SUMMARY

Chronic periodontitis is a complex disease which is chiefly caused by Dental plaque, which as a biofilm that harbors variety of periodontal pathogens. This is a commonest cause of tooth loss in adults due to damage of periodontal ligament and the alveolar bone. The development of periodontitis and its progression varies from person to person and depends on modifiable and non-modifiable risk factors. Modifiable risk factors are usually environmental or behavioral in nature whereas non-modifiable risk factors are usually intrinsic to the individual and therefore not easily changed. Non-modifiable risk factors are also known as determinants. Depression is the most commonly diagnosed disease in the practice of psychiatry which includes disruptive mood dys-regulation disorder, major depressive disorder and persistent depressive disorder, which may occur at any age. Dental consequences of depression are high and are usually associated with chronic facial pain bruxism. There are many studies which describe that a causal relationship exists between the periodontitis and the depression.

Stress and depression reduce the immune system function and facilitate chronic inflammation which are mediated through the hypothalamic-pituitary-adrenal axis and the production of cortisol. This leads to increased plaque loaded with various types of bacteria and reduced ability to prevent connective tissue invasion. Additionally, after periods of chronic elevation, cortisol loses its ability to inhibit inflammatory responses initiated by immune reactions, which leads to sustained inflammatory destruction within the periodontium. Recent studies have also confirmed positive correlations between stress, depression and periodontal disease by demonstrating convincing linkages between depression and tooth loss; stress and attachment loss; stress/depression and neglect of oral hygiene; and elevated cortisol levels and pocket depth/tooth loss. Frequently, consuming an unhealthy diet and neglecting their oral hygiene. This leads to increased oral biofilm burden and decreased resistance of the periodontium to inflammatory break down.

Origin of research problem: the focused question

Although the effects of depression on periodontal tissue are detrimental but it would be of interest if antidepressants improve the periodontal health of the patients with recovery of the psychotic illness. On the basis of positive benefits of these drugs on mood and behaviour of the patient we propose a null hypothesis that antidepressants contribute in improvement of periodontal health with the recovery of the disease.

Aim of the study
The aim of this study is to evaluate the effect of two commonly prescribed antidepressants (Fluoxetine and venlafaxine) on periodontal health in depressed patients using oral hygiene status, gingival inflammation, periodontal pocket depth and clinical attachment level as parameters of assessment.

**Study Design and Sample Selection**

This case control study was performed on patients who agreed to participate in the study. Only those patients were selected for study who had HAMD Score 14 to 18 and were diagnosed as cases of moderate depression. The patients selected for control group were examined for stage of clinical depression and periodontal status, who were not on antidepressants and appeared for the first time with their problem to OPD and diagnosed as depressed, were selected for control group. The patients were divided in three study groups viz. Control group, Study group I (depressed patients on fluoxetine) and Study group II (depressed patients on venlafaxine therapy).

**Results and discussion:**

In this study there was no significant difference in the age group between the control and study groups which was approximately 41-42 years. Similarly other demographic variables such as marital status, employment, education level, residential background, income group and means of oral hygiene did not differ significantly between the study groups.

Depression is a commonly diagnosed disorder in the psychiatric clinics and is considered as chronic illness, thus for long term sustained benefit maintenance doses of drugs are advised to prevent relapse and the long term benefit. Fluoxetine and venlafaxine are commonly prescribed antidepressants. These drugs possess immuno-modulatory properties, act directly on the peripheral cells and show strong anti-inflammatory effects, in addition to antidepressant effects. These anti-inflammatory effects have been seen and have been the part of animal studies, however, in a single human bases observational study cross sectional study it was found that fluoxetine was associated with lower BOP (Bleeding on Probing) and AL (attachment level) but could not conclude if fluoxetine was beneficial for inflammatory periodontal disease. However, in this study attempts have been done to explore the effects of fluoxetine and venlafaxine on human periodontal inflammation in depressed patients.

Fluoxetine, and venlafaxine are drug of choice in the treatment of depression due to their safer profile, fewer side effects. In addition they possess an anti-inflammatory response just like an standard anti-inflammatory drugs.
In this study comparative effects of fluoxetine and venlafaxine on periodontium have been assessed on the basis of clinical parameters like GI (Gingivitis index), DI (Debris Index), CI (Claculus index), PPD (Periodontal pocket depth) and CAL (clinical attachment level) in each study group.

Gingivitis index and bleeding on probing are two common parameters used to assess gingival inflammation. The presence of gingivitis reveals the presence of disease activity but the absence does reflect periodontal stability. But, bleeding on probing, doesn't always mean the same as gingivitis. In this study we restricted our observation to gingivitis by measuring gingival index only. So to maintain the uniformity in the study, gingival probing for BOP was eliminated from the examination and observation because the Gingivitis is considered as an inflammatory parameter that can be used to know the clinical state of inflammatory periodontium.

The gingival index (GI) in control group was found to be 1.68 ± 0.3513. However it was 1.85 ± 0.2740 in study group I and 1.87 ± 0.2169 in study group II. Thus the values of gingival index increased in both the groups and confirming that level of gingivitis had increased with the intake of drugs as well as passage of time. However, there was statistically significant difference (p = 0.0012) in gingivitis when Group I was compared to Control. Similarly Study Group II was compared to control, there was again statistically significant difference (p = 0.0001). These findings indicate that gingivitis index significantly increased on taking either of these medication.

But, when the two study groups, I and II were compared to each other for same effects, the gingival index was not significantly different (p = 0.6209). This means the effect of both the drugs is same on gingival index. Thus Venlafaxine and fluoxetine do not differ on their effect on gingival inflammation. So, additional oral hygiene measures may be needed in depressed patients on these medications as these drugs do not protect periodontium by their anti-inflammatory effects.

In our study Study groups I and II well exhibited the presence of gingivitis.

The Oral Hygiene Index -Simplified (OHI-S) in control group was found to be 3.85 ± 0.494975. However it was 3.77 ± 0.565681 in study group I and 3.81 ± 0.21213 in study group II. Thus the scores of OHI-S mathematically decreased in both the groups and indicating that scores of OHI-S decreases with the intake of antidepressant in either of the study groups. However, there was not statistically significant difference in OHI-S when Control was compared to Group I (p = 0.05382) , and the Control was compared
with study group II ($p = 0.5210$). Similarly Study Group I and II was compared to each other and the $p$ values were again statistically not significant difference ($p = 0.6060$). These findings indicate that OHI-S is not affected by taking either of these medication. The pocket depth in the both the study group was not affected. In control group the pocket depth was $3.53 \pm 0.841$. However, in study group I it was $3.39 \pm 0.992$. These changes were statistically not significant. When control group was compared to Study group I in term of pocket depth, it was statistically not significant ($p = 0.3329$). Similarly when Control group was compared to study group II, the $p$ value was found to be $0.7446$ (not significant). Thus in either situation the pocket depth is not significantly affected. In addition the comparative effects of both of these medicines were also statistically analyzed. The results indicated that fluoxetine and venlafaxine both were not significantly different in their action ($p = 0.5729$). Thus both of these drugs don’t alter the pocket depth in depressed patients due to their primary effect.

The Clinical attachment level in the both the study group was not affected. In control group the clinical attachment level was $4.07 \pm 1.026$. However, in study group I it was $4.04 \pm 0.8549$. Similarly, in study group II, the clinical attachment level $4.05 \pm 1.063$. These changes were statistically not significant. When control group was compared to Study group I in term of CAL, $p$ value was found to be $0.8549$ (statistically not significant). Similarly when Control group was compared to study group II, the $p$ value was found to be $0.9068$ (statistically not significant). Thus in either situation the CAL is in significantly affected. In addition the comparative effects of both of these medicines were also statistically analyzed. The results indicated that fluoxetine and venlafaxine both were not significantly different in their action ($p = 0.9523$). Thus both of these drugs don’t alter the clinical attachment in depressed patients.

A partial correlation study was also performed to analyze the correlation between attachment level and duration of drug therapy which did not reveal any positive correlation. There was no observable effect of down regulation on destructive process on periodontium. Further, sub grouping of attachment level and the duration of therapy did not reveal statistically significant difference. The attachment level in all the patients was very large and statistically not significant. Thus on the basis on our short term study and small sample size it is fluoxetine and venlafaxine therapy did not produce any significant reduction of attachment level.
This case control clinical study reveals among the clinical periodontal parameters OHI-S, GI, PPD and CAL, only gingival index was statistically significantly increased and remaining three viz. PPD, CAL and OHI-S were statistically not significantly changed in patients receiving fluoxetine (Group I) compared and venlafaxine (Group II) when compared with Control - Table 2, 3, 4 and 5. This indicates that the depressed patients taking fluoxetine or venlafaxine are not protected against the periodontal inflammation.

CONCLUSION

We could not prove that the patients taking antidepressants like venlafaxine or fluoxetine protect the periodontium due to their anti-inflammatory properties, but these drugs may be considered as a risk factor of periodontal disease. Although it is not necessary for the treating dentist to diagnose a depressive condition, but familiarity with the patient’s medical history, current prescriptions, and general indicators of depression could alert the dentist to possible problems and possibly facilitate an appropriate referral for evaluation of the depressive symptoms.