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Original Research

Chronic periodontitis and risk of fetal intrauterine growth retardation in pregnant ladies: a case control study

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ABSTRACT:
Objective: The objective of the study was to determine whether periodontal disease is associated with risk of fetal intra uterine growth retardation (IUGR) in pregnant females. **Method:** It was a case control study which consisted of a sample size of 100 patients divided into groups: Test group consisted of 50 pregnant females who had fetal IUGR diagnosed with ultrasound and control group consisted of 50 pregnant females with healthy pregnancy. Clinical parameters assessed were Gingival Index (GI), Probing pocket depth (PD) and Clinical attachment level (CAL). All parameters were recorded at baseline. **Result:** Results showed a significant difference between the two groups. All parameters were significantly raised in test group as compared to control group. **Conclusion:** Based on the results of the study it was concluded that pregnant females with fetal IUGR were at higher risk of periodontal disease as compared to females without IUGR. Thus, it can be concluded that periodontal disease may act as an important risk factor for IUGR in pregnant females.
Keywords: Chronic Periodontitis**,** IUGR, periodontal disease, pregnancy, risk factor.

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INTRODUCTION

In both developing and developed countries, about four-fifths of low birth weight infants are born preterm and a fifth of these preterm births are due to intrauterine growth restriction (IUGR). IUGR entails two distinct processes: constitutional smallness, or pathological[1]. The etiology of IUGR remains undetermined, but several risk factors can be associated with this condition which include advanced maternal age, smoking during pregnancy, low pre-pregnancy body mass index and low gestational weight gain (due to low energy intake),poor maternal nutrition, and low socioeconomic status being some of the important risk factors. Maternal, placental and fetal infections are strongly implicated in the development of IUGR[2].Periodontal disease is initiated by overgrowth of certain bacterial species, with a majority of gram negative, anaerobic bacteria growing in subgingival sites. The host response to periodontal pathogens causes persistent inflammation and the destruction of periodontal tissues that support teeth leading to clinical manifestation of the disease[1]. Evidence suggesting associations between periodontal disease and increased risk of systemic diseases such as atherosclerosis, myocardial infarction, stroke, diabetes mellitus, and adverse pregnancy outcomes are numerous[3].

Since Offenbacher et al. first reported an association between periodontal disease and preterm low birth in1996, adverse pregnancy outcomes that have been linked to periodontal disease include preterm birth, low

birth weight, miscarriage or early pregnancy loss and pre-eclampsia. Periodontal disease has a possibility to influence pregnancy outcome through an indirect mechanism, involving inflammatory mediators or a direct bacterial assault on the amnion and causing IUGR. Therefore, the aim of this study is to highlights the relationship between pregnancy IUGR and periodontal disease[4].

MATERIALS AND METHODS

STUDY DESIGN

The study is designed to establish Chronic Periodontitis as a risk for IUGR. Around 100 pregnant females with 26-28 weeks of pregnancy were selected for this study. The selected patients were divided into 2 groups of 50 patients each. **Group I (Test)** included patients diagnosed with IUGR by ultrasound. **Group II (Control)** included patients with normal intra uterine growth.

CLINICAL PARAMETERS

Clinical examination[5] included intraoral examination and a detailed periodontal examination. The periodontal examination included examination of

- Gingival Index (GI)
- Probing pocket depth (PD)
- Clinical attachment level (CAL)

IUGR is diagnosed when ultrasound-estimated fetal weight is below the 10th percentile for gestational age. A diagnosis of IUGR implies a pathologic growth restriction responsible for low fetal weight[6,7]. Small for gestational age (SGA) is another term that defines a fetus with an estimated weight below the 10th percentile; however, the term SGA does not imply a pathological condition causing low fetal weight. Approximately 70 % of SGA fetuses are constitutionally small, meaning they are small but healthy. The remaining are fetuses with IUGR, which are at high risk for perinatal complications and therefore require more intensive surveillance[8].

Inclusion criteria:

- Pregnant females aged between 20-35 years
- Pregnant females with uncomplicated pregnancy
- Pregnant females with single pregnancy
- Pregnant females who were able to give informed consent.
- Pregnant females with at least 20 non crowded teeth

Exclusion criteria:

- Pregnant females with any known systemic disease
- Pregnant females on any medication
- Current or past use of tobacco or smoking
- Current or past use of alcohol
- High risk gestation

Both the groups were then subjected to clinical examination. GI, PD and CAL were recorded for each female. The periodontal examination was performed with the woman supine on a hospital bed. Full-mouth periodontal examination was performed by the same investigator Measurements of probing depth (PD) and clinical attachment loss (CAL) were made six sites for tooth using William's periodontal probe (Hu-Fredy, Chicago, IL, USA). The PD was recorded at each location as the distance from the gingival margin to the most apical extent of probe penetration. Clinical attachment levels were determined using the cemento-enamel junction as a reference point. PD and CAL measurements were recorded to the nearest higher millimeter using a periodontal probe. The data obtained was subjected to statistical analysis.

RESULTS:

The statistical analysis of the data collected revealed that the mean gingival index in Group I was 2.4 and in Group II was 2.1 with a mean difference of 0.34. There was not much difference between the two groups (Table 1). The mean probing depth in group I was 7.78 whereas in group II it was 4.08 with the mean difference of 2.70 which was statistically significant (Table 2). Also, it was observed that the mean CAL in Group I was 6.8 and in group II was 1.6 with a standard deviation of 0.61 & 0.22 and a mean difference of 5.26. There was a statistically significant difference between the two groups (Table 3).

Table 1: COMPARISON OF MEAN GINGIVAL INDICES BETWEEN GROUP I and GROUP II

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	P Value
Gingival Index	Pregnant females with IUGR	50	2.44	0.44	0.081	0.34	0.015
	Pregnant females with normal pregnancy	50	2.10	0.61	0.111		

Table 2: COMPARISON OF MEAN PROBING DEPTHS BETWEEN GROUP I and GROUP II

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	P Value
Probing Depth	Pregnant females with IUGR	50	7.78	0.67	0.123	2.70	<0.001
	Pregnant females with normal pregnancy	50	4.08	0.43	0.079		

Table 3: COMPARISON OF MEAN CLINICAL ATTACHMENT LEVELS BETWEEN GROUP I and GROUP II

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	P Value
CAL	Pregnant females with IUGR	50	6.87	0.61	0.111	5.26	<0.001
	Pregnant females with normal pregnancy	50	1.61	0.22	0.041		

DISCUSSION:

The results of this case-control study support the hypothesis that maternal periodontal infection provides an enhanced risk for adverse pregnancy outcomes like IUGR and the same has been examined using various clinical research designs. Human case-control studies have demonstrated that women who have low birth weight infants as a consequence of either preterm labor or premature rupture of membranes tend to have more severe periodontal disease than mothers with normal birth weight infants[9].

In our study the gingival index is used as a method for assessing the severity and quantity of gingival inflammation in individual patients or among subjects in large population groups. In the present study the mean gingival index in Group I was 2.4 and in Group II was 2.1 with a mean difference of 0.34. The probing depth was also high group I as compared to the control group which indicate an increase in severity of periodontal disease in pregnant females with IUGR as compared to those with appropriate fetus growth. This is in accordance with the study conducted by Kayer et al 2015[10] which also demonstrated higher values of periodontal indices in pregnant ladies with IUGR as compared to control group indicating that increased risk of periodontal disease can affect the pregnancy outcomes as well as the growth of fetus.

In our study clinical attachment level (CAL) assessment provides information relating to the gain or loss of connective tissue attachment to the root surface, and seems to be the most appropriate method to determine if the disease is progressive (active), when a significant loss of attachment has occurred with time.[11]The mean CAL in Group I was 6.8 and in group II was 1.6 with a standard deviation of 0.61 & 0.22 and a mean difference of 5.26. There was a statistical significant difference between the two groups. This was in accordance with another study by Offenbacher et al (1996) in which they used clinical attachment level as a measure of periodontal health[4]**.**Other study with similar results which showed a significant increase in mean value of CAL in the periodontitis group than the control group[4]is of Faghihi et al 2009 in CAL was significantly higher in test group compared to the control group both men and women.[12]

It is well-known that smoking, ethnicity, low educational, and socioeconomic levels were also major risk factors for periodontal disease[13,14] and may confound the association between periodontitis and LBW[15] .Thus, smokers were excluded from the present study. The women in our groups were similar and relatively homogenous based on the low educational and socioeconomic factors.

As the maternal age has been regarded as one of the risk factor for PLBW, [16] we selected the subjects aged18–34 years. Boggess and colleagues also observed that the incidence of small for gestational age increased with periodontal disease severity[17]. These findings are consistent with observations by several other investigators. In a study of Brazilian women, Siqueria and colleagues found increased odds of IUGR (adjusted OR 2.06, 95% CI 1.07, 4.19) among women diagnosed with periodontitis[18]. Similarly, Kumar and colleagues reported an increased association between periodontitis and IUGR, which was attenuated after adjusting for confounders[19]. The associations that we report are very similar to those of the Brazilian study. By comparison, earlier studies have reported prevalence rates of 56–61% for maternal periodontitis[20,21]. It should be noted that while we and Siquiera and colleagues[18]observed an increased odds for growth restriction with periodontal disease, other studies did not find such a relationship[22].

Adverse pregnancy outcomes (APOs) are serious events that every year cause the death or disability of many newly born infants worldwide[23]. The most common adverse pregnancy outcomes are represented by low birth weight (LBW) and preterm birth (PTB). Little reduction in incidence of adverse pregnancy outcomes has occurred despite advances in technology, promotion of prenatal care, and continued scientific efforts.

Investigations to detect the potential causative factors for adverse pregnancy outcome include infection and/or inflammation in the reproductive tract and at sites remote from the feto-placental unit. The relationship between adverse pregnancy outcomes and maternal periodontal infections has been studied extensively over the past 10 years, as periodontal infection is most prevalent in populations with highest risk of adverse pregnancy outcomes. The present study also aims to conclude an association between periodontal disease and increased risk for IUGR in pregnancy.

CONCLUSION:

Medical science aims at reducing the risk factors involved in the growth and development of a baby in the womb. Periodontal diseases go unnoticed in the initial stages of disease process. The inflammatory load of periodontal disease can enter the systemic circulation and can be a risk factor for several host tissues and physiological activities. There is definite link between periodontal diseases and adverse pregnancy outcomes, through direct or indirect mechanisms. The direct action of perio-pathogenic organisms on amnion and indirect action through systemic circulation by production of inflammatory mediators can be risk for adverse pregnancy outcomes like IUGR. It is well accepted that oral prophylaxis and nonsurgical periodontal therapy can be rendered to pregnant women in the second trimester. It is better to consider periodontal disease as a risk factor for adverse pregnancy outcome, as thorough oral health maintenance helps the pregnant women attain a better oral health which is part of general health.

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