Original Research

Effect of non surgical periodontal therapy on the incidence of preterm and low birth weight infants - A case control study

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ABSTRACT

BACKGROUND: The role of infection as an underlying cause for Preterm Low Birth Weight(PLBW) has been investigated and it has been found that mothers with periodontitis deliver more PLBW infants than the mothers with healthy periodontium.The rate of PLBW among women treated periodontally has been reported less than those who have not received such treatment.
AIM: To study the effect of non surgical periodontal therapy on the incidence of preterm and low birth weight infants.
MATERIALS AND METHODS: Sixty pregnant women with periodontitis between 14-26 weeks of gestation were taken into the study. Simplified oral hygiene index, Gingival bleeding index , and Community periodontal index of treatment needs were recorded. Only 30 women in the treatment group received periodontal therapy which included plaque control instructions and scaling and root planing and those in the control group received no periodontal treatment . The gestational age at the time of parturition was recorded, the type of delivery and the weight of the neonate were recorded.
RESULT: 81.7% of the infants delivered were of normal weight and 18.3% were low birth weight. 13.3% in the control group and 23.3% of the case group had low birth weight infants. 3.3% in both the control and case group had premature infants.
CONCLUSION: The study showed no significant effect of periodontal therapy on the incidence of low birth weight and premature infants.

KEYWORDS: Preterm, low birth weight, scaling and root planing.

INTRODUCTION

Preterm birth refers to the delivery of a new born child before the 37th week of pregnancy and low birth weight refers to the birth of a newborn child with a weight equal or less than 2500 gms[1]. Pre term Low Birth Weight (PLBW) is one of the highly significant causes for mortality and morbidity among infant. 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[2,3].

The role that infection plays in the preterm rupture of membranes leading to preterm delivery has been the focus of much research in recent years . Maternal infections during pregnancy have been demonstrated to perturb the normal cytokine and hormone-regulated gestation, resulting in preterm labor, preterm rupture of membranes, and preterm low birth weight (PLBW) i.e.,<2500 gms and <37 weeks of gestation.

The genitourinary tract infection in pregnancy has been established as one of the main reasons for preterm low birth weight . The mechanism explaining the hypothesis of chronic infection and premature birth is that microorganisms or their products enter the uterine cavity either through the ascending route in Genitourinary tract infections or through the circulation in non genital infections. Once they have gained access to the uterine cavity, they can stimulate an inflammatory cytokine cascade with increased production of pro-inflammatory mediators such as IL-1β and TNFα. These eventually lead to elevated

synthesis, which causes uterine contraction, cervical dilation and premature rupture of membranes[4].

In the early 1990s Offenbacher and his group hypothesized that oral infections, such as periodontitis, could represent a significant source of both infection and inflammation during pregnancy . He hypothesized that periodontal infections, which serve as reservoirs for gram-negative anaerobic organisms and inflammatory mediators may be a potential threat to the fetal-placental unit[5,6].

Studies provide a significant association between poor periodontal health of the mother as an independent risk factor for PLBW. It has been found that mothers with PLBW babies have more periodontal problems than the mothers with normal babies[7,8,9,10,11] Pregnant women with periodontitis who underwent scaling and root planing during pregnancy had a lower rate of preterm birth compared with women who did not receive periodontal treatment until after parturition[10].

In the present-case control study, an attempt was made to determine whether treatment of periodontal infection in expecting mothers could be associated with low risk of preterm labor, which in turn may also result in low birth weight babies.

MATERIALS AND METHODS

Study population:
Over 90 pregnant women who visited the maternity clinic and hospital V. K Nursing home, Chennai, in their second trimester pregnancy were interviewed and briefed about this study, with request for enrolment. All the available evidence linking poor periodontal health to adverse pregnancy out come and the possible benefit arising out of the timely intervention were explained, to the patient. Further they were assured that all dental treatment would be rendered free. However only 60 patients consented to participate in the study, the main reason for non-participation were found to be belief that dental problems during pregnancy can be postponed to a later date following delivery.

Criteria for selection:
The patients aged between 18-30 years with primiparous or second gestation were included in this case control study. All the patients were between 14-26 weeks of gestation and were followed till they delivered the babies. Patients with systemic diseases and having obstetric disorders were excluded.

Data collection:
Data regarding pregnancy status, gestation period in weeks, the number of previous births and birth weight of previous births were recorded. Patients were evaluated for socioeconomic status, nutritional status, infections, toxic exposures through personal questionnaire. Dental treatment before and during pregnancy and oral hygiene practices were also assessed.

Clinical examination:
A full mouth periodontal examination was performed on all the selected patients. The oral examination was done with the help of artificial light source, mouth mirror and a CPITN probe.The indices used in the present study included Simplified Oral Hygiene Index (OHI-S), Gingival bleeding index by Ainamo and Bay, and Community periodontal index of treatment needs.

Periodontal therapy:
Among the 60 patients only 30 in the treatment group received non-surgical periodontal therapy during the gestational period, and those in the control group agreed only for screening and were not willing for treatment . Periodontal therapy included plaque control instructions and scaling and root planing performed under local anaesthesia and Chlorhexidine gluconate 0.2% anti microbial rinse. The gestational age at the time of parturition was recorded,the type of delivery and the weight of the neonate were recorded.

Results & statistical analysis :
The statistical software namely SPSS 11.5 was used for the analysis of the data . Data is analyzed statistically by computing mean and standard deviation. The statistical inference is obtained by applying chi-square test. The result is considered significant if $p \leq 0.05$.

General demography :
60 participants aged between 18-30 yrs were included out of which 38 were primiparous and 22 were second gestation. The maternal weight ranged from 50-65kgs. No history of toxic exposure to either smoking or alcohol was present in the 60 pregnant women.

Pregnancy outcome and birth weight:
Out of the 60 pregnant women recruited in the study 30 underwent scaling and root planning and 30 availed no treatment. The entire group was given oral hygiene instructions. The gestational age at delivery ranged from 29 wks to 40 wks and The weight of the babies ranged from 2.0kg to 3.9kg. 81.7% of the infants delivered were of normal weight and 18.3% were low birth weight. All the participants in the study delivered live babies.

Periodontal parameters:
Periodontal pocket:
13.3% in the control group and 23.3% of the case group had low birth weight infants(Table 1). 3.3% in both the control and case group had premature infants (p value 0.690 $p > 0.05$ in the control and p value 0.575 $p > 0.05$ in the case group).

The results show no co-relation between the presence of periodontal pockets and the incidence of low birth weight and premature infants (table 2).

Birth weight of the neonate

			Group		Total
			Without Treatment	Treatment	
Bright Weight of the neonate	Yes	Count	4	7	11
		% within Group	13.3%	23.3%	18.3%
	No	Count	26	23	49
		% within Group	86.7%	76.7%	81.7%
Total		Count	30	30	60
		% within Group	100.0%	100.0%	100.0%

results of the present study gave an insight into the fact that there are several myths related to pregnancy, which are embedded deep in the minds of Indian women due to their socio-religious beliefs. Of over 90 patients interviewed only 60 participated and completed the study. The study sample was obtained from a homogenous population with respect to age, race and socioeconomic class. During the course of the study it was apparent that there was very little knowledge about the influence of periodontal disease on pregnancy outcome.

Incidence of preterm delivery in the study group

Group	Total	Preterm Delivery	
		Count	Percentage
Treatment	30	1	3.3%
No Treatment	30	1	3.3%

Gingival bleeding with birth weight of the neonate and delivery

Group	Gingival bleeding				Bright Weight of the neonate		Total
					LBW	Normal	
Without Treatment	Present	Delivery	Preterm	Count		1	1
				% of Total		3.3%	3.3%
			Term	Count	4	25	29
				% of Total	13.3%	83.3%	96.7%
		Total		Count	4	26	30
				% of Total	13.3%	86.7%	100.0%
Treatment	Present	Delivery	Preterm	Count		1	1
				% of Total		3.3%	3.3%
			Term	Count	4	22	26
				% of Total	23.3%	73.3%	96.7%
		Total		Count	4	23	37
				% of Total	23.3%	76.7%	100.0%

Gingival bleeding:

13.3% in the control group and 23.3% of the case group with gingival bleeding on probing with Ainamo and Bay bleeding index showing more than 75% sites bleeding had low birth weight infants. (p value 0.690 p> 0.05 in the control and p value 0.575 p> 0.05 in the case group) the results show no co-relation between the presence of gingival bleeding and the incidence of low birth weight and premature infants(table 3).

Discussion:

In 1996 Offenbacher et al first demonstrated an association between periodontal infection and adverse pregnancy outcomes in humans[6]. Jeffcoat and Hauth[12] reported that maternal periodontitis was an independent risk factor for preterm birth[10] .Pregnant women with periodontitis who underwent scaling and root planing during pregnancy had a lower rate of preterm birth compared with women who did not receive periodontal treatment until after parturition.

In the present case control study, an attempt was made to determine whether the treatment of periodontal infection in expecting mothers could be associated with low risk of preterm labor and low birth weight babies. At the outset results of the present study failed to support a proposed link between pre-term and low birth weight infants and periodontitis. The method used in this present study attempted to control some of the known risk factors of PLBW. Women aged from 18-30 years were selected as maternal age under 18 and over 35 have been found to be risk factors for PLBW. 60 pregnant women participated and completed the study with 30 case and 30 control groups out of which the case group underwent scaling and root planning. It is nevertheless ethically questionable to have a control group in such a study which often is a question of mortality and morbidity The control group were pregnant women who wanted only a routine screening.

In the present study using chi-square analysis, it was found that preterm and low birth weight was not significantly associated with periodontal disease.The previous records obtained through personal interviewing of mothers in both the case and control groups did not show significance for obstetric risk factors like, Gravida, Parity and previous LBW except for earlier spontaneous abortions which was positive in 3 controls and they delivered LBW children.

In the Indian mothers, the incidence of smoking and alcohol use, two traditional risk factors for preterm low birth weight are very low. In the present study, since all the patients gave a negative history with respect to toxic exposure, no conclusions could be drawn on the effects of tobacco smoking and alcohol and preterm low birth weight. Pregnancy associated localized gingival enlargements were seen in two of the participants.

Periodontal examination conducted at a point of time is a measure of past periodontal experience of an individual. Considering this fact, in the present study, the periodontal status of the pregnant women was assessed using CPITN index.

No co-relation could be elicited between the presence of periodontal pockets, the incidence of low birth weight and premature infants as only 11 patients in the entire study group had low birth weight infants and 2 had preterm delivery. The results points out to the fact that periodontitis could not be an independent risk factor for preterm low birth weight delivery. The results are supported by other similar studies by Bryan S.Michalowicz[13] et al , Moore[14] et al,S.Farrel[19] et al , Lunardelli[15] et al, that periodontal disease is not an independent risk factor for preterm low birth weight.

Moore et al[14], Esplin et al[16],Crider et al [17] has proposed that gene polymorphisms which increase the inflammatory response could be the reason for preterm rather than periodontal disease. However, the present study had some limitations like small sample size so statistical tests could not be performed. No attempts were made to estimate the levels of inflammatory mediators, α fetoprotein, fibronectin, alkaline phosphatase which could have influenced the outcome of pregnancy. Other confounding factors like number of prenatal visits, stature, short cervical length etc were not controlled More studies needs to be done with larger sample size,estimation of inflammatory mediators,and other factors which increase the risk for preterm labor. Gene polymorphisms which lead to increased inflammatory mediators need to be identified in order to strengthen the correlation or reject the supposed link between maternal periodontal disease and preterm delivery.

Summary & conclusion:

The correlation between periodontal disease and pregnancy has been under investigation for over a decade, but the quest is still inconclusive.The present study endeavored to examine the possible effect of periodontal disease and its therapy in association with preterm low birth weight. In the present case-control study, no co-relation could be elicited between the presence of periodontal pockets, the incidence of low birth weight and premature infants.

The results obtained in this study, provides additional evidence that periodontal disease in pregnant women is not an independent risk factor for preterm low birth weight. However it remains to be seen whether larger studies can strengthen or oppose this link between periodontal diseases and preterm low birth weight.

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