

## ORIGINAL RESEARCH

# Maternal Periodontitis and Low Birth Weight Babies

Shanthi Vanka, Vrinda Saxena, Amit Vanka, KS Ravi

## ABSTRACT

**Introduction:** Low birth weight in developing countries is primarily because of poor maternal health and nutrition. If maternal health plays such an important role in the child's development, all the means of preventing problems among the pregnant women is of utmost importance.

**Aim:** This study was conducted to assess the relationship between maternal periodontitis and the weight of the baby after birth.

**Materials and methods:** The subjects in the present longitudinal study were chosen from the outpatients of Gynecology Department of the People's Hospital over a period of 1 month. The periodontal status was assessed based on community periodontal index (CPI) and loss of attachment (LOA).

**Results:** All the participants demonstrated periodontal pockets with more than half the population (56%) presenting shallow pockets (pockets of 4-5 mm).

**Conclusion:** In the present study, periodontal status of the mother was significantly related to delivery of low birth weight babies. Thus it can be concluded that periodontitis may be associated with delivery of low birth weight babies.

**Keywords:** Periodontitis, Low birth weight, Pregnant women, Health promotion.

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## INTRODUCTION

Periodontitis can be considered a continuous pathogenic and inflammatory challenge at a systemic level, due to the large epithelium surface that could be ulcerated in the periodontal pockets. This fact allows bacteria and their products to reach other parts of the organism, creating lesions at different levels.<sup>1</sup> Periodontal infection can promote an inflammatory and immune system response by releasing inflammatory mediators (proinflammatory citoquines).<sup>2</sup>

Weight at birth is an indicator of the new born survival long-term health and psychosocial development.<sup>3</sup> Low birth weight in developing countries is primarily because of poor maternal health and nutrition.<sup>4</sup> If maternal health plays such an important role in the child's development, all the means of preventing problems among the pregnant women is of utmost importance. This study was conducted to assess the relationship between maternal periodontitis and the weight of the baby after birth. The null hypothesis that there is no association between the periodontal health and the birth weight of the baby was formulated prior to the study.

## STUDY DESIGN

The subjects in the present longitudinal study were chosen from the outpatients of Gynecology Department of the People's Hospital over a period of 1 month. The protocol for research was submitted to the Ethical Committee, People's college of Dental Sciences and was approved.

To be eligible for participation in this study, a pregnant woman must have reached the second trimester. The pregnant women had to have at least 4 teeth with periodontal pockets when examined with a WHO probe.

We excluded subjects who required antibiotic prophylaxis. This exclusion was primarily in the interest of patient safety, but it also eliminated one potential source of confusion in the interpretation of study results. Since antibiotics could modify the risk factors being tested. The final sample came up to 232.

After obtaining informed consent from the patient, a questionnaire covering the patient's age and occupation was recorded and structured interviews were conducted after the delivery to collect information regarding the weight of the baby, i.e. normal birth weight or low birth weight.

The periodontal status was assessed based on Community Periodontal Index (CPI) and Loss of Attachment (LOA). The examination procedures for the CPI and LOA were as recommended by the WHO.<sup>5</sup> The clinical examination was conducted by a single examiner on all the subjects in under natural day light. Intraexaminer diagnostic calibrations were performed for over 10% of the study sample; the kappa scores were over 90% and considered adequate.

## Statistical Analysis

The data collected was analyzed using SPSS Version 16. Probability value of less than 0.05 was considered statistically significant. Logistic Regression analysis was also done to analyze the cause and effect relationship between the dependent (normal vs lowbirth weight babies) and the independent variables (periodontal pockets).

## RESULTS

The total participants in the study were two hundred and thirty two. All the participants demonstrated periodontal pockets with more than half the population (56%) presenting shallow pockets (pockets of 4-5 mm) as depicted in Table 1. It was observed that significantly greater proportion 134 subjects with deep pockets delivered a low birth weight in contrast to 98 subjects, who delivered normal weight babies.

**Table 1:** The periodontal status of the study population in relation to birth weight of the baby

Weight of the baby	Community periodontal index score		
	Pocket 4-5 mm n (%)	Pocket ≥6 mm n (%)	Total
Normal weight	36 (36.7)	62 (63.3)	98 (100)
Low birth weight	94 (70.1)	40 (29.9)	134 (100)
Total	130 (56)	102 (44)	232 (100)

It is evident from Table 2 that majority of the subjects with loss of periodontal attachment of 6 to 8 mm had low birth weight babies deliveries. The loss of attachment and low birth weight babies delivery was significantly related. Table 3 summarizes the results of multiple logistic regression analysis for the association between maternal periodontitis and preterm birth of babies. This association has also been shown as highly significant in the results. Subjects with periodontal pockets and loss of attachment are likely to have low birth weight babies.

## DISCUSSION

The study results show an association between periodontal status of the pregnant and the birth weight of the baby after delivery. The logistic regression analysis have proved that the null hypothesis has been rejected creating a causal relation between Periodontitis and low birth weight of the babies.

Rakoto-Alson et al 2010,<sup>6</sup> Lin et al 2009,<sup>7</sup> Africa et al 2009,<sup>8</sup> Khader et al 2009<sup>9</sup> are studies which are in agreement with the periodontitis in the mother causing low birth weight babies.

There are few studies which does not support the relationship. The studies that do not support the relationship are by Ebersole et al 2009,<sup>10</sup> Lopez R 2007,<sup>11</sup> Bobetsis et al 2006,<sup>12</sup> Kurnatowska et al 2006<sup>13</sup> and Noack et al 2005.<sup>14</sup>

The probable reasons given in the studies are:

1. Changes in IgG antibody during pregnancy are not associated with birth outcomes.
2. Treatment of periodontitis in pregnant women improves periodontal disease and is safe but does not significantly alter rates of preterm birth, low birth weight or fetal growth restriction.
3. There is insufficient evidence at this time for healthcare policy recommendations to provide maternal periodontal treatments for the purpose of reducing the risk of adverse pregnancy outcomes.
4. Study did not prove correlation between amount of bacterial dental plaque in pregnant women and risk of preterm low birth weight.
5. Periodontitis was not a detectable risk factor for preterm low birth weight in pregnant women.

Low birth weight is a world wide leading perinatal problems and has evident public health implications, due to the fact that their incidence does not decrease in spite of the many attempts at their prevention.<sup>1</sup>

Promotion of oral health can be done through:<sup>15</sup>

Health education programs at all the Maternal and Child Health Centres for the pregnant women should include dental care also.

1. Professional education through dental professionals and also the auxiliary personnel on the oral hygiene practices.
2. Marketing high quality products at affordable prices.
3. Reaching the unreached through NGO's or Government programs.
4. Organizing treatment camps on scaling throughout the reached dental centers.
5. Through health education programs emphasis on the various health problems that can occur in a PTLB baby.
6. Incorporation of skills of oral hygiene into training of health education and social care professionals.

**Table 2:** Loss of attachment according to birth weight of the baby

Weight of the baby	Loss of attachment					Total n (%)
	0-3 mm n (%)	4-5 mm n (%)	6-8 mm n (%)	9-12 mm n (%)	>12 mm n (%)	
Normal weight	2 (2)	4 (4.1)	45 (45.9)	37 (37.8)	10 (10.2)	98 (100)
Low birth weight	56 (41.8)	1 (0.7)	60 (44.8)	17 (12.7)	0 (0)	134 (100)
Total	58 (25)	5 (2.2)	105 (45.3)	54 (23.3)	10 (4.3)	232 (100)

**Table 3:** Logistic regression analysis with type of baby birth weight (low birth weight vs normal birth weight) as dependent variable and maternal periodontitis as independent variable

	Coefficient	Std. error	Wald chi-square	Odds ratio	Lower bound	Upper bound	p-value
Constant	1.941	0.111		17.549	1.723	2.159	0.000
Loss of attachment	-0.109	0.016	-0.439	-6.732	-0.141	-0.077	0.000
Periodontal status	-0.151	0.068	-0.151	-2.228	-0.284	-0.017	0.027

Dependent variable: Birth weight of the child

## CONCLUSION

Since periodontitis and its causes may be associated risk factors for preterm low birth weight babies, it is suggested to include the oral health condition of a pregnant woman along with other risk factors, such as BP, Blood sugar, etc. especially in the rural areas. In cases of necessity, case has to be referred to a dentist for the needful. Health promotion at a community level is essential to prevent Periodontitis to prove the old wives' tale of 'the loss of a tooth for every pregnancy,' wrong. In the present study, periodontal status of the mother was significantly related to delivery of low birth weight babies. Thus, it can be concluded that periodontitis may be associated with delivery of low birth weight babies.

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## ABOUT THE AUTHORS

### Shanthi Vanka (Corresponding Author)

Lecturer, Department of Preventive Dental Sciences, Ibn Sina National College for Medical Studies, Jeddah, Saudi Arabia  
e-mail: shanthiamit@rediffmail.com

### Vrinda Saxena

Professor, Department of Public Health Dentistry, People's College of Dental Sciences and Research Center, Bhopal, Madhya Pradesh, India

### Amit Vanka

Associate Professor, Department of Preventive Dental Sciences, Ibn Sina National College for Medical Studies, Jeddah, Saudi Arabia

### KS Ravi

Assistant Professor, Department of Preventive Dental Sciences College of Dentistry, King Khalid University, Abha, Saudi Arabia