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Assessment the relationship between preterm labor and oral infections in pregnant women refer to Imam Khomeini hospital

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Abstract

***Objective**:*

Periodontitis may be a risk factor for preterm labor due to the presence of pro-inflammatory bacteria and cytokines in the bloodstream during infection, which can affect the farther organs. The aim of this study was to investigate the relationship between oral infections and preterm labor pain.

***Methods**:*

This case-control study was performed on 100 pregnant women referred to the women and maternity ward of Ahvaz Imam Khomeini Hospital. Patients divided into two groups of pre-term and term patients. Demographic characteristics and midwifery data such as preterm labor risk factors were recorded by approved questioner in both groups. At follow-up and within 48 hours postpartum, patients were examined by a knowledgeable dentist for oral infections. Modified Machtei's index was used to determine the presence of periodontitis in patients and finally data were analyzed using SPSS version 22 software and Significance level was considered less than 0.05 ($p<0.05$).

***Results**:*

The mean age of the patients was 28.91±4.59 years (28.94 ± 4.87 vs 28.88±4.34 in case and control group respectively ($p = 0.94$).) None of the patients in the two groups had any history of smoking and no previous preterm pregnancy and bleeding was reported in any of the patients. Evaluation of patients in both groups showed that 39 cases had oral infections in the case group and 31 cases had oral infections in the control group, which was not statistically significant ($p = 0.08$).

***Conclusion**:*

Our findings indicate that prevalence of periodontal diseases in preterm mothers was not statistically significant more than control group. Further studies are needed to determine exact relationship between oral infections and preterm labor.

Keywords: Gynecology, Preterm labor, Oral infections, Periodontitis

Introduction

One of the current problems in health care management is the occurrence of preterm births that occur in different parts of the world with different causes and different incidence rates (1-2). Preterm labor is considered to be premature if the preterm labor causes the baby to be born within 20 to 37 weeks (3-4). Preterm labor pain occurs in 12.8% of all pregnancies. However, recognizing the

symptoms and avoiding risk factors can reduce the chance of preterm labor. Factors that increase the risk of preterm labor include smoking, overweight or low birth weight, lack of proper care around delivery, alcohol or drug abuse, having a defective baby, pregnancy with IVF, Multi-pregnancy, history of preterm birth, re-pregnancy immediately after previous delivery, and conditions such as hypertension, diabetes, coagulation disorders and infections. (5-6) Approximately 15 million babies are born prematurely (birth before 37 weeks) around the world each year, and these premature babies are typically low birth weight (LBW, <2500 gr). Preterm delivery leads to deaths, disabilities, and infant development. Despite advances in midwifery care, preterm birth rates have not changed and it is estimated that 9.6% of deliveries are premature worldwide. The highest rates of preterm birth are in Africa (11.9%) and North America (10.6%) and the lowest in Europe (6.2%). However, the underlying causes of preterm delivery are still not fully understood. Therefore, accurate identification of risk factors for preterm delivery that are important for intervention may have a broad and long-term impact (7). Of the many risk factors for preterm labor, maternal infections are consistently identified. Periodontal disease is a common infectious and inflammatory disease of the supporting tissues of the tooth which can lead to oral disorders if left untreated. Periodontal disease is mainly caused by gram-negative microbophilic and anaerobic bacteria that are colonized in the gingival area and cause a significant amount of proinflammatory mediators. Periodontal disease includes gingivitis and periodontitis. Gingivitis is the presence of gingivitis without loss of connectivity to the connective tissue. Periodontitis is the presence of gingivitis in places where the apical epithelial attaches to the root surface, which is associated with loss of connective tissue and alveolar bone. In the past two decades, many studies have examined the relationship between periodontitis and preterm labor (8). Periodontitis may be a risk factor for preterm labor due to the presence of pro-inflammatory bacteria and cytokines in the bloodstream during infection, which can affect the farther organs. However, epidemiological studies and interventional trials have yielded conflicting results regarding the association between periodontitis and preterm delivery (9). Since the issue of preterm labor is one of the most important problems in the field of obstetrics and gynecology, it is necessary to know its predisposing factors and also periodontal disease is an infectious disease and infection is one of the risk factors for preterm labor and considering the mechanisms proposed for preterm labor and the fact that some of the mediators involved in this process appear in periodontal disease are currently being investigated as a predisposing factor for preterm labor. The aim of this study was to investigate the relationship between oral infections and preterm labor pain.

Material and Methods

After obtaining permission from the University Ethics Committee (this study was approved by the ethic committee of Ahvaz Jundishapur University of Medical Sciences under number:

IR.AJUMS.REC.1398.715), this case-control study was performed on 100 pregnant women referred to the women and maternity ward of Ahvaz Imam Khomeini Hospital. Inclusion criteria included age 18 to 35 years, first delivery or absence of preterm labor and no induction of labor. Also exclusion criteria included urinary tract infections, high risk pregnancy, induction of labor and maternal systemic disease. At the beginning of the study, patients were given verbal consent and if patients were satisfied with the study, the interventions and the way of use and possible complications for the patients were explained. Demographic characteristics of all participants were recorded and the patients were divided into two groups: pre-term and term, with 50 patients in each group. According to the WHO index, birth before 37 weeks with a birth weight of less than 2500 g was selected as pre-term group, and birth after 37 weeks with a birth weight of more than 2500 g was considered as the normal group. Demographic characteristics and midwifery data such as smoking, overweight or low birth weight, lack of proper care around delivery, alcohol or drug abuse, having a defective baby, pregnancy with IVF, Multi-pregnancy, history of preterm birth, repregnancy immediately after previous delivery, and conditions such as hypertension, diabetes, coagulation disorders and infections were recorded by approved questioner in both groups. At follow-up and within 48 hours postpartum, patients were examined by a knowledgeable dentist for oral infections. Modified Machtei's index was used to determine the presence of periodontitis in patients. Participants were considered if they had a dental plaque, a 5 mm periodontal pocket depth, or had bleeding at one or more of the bleeding sites in the periodontitis group. Finally, the results were analyzed and compared in the two groups of pre-term and term and compared with each other in the

desired parameters. Data were analyzed using SPSS version 22 software (chart 1) and Significance level was considered less than 0.05 ($p<0.05$).

Results

The mean age of the patients was 28.91±4.59 years also the mean age of the case group was 28.94 ± 4.87 years and for the control group was 28.88±4.34 years, without statistical significant differences ($p = 0.94$). The mean gestational age of the patients was 35.55±5.03 years also the mean gestational age of case group was 32.00±39.04 years and for controls was 39.04±1.15 years, which was significantly lower in the control group ($p <0.01$). Examination of the number of pregnancies showed that in the case group, 12 had one pregnancy, 15 had two pregnancies, 16 had three pregnancies, 5 had four pregnancies and 2 had five pregnancies. In the control group, 10 patients had one pregnancy, 26 had two pregnancies, 10 had three pregnancies, 3 had four pregnancies and 1 had five pregnancies. There was no statistically significant difference between the two groups ($p = 0.24$). None of the patients in the two groups had any history of smoking, overweight or low birth weight, lack of proper care around delivery, alcohol or drug abuse, having a defective baby, pregnancy with IVF, Multi-pregnancy, history of preterm birth, re-pregnancy immediately after previous delivery, and conditions such as hypertension, diabetes, coagulation disorders, smoking, bleeding and infections. Evaluation of patients in both groups showed that 39 cases had oral infections in the case group and 31 cases had oral infections in the control group, which was not statistically significant ($p = 0.08$) (Figure 1)

Discussion and Conclusion

Since the issue of preterm delivery is one of the major problems in the field of obstetrics and gynecology, it is necessary to know its predisposing factors. Research has shown that periodontal diseases are infections that can affect cytokine production, cause premature labor pain, rupture of fetal membranes, and possibly premature birth (10-11). The present study was conducted to find new information on the possible association of oral infections and preterm labor. Evaluation of 100 patients in both case and control groups showed that there was no significant difference between the prevalence of oral infections in the two groups in the same age and history of underlying disease or history of preterm labor risk factors. In order to compare the results of the present study with other studies, we will discuss the other articles in the following discussion. In a 2017 study by Meqa et al. In the Republic of Kosovo, examined the association between low birth weight preterm and periodontal disease in 200 patients with a mean age of 26.9 years, using the modified Machtei's index. The results of their study showed that the pre-term group had significantly higher dental plaque index than the normal group. Birth weight was significantly lower in the preterm group than in the normal group. Gestational age was also significantly shorter in the preterm group. The researchers concluded that in the event of periodontal disease, premature birth would increase (12). In their study, although the scale used and the age of the patients were similar to the present study, there was a statistically significant association between oral infections and preterm labor. In another study, Reddy et al., 2015 in India investigated the association of maternal periodontal disease with low birth weight in 300 patients aged 18 to 35 years. Their results, contrary to the present study, showed that maternal periodontal disease is a potential independent risk factor for low birth weight in preterm infants. Actually we never evaluated infant and just examined the mother but they focus on the infants. In their study, other factors such as body mass index, bleeding and other health parameters were also different from the present study, which may be the possible reasons for the difference in outcome in the two studies (13). In another study, Karimi et al., In 2016, evaluated the association between maternal low birth weight and premenatal status on 264 patients by the community periodontal index of treatment needs (CPITN) index. The results showed that infants of mothers of periodontal group had 8 times less weight than those of healthy group. The mothers of the periodontal group had a history of multiple births 10 times more than the low birth weight infants and 8 times more premature babies than the control group. The researchers concluded that further studies are needed to prevent periodontal disease leading to preterm labor to reduce the birth rate of low birth weight infants (14). Although the study was conducted in Iran and in a community close to our study population, the researchers reported statistically significant differences due to differences in measured variables such as neonatal weight that were not evaluated in the present study. Harjunmaa et al., 2015 also examined the association of maternal dental infections with pregnancy

outcomes. This case-control study was conducted on 1024 Malawi mothers. The incidence of preterm birth among mothers with periapical infection was 10%, and in the control group was 7.3%. The researchers concluded that shorter gestation periods and IUGR are associated with periapical dental infection, and therapeutic interventions may improve pregnancy outcomes in low socioeconomic situations (15). Although their study evaluated a significant sample size 10 times more than the present study, the significant difference in the health and economic status of patients in Africa compared to Iranian patients who have broader health services, is a possible reason for the differences between the two studies. Although studies in different regions of the world have shown different results, but the importance of the relationship between oral infections and preterm delivery is the starting point of all researches. Multicenter as well as investigating more and more comprehensive variables may provide more accurate information from these patients.

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Variables		**Group**		p-value
		Case (n=50)	Control (n=50)	
Age (M±SD)		28.94 ± 4.87	28.88±4.34	0.94
Gestational age (M±SD)		32.00±39.04	39.04±1.15	<0.01
	1			
	2	15 (30%)	26 (52%)	
	3	16 (32%)	10 (20%)	
	4	5 (10%)	3 (6%)	
	5	2 (4%)	1 (2%)	
Oral infection N (%)		39 (78%)	31 (62)	0.08

Figure 1. patient's characterizations

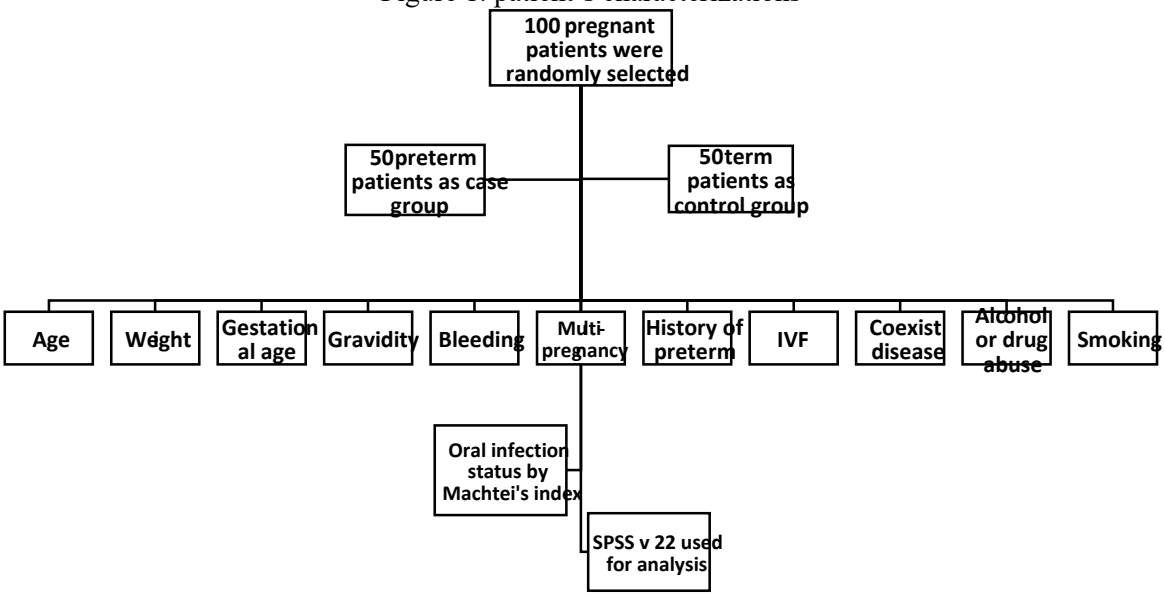

Chart 1. Study design