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Original Research Article

Prevalence of periodontal disease in pregnant women

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ABSTRACT

Background: Periodontitis is inflammation of the periodontium that extends beyond the gingiva and produces destruction of the connective tissue attachment of the teeth. Maternal oral health is very important factor in determining pregnancy outcome not only for the mother but also for the health of fetus. Various forms of periodontal infections have been correlated to adverse pregnancy outcomes as miscarriage, preterm birth, preeclampsia, preterm birth, low birth weight, IUGR, still birth. Good maternal oral health may be key to childhood caries prevention.
Methods: Two hundred and sixty-three pregnant women were included as per inclusion criteria. Written informed consent of the eligible women was taken. Subjects were evaluated on the basis of predesigned and pretested study proforma with respect to history, clinical examination and ultrasonography. Oral health examination of the patients was conducted at the time of inclusion into study and re-examined in the postpartum period for maternal and perinatal outcomes.
Results: Prevalence of periodontal disease was seen in 77.18% of pregnant women. There was no statistically significant association between periodontal disease and maternal co-morbidities like GDM, Pre-eclampsia and gestation age of delivery. Significant correlation was found between periodontal disease and socio-economic status of the patients. There was significant correlation between birth weight and periodontal disease.
Conclusions: Periodontal disease is prevalent in pregnancy. Pregnant women were not aware regarding the role of periodontal disease in adverse pregnancy outcomes and the importance of regular dental check-up.

Keywords: Low birth weight, Oral health, Periodontitis, Pregnancy

INTRODUCTION

Pregnancy is a period of change in various systems of body. Every system is affected due to increase in the hormone levels. These hormones act on tissues like smooth muscles and even blood vessels. Lots of studies have been done to see the effect of pregnancy on the physiological changes in various organs of the body. Somehow oral hygiene has always been given a backseat. Periodontal disease are chronic infections caused by gram negative bacteria that causes destruction of connective tissue, attachment fibres and supporting bones of teeth.[1] Periodontal disease can be broadly divided into two stages-gingivitis and periodontitis. Gingivitis is a mild and reversible form of the disease which causes swollen gums, bleeding, from gums and pain. It does not affect the underlying supportive structures of the teeth. Periodontitis is a more advanced and severe form of the disease characterized by loss of connective tissue, bone support and is a major cause of tooth loss in adults.[2] Severe periodontal disease was found as eleventh most prevalent

condition in the world according to global burden of disease study.[3]

Factors which increase the risk of periodontitis include modifiable factors like smoking, poor oral hygiene, stress, certain medications like atropine, antihistaminics by causing dryness of mouth, diabetes mellitus, hormonal changes in females like in pregnancy and non-modifiable risk factors like age and hereditary.[4]

It has been seen that during pregnancy there occurs increased levels of estrogen and progesterone which make pregnant women more vulnerable to periodontal disease by producing dilatation of small blood vessels of gingiva, circulatory stasis and making them more permeable thus causing periodontitis and gingivitis.[5]

Maternal oral health is very important factor in determining pregnancy outcome not only for the mother but also for the health of fetus. Various forms of periodontal infections have been correlated to adverse pregnancy outcomes as miscarriage, preeclampsia, preterm birth, low birth weight, IUGR, still birth.

This study was done to find prevalence of periodontal disease in pregnancy. This is important because periodontal disease is preventable by practicing good oral hygiene. Periodontal intervention results in significantly decreased incidence of pregnancy related complications like preterm birth and low birth weight. This in turn may also improve the oral health of their children as maternal oral health and flora is a very important predictor of childhood oral health and flora.

METHODS

Study design

This study was prospective observational study and was conducted at Sir Ganga Ram Hospital, New Delhi in the Institute of obstetrics and gynecology and department of dental sciences from June 23 to March 2024.

Sample size calculation

The required sample size for the proposed multi-objective study was estimated on the average value of reported prevalence (5-20%) of periodontitis in pregnant women.[6] The minimum sample size at a significant level of 5% and a precision of 4% was found to be 263 by using the formula.

$$n >_{=} \frac{z^2_{(1-\alpha/2)} p(1-p)}{d^2}$$

[n= sample size needed, z=1.96 at 5% level of significance, estimated proportion (p) =12.5%, precision (d) =4%, α=0.05].

Study population

It consisted of all antenatal women coming to antenatal clinic with singleton pregnancy and without any comorbid condition.

Study method

History

All pregnant patients, irrespective of period of gestation, were assessed through a questionnaire on oral hygiene. Detailed obstetric history and antenatal history was taken including parity, period of gestation, menstrual history, ante natal care, any systemic disease and socioeconomic status. History of paan, tobacco use or of any addiction was taken. Detailed antenatal examination with general examination was done. Patients were enrolled for study after written and informed consent. All patients were examined by a dentist and sequential periodontal checkup was done. Treatment was offered to patients with periodontal disease. Patients who delivered during study period were followed up till post-partum for maternal and perinatal outcomes.

Table 1: CPI index.

Code	Description	Trigger
0	No periodontal disease (no gingival pocket less than 3 mm)	No action required
1	Bleeding on probing (no gingival pocket less than 3 mm)	Oral hygiene instruction because bleeding on probing usually indicate the presence of plaque induced gingivitis
2	No gingival pocket less than 3mm but calculus with plaque seen or felt by probing	Oral hygiene instruction, remove calculus by professional tooth cleaning
3	Shallow periodontal pockets 4-5 mm (i.e. first band on probe partially visible)	Scaling and more detailed examination of periodontal condition indicated
4	Deep periodontal pocket more than 6 mm (first band of probe disappears)	Scaling and more detailed examination of periodontal condition indicated

Physical examination

It included general examination, obstetric examination and dental examination. Dental examination included oral examination to look for bleeding gums, presence of calculus and plaque and status of gingiva by using WHO periodontal probe. Periodontal probing is gold standard for periodontal assessment. Probe is used to locate, measure and mark pockets as well as to determine their course on individual tooth surface. WHO probe have millimeter marking and small round ball at the tip. Severity of disease was calculated by using CPI index by using three parameters- bleeding on probing, probing pocket depth and calculus with plaque deposit.[7]

Statistical methodology

The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS). The numeric continuous data was expressed as means, standard deviations and confidence intervals etc. Testing/comparisons etc. was done using either parametric or non-parametric tools depending upon the distribution. Chi Square or Fisher exact test was used for testing/comparison of prevalence or for studying the association between the nominal/qualitative attributes. A 'p' value less than 0.05 of a statistic was considered as 'statistically significant'.

RESULTS

The study was conducted at Institute of Obstetrics and Gynecology, Sir Ganga Ram Hospital, Delhi. During the period of 10 months from June 2023 to March 2024, two hundred and sixty-three women were recruited. A periodontal examination at first visit by a dentist was done. All patients were followed till end of pregnancy for any signs and symptoms suggestive of adverse pregnancy outcomes and sequential periodontal examination was done. Out of 263 patients recruited initially, 143 patients delivered during the study period. All these 143 patients were examined in the postpartum period for maternal and perinatal outcomes.

Table 1: Prevalence of periodontal disease.

Total number of patients examined	**263**
Number of patients with periodontal disease	203
Prevalence of periodontal disease	77.18

Table 2: Distribution of women according to socio- economic status and periodontal disease.

Socio economic status	Patients without periodontal disease (%)	Patients with periodontal disease (%)	Total (%)	P value
	n=60	**n=203**	**n=263**	
Upper	16 (26.67)	28 (13.79)	44 (17.73)	0.021
Middle	16 (26.67)	43 (21.18)	59 (22.4)	
Lower	28 (46.67)	132 (65.02)	160 (60.8)	
Total	60	203	263	

Table 3: Association between periodontitis and pre-eclampsia.

Pre-eclampsia	Patients without periodontal disease (%)	Patients with periodontal disease (%)	Total (%)	P value
	n=60	**n=203**	**n=263**	
Yes	2 (3.3)	6 (3.0)	8 (3.0)	0.579
No	58 (96.7)	197 (97.0)	255 (97.0)	
Total	60	203	263	

Table 4: Distribution of women according to weight of baby and periodontal disease.

Birth weight (kg)	Patients without periodontal disease (%)	Patients with periodontal disease (%)	Total (%)	P value
	n=33	**n=110**	**n=143**	
<2.5	1 (3.0%)	26 (23.6%)	27 (18.9%)	0.004
≥2.5	32 (97.0%)	84 (76.4%)	116 (81.1%)	
Total	33	110	143	

Out of 263 pregnant women recruited for the study 203 (77.18%) were found to have some type of periodontal disease.

Maximum number of women 160 (60.84%) with periodontal disease were from lower socio-economic status group. Only 44 (16.73%) were from higher socio-economic status. Statistically significant association of periodontal disease with socio-economic status was seen.

Only six women (3%) with periodontal disease developed pre-eclampsia during pregnancy. No statistically significant relation was found in women with or without periodontal disease.

Out of 110 deliveries in women with periodontal disease during the study period, only 26 (23.6%) were low-birth-weight whereas 84 (76.4%) were more than 2.5 kg as compared to 33 patients without periodontal disease where 32 (97%) were more than 2.5 kg. Hence statistically significant correlation was seen in these patients with periodontal disease.

DISCUSSION

Periodontal disease in pregnancy in India has not been studied that much as the other systems of the body. Due to change in hormone levels in pregnancy, various tissues of the body including gums can undergo changes. If the patient is already having some dental problem, it can worsen further. High risk factors for periodontal disease vary from age, medical disease, personal hygiene and habits. Oral health is a major issue. National oral health survey has reported variable prevalence in different age groups. Keeping this in mind "study of prevalence of periodontal disease in pregnant women" was carried out in Institute of Obstetrics and Gynecology along with Department of Dental Science at Sir Gangaram Hospital from 1st June 2023- 31st March 2024.

Pregnant women attending antenatal OPD were examined and 263 women were recruited for the study. Out of 263 pregnant women 60 (22.81%) women did not have any periodontal disease. So, the prevalence in our study was 77.18%. Sheha et al in their study on 400 pregnant women found 83.5% prevalence of periodontal disease.[8] Similar results have been reported i.e. 73.2% by Rikawarastuti et al from Indonesia.[9] Studies from India in Karnataka by Gupta and Acharya in 2016 reported prevalence of 95%.[10] Satija et al in 2014 from Harayana reported prevalence of 45%.[11] On the contrary, Tellapragda et al from Karnataka in 2014 reported prevalence of gingivitis 38% and periodontitis 10% only.[12] There is wide difference in the prevalence from west to east and from different states of India.

Socioeconomic status does impact the periodontal disease. People from lower socioeconomic suffer more from the disease as compared to higher socioeconomic status. In our study statistically significant association of periodontal disease with socio-economic status was seen (p=0.021). Kruger et al and Uwambaye et al in their study have also pointed out that low-income group has high incidence of periodontal disease.[13,14]

We enrolled patients from all trimesters of pregnancy. Maximum 135 (51.3%) were in the first trimester at the time of their first antenatal visit. Out of 263 women recruited only 1.1% were aware of the fact that periodontal disease can have effect on pregnancy and fetus. Out of 203 women with periodontal disease maximum 103 (50.73%) were with grade II. None was found to have grade IV.

In our study only six (3%) out of 203 with periodontitis disease developed pre-eclampsia and similar number of patients 7 (3.4%) developed gestational diabetes mellitus. Gesase et al in their study found maternal periodontal disease an independent risk factor for developing pre-eclampsia, low birth weight and pre term birth.[15] Desai et al has also reported odds ratio (OR)19.8% for developing pre-eclampsia in women with periodontal disease.[16] Ha et al in their study have also shown similar results that periodontal disease increases the risk of developing pre-eclampsia.[17]

Till date 143 out of 263 women had delivered. Out of which 110 are with periodontal disease. Nearly half 53.63% were delivered by caesarean section due to obstetrical reasons, 18 (16.4%) were pre term and 92 (83.6%) were term birth. Nearly 26 (23.6%) were low birth weight <2.5 kg and 84 (76.4%) were ≥ 2.5 kg, 104 (94.54%) babies were shifted with mother, whereas only six (5.46%) were shifted to nursery. Statistically significant correlation was seen between weight of baby and periodontal disease in our study. Cisse et al in 2015 reported that risk of having a low-birth-weight baby was 4.45 times higher if the mother had periodontitis.[18] Jacob and Nath in their study have also shown similar results that periodontal disease increases the risk of low-birth-weight baby.[19]

Due to smaller sample size association of periodontitis with preeclampsia and gestational diabetes mellitus could not be established.

CONCLUSION

The results of the observational study show that oral health is not given much importance. People need to be made aware about the importance of oral health in pregnancy and its impact on pregnancy outcomes. Low birth weight baby was significantly seen in women with periodontal disease.

Dental checkup should be a part of antenatal care. Oral health is important during pregnancy in order to minimise possible undesirable perinatal outcome and to improve the quality of life of pregnant mother and baby. Awareness about correlation between pregnancy and oral health needs to be spread to bring down the prevalence of periodontal disease.

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