

# Periodontal Disease and Pregnancy Outcome

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## ABSTRACT

Periodontal disease is one of the most common chronic disorders of infectious origin known in humans. Infection and/or inflammation in the reproductive tract and at sites remote from the fetoplacental unit continue to be investigated as potential causative factors for adverse pregnancy outcomes. This study was conducted to examine the relationship between periodontal disease in early pregnancy and the risk of preterm birth and pre-eclampsia. A prospective study of obstetrical outcome of 262 women, examined for periodontal disease at 15-24 weeks gestation was carried out. In our study, 60.7% patients suffering from periodontal disease had preterm deliveries as compared to 20% preterm deliveries in those not having periodontal disease. Incidence of pre-eclampsia was found to be 53.57% in patients with periodontal disease as compared to 13.33% in those without periodontal disease. Thus, we conclude that there is a definite relationship between periodontal diseases and adverse pregnancy outcome.

**Keywords:** Pregnancy, periodontal diseases, pre-eclampsia, preterm birth

Periodontal disease is one of the most common chronic disorders of infectious origin known in humans, with a reported prevalence varying between 10% and 90% in adults, depending on diagnostic criteria.<sup>1-5</sup>

Periodontal disease presents as two main types:<sup>6</sup>

- Gingivitis—an inflammatory condition of the soft tissues surrounding a tooth or the gingiva
- Periodontitis—involving the destruction of supporting structures such as the periodontal ligament, bone, cementum or soft tissues.

Over the years, several risk factors for periodontitis have been identified. For example, stress, poor dietary habits with high sugar intake, smoking and tobacco use, obesity, age and poor dental hygiene all contribute to the development of periodontal disease.

Other major risk factors include clenching or grinding teeth, genetic factors, other family factors, other medical diseases such as diabetes, cancer or acquired immunodeficiency syndrome (AIDS), defective dental restorations medication use and conditions that change estrogen levels (puberty, pregnancy, menopause).<sup>7,8</sup>

Pregnancy complications, including pre-eclampsia, preterm delivery and low birth weight (LBW), represent major public health problems because of their prevalence, associated mortality, economic burden and long-term disability.

Infection and/or inflammation in the reproductive tract and at sites remote from the fetoplacental unit continue to be investigated as potential causative factors for these adverse outcomes. Periodontal infection is one of the many infections that have been associated with adverse pregnancy outcomes.

Consequently, the relationship between adverse pregnancy outcomes and maternal periodontal infections has to be studied extensively, particularly since periodontal infections are most prevalent in populations at highest risk of adverse pregnancy outcomes.

## AIMS AND OBJECTIVES

This study was conducted to examine the relationship between periodontal disease in early pregnancy and the risk of preterm birth and pre-eclampsia.

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## MATERIAL AND METHODS

A prospective study of obstetrical outcome of 262 women, examined for periodontal disease at 15-24 weeks of gestation was carried out. Participants underwent periodontal examination along with routine antenatal examination and patients having other foci of infection were excluded from the study. Periodontal disease was defined as the presence of one or more sites with probing depths  $>4$  mm and  $>10\%$  bleeding on probing. The obstetrical outcome of all the patients was analyzed.

## RESULTS

Among 262 patients, 112 were suffering from periodontal disease. Of these, 68 women delivered a preterm baby (60.7%). Among the remaining 150 patients, there were 30 preterm deliveries (20%). Pre-eclampsia was seen in 60 cases (53.57%) with periodontal disease as compared to 20 cases in those not suffering from periodontal diseases (13.33%).

## DISCUSSION

Infection and inflammation have been associated with spontaneous preterm delivery and LBW. In addition, evidence suggests an important role for inflammation and endothelial activation in the pathophysiology of pre-eclampsia.<sup>9</sup>

Consequently, reproductive biologists and immunologists hypothesized that periodontal disease could induce adverse pregnancy outcomes mediated by systemic infectious and inflammatory processes.

The first association between periodontal disease and preterm LBW was documented by Offenbacher and colleagues in 1996 using a case-control study design with 124 patients.<sup>10</sup>

Investigators from the University of Alabama conducted a prospective evaluation of over 1,300 pregnant women. Complete medical, behavioral and periodontal data were collected between 21 and 24 weeks of gestation. They concluded that the risk for preterm birth was increased among women with generalized periodontal infection; this risk was inversely related to gestational age.<sup>11</sup>

Offenbacher et al<sup>12</sup> conducted a prospective study of obstetric outcomes of over 1,000 women who received an antepartum and postpartum periodontal examination. Periodontal disease progression was found to be an independent risk factor for preterm delivery.

Santos-Pereira et al<sup>13</sup> studied 124 women between the ages of 15 and 40 to determine if chronic periodontitis increased the risk of experiencing preterm labor. In this cross-sectional study, they concluded that chronic periodontitis increased the risk of having preterm labor.

Pitiphat et al<sup>14</sup> conducted a prospective study to determine if self-reported periodontitis was a risk factor for poor pregnancy outcomes. The authors concluded that periodontitis is an independent risk factor for poor pregnancy outcomes.

Agueda et al<sup>15</sup> enrolled over 1,200 women to evaluate the association between periodontitis and preterm birth and/or LBW. In their study, no significant association was found between LBW and periodontitis.

A study examined the relationship between multiple periodontal parameters, including mean probing depths, percent of tooth sites with probing depths  $\geq 4$  mm, percent of sites with bleeding on probing and percent of sites with clinical attachment loss  $\geq$  either 2 or 3 mm. No difference was found in the periodontal parameters between women with preterm birth and without preterm birth.<sup>16</sup>

Buduneli and colleagues<sup>17</sup> found no differences in periodontal infection between women who delivered preterm versus full-term. However, women were at significantly increased risk for preterm birth if either *Porphyromonas gingivalis* or *Campylobacter rectus* were found in the subgingival plaque.

Vettore et al<sup>18</sup> recruited 542 postpartum women who were over 30 years old. The investigators sought to explore the relationship between periodontal disease and preterm LBW. The results of this study indicated that the extent of periodontal disease did not increase the risk of preterm LBW.

Evidence suggests a role for inflammation and endothelial activation in the pathophysiology of pre-eclampsia;<sup>19,20</sup> periodontal infection is one of many potential stimuli for these host responses.

Contreras et al<sup>21</sup> found that women with pre-eclampsia were twice as likely to have chronic periodontitis. Several other investigators have been unable to confirm an association between maternal periodontal infection and pre-eclampsia.<sup>22,23</sup>

The conflicting results are yet to be resolved.

## CONCLUSION

In our study, 60.7% patients suffering from periodontal disease had preterm deliveries as compared to 20%

preterm deliveries in those not having periodontal disease. Incidence of pre-eclampsia was found to be 53.57% in patients with periodontal disease as compared to 13.33% in those without periodontal disease.

Thus, we conclude that there is a definite relationship between periodontal diseases and adverse pregnancy outcome, preterm birth and pre-eclampsia, and treating periodontal diseases in the antenatal period may be beneficial in improving the pregnancy outcome.

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