Correlation of Periodontitis during Pregnancy and Incidence of Low Birth Weight Babies

Prashanthi Reddy, Tushar Phulambrikar, PV Wanjari, Rajeev Srivastava

ABSTRACT

Objective: To verify a possible association between periodontitis and low birth weight babies.

Materials and methods: Two hundred and eighty antepartum women were examined aged between 18 and 37 years. Demographic, medical and clinical histories were taken under obstetrician’s guidance. A thorough periodontal examination was done in all the participants with their consent which included bleeding on probing, pocket depth and clinical attachment level. After delivery, gestational age (in weeks) and birth weight of baby (in kg) were collected from hospital records. Infants were placed into following categories by gestational age (WHO) and by birth weight: preterm—<37 weeks, term—37 to 42 weeks, post-term—42 weeks completed and above, low birth weight—<2,500 gm, normal birth weight—2,500 to 3,900 gm, high weight—>3,900 gm.

Results: Based on the findings of the study, a significant correlation was observed between periodontitis and low birth weight and preterm low birth weight (p ≤0.001) and a significant relation was observed between periodontitis and gestational age (p < 0.001).

Conclusion: Periodontitis was considered a risk indicator for reduced gestational age and birth weight. Multicentric trials will greatly help to establish the independent role of periodontal disease and their relationship in terms of pregnancy outcomes.

Keywords: Periodontitis, Low birth weight, Preterm low birth weight.


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INTRODUCTION

Adequate birth weight is the single most important factor in the survival, growth and development of a newborn; despite the advances and awareness in the care, even today a tenth of the births are either premature or low birth weight.1

It is estimated that around 50% of these low or early births are idiopathic and for the rest various reasons have been attributed which include chronic hypertension, diabetes mellitus, discoid lupus erythematosus, acute endocrinopathies, anemia, abdominal trauma, alcoholism, multiple pregnancies and infectious diseases.2 Among this array of multifactorial, the subset of infectious diseases concerns us. Recently, it has been postulated that distant infections like periodontal diseases may be associated with the preterm low birth weight. WHO describes all deliveries before 36 weeks as preterm and all babies weighing less than 2,500 gm as low birth weight.3 With periodontally compromised status so rampant present in our country, and preterm low birth weight deliveries a substantial risk, a study was designed around the hypothesis of periodontal infection and low birth weight and/or early deliveries.

STUDY DESIGN

The cohort study designed included 280 antepartum women aged between 18 and 37 years. Demographic data and medical history were assessed by interview. Most of the predisposing factors for preterm low birth weight and low birth weight documented in medical literature were assessed in each of the participant. Clinical histories were taken under obstetrician’s guidance to ensure that all the participants were included according to inclusion criteria. A thorough periodontal examination was performed for all subjects which included bleeding on probing, probing depth and clinical attachment level. After delivery, the following variables were obtained from hospital records.

1. Gestational age (in weeks)
2. Birth weight of baby (in kg)

Infants were placed into following categories by gestational age (WHO) and by birth weight:

1. Preterm—<37 weeks
2. Term—37 to 42 weeks
3. Post-term—42 weeks completed and above
4. Low birth weight—<2,500 gm
5. Normal birth weight—2,500 to 3,900 gm
6. High weight—>3,900 gm

The data obtained was tabulated and then subjected to statistical analysis.

RESULTS AND OBSERVATIONS

The study population comprised of a total of 280 subjects which were divided under three groups, pregnancy with normal gingiva, pregnancy associated with gingivitis and pregnancy with periodontitis.

There were a total of 68 subjects in normal group, there were a total of 133 subjects in gingivitis group and there were a total of 79 subjects in periodontitis group (Table 1).

DISCUSSION

India has the highest prevalence of malnourished children, low birth weight babies and anemia levels among children.
and women in the world. Along with the micronutrient deficiencies, poor oral hygiene also contributes to serious health hazards.4

Low birth weight has been defined as birth weight of less than 2,500 gm by WHO.5

It is evident that the microbes present in periodontium frequently enters into the circulation and it is established fact that there is increase in gingival inflammation during pregnancy. Furthermore, the inflamed periodontium could be regarded as a reservoir for both microbial products and inflammatory mediators. Periodontal disease is a chronic, low grade, Gram-negative, anaerobic infection of periodontal tissue. Periodontal organisms have been isolated from the amniotic fluid suggesting the possibility of hematogenous spread. Periodontal disease could potentially influence pregnancy outcomes through indirect mechanisms involving inflammatory cytokines or direct translocation of bacteria and its products to fetoplacental unit.5,7

On the basis of current evidence from both animal and human studies, a hypothetical model of the association between maternal periodontal inflammation and fetal development may be proposed. Periodontal disease is associated with an increase in systemic levels of inflammatory cytokines, although produced with the intention to combat the infection, also may cause tissue destruction. Because the structural integrity of the placenta is vital for the normal exchange of nutrients between the mother and the fetus, this placental tissue damage may contribute to impaired fetal growth, which may lead to low birth weight. Also, structure damage in the placenta may disrupt the normal blood flow between the mother and fetus, affecting the maternal blood pressure and leading to pre-eclampsia. The increase in the production of inflammatory cytokines, such as IL-1B and PGE2 also may contribute to preterm rupture of the membranes and uterine contraction and lead to miscarriage or preterm delivery.8

Over the past 10 years, since the first case-control study, demonstrated an association between preterm low birth and maternal periodontitis, the question of whether maternal periodontal infection is related to poor birth outcome has been continuously debated in the literature.9

We observed 17.85 incidence of low birth weight babies among the group of individuals suffering from periodontitis and has been found comparable to that reported by Hirve S et al.10

**GESTATIONAL AGE**

Among 251 subjects of full-term group 51 subjects delivered low birth weight babies and among the 29 subjects of preterm group 23 subjects delivered low birth weight babies. It has been observed that preterm subjects delivered low birth weight babies.

When we subject this data to statistical analysis, we find significant correlation between the two means which is suggestive that delivery outcomes are been influenced by gestational age. These findings strengthen the statements of the study performed by Love et al (1965).11

**PERIODONTITIS**

In the study population, there were 79 subjects suffering from periodontitis. Of these 79 subjects, 51 subjects delivered babies with normal birth weight, 17 subjects delivered low birth weight babies, two subjects delivered preterm babies and 10 delivered preterm low birth weight babies.

<table>
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<tr>
<th>Table 1: Infant birth weight in relation to normal, gingivitis, periodontitis and gestational age</th>
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<td><strong>Different groups</strong></td>
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<td>Normal</td>
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<td>Infant weight</td>
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<td>&lt;2,500</td>
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<td>2,600-3,500</td>
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**Significant**
After comparing the infant birth weight to periodontal condition of the subjects, a statistically significant relationship was found between periodontitis and low birth weight and preterm low birth weight. This was in accordance with Khader (2005),12 Noack (2005).9 However, it was suggested by Madianos (2001),13 Vergnes (2007)14 that risk of preterm delivery increases with increase in periodontal disease.

In the present study we could get the encouraging results and for other parameters included in the study of which the findings and observations were quite satisfactory and comparable with that of previous studies carried out in this regard. Periodontitis condition was related statistically significant to preterm low birth weight. Women with advanced periodontitis had a greater risk for preterm delivery.

Moreover, significant correlation was observed between periodontitis and low birth weight and further preterm low birth weight. This suggests the coexistence and interrelationship between these conditions. Further it could be emphasized that periodontitis could affect fetus during gestational age resulting into low birth weight infant or preterm deliveries with low birth weight babies.

**CONCLUSION**

Periodontal diseases are more prevalent in females, due to hormonal changes as well as genetic differences during pregnancy.

The mechanisms by which periodontal disease may cause preterm low birth weight have still not been elucidated, but there are evidences suggesting its association with biologically feasible basis. Therefore, periodontal disease has been identified as one of the potential risk factor for low birth weight.

Based on the findings of this study, the following conclusions were drawn:

1. A significant correlation was observed between periodontitis and low birth weight and preterm low birth weight (p ≤ 0.001).
2. A significant relation was observed between periodontitis and gestational age (p < 0.001).

Multicentric trials will greatly help to establish the independent role of periodontal disease and their relationship in terms of pregnancy outcomes. Moreover, this will allow the researchers to grade periodontal conditions and thus will help in finding the answer for the raised doubts by performing many more meta-analysis to establish the role of periodontitis in pregnancy.

**REFERENCES**


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