



ASSESSMENT OF THE RELATIONSHIP BETWEEN ANXIETY, DEPRESSION WITH THE PERIODONTAL STATUS IN PREGNANT INDIAN WOMEN - A CROSS SECTIONAL STUDY

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Cite This Article: Niha Naveed & Dr. Asha Ramesh, "Assessment of the Relationship between Anxiety, Depression with the Periodontal Status in Pregnant Indian Women - A Cross Sectional Study", International Journal of Multidisciplinary Research and Modern Education, Volume 3, Issue 1, Page Number 405-409, 2017.

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Abstract:

Background: Pregnancy results in hormonal fluctuations in the body with a dramatic increase in oestrogen and progesterone levels. These hormones have a bearing on the periodontium due to the presence of its receptors. Adverse pregnancy outcomes such as low birth weight babies, prematurity and pre-eclampsia have been established in periodontitis patients. The development of periodontal disease in pregnant women can be influenced by various factors such as sociodemographic background, altered immune response etc. There is a lacunae in the data with respect to the influence of stress and anxiety on the periodontium during pregnancy. Identification of these risk factors for periodontitis during pregnancy can help guide early treatment and prevention of adverse pregnancy.

Aim: The aim of this study is to assess the relationship between anxiety and depression with the periodontal status in pregnant women.

Materials and Methods: The Study population consisted of 67 pregnant women. The assessment of patient's periodontal status was done by Plaque index (Silness and Loe), Gingival index (Loe and Silness), Probing pocket depth (mm) and Clinical attachment loss (mm). Assessment of depression was done by Patient Health Questionnaire (PHQ-9) which were distributed these women. Assessment of anxiety was done by Beck Anxiety Inventory (BAI). The data obtained was statistically analysed by Pearson correlation to determine the correlation between stress and periodontal parameters in pregnant women.

Results: There was a statistically positive correlation between the depression and anxiety scores with the periodontal parameters. The results showed high statistical significance. (p value = 0.000)

Conclusion: This study marks the first step in associating the cumulative effects of depression and anxiety on the periodontal parameters in pregnant Indian women. It paves the way for a holistic treatment approach in pregnancy where the periodontal parameters have to be monitored along with the psychological status of the patient for a healthy mother and child.

Key Words: Pregnancy, Psychological Stress, Hormones, Anxiety, Depression & Periodontal Status

Introduction:

Periodontal disease is one of the most common chronic disorders of infectious origin known in humans. It may be present as gingivitis or periodontitis. Gingivitis is the inflammatory condition of the soft tissues surrounding the teeth while periodontitis is the destruction of the supporting structures of the teeth, that is, the periodontal ligament, bone, cementum and soft tissues. [1] Periodontal infection is known to be highly prevalent during pregnancy. [2] Studies have shown that there is a relationship between pregnancy and the periodontal status with the frequency of periodontitis among pregnant women, ranging from 35% to 100%. [2, 3, 4, 5, 6, 7 & 8]. Periodontal infections during pregnancy not only affect the mother, but may also cause harm to the foetus if left untreated. There are many studies correlating the effect of periodontal disease on adverse pregnancy outcomes like prematurity, low-birth weight infants and preeclampsia. [9, 10, 11 & 12] Some intervention studies supported that mechanical periodontal treatments such as scaling and root planing during the second trimester of pregnancy may reduce the risk of these adverse outcomes. [13 & 14] Negative life events manifested as psychological stress and depression are common in one's day-to-day life, thus emphasizing the relationship between the person and environment. [15] Stress is a state of physiological or psychological strain caused by adverse stimuli, physical, mental, or emotional, internal or external, that tend to disturb the functioning of an organism and which the organism naturally desires to avoid. Stress has a direct effect on the hypothalamus-pituitary-adrenal cortex axis. [16] [17] It is hypothesized that prolonged activation of this axis can be detrimental to health and may provide a link between mental stress and physical illness. [18] [19] [20] Periodontal tissue changes may be the result of an altered immune response, or it may be triggered by the stress and anxiety during pregnancy, which may lead to a neglect of oral hygiene and contribute to the deterioration of the periodontal condition. The identification of risk factors for periodontitis during pregnancy can help guide

and establish early treatment, which can lead to the avoidance of the possible adverse effects of this disease on pregnancy.

Materials and Methods:

The present study was a cross-sectional study conducted in Chennai, Tamil Nadu, India. The study population included sixty seven pregnant women. The subjects were recruited according to the inclusion criteria which were pregnant women in the age range of 20-35 years, those from all 3 trimesters of pregnancy and the presence of minimum of 20 teeth in the dentition excluding the third molars. Patients with systemic diseases, with smoking/ alcohol habits, patients on any antibiotic, steroidal, chemotherapeutic or antipsychotic drug therapy, history of professional oral prophylaxis within the last 6 months and use of chemical methods of plaque control were excluded from the study. The nature of the study was explained to all the participants and consent was obtained prior to the commencement of the study. A detailed Institutional Ethical Committee Approval was taken before the start of the study. Information on the socio-demographic characteristics and trimester of pregnancy were obtained. All participants were asked to answer two questionnaires to assess the depression and anxiety levels. Assessment of depression was done by Patient Health Questionnaire (PHQ-9) and assessment of anxiety by Beck Anxiety Inventory (BAI). Reliability and validity of these scales have already been established. PHQ-9 scores of 5, 10, 15, and 20 represents mild, moderate, moderately severe and severe depression. BAI scores of 0 – 21 indicates low anxiety, score of 22 – 35 indicates moderate anxiety and score of 36 and above indicate potentially concerning levels of anxiety. After the questionnaires were received, the participants underwent a thorough examination of their periodontal status. Oral examinations were performed in a well-lit room by a calibrated dentist with participants seated on a chair using a mouth mirror and William’s periodontal probe. The periodontal status of the study population were measured by clinical parameters like plaque index (Silness and Loe), gingival index (Loe and Silness), probing pocket depth (mm) and clinical attachment loss (mm). Data were entered and analyzed using the SPSS software version 20.0. Data were subjected to Pearson correlation to determine the correlation between depression and anxiety scores with the periodontal parameters.

Results:

A total of 67 pregnant women according to the inclusion criteria were recruited for the study. The ages ranged between 20 and 35 years with a mean of 26.31. 17% (11) of the subjects were in the first trimester of pregnancy, 48% (33) were in the second trimester and 35% (24) were in the third trimester of pregnancy. Table 1 shows the descriptive statistics of the periodontal parameters (plaque index, gingival index, probing depth and clinical attachment loss) and the depression and anxiety scores. Statistical analysis between the clinical parameters and the depression and anxiety scores was done to check for concordance. If p-value < 0.05, then the results obtained are statistically significant. Pearson correlation demonstrated that the depression and anxiety scores had a statistically positive correlation with all the periodontal parameters. Table 2 shows the highly significant positive correlation between the periodontal parameters and the depression and anxiety scores.

Table 1

Descriptive Statistics		
	Mean	Std. Deviation
PI	.7888	.41486
GI	.8201	.47445
PD	3.4788	.73025
CAL	3.7870	.83736
Depression Score	6.4776	4.42568
Anxiety Score	13.5821	6.43652

Table 2

	PI	GI	PD	CAL	P Value
Depression	0.487	0.506	0.510	0.527	0.000
Anxiety	0.445	0.401	0.422	0.447	0.000

Discussion:

The connection between the body and mind has been a topic of much controversy. For many years studies have been performed to show the relationship between psychosocial factors and periodontal status. This study is one of them in order to show an association between depression and periodontitis in pregnant women. According to studies, pregnant women are more likely to undergo stress and depression and hence they were recruited in this study. Oral health is increasingly recognized as an important public health concern among pregnant women. Maternal periodontal disease has been associated with adverse pregnancy and neonatal outcomes such as preterm birth and low birth weight, intrauterine growth restriction or small-for-gestational age, preeclampsia, and miscarriage or pregnancy loss [21] [22]. In addition, high bacterial titers in maternal saliva may lead to direct vertical transmission of cariogenic bacteria from mother to the child, thus elevating the risk

for early childhood caries [23]. Despite the higher risk for oral disease in pregnancy, pregnant women use dental services less frequently than the general population. Studies of oral healthcare utilization have shown that less than one half of women visit the dentist during pregnancy as compared with during non-pregnancy [24]. Thus pregnancy and periodontitis have been established to be correlated to each other. Considering the pathophysiology of stress, the release of stress hormones is said to influence the host defenses, exerting an immunosuppressive effect, increasing one's vulnerability to disease.[25] [26] Cytokines and other humoral mediators of inflammation are potent activators of the central stress response, and the glucocorticoids released via this mechanism might regulate the recruitment of immune cells into inflamed tissues, in order to cope with the psychological stress and depression.[27] When the inflammatory action is sufficiently long and profound, the systemic manifestations of the disease may become evident, as could happen with periodontitis. In this study we used the PHQ-9 to assess the patients' depression status which is a multipurpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. The PHQ-9 incorporates DSM-IV depression diagnostic criteria with other leading major depressive symptoms into a brief self-report tool. The diagnostic validity of the PHQ-9 was established in studies involving 8 primary care and 7 obstetrical clinics.[28] PHQ scores ≥ 10 had a sensitivity of 88% and a specificity of 88% for major depression.[28] These psychometric properties make it a very reliable tool as a measure for depression status. The Beck Anxiety Inventory (BAI) is a self-report measure of anxiety consisting of 21 questions. Internal consistency for the BAI = (Cronbach's $\alpha=0.92$) Test-retest reliability (1 week) for the BAI = 0.75 (Beck, Epstein, Brown, & Steer, 1988). The BAI was moderately correlated with the revised Hamilton Anxiety Rating Scale (.51), and mildly correlated with the Hamilton Depression Rating Scale (.25) (Beck et al., 1988) hence proving its validity. [29] Our study showed that the depression and anxiety scores of the pregnant women had a positive correlation with the plaque index, gingival index, probing depth and clinical attachment loss. The results of this study are in concordance with previous studies conducted in Korea and Nigeria[30][31]. This is one of the few studies to evaluate the important role of psychological stress and hyperactivation of the hypothalamus-pituitary-adrenal axis on periodontal problems, and is the first of its kind in associating the cumulative effects of depression and anxiety on the periodontal parameters in pregnant Indian women. Therefore, patients who are under stress should be provided more periodontal care to avoid initiation of periodontal disease or to avoid a more severe form of periodontal disease if the disease already exists, along with the treatment to reduce the stress. However, Monteiro da Silva, in 1998, found no correlation between psychosocial stress and periodontal disease. [32] Pregnancy causes hormonal changes that increase the risk for developing oral health problems like gingivitis and periodontitis. During pregnancy, progesterone levels are elevated. As a result of varying hormone levels, 40% of women will develop pregnancy gingivitis. [33] This is because progesterone stimulates the production of prostaglandins, which causes vasodilation of the gingival blood vessels. The increased level of progesterone in pregnancy may make it easier for certain gingivitis-causing bacteria such as specific species of Streptococcus, Fusobacterium, Actinomyces, Veillonella, and Treponema to grow, as well as make it more sensitive to plaque and exaggerate the body's response to the toxins that result from plaque. [34] Also, few studies documented that about 30% of pregnant women suffered from periodontitis. [31] [33] A couple of studies have shown that there is a link between periodontal disease and premature birth. [5] [9] [10] [11] [12] [35] According to one study, pregnant women with chronic gingival disease were four to seven times more likely to deliver premature babies (before 37th week of gestation) and underweight babies compared to mothers with healthy gingiva. Mothers with the most severe periodontal disease delivered the most prematurely, that is, at 32 weeks. [11] However, to confirm this hypothesis, longitudinal studies are necessary in order to evaluate the role of social stress-coping strategies, together with psychosocial or physiological stress, and progression of periodontitis in pregnant women.

Conclusion:

Periodontal tissue changes may be triggered by stress and anxiety during pregnancy, which may lead to a neglect of oral hygiene and contribute to the deterioration of the periodontal status. Lack of regular dental visits during pregnancy may be attributed to lack of oral health care awareness and counselling in the antenatal health care centres. Oral health education should be included as a crucial and an integral part of antenatal care. The main goal is to create awareness among the expectant mothers about the importance of prevention of dental disease and the impact it has on the foetus. The increased awareness would also improve the mothers' dental care-seeking behaviour, to guide and establish early treatment, which can lead to the avoidance of the possible adverse effects of periodontitis on pregnancy.

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