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RESEARCH ARTICLE

MENTAL DEPRESSION AS A RISK FACTOR FOR PERIODONTAL DISEASE

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Abstract

Periodontitis is a chronic, multifactorial, polymicrobial disease causing inflammation in the supporting structures of the teeth. There is a plethora of non oral risk factors which have been reported to aid in the development of chronic periodontitis. Psychological stress and depression have been documented to have a negative impact on the periodontal health. Depression is associated with negligent oral health care leading to poor periodontal health.

Objective: The aim of this study was to assess the association between periodontal clinical parameters and depression.

Methodology: The study design was a case-control study with 25 patients each in the Case and Control group. Case group consisted of patients diagnosed with depression by a specialist in the medical OPD. Control group consisted of the patients living in the same environment with similar background characteristics. All the cases and controls were assessed for the severity of depression by Hamilton Depression rating scale and Beck Depression Inventory. Periodontal parameters were assessed by using Oral Hygiene index; Debris Index (DI) and Calculus Index (CI), Gingival Index, Probing Pocket Depth (PPD) and Clinical attachment loss (CAL).

Results: In this study significant relationship is seen between subjects with depression and periodontal clinical parameters (DI, CI, GI, and PPD, CAL) as compared to the healthy subjects. Also it is seen that as the severity of depression increases, the periodontal condition deteriorates as reported by increased values of all the clinical parameters used in the study although, the relationship is not significant.

Conclusion: After evaluating depression and periodontal clinical parameters we came to a conclusion that both diseases are related to each other and that stress or depression highly affects the periodontal health and therefore can be considered as a risk factor to periodontitis.

Introduction:-

Chronic periodontitis is a multifactorial disease caused primarily by complex interactions between the pathogenic bacteria and the host's inflammatory-immune response.[1] Other causes include poor oral hygiene, smoking, systemic diseases such as diabetes mellitus, cardiovascular diseases, and psychological factors such as stress and depression.[1,2,3] Depression and other emotional disorders demonstrated a biological plausibility for an association between both. The immune response of an individual varies from one person to another and it has been reported

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that it reacts differently to depression and stress. Both of these, can act as a modifiable risk factors that make an individual more prone to develop an insalubrious condition and may also cause an impact on periodontal health.[4] Depression is defined as pervasive, protracted periods of despondency (low spirit), feeling of meaninglessness, and a sense of hopelessness. It is among the leading causes of ill health, loss of productivity and disability worldwide.[5]

Psychosomatic conditions have a negative impact on the immune system and lack of mental well-being and depression can have a negative impact on life style, which will hamper the oral hygiene habits of an individual.[6] There are many links described in the literature between depression and infectious diseases which support the possibility that these conditions may be associated with periodontal disease too.[7,8] In depression glucocorticoids released into the cortex of suprarenal can induce reduction of pro-inflammatory cytokines secretion (interleukins, prostaglandins, and tumor necrosis factor) while on the other hand, catecholamine's (epinephrine and nor epinephrine) stimulate the formation and activity of prostaglandins and photolytic enzymes which can indirectly provoke tissue destruction.[9] An understanding of this relationship is required for further planning in the aversion and treatment of periodontal disease.

Aim of the Study:-

The aim of this study was to assess the association between Periodontal clinical parameters and depression.

Material and Methods:-

The study design was a case-control study with total 50 (Male and Females) patients in case and control group. Case group consisted of 25 patients diagnosed with depression in the medical psychiatry OPD by a specialist while the control group consisted of 25 patient's living in the same environment but mentally healthy. The study protocol was approved by Institutional Ethical Committee at Kalka Dental College and Hospital, Meerut and informed consent was obtained from the participants. Medical and dental histories were obtained from all the patients included in the study. Patients included should have age between 20 and 55 years and should be diagnosed by depression by a specialist. Smokers, patients having any hematological, allergic disorder, Pregnant and lactating mother were excluded from the study.

Assessment of the periodontal condition of the patient was done using different clinical parameters including Oral hygiene Debris index (DI) & Calculus index[10] (Green and Vermilion, 1960); Gingival Index[11] (Loe and Silnes,1964) ;Probing Pocket Depth[12] in mm, Clinical Attachment Loss[13] in mm.

Assessment of depression was done using two scales: Beck's Depression Inventory[15] (TABLE 1) and Hamilton Depression Scale[14] (TABLE 2).

The HAM-D scale, which was used in the study, is a multidimensional scale which is considered to be a gold standard for evaluating the severity of depression. It consists of 17 questions, easy to use and reliable. Beck Depression Inventory is one of the most popular self-rated scales consisting of 21 statements including symptoms and attitude. Each of the 21 statements is scored from 0 to 3. The statements are related to sadness, pessimism, and sensation of failure, lack of satisfaction, suicidal ideation, irritability and social retraction among others. Beck's depression inventory was scored by adding the greatest value of each statement. In the present study cut-off score of 18 or greater identified the patient with depression symptoms as both the scales used in the study have variable scoring system. Only questionnaires were used in the study for assessing depression as no evidence for biological markers are available for confirmed diagnosis of depression.

Statistical Analysis

For comparison of different periodontal indices Mann-Whitney U[16] test and Kruskal –Wallis[17] test were employed. Depression was assessed based on the responses for the questionnaire.

Results:-

This is a case control study conducted on 50 subjects diagnosed with depression. Evaluation of depression was done through a questtainere based scales (Beck and Hamilton) whereas clinical parameters were assessed by two periodontist blinded for the study. In all the subjects with depression greater and significant values(p value<0.05) of

periodontal clinical parameters (DI, CI, GI,PPD,CAL) have been seen as compared to the subjects not suffering from depression and clinically healthy as shown in Table 3.TABLE 4 shows the relationship between different grades of depression (mild, moderate and severe) and periodontal clinical parameters(DI,CI,GI,PPD,CAL).It can be noted that with increased grade of depression, the values for clinical parameters also increases but is only significant for calculus index as for all other parameters (DI,GI,PPD,CAL) the p value shows non -significant relationship.

Discussion:-

Periodontitis is one of the most ubiquitous disease which is associated with inflammatory host response secondary to microbial infection[1, 2]. The role of modifiable and non -modifiable risk factors in periodontitis has been reviewed by many authors[16,27,18,19,20].The contribution of psychological factors(stress, depression ,anxiety) to the development and progression of periodontal disease has been studied since a very long time but the evidence is scar regarding the same[21.]

In our study different periodontal clinical parameters has been evaluated and their relationship with severity of depression has been studied. As most of the studies done in the past have not reported any strong relationship between depression and periodontitis disease, which might be due to the unawareness and lack of knowledge about the depressive scales it was difficult for the dentist to understand how to formulate the same[22, 23.] As mentioned in the literature systemic health could be an reflection of your oral health, therefore an interdisciplinary approach which will include a medical specialist (PSYCHAITRIST/PSYCHOLOGIST) in order to integrate the knowledge, skills and experiences, will be an efficient and more reliable way to make these form of studies possible[24].Therefore in our study the clinical parameters were evaluated by the periodontist whereas the depression was assessed by a specialist.

In our study, the mean values of periodontal clinical parameters in patients diagnosed with depression are DI=1.49±0.7; CI=1.25±0.74 GI=1.29±0.7, PPD=22.97±0.92 CAL=3.42±1.15 whereas for healthy patients it was DI=0.68±0.69;CI=0.47±0.59;GI=0.46±0.50;PPD=2.01±0.80;CAL=2.15±1.01.With all the above findings it can be noted that more debris &calculus scores, increased gingival inflammation, more pocket depth along with clinical attachment loss was seen in depressive patients as compared to the healthy subjects, which might be mainly due to the poor oral hygiene in people with depression and anxiety as reported by **Genco et al[19].**

In our study as the severity of depression increases, the values of periodontal clinical parameters also increases, this might be due to the etiological factors (local factors) which triggers the immune system and leads to the tissue destruction[25, **26**]**.** Also periodontal disease, results from interaction between the immune system and oral bacteria that may promote oxidative stress and initiate an inflammatory cascade inducing the destruction of the oral structure as suggested by **Suchday et al[27], 2006**. **Breivik et al[28] in 1996** reported a delicate, yet complicated relationship, exists between the immune system, endocrine system, nervous system, and mental health.

Psychosomatic conditions have a negative impact on the immune system. In 1996 **Monteiro et al[29]suggested** an association between psychosocial factors such as depression, stress and anxiety, and adult onset rapidly progressive periodontitis (RPP).They conducted a study which concluded that RPP group presented significantly increased depression and loneliness compared to the control groups.

Belting and Gupta[30] in 1961 reported a deteriorated periodontal status in psychiatric patients when compared with controls, the results of which are similar to the above study.

According to an in vitro study, investigating the effect of catecholamine's on subgingival plaque microorganisms, **Roberts et al[31] and Moss et al[32]** concluded that various organisms of microbial complexes have different developmental responses to noradrenalin, among which Actinomyces naeslundii, Eiknella, and Campylobacter have 49.4, 43.3, and 79.9% growth increase, respectively.

In our study results all the findings shows a significant relationship between depression and periodontal condition, although literature is scar.

Conclusion:-

Patients with depression may experience difficulties in initiating dental checkups and in its maintenance. A more active approach from dentists may be needed, the patients should be informed that maintenance of oral hygiene plays an important role in the well being of an individual and, and thus should be motivated to keep regular routines for oral hygiene maintenance.

Table 1:- Becks Depression Inventory.

S.NO	SCORING	DIAGNOSIS
1.	1-10	These ups and downs are considered normal
2.	11-16	Mild mood disturbance
3.	17-20	Borderline clinical depression
4.	21-30	Moderate depression
5.	31-40	Severe depression
6.	Over 40	Extreme depression

Table 2:- Hamilton Depression Scale.

Subjects	DI	CI	GI	PPD	CAL
SUBJECTS WITH DEPRESSION	1.49±0.70	1.25±0.74	1.29±0.72	2.97±0.92	3.42±1.15
HEALTHY SUBJECTS	0.68±0.69	0.47±0.59	0.46±0.50	2.01±0.80	2.15±1.01
MANN-WHITNEY	Z=6.705	Z=6.764	Z=7.403	Z=6.549	Z=7.261
U-TEST	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001

Table 3:- Periodontal Clinical Parameters in Subjects With Depresion And Healthy Subjects.

S.NO	SCORING	DIAGNOSIS
1.	0-7	Normal depression
2	8-13	Mild depression
3	14-18	Moderate depression
4	19-22	Severe depression
5	>23	Very severe depression

DI: Debris index, CI: Calculus index, GI: Gingival index, PPD: Periodontal pocket depth, CAL: Clinical attachment loss, P<0.05 significant.

Table 4:- Relationship between Severity of Depression And Clinical Parameters.

PARAMETER	**MILD DEPRESSION(n=5)**	**MODERATE DEPRESSION(n=9)**	**SEVERE DEPRESSION (n=11)**	**KRUSKAL-WALLIS TEST**	**P value**
DI	0.71±0.26	1.32±0.75	1.55±0.68	5.69	0.128
CI	0.58±0.08	0.97±0.81	1.30±0.68	7.87	0.049
GI	0.34±0.05	1.16±0.89	1.34±0.68	6.55	0.087
PPD	2.40±0.84	2.84±1.17	2.96±0.82	4.15	0.244
CAL	2.59±0.71	3.40±1.40B	3.38±1.03	3.073	0.38

DI: Debris index, CI: Calculus index, GI:Gingival index, PPD: Periodontal pocket depth, CAL :Clinical attachment loss P<0.05 significant.

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