ORIGINAL ARTICLE

Association Between Periodontal Diseases and Preeclampsia

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ABSTRACT

Objective: The goal of this study is to examine whether or not periodontal disease is linked to preeclampsia.
Methodology: One hundred participants (fifty cases and fifty controls) were recruited in the research after providing informed consent. Demographic details such as age, address, smoking, and parity was recorded. All periodontal disease pregnant women were allotted in cases group and normotensive pregnant women were allotted control group, the association between the two groups was investigated by applying O.R and chi square test.
Results: Mean age was calculated as 25.81+3.91 years in cases and 24.71+5.73 years in control group, mean gestational age was 37.11+3.62 weeks in cases and 38.11+3.24 weeks in control group. The association of periodontal diseases and pre-eclampsia shows that 24(48%) in cases and 10(20%) in control group, O.R 3.69 and p-value=0.003.
Conclusion: We came to the conclusion that there is a high link between the association between periodontal diseases and preeclampsia.
Keyword: Pregnant women, periodontal disease, preeclampsia, association

INTRODUCTION

It has been postulated that periodontitis and subsequent immunological responses may contribute to unfavorable pregnancy outcomes (gestational diabetes, preeclampsia, low birth weight(LBW), and perinatal mortality).[1] Periodontal disease(PD), including gingivitis and periodontitis, are a pathological condition resulting from infection and characterised by an immune-inflammatory response.[2]

Periodontitis is a widely prevalent condition, affecting over 30% of individuals in various populations.[3] Its prevalence among pregnant women ranges from 5% to 20%.[4] It is evident in literature that due to alteration in oestrogen and progesterone levels in pregnant women have a significant effect on inflammatory response and subgingival microbiota due to modulation of cytokines, enzymes, chemotaxis and antioxidants produced because of polymorphonuclear leukocytes, gingival fibroblasts and periodontal ligament cells. However, remain as largely unknown changes.[5] In addition, investigators suspect that inflammatory mediators including cytokines and pathogens may play a role in the development of PD.[4]

Periodontitis has been independently associated to a number of pregnancy problems.[6] One probable explanation is that inflammatory mediators such interleukin-1 (IL-1), IL-6, IL-8, tumour necrosis factor alpha (TNF alpha), and prostaglandin E2 (PGE2) have an effect on the fetus-placenta unit..[7-8] Bacteremia is defined as the presence of live bacteria in the circulation, either temporarily or continuously. Subgingival microflora is connected with the injured inner epithelium of periodontal pockets in persons who have periodontal disease,[9] which enables germs to enter the circulation. This occurs in people who have periodontal disease. It would seem that this is the mechanism that underlies the connection between periodontal disease and unfavorable outcomes during pregnancy.[10]

There have only been a few of research that have investigated the correlation between periodontal disease and unfavourable birth outcomes in our community. The purpose of this research was to examine whether or not periodontal disorders were linked to unfavourable birth outcomes.

METHODOLOGY

One hundred pregnant women were included in the trial, fifty with pre-eclampsia and fifty without; all were getting treatment in the prenatal outpatient section of our institute's obstetrics department. The hospital's Ethics Committee gave its approval, so everything is good to go. After gaining mothers' agreement, socio-demographic and health information was recorded using standardised questionnaires. Women who satisfied these requirements were eligible to participate in the research: >18 years, expecting a single child, at least 26 weeks along in their pregnancy, and planning to give birth at the assigned study site. Individuals with twin gestation, persistent HTN, overt diabetes were not eligible for this research.

Blood pressures of >140/90 mm Hg on more than two occasions, with at least four hours between readings, and proteinuria of 1+ or more as determined by a dipstick (Bayer Diagnostics India Limited's Multistix SG Reagent strips) on a random urine sample were used to diagnose preeclampsia. Examinations of the participant's oral health were conducted at enrollment, and then again within forty-eight hours following delivery, with the goal of identifying the existence of PD and tracking its course. Quantitative measures of periodontal health, including the gingival index, pocket depth (PD), recession of the gums, and clinical attachment loss (CAL), were collected. Probing depth (PD) was calculated by using a UNC-15 periodontal probe to measure the vertical distance, in millimetres, from the gingival margin to the pocket's bottom at four distinct locations on each tooth.

The calculation of gingival recession involved rounding down the measured distance from the cemento-enamel junction to the gingival margin. This distance was then used to calculate the gingival recession. The CAL was determined using the recession and PD measurements, and it was expressed as the distance, in millimetres, from the cemento-enamel junction to the base of the pocket. A CAL that was less than 3 millimetres and a PD that was less than 4 millimetres were thought to be indicative of periodontitis.

The teeth numbers 16th 22nd, 24th, 36th, 42nd, and 44th (Ramfjord index teeth) were evaluated in this study (7). There are four areas on each tooth that are examined: the mesiobuccal, the midbuccal, the distobuccal, and the lingual areas.

The course of the disease was determined by whether or not there was an increase in the severity of periodontitis between the time of enrollment and delivery. For the purpose of evaluating the clinical severity of gingival inflammation (8), the gingival index was used. The following ages of teeth were evaluated: 16, 12, 24, 32, 36, and 44. The mesiobuccal, midbuccal, distobuccal, and lingual surfaces of each tooth were evaluated, and the scores obtained were then categorised as follows: 0.1 indicates no inflammation, 0.1–1.0 indicates mild inflammation, 1.1–2.0 indicates moderate inflammation, and 2.1–3.0 indicates severe inflammation.

The Pearson's chi-squared test was used in a bivariate analysis to see the differences in categorical variables across the

different groups. The mean and standard deviation were the expressions used for all of the descriptive data.

RESULTS

Mean age was calculated as 25.81+3.91 years in cases and 24.71+5.73 years in control group, mean gestational age was 37.11+3.62 weeks in cases and 38.11+3.24 weeks in control group. In our study, primigravida was in 34(68%) in cases group and 32(64%) in control whereas multigravida was recorded in 16(32%) in cases and 18(36%) in control group, smoking was 11(22%) in cases and 9(18%) in control group. The association of periodontal diseases and pre-eclampsia shows that 24(48%) in cases and 10(20%) in control group, O.R 3.69 and p-value=0.003

Table 1: Demographics of the participants

Demographics	Cases(n=50)	Controls(n=50)
Age (mean+sd)	25.81+3.91 years	24.71+5.73 years
Gestational Age (mean+sd)	37.11+3.62 weeks	38.11+3.24 weeks
Parity(%)		
Primigravida	34(68%)	32(64%)
Multigravida	16(32%)	18(36%)
Smoking(%)		
Yes	11(22%)	9 (18%)
No	39(78%)	41(82%)

Table 2: Association of Periodontal diseases and pre-eclampsia

Periodontal disease	Cases(n=50)	Controls(n=50)	O.R	P value
Yes	24(48%)	10(20%)	3.69	0.003
No	26(52%)	40(80%)		
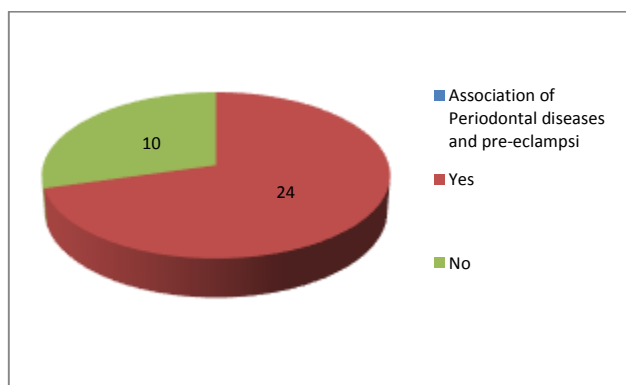
DISCUSSION

An infection is the root cause of periodontal disease, which includes both gingivitis and periodontitis. Gingivitis is the milder form of periodontitis. Additionally, it is an immuno-inflammatory reaction that causes the tissues that are in charge of the formation of the teeth to become disorganized. Periodontitis comes in a less severe type known as gingivitis. Periodontitis is the more advanced stage of the disease. It has been shown that periodontitis affects more than thirty percent of persons in certain regions, but the percentage of pregnant women who are affected by the ailment ranges from five to twenty percent. Over the course of the past three decades, a substantial number of investigations into the connection between PD and negative outcomes of pregnancy have been carried out by researchers.

In addition, these investigations utilized case-control studies. It is uncertain whether or not PD is related with bad pregnancy outcomes, despite the fact that the majority of these studies identified a relationship between PD and adverse pregnancy outcomes. In addition, few of these studies did not find an association between PD and adverse pregnancy outcomes. The reason to conduct this study was that limited literature exist in our local population examined the correlation between periodontal diseases and unfavourable pregnancy outcomes.

In our study, demographic variables like age, gestational age, parity and smoking etc were insignificant in both groups. However, the association of periodontal diseases and pre-eclampsia shows that 24(48%) in cases and 10(20%) in control group, O.R 3.69 and p-value=0.003. In 2021, Pockpa et al[11] released a comprehensive evaluation of clinical research spanning the previous two decades. There were a total of 232 articles in this analysis (including 119,774 participants).

According to the geographical interpretation of the data, most of the studies belongs to US (42, or 18.10%), Brazil (33 studies, or 14.22%), and India (25 studies, or 10.78%) respectively.[11] In addition, a study in 2021[7] examined the effectiveness of treating PD in pregnant females to reduce perinatal morbidity and death. This research was published in the journal Perinatal Medicine.[12] The data for this meta-analysis came from 15 separate randomised controlled trials, totaling 7161 participants.

According to a meta-analysis of 11 studies, there was no significant difference in the risk of preterm birth between pregnant women who had periodontal therapy and those who did not receive treatment during pregnancy (RR: 0.87, 95% CI: 0.70 to 1.10; 5671 participants;[11] studies; low-quality data). This finding was based on the finding that there was no significant difference in the risk of premature delivery between pregnant women who had periodontal therapy and those who did not get treatment during pregnancy. The findings of seven clinical studies with 3470 participants and a total of low-quality data revealed that periodontal therapy may lower the probability of delivering a baby with a birth weight of less than 2500 grammes (9.70% with treatment vs 12.60% without; relative risk (RR): 0.67, 95% confidence interval (CI): 0.48 to 0.95). Evidence of very poor quality shows that periodontal therapy did not have an effect on perinatal mortality (RR: 0.85, 95% CI: 0.51 to 1.43) or preeclampsia (RR: 1.10, 95% CI: 0.74 to 1.62) in 5320 participants across seven studies. This is based on the fact that the quality of the evidence was very low. (Relative risk: 0.97, 95% confidence interval: 0.81 to 1.16; 3610 people; three trials; data quality was poor)[12] There is no evidence to suggest that there is a difference in the small for gestational age category. It was discovered that there is unclear evidence that periodontal treatment during pregnancy influences preterm delivery, but that periodontal therapy may reduce low birth weight. Additionally, it was observed that there is evidence that periodontal treatment during pregnancy may increase low birth weight.[12]

Gingivitis and periodontitis were shown to have a prevalence of 93%-100%[13] in rural Northern India by Chawla et al. This was, however, a diverse group of people. Poor dental hygiene and the prevalent practice of chewing betel-nut, areca nut, and/or tobacco, particularly among rural Indian women, are blamed for the disease's high incidence. Vandana and Reddy[14] found that among Southern Indian women, 65.9% had gingivitis and 32.8% had periodontitis. Our research indicated that all of the women who had preeclampsia also developed periodontitis. The temporary transfer of dental bacteria to the maternal and fetal circulation in pregnant women with active periodontitis is hypothesized to initiate oxidative stress and placental inflammation.

We are aware that our sample size is on the lower side in comparison to those of previous researchers; yet, it is clear that periodontitis are quite prevalent in the community of pregnant women. Because the etiology of both periodontitis and preeclampsia involves several factors, it may be too soon to draw any conclusions on a possible causative link between the two conditions. Given the limited epidemiological data pertaining to periodontal disease in expectant mothers within this densely populated nation, it is imperative that larger-scale investigations be conducted to elucidate the potential impact of oral health interventions on the prevention of preeclampsia.

CONCLUSION

We have reached the conclusion that there is a high relationship between the association between preeclampsia and periodontal disorders. This was our finding.

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