

## **EFFECT OF PERIODONTAL DISEASE ON MATERNAL OUTCOME – A CASE CONTROL STUDY**

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### **Background**

The leading reason for neonatal death may be attributed to preterm delivery or low birth weight infants. In addition, it also causes long term neuro-developmental disturbances, and several other morbidities. Plethora of studies done in the past have associated preterm delivery with diseases occurring in the periodontium.

### **Aim**

The aim of the study was to establish the association between periodontitis occurring in pregnancy and pre-term/low birth weight among infants. (PLBW).

### **Method**

A total of 180 patients were enrolled for this study. The pregnant women were designated based on the weight of their infants, as cases (<2500 g and <37 weeks) and controls (≥2500 g and ≥37 weeks). A questionnaire was used to assess the association between risk factors for periodontal diseases with risk factors of low birth weight such as age of the mother, hemoglobin levels, history of previous deliveries, history of previous LBW deliveries, history of dental treatment, and periodontal status from maternal medical record. In this study, nursing mothers who had minimum of four teeth with probing depth ≥4 mm and clinical attachment loss ≥3 mm, with bleeding on probing at the same site, were categorized as cases with periodontitis. The birth weight of the infants were obtained through the hospital medical records. The association between maternal periodontal status and pregnancy outcome was evaluated using the chi-square test, considering confounders.

### **Results**

Among the post partum mothers, the prevalence of periodontal disease was 33% among the cases and 29% among the control group. The levels of periodontitis had a significantly association with low birth

weight/preterm infant. Moderate clinical symptoms were seen in both cases and controls. Other co-morbidities were not significant with maternal outcome.

### **Conclusion**

The present study suggests a remarkable association between periodontal disease and low birth weight/Preterm babies and highlights periodontal inflammation as an independent risk factor. Good oral hygiene practices and routine prenatal visits are a key to avoid obstetric complications like low birth weight/preterm.

**Key words:** Periodontitis, PLBW, Risk factor

### **Background**

Pregnancy is frequently considered as a dynamic state which leads to innumerable transient changes in physiology within the body including the oral cavity. Despite improvements in obstetric care, rates of preterm birth haven't decreased during the last decade among the developing countries. It is estimated that nearly 6.9 million babies die across the world because of prematurity and low birth weight. Pregnancy states can instigate physiological and microbiological changes within the oral cavity thereby resulting in a surge in incidence of periodontal diseases. For optimum maintenance of oral health during gestation, the dental treatment particularly oral hygiene prophylactic procedures shouldn't be withheld during gestation. The rise in levels of oestrogen or progesterone during pregnancy is proposed to be the most common etiological factor associated with maternal periodontitis. *Porphyromonas gingivalis*, *Tannerella forsythia* and *Treponema denticola* are Gram-negative obligate anaerobic bacteria which are primarily related to periodontal disease. The toxins and enzymes produced by these "Red complex bacteria" enters the bloodstream and cross the placenta to produce the adverse effect in the foetus. The immune reaction of the mother against these primary periodontal pathogens elaborates inflammatory mediators which results in preterm labour or may lead to low birth-weight infants. Majority of mothers delivering preterm infants possess no known risk factors.<sup>1</sup> Considerable number of earlier studies have highlighted the role of periodontitis, an infectious disease caused primarily by gram-negative bacteria that destroys the connective tissue that supports the tooth and the alveolus had a major association with an increased risk of preterm birth, low birth weight and preeclampsia.<sup>2-4</sup> Though, there are lots of evidence to relate periodontal disease with adverse pregnancy outcomes, the issue still remains contentious. Hence, this study was planned to search out the association between periodontitis and maternal outcome.

### **Objectives**

To test the hypothesis that periodontal infection is a risk factor for adverse maternal outcome including preterm and low birth weight among infants.

### **Materials and methods**

The present study included 180 post partum women with a mean age of 27+(±3.20) in years. A case-control study was carried out on 180 mothers in the private obstetric clinic. The case group ( $n = 60$ ) consisted of mothers of newborns with birth weight <2500 g and a control group ( $n = 120$ ) of mothers of newborns with birth weight  $\geq 2500$  g. A questionnaire was used to collect data pertaining to demographic variables and risk factors associated with periodontitis and adverse maternal outcome. Periodontal status of the participants were assessed by probing pocket depth and loss of connective tissue attachment and were graded as mild, moderate, severe or absent. In this study, Women who had a minimum of four teeth

with probing depth  $\geq 4$  mm and clinical attachment loss  $\geq 3$  mm, with bleeding on probing at the same site, were diagnosed as cases with periodontitis. The birth weight of the infants were obtained through obstetric records from the hospitals. Maternal periodontal status was compared with pregnancy outcome using Chi square test. Ethics committee clearance was obtained from the institutional ethics committee and informed consent were obtained from all the participants before being enrolled for the study.

## Results

In this study, 180 post partum women were enrolled in to 2 groups, of which 60 women were included in to the case group and 120 to the control group. Of the 180 women, age ranged between 23-34 years, the mean age was  $25.5(\pm 5.6)$  among the cases &  $26(\pm 6.7)$  among the controls.(table-1)

Table 1: Age distribution of the Maternal characteristics

Maternal Age in years	Frequency(%) -Case	Frequency(%) -Control
23-25	34	85
26-30	18	23
31-34	8	12

Among the 60 cases of post partum women 56.3% were primigravida, 34.3% were second gravida and 9.4% were gravida 3 or more (as shown in Table 2). Among the 20 cases with periodontitis, majority were term gestation (68.8%) and 9.3% were pre-term gestation (Table 2).

Table 2: Parity wise distribution

Parity	Frequency(%) - Case	Frequency(%) -Control
Primigravida	54(90)	103(86%)
Gravid-2	4(7)	12(10)
Gravid-3	2(3)	5(4%)

Table 3: Prevalence of periodontal disease

Among the post partum mothers, the prevalence of periodontal disease was 33% among the cases and 29% among the control group, but On the basis of clinical periodontal measures, most of the patients had moderate periodontitis.(table-3)

Periodontal disease status	Frequency (%)in Cases	Frequency(%) in Controls	Chi-square value
Mild	5(8)	18(15)	0.002
Moderate	12(20)	16(13)	
Severe	3(4)	1(1)	
Nil	40(68)	85(71)	

p-value >0.05 were considered as significant

Other co morbidities among cases during pregnancy were, urinary tract infection in about 14 (22%) patients, 7(12%) patients with bacterial vaginosis and 5(6%) with gestational diabetes. The frequency of these findings differed significantly between both the groups. Among the controls, 2(2%) were anemic and 1(1%) had gestational diabetes. While comparing other comorbidities with periodontal diseases between cases and controls (5,2) only few had clinical symptoms of periodontitis.

While controlling the other factors, significant associations were found between pregnancy outcomes and maternal periodontal index scores.

Table-4 Neonatal outcome

Complications	Number(%)in cases	Number(%)in controls	Chi-square value
SGA	2(0.3)	1(0.83)	NS
Apgar score <7 at 1 minute	5(0.8)	3(2.5)	NS
NICU admission	6 (1)	8 (6.6)	NS
Birth Asphyxia	-	1(0.83)	NS
Preterm	12(2)	10 (8.3)	NS

NS- p value < 0.05 non significant

## Discussion

Periodontitis is a common infectious disease of the periodontium which affects nearly 30 percent of women of reproductive age. The disease process involves bacterial infiltration in to the periodontium thereby leading to a destructive inflammation of the tooth supporting connective tissues. The toxins produced by periodontal pathogens stimulates a chronic inflammatory response, and leading to destruction of the periodontal tissue leading to pocket formation and loss of connective tissue. Eventually, in extreme cases it could lead to mobile teeth and further infection<sup>5</sup>. This present study findings shows that periodontal disease was significantly high among cases than the control group. Periodontal disease contributes to be a risk factor for maternal and neonatal morbidity. According to this study, the commonest oral presentation in pregnancy was gingivitis, with a prevalence of up to 75%. On the other hand, one half of pregnant patients with preexisting gingivitis have significant inflammation during pregnancy. This may be attributed to hormonal fluctuations in estrogen and progesterone levels, changes in oral microbiome and a decreased immune response during pregnancy. There might be an acute exacerbation of gingival inflammation during pregnancy and this tends to diminish during the last weeks of the pregnancy and postpartum period<sup>5</sup>. Gestational gingivitis may be unrelated to the amount of plaque biofilm and usually does not increase the rate of periodontitis<sup>6</sup>. In this study, only clinical symptoms were assessed to

identify the cases, no bacterial isolation was done. The neonatal outcome secondary to maternal periodontitis was almost equal in both cases and controls, hence the study hypothesis was accepted.

### Conclusion

This study provides additional evidence that periodontal disease can be considered a risk indicator for adverse pregnancy outcomes. The challenge is that not many women seek dental treatment for periodontal condition during pregnancy and oral health assessments are not part of antenatal care. Majority of the times, this complication often goes undetected. There is a growing concern about the relationship between periodontal disease and pregnancy outcomes. Although the lack of evidence in the studies are significant, there is a population that needs attention. It is important that dentists and gynecologists work together to treat oral diseases in pregnant women and reduce the morbidity associated with these conditions.

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