## RESEARCH ARTICLE

# PREVALENCE OF PERIODONTITIS IN PREGNANT PATIENTS ATTENDING GYNAECOLOGY DEPARTMENT OF GOVERNMENT HOSPITAL, AHMEDABAD

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**ABSTRACT**

**Background:** During pregnancy, progesterone & estrogen level increases, resulting in increased vascular permeability, gingival oedema, crevicular fluid level, prostaglandin production which may lead to gingival inflammation & render gingival tissues less resistant to inflammatory changes caused by bacteria. **Objective:** To evaluate prevalence of periodontitis in pregnant women. **Method:** The study included 924 women with low risk pregnancy of <32 weeks of gestation. Medical history was recorded which included the following parameters: Age, gestational age, smoking, alcohol consumption, systemic disease, Body mass index, halitosis & oral hygiene. On oral examination, Russell's & Oral Hygiene Index-Simplified were recorded. The data was collected and statistically evaluated. **Results:** The prevalence of periodontitis was 43% and was associated with higher gestational age, increased maternal age, poor oral hygiene which was measured by OHI-S by Greene and Vermilion. **Conclusion:** The prevalence of Periodontitis is high in pregnant women and is associated with increased gingival bleeding on probing, advanced gestational age and obesity. A program of oral health care should be included in prenatal care for early pregnancy. Oral health during pregnancy is important to minimize possible undesirable perinatal results and to improve the quality of life and well-being of the expectant mother and her baby.

## INTRODUCTION

During the past few years, the interest in the oral health of pregnant women has increased, due to the fact that they do not access oral health care, despite evidence that poor oral health can have adverse effect on the health of mother as well as child. Maternal periodontal infection during pregnancy can lead to obstetric complications like preeclampsia and premature birth.[1]Periodontal disease is a common oral infection with prevalence ranging from 10-60%. One in four adults in the world suffers from periodontal disease and pregnancy is associated with increased susceptibility (Xiong *et al.*, 2006; Vogt *et al.*, 2012; Baelum, 2002; Baelum *et al.*, 1996; Lachat *et al.*, 2011). Pregnant women have a higher incidence of periodontitis and gingivitis compared with their non-pregnant counterparts and the prevalence rates vary between 36% and 100% (Miyazaki *et al.*, 1991; Russell *et al.*, 2008).

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During pregnancy, progesterone level increases by 10-fold and estrogen levels by 30-fold compared to those observed on menstrual cycle due to their continuous production. Physiological changes in metabolism include chage in oral microbial species, immune response and cell metabolism. The increase in progesterone results in greater vascular permeability, gingival edema, increased crevicular fluid levels and prostaglandin production, which may lead to gingival inflammation (Amar, 1994). In addition, it may affect the development of local inflammation, reducing regulation of interleukin-6 production and rendering gingival tissues less resistant to inflammatory challenges caused by bacteria (Lapp, 1995). Studies have shown that pregnancy does not cause PD but may exacerbate preexisting unfavourable periodontal conditions (Gomes-Filho *et al.*, 2006; Vettore *et al.*, 2008). Inspite of some studies showing no association between PD and adverse perinatal outcome, a growing number of studies indicate that the consequences of PD activity during pregnancy may affect delivery outcomes, contributing towards prematurity, neonates with low birth weight, small for gestational age and fetal growth restriction (Offenbacher *et al.*,

1996; Lopez *et al.*, 2002; Boggess *et al.*, 2006). Therefore, the objective of the study was to evaluate the periodontal status of a sample of low-risk pregnant women, assessing the full-mouth prevalence, extent and severity of periodontitis, besides the other clinical parameters and to investigate its possible association with some socio-demographic factors, habits and oral hygiene.

## MATERIALS AND METHODS

**Study design:** Study included 924 women, aged 19 to 35 with low risk pregnancy of <32 weeks of gestation attending the Gynaecology department of Civil Hospital Ahmedabad. Each women underwent a single periodontal examination. The data was collected and evaluated. Women carrying twins, with a greater risk of preterm and/or low birth-weight (cervical incompetence, prior cervical surgery), with a previous preterm, and two or more Caesarean sections were excluded from the study. Clinical parameters recorded were maternal age, gestational age**,** habits like smoking, alcohol consumption, snuff rubbing**,** systemic diseases**,** body mass index**,** halitosis, Russell's periodontal Index and Oral Hygiene Index-Simplified by Greene and Vermilion. Periodontal Examination was carried out once during pregnancy before 32 weeks of gestation. The data was recorded on a clinical record form with a complete clinical and periodontal description of all the teeth including third molars. Oral hygiene status was recorded based on OHI-S by Greene and Vermillion. Periodontitis was measured by Russell's Index.

**Statistical Analysis:** When each case was finished the information on periodontal examination and socio-demographic and habit factors was recorded the form was checked for completeness and correctness. The information was entered to feed a computer database.IBM SPSS 17.0 for Windows (SPSS) was used for the data analysis. The frequency distribution of variables was initially evaluated in the two groups and the chi-square test was used to measure statistical significance.

## RESULTS

A total of 924 pregnant women were included in the study. Among these, 397 were classified as with PD, and 527 without PD, which represented a 43% prevalence of exposure of PD in the pregnant women examined (Table 1).  The mean value of OHI-S (Table 2) and Russell's periodontal index were higher in patients with periodontitis. There were 130 patients with good oral hygiene amongst which 24(6.1%) females had periodontitis, 427  fair oral hygiene in which 226(57%) females had periodontitis and 367 had poor oral hygiene amongst which 163(41.1%) had periodontitis, as measured by OHI-S. The ages of women evaluated ranged from 19-35 years. Of all the factors evaluated, the ones showing statistical significant associations with PD were: maternal age and halitosis (Table 3).

## DISCUSSION

Periodontal disease during pregnancy was influenced by greater maternal age, gestation period, weight and other sociodemographic measures. Definitions of disease parameters, such as gingival bleeding, probing pocket depths, attachment loss and alveolar bone loss, the number of sites per

tooth and number of teeth examined per individual vary across studies (Vogt *et al.*, 2012; Lachat *et al.*, 2011; Lieff *et al.*, 2004). These inconsistencies influence the results and limits valid comparisons between studies.[16]In the present study major population consisted of people of low socioeconomic status, according to Kuppuswamy scale. Numerous studies have shown that estimates of prevalence and severity as well as distributional characteristics of periodontal condition vary according to the method used for recording (Kingman, 2000). In the study Russell periodontal index was used to measure periodontitis. The current study found a high prevalence of PD during pregnancy of 43% showing a poor periodontal condition. A similar study was carried out amongst low income Brazilian pregnant women sample, in which there was high prevalence of periodontal disease (47%) showing poor periodontal condition (Vogt *et al.*,  2012). Other South American study reported a lower prevalence of PD of 29.85% in pregnant Chilean population (Boggess *et al.*, 2006). Periodontitis increases with increase in gestation period. More periodontal damage occurs later in gestation. Since only one periodontal examination was carried out in the study, it was not possible to affirm to what extent PD was exacerbated during pregnancy.

A significant association was found between gestational age and periodontitis. As the gestation period increases, occurrence of periodontitis also increases. In a study on a rural population of Sri-Lankan women, GI and plaque scores were measured. Despite similar scores of plaque level in pregnant and non pregnant women, the GI of pregnant women was significantly increased, during the first and second trimesters compared to controls. During the third trimester also it increased but dropped at 3 months post partum. Values of loss of periodontal attachment did not show significant differences from that of controls, during any stages of pregnancy. Thus, it showed that pregnancy had an effect only on gingiva and not on periodontal attachment levels (Tilakaratne *et al.*, 2000). The study showed a positive co-relation between increased occurrence of halitosis in pregnant women having periodontitis, although this has not been the focus of other studies.

Studies have been carried out in non pregnant women showing increased halitosis inperiodontitis. A similar study was carried out among the low income Brazilian pregnant women sample, in which no significant association was found between halitosis and periodontitis in pregnant women (Vogt *et al.*, 2012). Oral malodour is mainly attributed to volatile sulphur compounds (VSC) such as hydrogen sulphide, methyl mercaptan and dimethyl sulphide. The primary causative microorganisms are gram negative, anaerobic bacteria that are similar to bacteria causing periodontitis. These bacteria produce VSC by metabolizing different cells / tissues (i.e epithelial cells, leukocyte, etc.) located in saliva, dental plaque and gingival crevicular fluid. Tongue surface is composed of blood components, nutrients, large amount of desquamated epithelial cells and bacteria, suggesting that it has proteolytic and putrefactive capacity to produce VSC. Although the underlying biological mechanisms for this association are not well known (Stabholz *et al.*, 2010). There was no significant association between periodontitis and BMI in the study, although this has not been the focus of other studies on PD and pregnancy. Some studies which have been carried out in non pregnant women, reported a higher risk of obese women having periodontitis (Morita *et al.*, 2011; Chaffee, 2010).

**Table 1. Percent distribution of pregnant women according to the periodontal status based on Russell's Periodontal Index**

| Periodontal category | Number | Percentage |
|---|---|---|
| With periodontits | 397 | 43% |
| Without periodontitis | 527 | 57% |

**Table 2. Percent distribution of pregnant women according to the Oral Hygiene Index-Simplified by Greene and Vermillion**

| OHI-S | Number | With periodontitis | Without Periodontitis |
|---|---|---|---|
| 0.1-1.2(Good) | 130 | 24 (6.1%) | 106 (20.1%) |
| 1.2-3(Fair) | 427 | 226(57%) | 201(38.1%) |
| 3.1-6(Poor) | 367 | 163(41.1%) | 204(38.7%) |

**Table 3. Distribution of women according to habit, some pregnancy related and body weight variables and periodontal disease**

| Variables | Subjects Without periodontitis n (%) | Subjects With periodontitis n(%) | p Value |
|---|---|---|---|
| **Maternal age** | | | 0.005 |
| 19 years | 30(5.7%) | 20(5%) | |
| 20-25 years | 227(43%) | 161(40.6%) | |
| 26-30 years | 189(35.9%) | 180(45.3%) | |
| 31-35 years | 81(15.4%) | 36(9.1%) | |
| **Gestational age** | | | <0.001 |
| 1$^{ST}$ TRIMESTER | 100(19%) | 85(21.4%) | |
| 2$^{ND}$ TRIMESTER | 222(42.1%) | 203(51.1%) | |
| 3$^{RD}$ TRIMESTER | 192(36.4%) | 122(30.7%) | |
| **Habit** | | | 0.012 |
| Yes | 20(3.8%) | 30(7.6%) | |
| No | 507(96.2%) | 367(92.4%) | |
| **Use of medications** | | | 0.008 |
| Yes | 10(1.9%) | 20(5%) | |
| No | 517(98.1%) | 377(95%) | |
| **Any systemic Disease** | | | 0.008 |
| Yes | 10(1.9%) | 20(5%) | |
| No | 517(98.1%) | 377(95%) | |
| **Halitosis** | | | <0.001 |
| Yes | 117(22.2%) | 235(59.2%) | |
| No | 410(77.8%) | 162(40.8%) | |
| **BMI** | | | 0.079 |
| Low(<19.8) | 130(24.7%) | 70(15.9%) | |
| Normal(19.8-26) | 253(48%) | 210(52.9%) | |
| Overweight(26.1-29) | 63(15.9%) | 54(13.6%) | |
| Obese(>29) | 81(15.4%) | 63(15.9%) | |

BMI is positively correlated with the severity of periodontal attachment loss and this relationship may be modulated by insulin resistance. The fat-distribution, general and abdominal obesity seems to be associated with an increase of PD, besides the maintaining of normal weight by regular physical activity is associated with a lower prevalence of PD. The underlying biological mechanisms for this association are not well known; however, adipose tissue derived cytokines or adipokines, may play a key role in this link by modulation periodontitis (Morita, 2000).

Even if new periodontal pockets appear and revert after pregnancy, it is important to take into consideration that preventing inflammation during pregnancy should be a therapeutic objective (Moss *et al*., 2005). Although treatment and prevention of PD are known to improve oral health status during pregnancy, no studies have yet shown that these therapies are definitively able to reduce adverse delivery outcomes (Clothier *et al*., 2007; Polyzos *et al*., 2010). Therefore, it is of clinical interest to evaluate individual risks of changes in PD during pregnancy so that adequate planning of periodontal therapy may be implemented.

**Conclusion**

It can be said that a program should be developed and implemented in early pregnancy to provide information on oral hygiene. Periodontal treatment must be provided to women at greater risk. Thus, it can be said that oral health during pregnancy is important in order to minimize possible undesirable perinatal results.

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