

Effects of periodontal treatment phase I on birth term and birth weight

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Abstract

Considering the high prevalence of preterm birth (PTB) and low birth weight (LBW) and their complications as well as the role played by periodontal disease in their incidence and the lack of any report of periodontal therapy on these problems in Iran, the goal of the present research was to determine the effects of periodontal treatment on PLBW incidence among women with moderate or advanced periodontitis who were referred to Javaheri hospital (2004-2005). This clinical trial research was conducted on 30 pregnant women age ranging from 18-35 years old, with moderate or advanced periodontitis. Fifteen subjects randomly underwent the first phase of periodontal treatment including scaling, root planning and the use of 0.2% chlorhexidine mouth rinse for one week. None of these steps were taken for the controls. After necessary follow ups, the effect of periodontal treatment on birth term and birth weight were analyzed statistically. This research was conducted on 30 subjects, 15 controls and 15 cases in study group. In the control group, the observed rate of PLBW was 26.7% whereas among periodontally treated group, phase I, PLBW infant was not observed ($P < 0.05$). Infants birth weight were (3059.3-389.7) gms in study group and (3371-394.2) gms in the control group and respectively ($P < 0.05$). Periodontal therapy, phase I, results in a reduction in PLBW incidence rate. Therefore, the application of such a simple method among periodontally diseased pregnant women is recommended.

Key words: Birth term, birth weight, periodontal treatment

Preterm birth (PTB) which refers to the delivery of a new born child before the 37th week of pregnancy and low birth weight (LBW) which refers to the birth of a newborn child with a weight equal or less than 2500 gms are grouped under the term of preterm low birth weight (PLB W).^[1] PLBW is one of the highly significant causes for mortality and morbidity among infant.^[2] Approximately 11% of all pregnancies lead to PLBW^[3] and despite considerable progresses in medical care, this rate is increasing in western countries.^[4] PLBW infants are greatly exposed to the risk of a number of acute and chronic disorders such as respiratory distress syndrome, cerebral palsy, heart diseases, epilepsy and severe learning disabilities.^[5]

According to statistics nearly 10% of pregnant women in U.S.A are affected with pre-term delivery causing more than 60% of all neonatal mortality as well as 50% of infants medic care expenses in this country.^[6]

The role of infection as an underlying cause for PLBW has been investigated earlier and have found relationship between periodontal disease and PTB.^[7] It has been found that mothers with PLBW babies have more periodontal problems than the mothers with normal babies.

The rate of PLBW among women treated periodontally has been reported less than those who have not received such a treatment.^[1,7,9]

Considering the importance of this problem and the lack of any related evidence in this country, the aim of this study was to determine the effects of periodontal treatment phase I on pregnant women with moderate or advanced periodontitis.

Materials and Methods

In this randomized clinical trial research, pregnant women in the 18 to 35 year age group with moderate or advanced periodontal disease who were in the 13th to 20th week of pregnancy participated.

Subjects having a history of congenital heart disease requiring prophylactic antibiotics, diabetes, current use of corticosteroids, chronic renal disease, and with the presence of fetal congenial abnormality (evaluated ultrasonically until the 20th week) were excluded.

Periodontal parameters including pocket depth, clinical attachment loss, bleeding on probing were investigated. Pocket depths, from gingival margin to the pocket base, were measured and recorded in millimeter for all teeth except the third molars, at six points using a Williams probe. Clinical attachment loss was also measured in millimeter at surrounding points of each tooth from CEJ to the base of pocket by a Williams probe. Bleeding on probing was evaluated as positive if bleeding was observed within seconds after pocket depth measurement, otherwise bleeding on probing was considered as negative. Subjects, having 4 or more than 4 teeth, with at least one site with pocket depth of (equal or more than 4 mm) and clinical attachment loss of (equal or

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more than 3 mm) were diagnosed with periodontal disease. Following the selection of 30 women, based on the above mentioned criteria, they were randomly divided into two groups. Fifteen women, who were less than 28th week of pregnant, underwent the first phase of periodontal treatment including ultrasonic scaling and hand instrument root planning under local anesthesia with Lidocaine or Mepivastasin, if needed. Maintenance phase of treatment consisted of oral hygiene instructions, use of 0.2% chlorhexidine mouth rinse once a night for one week period and periodontal evaluation once every two weeks prior to delivery.

Control group subjects did not receive any treatment and they were recommended all types of periodontal treatment after delivery. The studied women were also investigated for risk factors including cigarette smoking, genitourinary tract infections, history of PLB delivery, weight before pregnancy and antibiotic therapy due to pregnancy infection. Smoking of more than 5 cigarettes was considered as a criteria for smokers. Women with vaginal or urinary tract infection were suggested to consult with a gynecologist. Mothers weight of less than 50 kg before pregnancy was considered as low weight subjects. Those having obstetric disorders, e.g, gestational diabetes, placenta previa, preeclampsia eclampsia and polyhydramnios were excluded.

Periodontal examinations were repeated after the 28th week of pregnancy for control group and 2nd week after treatment (maximally during the 30th week) for the study group.

Infants weight and delivery time in weeks were recorded.

Data were subjected to chi square, Fisher's exact test and T. C test for statistical analysis.

Results

In this research, 30 pregnant women with moderate or advanced periodontitis were selected. The mean age of control group was 28.4 ± 4.1 whereas that of case group was 29.1 ± 4.3 ($P < 0.7$). None of the subjects were excluded due to abortion, eclampsia, preeclampsia, pregnancy diabetes, placenta previa and polyhydramnios. Individual characteristics and history of disease of all samples are shown in [Table 1] revealing that subjects of both groups had equal level of educational status, history of previous PLBW maternal weight before pregnancy and antibiotic therapy.

Periodontal characteristics, of each group, in preliminary examinations are shown in [Table 2] displayed no statistically significant difference in pocket depth, clinical attachment loss and the percentage of positive bleeding on probing sites between groups ($P > 0.05$).

In the control group repeated periodontal examinations were conducted after 28th week of pregnancy while in the study group at 2 weeks post treatment (maximally in 30th week).

Periodontal characteristics in monitored examinations demonstrate that periodontal problems were resolved in the treat group and significant differences in periodontal characteristics existed between groups ($P < 0.05$) [Table 3].

The mean birth weights were 3059 ± 389.7 gr and 3371 ± 394.2 gr in control and case groups, respectively showing 312 gr or 10.2% increase among case subjects. Such a difference was statistically significant according to t-test analysis ($P < 0.05$).

It should be also mentioned that in control group and infant

Table 1: Differential group distribution of pregnant women by individual characteristics

Individual characteristics PLBW	Urinary infection		Vaginal infection		History of previous		Prepregnancy maternal		Antibiotic therapy		Maternal education	
	No	yes	No	Yes	No	Yes	>50 kg	<50 kg	No	Yes	>12 years	<12 Years
Phase I												
Periodontal treatment												
Control	15	0	12	3	13	2	14	1	12	3	14	1
Group N= 15	(100)	(0)	(80)	(20)	(86.7)	(13.3)	(93.3)	(6.7)	(80)	(20)	(93.3)	(6.7)
Test group	14	1	14		15	0	14	1		13	14	1
N=15	(93.3)	(6.7)	1		(100)	0	(93.3)	(6.7)	2		(93.3)	(6.7)
			(93.3)	(6.7)					(86.7)			
									(13.3)			
P - value	0.4		0.3		0.1		0.5		0.6		0.3	

Table 2: Differential group distribution of pregnant women by periodontal characteristics before treatment

Periodontal parameters phase I treatment	Percentage of sites with PD (4 mm)	PD	Percentage of sites with CAL (3 mm)	CAL	Percentage of sites with positive BOP
Control group N=15	57.1 ± 24.2	2.3 ± 0.4	54.7 ± 21.2	2.2 ± 0.3	13.4 ± 6.4
Test group N=15	72.2 ± 28.9	2.3 ± 0.3	69.8 ± 24.9	2.3 ± 0.3	16.6 ± 7.2
P - Value	0.06	0.6	0.09	0.3	0.2

Table 3: Differential group distribution of pregnant women by periodontal characteristics after treatment.

Periodontal parameters phase I therapy	Percentage of sites with PD 4 mm	PD	Percentage of sites with CAL 3 mm	CAL	Percentage of sites with positive BO
Control Group N=15	68.6 ± 20.2	2.5 ± 0.5	67.1 ± 15.6	2.3 ± 0.4	17.2 ± 3.3
Test group N=15	53.31 ± 18.5	2.1 ± 0.3	41.4 ± 18.4	2 ± 0.3	0.7 ± 4.2
P value	0.04	0.01	0.000	0.03	0.000

(6.7%) with low birth weight less than 2500 gr, was found whereas in periodontally treated subjects no low birth weight infants were found.

In control group, three infants were born before 37th week of pregnancy but among periodontally treated group no preterm low birth infants were observed. There was not any statistically significant difference between groups in the number of preterm infants using Fisher's exact test ($P < 0.11$).

The treatment group had higher mean gestational period ($3 8.5 \pm 0.8$ weeks versus $3 7.9 \pm 1.3$ weeks) [Table 4] than the control group, however, the difference was not statistically significant ($P < 0.06$).

The incidence rate of PLBW, both PTB and LBW, is shown in [Table 5]. showing incidence rate of 26.7% in the control group whereas there was no PLBW infant in the study group. Fisher's exact test proved statistically significant differences, in PLBW incident rate between groups ($P < 0.05$).

The risk of PLBW incidence among control group is several times more than the study group.

Discussion

The findings of this study showed that periodontal therapy significantly reduces the incidence rate of PLBW among pregnant women with moderate or advanced periodontitis. The incidence rate of PLBW, in the control group, was 26.7% whereas no PLBW case was observed in the case group. There was statistically significant difference in the mean birth weight between groups with a 10.2% increase among the

Table 4: C Differential group distribution of pregnant women by gestational period

Birth after 37 th week Phase I periodontal. treat	Yes	No	Total
Control group N=15	12 (80)	3 (20)	15
Test group	15 (100)	-	15
$P < 0.11$			

Table 5: Differential group distribution of pregnant women by PLBW incidence

PLBW incidence Phase I treatment	No	Yes	Total
Control group	11 (73.3)	4 (26.7)	15
Test group	15 (100)	-	15

case group. Lopez et al. showed that periodontal therapy could decrease the rate of PLB incidence in periodontally diseased pregnant women,^[1] however, the studied subjects were not similar in two important risk factors involved in PLBW incidence namely the mean age and marital status.

In the present study, both groups were similar in PLBW influencing factors and significant difference was observed. Mitchell et al. suggested that periodontal therapy in periodontally diseased pregnant women could lead to a reduction in PLBW incidence rate.^[9] Jeffcoat et al. showed that scaling and root planning, among other therapies, played more effective role in the reduction of PLBW rate and the addition of Metronidazole 250 mg times a day for one week was less beneficial.^[7] In the present study periodontal treatment included scaling and root planing and subjects affected with vaginal or genitourinary tract infection were treated by a gynecologist. There was no statistically significant difference in antibiotic therapy between groups. Offenbacher *et al.* showed that pregnant women affected with bacterial vaginal infection showed a decrease in PLBW incidence rate ($P < 0.05$) which could be justified by Metronidazole therapy,^[8] however; in Jeffcoat research Metronidazole therapy associated with periodontal treatment phase I, did not have a influence on PLBW incidence rate.^[7]

Various risk factors are associated with PTB incidence include: low (<17 years) and high (> 37 years) maternal age, African race, low socioeconomic status, inadequate prenatal care, alcohol and tobacco use, hypertension, genitourinary tract infection; diabetes, multiple pregnancies, vaginosis and a history of previous PTB.^[1,6-8] Galloway initially suggested that maternal periodontal disease caused potentially harmful effects on the developing fetus. These findings were not considered important until the time of Offenbacher who stated that periodontal infections could act as reservoirs for gram negative anaerobes and bacterial lipopolysaccharide (LPS) and endotoxin could increase inflammatory mediators including PGE₂, IL-1 and TNF- α and pose a potential threat to the fetal placental unit, even in the absence of genitourinary infection, resulting in preterm labor and premature rupture of membrane.^[8] Comparisons between post partum women with PLBW and their counterparts with normal birth outcome revealed higher levels Bacteroides Forsythus and Campylobacter rectus for the first group.^[9]

Adequate utilization of prenatal care has been associated with improved birth weights and lower risk of preterm de-

livery.^[1] In a lot of investigations, less than 6 prenatal visits have been known as influential risk factors on PLBW incidence.^[1,8,10]

In the present study, all pregnant women were referred to Javaheri hospital for prenatal care on once a month before 28th week of gestation and twice a month thereafter, so the effect of the risk factor was eliminated. There was no statistically significant difference in pre pregnancy weight (less than 50 kg) and history of previous PLBW between groups. The patients were selected from the same hospital and were similar in socioeconomic status.

Periodontal therapy phase I is able to reduce the incidence rate of PLBW. As result, periodontal treatments and oral hygiene instructions are essential to prevent future complications among pregnant women particularly those with periodontitis. Pre pregnancy care and prenatal follow up are thought to be the most reasonable choice.

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