Journal of Periodontal Medicine & Clinical Practice

Vol- I, Issue - 2, May - Aug 2014

www.jpmcp.com

Original Research

Effect of non-surgical periodontal treatment during pregnancy on obstetric outcome: a randomized controlled trial.

Dr. Yash Paul Dev Sharma[1], Dr. Preetinder Singh[2], Dr. Ravleen Sharma[3], Dr. Prabhjot Kaur[3], Dr. Ankur Wahi[3]

Sharma YPD, Singh P, Sharma R, Kaur P, Wahi A. **Effect of non-surgical periodontal treatment during pregnancy on obstetric outcome: a randomized controlled trial. J** Periodontal Med Clin Pract. 2014;01:183-188

Affiliations:

1. Principal, Professor &Head, Department of Periodontology and Oral Implantology, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula, Haryana.
2. Assoc. Prof, Department of Periodontology and Oral Implantology, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula, Haryana.
3. Post Graduate Student, Department of Periodontology and Oral Implantology, Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula, Haryana.

ABSTRACT

AIM AND OBJECTIVES: The aim of the study was to evaluate the effect of intrapregnancy non-surgical periodontal treatment on pregnancy outcomes in terms of gestation age & birth weight.

METHODS: 64 pregnant female patients with periodontitis were selected from the outpatient section of Department of Gynaecology of Swami Devi Dyal Hospital, Panchkula. After the periodontal examination, the participants were randomly allocated to either the test or control group of the study. Test group participants received non-surgical periodontal therapy at the 20-24th week of gestation, which consisted of oral hygiene instructions followed by supra-gingival and sub-gingival scaling and root planning. Control group participants' received only oral hygiene instructions.

RESULTS: Random allocation of participants resulted in well-balanced control and test groups. No significant differences were detected between control and test groups with regard to birth outcome measures of birth weight and gestational age.

CONCLUSION: Intra-pregnancy non-surgical periodontal treatment, completed at 20 to 24 weeks, did not reduce the risk of preterm, low-birth-weight delivery in this population.

KEYWORDS: preterm low birth weight; periodontitis; pregnancy outcome.

INTRODUCTION:

Periodontal tissue destruction occurs as a result of host immune inflammatory processes triggered by specific bacteria contained within a complex microbial plaque biofilm.[1] Chronic oral infections have been associated with a variety of systemic illness including artherosclerotic cardiovascular disease, cerebrovascular ischemia and rheumatoid arthritis. Recently, chronic oral infection in the form of periodontal disease has also been associated with adverse pregnancy outcome including preterm birth.[2] *Offenbacher et al* have provided evidence that untreated periodontal disease in pregnant women may be a significant risk factor for preterm (<37 weeks gestation), low birth weight (<2500g) infants according to the criteria given by WHO.[3]

The following categories have been defined by the World Health Organization:[4]

Low birth weight less than 2,500 g (LBW) (5 lb 8 oz)

Very low birth less than 1,500 g weight (VLBW) (3 lb 5 oz)

Extremely low birth less than 1,000 g weight (ELBW) (2 lb 3 oz)

Prematurity less than 37 weeks of gestation

Very premature less than 32 weeks of gestation

The primary cause of LBW deliveries is preterm labour or Premature Rupture of Membranes (PROM).[5] Throughout normal gestation, amniotic prostaglandin levels raise steadily until a sufficient threshold is reached that induces labour and delivery. Research has examined the relationship between maternal infection and preterm labor, PROM, and LBW delivery. Maternal infection may cause increased amniotic prostaglandin production and may result in labour-inducing levels being achieved before full gestation. In addition to prostaglandins, various proinflammatory cytokines (Interleukin-1, Interleukin-6 or Tumor necrosis factor) have been found in the amniotic fluid of women with preterm labour.[5,6]

The identification of periodontal disease as a potential risk factor for PTB defines a population that could benefit from targeted intervention. This led to the hypothesis that the treatment of maternal periodontal disease, thereby minimizing the effects of periodontal infection during pregnancy, might reduce the incidence of PTB/LBW.

Scientifically, to determine whether periodontal disease conveys any modifiable risk, it is critical to demonstrate that eliminating periodontal disease and preventing periodontal disease progression in pregnant women results in a decreased incidence of preterm birth and associated low birth weight. A number of intervention trials that tested this hypothesis have also subsequently produced conflicting results.[7-9] Lopez et al[7] provided the first direct test of this association.

So this study was conducted to evaluate the effect of non-surgical periodontal treatment done during 20-24th week of gestation, on pregnancy outcomes in terms of gestation age & birth weight.

MATERIALS AND METHODS:

TYPE OF STUDY SUBJECT: For this randomised control clinical trial study, 64 pregnant female patients with periodontitis were selected from the outpatient section of Department of Gynaecology of Swami Devi Dyal Hospital, Panchkula. Ethical approval was obtained from the Ethical Committee of the institution and all participants gave written consent for the participation in the study.

INCLUSION CRITERIA:

1. Pregnant females between 18 to 34 years of age.
2. Pregnant females who had singleton pregnancy.
3. Pregnant females who had ≥ 20 teeth.
4. Pregnant females having periodontal disease, which was defined as the presence of probing depths (PD) ≥ 4mm at four or more sites and clinical attachment loss (CAL) ≥ 4mm at four or more sites.

EXCLUSION CRITERIA:

1. Females who were having any medical complications- diabetes or any pregnancy complications were excluded from the study.
2. Patients who had antibiotic prophylaxis in the last 12 months.
3. Patients who had aggressive periodontitis requiring urgent intervention were excluded from the study.

SOURCE OF DATA:

Subjects satisfying the inclusion and exclusion criteria of the present study were selected from amongst the patients visiting the Out Patient Department (OPD) outpatient section of Department of Gynaecology of Swami Devi Dyal Hospital, Panchkula. Pregnant females were approached during their antenatal booking appointment at the end of the first trimester of pregnancy,

before week 22 of gestation, and were provided with verbal information about possible participation in the project. In total, 73 females were approached, and 64 consented to complete the screening process. Periodontal status was assessed in the antenatal clinic, with the females in a relatively upright position and illumination provided by an angle-poised examination light.

BASELINE EXAMINATION:

At the baseline visit to the Department of Periodontology & Oral Implantology of Swami Devi Dyal Dental College & Hospital, Panchkula, all periodontal examinations were performed by one examiner to caliberate. Four Periodontal clinical measurements were recorded:

1. Plaque Index: the presence or absence of plaque, scored dichotomously (0 = absent, 1 = present) as per Ainamo and Bay.[10]
2. Probing Depth using a periodontal probe.
3. Bleeding on Probing: the presence or absence of bleeding on probing within 30 seconds of measurement of Probing Depth, scored dichotomously (0 = absent, 1 = present) as per Ainamo and Bay.[10]
4. Clinical Attachment Level: taking Cementoenamel junction (CEJ) as reference point.

STUDY DESIGN:

After the collection of all the clinical parameters, the participants were randomly allocated to either the control or test group. Random allocation to one of the two groups resulted in the following:

1) The **test group** (n = 32) participants received non-surgical periodontal therapy that was completed by the end of week 24 of gestation. This consisted of oral hygiene instruction, followed by supragingival and subgingival scaling and root planing (SRP) of sites with PDs ≥4 mm and polishing of all the teeth. Periodontal therapy was performed over two 1- hour sessions.

2) The **control group** (n = 32) participants received oral hygiene instruction only.

Post treatment clinical periodontal related data were collected at a subsequent review appointment 8 weeks after treatment for 32 participants in the test group. All control participants were offered the opportunity to attend for nonsurgical periodontal therapy postpartum.

Statistical Analyses

The independent samples t test was used to compare differences between the test and control groups in relation to these outcomes, with the level of significance set at $p < 0.05$. Analysis of covariance (ANCOVA) for possible confounders was also performed. Data that were not normally distributed were analyzed using the Mann-Whitney U and Wilcoxon signed-ranks tests. Statistical analysis was performed using software SSPS 1.5 version.

RESULTS:

BASELINE CHARACTERISTICS (Table 1)

The test (n = 32) and control (n = 32) groups were well balanced for age, weight, height, and body mass index (BMI) at antenatal booking, which occurred on average at 97.8 days for the test and 98.5 days of gestation for the control participants. The study groups were also balanced in relation to periodontal condition, with high levels of plaque and gingival bleeding. The obstetric history was similar in the females randomized to the two groups of the study with no statistically significant differences between the participants in each group identified.

Baseline Characteristics	Test (n=32)	Control (n=32)
Maternal Booking details		
Age (years, mean ± SD)	29.5 ± 5.5	30 ± 4.5
Weight (kg, mean ± SD)	70.4 ± 12.8	72.1 ± 9.7
Height (cm, mean ± SD)	165.6 ± 5.3	163.5 ± 6.7
Gestation (days, mean ± SD)	97. 8 ± 10.4	98.5 ± 10.8
Never Smokers (n,%)	20 (62.5%)	18 (56.25%)
Past Smokers (n, %)	12 (37.5%)	14 (43.75%)
Periodontal Status		
PDs ≥ 4mm (mean ± SD sites)	36.2 ± 17.5	35.1 ± 16.7
CAL ≥ 4mm (mean ± SD sites)	33.4 ± 18.3	31.3 ± 1.7
Plaque (mean ± SD sites)	121 ± 24	117 ± 29
BOP (mean ± SD sites)	117 ± 21	118 ± 25

PTB= preterm birth; LBW= low birth weight

TABLE 1: baseline characteristics and demographic data at initial assessment

Effect of Treatment on Clinical Parameters (Fig 1): Analysis of clinical parameters before and after treatment in the test group revealed that the data were not uniformly distributed. Data showed a statistically significant improvement in all clinical parameters recorded after non-surgical therapy and thus a favorable treatment response in this group. 10 sites out of 21 sites of test participants demonstrated a reduction in the number of PDs ≥4 mm after treatment. 11 out of 29 sites showed a reduction in the number of sites with CAL ≥4 mm. Statistically significant post treatment reductions in the number of sites exhibiting plaque and BOP were detected and consequently in the corresponding data for both of these variables with regard to the percentage of sites involved.

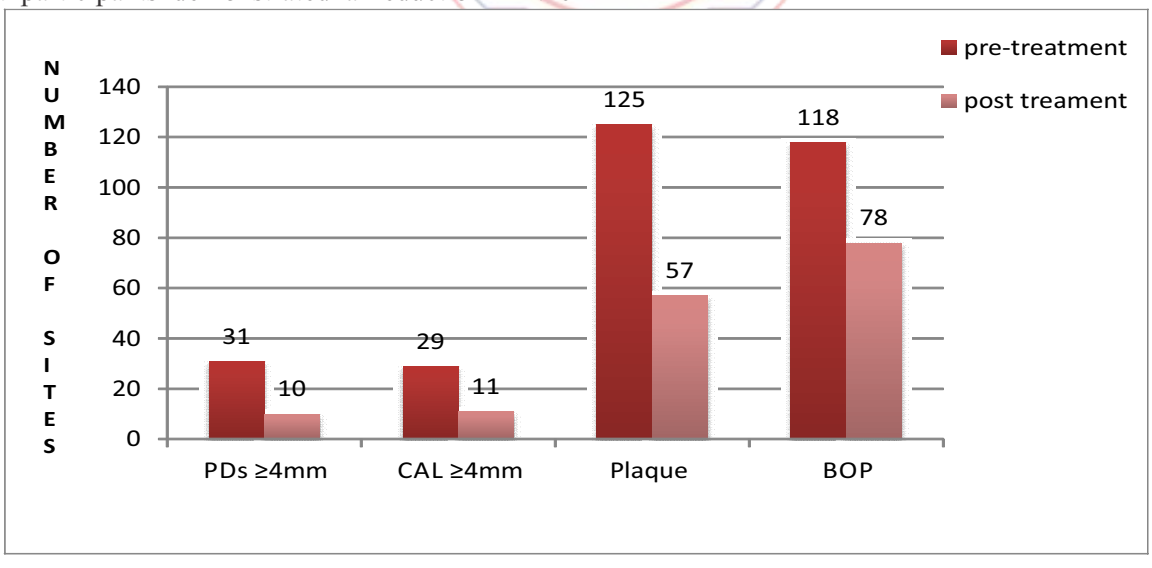

Fig.1. Clinical Parameters recorded at 8 weeks review after Periodontal Treatment in Test Group. ($p < 0.001$)

PTB and Preterm LBW Deliveries (Table 2):

There were eight babies delivered preterm at gestational days 172 to 257 out of which 6 were in the test group and 2 were in the control group. Two of these babies of test group mothers had normal birth weight (≥2.5kg), whereas the others were LBW i.e. <2.5 kg (1for test and 1 for control group). The smallest baby was born in the control group, with a birth weight of 0.6 kg. He was delivered at 172 days and subsequently died at 23 days.

Infants	Gestation Age (days)	Birth Weight (gm)	Sex	Study Group
1	172	600	Male	Control
2	195	940	Female	Test
3	237	1880	Female	Test
4	245	1910	Female	Control
5	245	2450	Female	Test
6	251	2500	Male	Test
7	255	2350	Male	Test
8	257	2670	Female	Test

Table 2: Key Details Related to PTB/PLBW deliveries

DISCUSSION:

The main finding of this randomized controlled intervention trial was that the non-surgical treatment of maternal periodontal disease, completed at 20 to 24 weeks of pregnancy, did not affect the risk of an adverse pregnancy outcome. No significant differences were detected between control and test groups with regard to the primary outcome measures of gestational age and birth-weight Standard Deviation Score (SDS). A slightly lower gestational age was determined for test group births, and the mean birth weight was also reduced, albeit very slightly. There were no significant differences between groups for the secondary birth outcome measures, including birth length. The null effect of treatment on birth outcome may be a consequence of the timing of periodontal treatment. [6-10] It is possible that, by the time maternal periodontal disease is diagnosed and subsequently treated during pregnancy, it may already be too late to improve the birth outcome. One proposed biologic mechanism linking periodontal disease and PTB and/or LBW is the translocation, via the systemic circulation, of periodontal pathogens and their virulence factors to the fetal–placental unit, inducing a local increase in cytokine release and subsequently early labor. The inflammatory

cytokines IL-8, IL-1b, and IL-6 are increased in intrauterine infection, preterm labor, and indeed term labor, regardless of the infection status.

CONCLUSION:

- The results of the study, combined with the findings of other recently published intervention studies, do not support the suggestion that nonsurgical periodontal treatment, performed during weeks 20 to 24 of pregnancy, influences obstetric outcomes in terms of gestation age & birth weight.
- Further studies are needed to demonstrate conclusively that periodontitis is indeed responsible for the PTB and LBW.

References:

1. Ebersole JL, Novak MJ, Michalowicz BS, Hodges JS, Steffen MJ, Ferguson JE et al. Systemic Immune Responses in Pregnancy and Periodontitis: Relationship to Pregnancy Outcomes in the Obstetrics and Periodontal Therapy (OPT) Study. J Periodontol 2009;80:953-960.
2. Lieff S, Boggess KA, Murtha AP, Jared H, Madianos PN, Moss K, Beck J, Offenbacher S. The Oral Conditions and Pregnancy Study: Periodontal Status of a Cohort of Pregnant Women. J Periodontol 2004;75:116-126.
3. Offenbacher S, Lin D, Strauss R, McKaig R, Irving J, Silvana P. Effects of Periodontal Therapy During Pregnancy on Periodontal Status, Biologic Parameters, and Pregnancy Outcomes: A Pilot Study. J Periodontol 2006;77:2011-2024.
4. Offenbacher S, Jared HL, O'Reilly PG, Wells SR, Salvi GE, Lawrence HP, Socransky SS, Beck JD. Potential Pathogenic Mechanisms of Periodontitis- Associated Pregnancy Complications. Ann Periodontol 1998;3:233-250.
5. Hill GB. Preterm Birth: Associations With Genital and Possibly Oral Microflora. Ann Periodontol 1998;3:222-232.
6. Ovadia R, Zirdok R, Diaz-Romero RM. "Relationship between pregnancy and periodontal disease," Facta Universitatis. Series Medicine and Biology, vol. 14, no. 1, pp. 10–14, 2007.
7. Lopez NJ, Smith PC, Gutierrez J. Periodontal therapy may reduce the risk of preterm low birth weight in women with periodontal disease: A randomized controlled trial. J Periodontol 2002;73:911-924.
8. Radnai M, Pal A, Novak T, Urban E, Eller J, Gorzo I. Benefits of periodontal therapy when preterm birth threatens. J Dent Res 2009;88:280-284.
9. Newnham JP, Newnham IA, Ball CM, et al. Treatment of periodontal disease during pregnancy: A randomized controlled trial. Obstet Gynecol 2009;114:1239-1248.
10. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. Int Dent J 1975;25: 229-235.

Competing interest / Conflict of interest The author(s) have no competing interests for financial support, publication of this research, patents and royalties through this collaborative research. All authors were equally involved in discussed research work. There is no financial conflict with the subject matter discussed in the manuscript.
Source of support: NIL