

Correlation between depression and periodontal health: A clinical study done among outpatients at Seema Dental College and Hospital, Rishikesh

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Abstract

Background: Chronic periodontitis is a multifactorial disease which is influenced by a variety of risk factors including psychosocial factors such as depression and stress that are known to affect the immune system thereby affecting the periodontal tissue.

Aim: The aim of this study was to evaluate the association between periodontal parameters and depression.

Materials and Methods: 35 patients with periodontitis as test group and 35 periodontally healthy patients as control group were included. Oral hygiene index and Community periodontal index of treatment needs was measured for all cases. Depression levels were assessed by Beck's depression inventory.

Results: All the parameters were statistically significant in test group as compared to control group. Beck's depression inventory showed that periodontal patients had a significantly higher total depression score than control group.

Conclusion: This study reveals that there is a positive correlation between the severity of periodontal disease and the severity of depression in patients.

Keywords: Chronic periodontitis, Depression, stress, Becks depression inventory.

Introduction

Chronic periodontitis considered as a multifactorial disease. A number of etiological factors play an important role in initiation of the disease process among which dental biofilm is considered as the main etiological factor. Various factors such as smoking, systemic diseases, poor oral hygiene, impaired nutrition, immunocompromised status, hormonal variation are considered as risk factors for periodontitis; as they may modify host response, disease progression, severity and outcome.¹ Psychosocial factors like stress, anxiety and depression are emerging as risk element in various systemic diseases including chronic periodontitis.

Depression involves disturbances in emotional, cognitive, behavioural and somatic regulation and is characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration (APA, 1994). Depression and stress have been known to cause various neuroendocrine and biochemical changes that may affect host immune response. Variety of conditions such as diabetes, hypertension, stroke, renal disorder are associated with stress and depression. They are important factors which governs the host defences through the hypothalamic-pituitary adrenal axis and could have an influence over the pathogenesis of periodontitis.² Depression is associated with conditions such as diabetes mellitus, stroke, hypertension, sleep disorders and renal disease.³ Moreover the patients suffering from depression tend to neglect their oral hygiene measures as well as their regular dental check ups due to lack of motivation. Depression is additionally associated with unhealthy habits such as smoking and alcohol dependence two factors that are also known to increase one's risk for chronic periodontitis.

Though various studies have been carried out to evaluate the relationship between stressful lifestyle, anxiety, depression and a individual's systemic health, very little literature is available on effect of depression on oral and periodontal health of individual. The aim of this study was to evaluate the association between periodontal parameters and depression.

Materials and Methods

A total of 70 subjects between 25 and 55 years of age were selected from patients visiting the Department of Periodontics of Seema Dental College, Rishikesh. These patients were assessed clinically and a detailed questionnaire was filled out based on Becks depression inventory. All protocols were cleared by the Institutional Ethics Committee of the institute and informed consent was obtained from the participants. A detailed case history, clinical examination, periodontal indices (OHI index) were recorded. The study comprised of two groups: Group I, a control group of 35 periodontally healthy subjects, and group II, a test group of 35 patients with chronic periodontitis. Patients were considered healthy if they exhibited a probing depth <3 mm and there was no clinical attachment loss (CAL). Patients were diagnosed with chronic periodontitis if they exhibited a probing pocket depth ≥ 5 mm and CAL ≥ 5 mm at multiple sites. All subjects were generally in good health and none had received periodontal treatment or medication during the past 6 months. No participants had a history of systemic conditions such as heart disease, diabetes, or other disorders that could influence the course of periodontal disease. Patients were not on any medication that could affect the manifestations of periodontal disease such as antibiotics, or their use in the 6 months prior, phenytoin, cyclosporine, anti-inflammatory

drugs, or calcium channel blockers. Postmenopausal women and smokers were excluded from the study. The clinical evaluation of patients was based on the Oral hygiene index (OHI) and CPITN index and the periodontal parameters that were recorded included probing pocket depth (PD) and clinical attachment loss (CAL). All parameters were measured using a Williams probe calibrated in mm except the CPITN index was evaluated using CPITN probe.

Assessment of depression was done with the help of Becks depression inventory which included a series of statements related to mood, pessimism, sense of failure, guilty feeling, self hate, sense of punishment, weight loss, loss of appetite etc. The scoring was done from 0 to 3 and final score was calculated by adding the individual score. Participant scoring above 17 was categorised as patient with depression symptoms.

Statistical analysis

Statistical analysis was done by means of SPSS software (SPSS Inc., Chicago, IL, USA; version 17.0 under windows 2000) and Student's *t*-test was used to determine the relationship between the clinical periodontal parameters and depression.

Results

The periodontal variables were correlated with levels of depression based on Beck's depression inventory, the following results were obtained.

Mean CAL was 0.00 ± 0.00 for control group compared to 2.93 ± 0.45 for cases, which was statistically significant at $P < 0.001$ and mean PD was 1.79 ± 0.21 for control group compared to 3.36 ± 0.38 for cases, which were statistically significant at $P < 0.001$. The mean depression value 13.17 ± 5.15 for the controls compared to 19.86 ± 6.40 for cases, which was statistically significant at $P < 0.001$ (Table 1 and Table 2).

Table 1: Description of study participants

Group		Gender			Age (Years)			
		Male	Female	Total	Mean	SD	Minimum	Maximum
Cases	n	22	13	35	40.94	8.52	25	55
	%	62.86	37.14	100.00				
Controls	n	17	18	35	33.40	8.11	24	52
	%	48.57	51.43	100.00				
Total	n	39	31	70	37.17	9.09	24	55
	%	55.71	44.29	100.00				

Table 2

Variables	Cases		Controls		Independent t test	p - Value
	Mean	SD	Mean	SD		
OHI(S)	4.28	0.68	1.94	0.59	15.348	< 0.001*
PD	3.36	0.38	1.79	0.21	21.096	< 0.001*
Attachment Loss	2.93	0.45	0.00	0.00	38.800	< 0.001*
CPITN	3.44	0.36	1.28	0.37	24.739	< 0.001*
Depression Scale	19.86	6.40	13.17	5.15	4.812	< 0.001*

*Very Highly Significant, OHI(S) — Oral Hygiene Index Simplified, PD — Probing Depth, CPITN — Community Periodontal Index of Treatment Needs, SD — Standard Deviation

Discussion

Periodontitis is a disease which is characterized by destruction of connective tissue along with the supporting bone due to inflammatory response secondary to infection caused by periodontal bacteria. Various behavioral and environmental risk factors are associated with periodontal disease which seem to affect the onset and severity of periodontal disease. Psychosocial factors such as stress, depression and anxiety negatively affect periodontal health. However, very less literature is available on strong association of depression with periodontal status. Hence in the present study we analyzed the association of depression with periodontal status of individuals.

Various screening tools are available to identify depression symptom and diagnose patient with depression. We used Becks depression inventory in our study which is a simple, reliable and inexpensive tool. Studies have demonstrated the reliability of utilizing self-reporting depression/depressive symptoms for research purpose, hence the Beck's depression inventory, which is one of the most prevalent depression/depressive symptoms screening measures was used in the present study.⁴

The results of our study were in agreement with various previous studies. Moss *et al* found out that the depression was associated with increased severity of periodontitis.⁵ Croucher *et al*. And Axtelius *et al*. found psychological stress factors to be an important determinant for periodontitis.^{6,7} Refulio *et al*. showed a strong relationship between emotional depression.⁸ The association between depressive symptoms and periodontitis observed in this study corroborates with previous findings.^{9,10} Two possible mechanism for this association were proposed. One mechanism was behavioural. The patient suffering from periodontitis tend to neglect the oral hygiene which in turn leads to increased biofilm load, inflammation, attachment loss and development of periodontitis.^{11,12}

Other mechanism is related to psychoneuroimmunologic changes. Psychological stressors activate the peripheral and central system that maintain homeostasis.

Moreover, stressors cause the alteration of the hypothalamic–pituitary–adrenal axis (HPA) which has a pro-inflammatory or anti-inflammatory effect on tissues. There is increased secretion of adrenocorticotropic hormone and cortisol which, in turn, negatively affects the immune system and initiation of periodontal disease.

In our study, we got a positive correlation between depression and periodontitis. The cases with higher depression score showed significantly higher PD, CAL, OHI and CPITN index scoring as compared to controls and patients showing lower depression score. Similar results were reported by Sundararajan S. *et al.* who reported direct co relation between severity of periodontitis and severity of depression in patients.¹³

Other possible factors such as lifestyle, education, nutritional status as well as coping ability of the patient were not taken into consideration which can be considered as limitation of the study. More longitudinal studies with greater sample size are required to establish a role of depression in severity of periodontitis.

Conclusion

There is a positive co relation between the depression and severity of periodontitis. However more longitudinal studied are needed for establishing a strong co relation. The beck's depression inventory scale is a reliable tool which can be used for assessment of depression in individuals.

Source of Funding

None.

Conflict of Interest

None.

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