



Investigating the Relationship Between Decayed, Missing, and Filled Teeth Index and Preterm Labor in Pregnant Women in Hamedan, 2016

Azita Tiznobaik¹, Safoura Taheri², Zohre Momeni Movahed³, Ghodratollah Roshanaei⁴, Loghman Rezaei⁵, Mahdi Shirinzad^{5*}, Mahdi Tahmasebi⁵

Abstract

Background: Preterm labor is defined as labor before 37 weeks of gestation, which is associated with neonatal mortality. Due to contradictory results of studies conducted on the relationship between preterm labor and dental decays and lack of research in this regard in Iran, the present study was conducted with the aim of evaluating the relationship between DMFT (decayed, missing, and filled teeth) index and preterm labor in pregnant women in Hamadan.

Methods: This study is a case-control study. The total number of samples was 227 pregnant women studied in two groups, 114 women in case and 113 women in the control group. The data collection method was interview and examination and the data collection tool was a questionnaire consisting of three sections, including demographic, midwifery, and dental information. The data were analyzed through SPSS software version 16.0 using descriptive and analytical statistics, independent *t* test and chi-square and at the significance level of $P < 0.05$.

Results: The mean age of the subjects was 28.41 ± 6.26 years. The mean score of the DMFT index was 13.02 ± 6.20 in the case group and 10.70 ± 6.12 in the control group, indicating a statistically significant difference between the two groups ($P = 0.005$). The results showed that there was no significant relationship between DMFT index and preterm labor ($P = 0.779$).

Conclusions: Based on the results of the study, the DMFT index is high in women with preterm labor, so providing necessary education before and during pregnancy by health service providers and mass media for pregnant women is essential to maintain and promote oral hygiene and reduce the complications of pregnancy.

*Correspondence to

Mehdi Shirinzad,
Tel: 09183151530,
Fax: +98 81 38381085,
Email: shirinzad@umsha.
ac.ir, shirinzad2000@gmail.
com

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Background

Preterm labor is defined as labor before 37 weeks of gestation (1). The prevalence of preterm labor is about 15% around the world (2). Preterm labor is a multifactorial health phenomenon associated with serious health problems. Preterm labor accounts for over 70% of neonatal deaths and is the second leading cause of death in children under the age of 5 years (3). Low socioeconomic status, smoking, alcohol consumption, medications, and medical conditions such as asthma, diabetes, hypertension, and kidney infections are risk factors for preterm labor (4-

Highlights

- ▶ The DMFT index is high in women with preterm labor.
- ▶ There was no significant relationship between DMFT index and preterm labor.

6). However, in almost 50% of women with preterm labor, there is no known factor (6). Pregnant women are vulnerable people who are at high risk for dental diseases (7). Moreover, restricted access to dental care and the lack of knowledge about the importance of dental care have

¹Department of Midwifery, Maternity and Child Care Research Center, Faculty of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran. ²Department of midwifery, School of Nursing and Midwifery, Ilam University of Medical Sciences, Ilam, Iran. ³Department of midwifery and Reproductive Health, School of Nursing and Midwifery, Qom University of Medical Sciences, Qom, Iran. Associate of Biostatistics, Modeling of Noncommunicable Diseases Research Center, Department of Biostatistics and Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran. ⁴Department of Restorative Dentistry, Faculty of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

an impact on pregnancy outcomes (8). Proper dental care and regular dental visits are associated with a reduced risk of perinatal complications, reduced bacterial transmission from the mother to the fetus, and reduced development of childhood caries (9). Due to elevated levels of certain hormones (especially elevated progesterone levels) during pregnancy, the gingival reaction to dental plaque increases, leading to increased gingival inflammation that is called pregnancy gingivitis (10). In addition, studies conducted recently have shown that elevated cortisol levels in pregnant mothers' saliva increase dental plaque levels (11).

Dental decay (usually measured by DMFT – decayed, missing, and filled teeth – index) is a type of bacterial infectious disease leading to degradation of the hard dental tissue and it can finally result in the spread of infection to the dental pulp and its consequences. Interestingly, microbial plaque is the agent of both periodontal diseases and dental decays. Any type of infection, including dental decays, is considered dangerous during pregnancy. In dentistry, it has been proven that chronic tooth infection can have harmful effects far beyond the oral cavity (11). Studies have indicated that an increased level of vaginal lactobacilli is associated with preterm neonates (12). In dentistry, it has been proven that lactobacilli play a major role in the development of dental decays (13). It is believed that dental problems before and during pregnancy increase the process of onset and progression of infections and inflammation that may increase the risk of preterm labor (14,15). In recent years, scientific evidence suggests an association between oral hygiene status mainly as the existence of periodontal disease and teeth missing and preterm labor (16). Studies have been carried out in different communities on the relationship between dental decays and preterm labor, but contradictory results have been reported, considering that some studies have found no association between dental decays and preterm labor (17).

In a study conducted in Mexico, no association was found between periodontal disease and preterm labor; however, some studies have provided evidence on the impact of dental decays on preterm labor (18). Additionally, in a study conducted by Zadeh Modarres et al in Iran in 2001 to evaluate gum hygiene in women with preterm and term labor, the results showed a significant difference between case and control groups in terms of dental problems (19). Therefore, considering the contradictory results and racial and ethnic differences and their effects on the results, this study was conducted to investigate the relationship between DMFT index and preterm labor in pregnant women in Hamadan.

Materials and Methods

The present case-control study was performed at Fatemeh hospital in Hamadan in 2016. A total of 227 pregnant women were divided into 2 groups of case (n=114) and

control (n=113). Data collection tool was a questionnaire consisting of 3 sections, including demographic data, midwifery characteristics, and dental information. Data were collected through interview and examination by researchers. The sample size was determined to be 114 by consulting with a statistical specialist and considering the first type error of 0.05 and the test power of 80% and using the following statistical formula:

$$n = \frac{(z_1 - \frac{\alpha}{2} + z_1 - \beta)^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2}$$

Finally, the data obtained from 114 subjects in the case group and 113 in the control group were analyzed. The research inclusion criteria included pregnant women with normal vaginal delivery and non-elective cesarean section delivery, willingness to cooperate and filling out a moral consent form. The research exclusion criteria included undergoing dental treatment during pregnancy, any clear periodontal disease, need for receiving antibiotic prophylaxis due to systemic diseases (such as heart disease), history of infertility, autoimmune diseases, history of abortion, a high risk of current pregnancy (diabetes, hypertension, etc), elective cesarean section delivery and a history of infection in pregnancy. The convenience sampling method was used in this study and the subjects were assigned to case and control groups. It should be noted that participants in both case and control groups were matched in terms of demographic variables. The method of data collection was based on interview and examination and the data collection tool was a questionnaire consisted of 3 sections. The first section of the questionnaire was related to personal information and the second section was related to midwifery information. The validity of these two sections was confirmed through consulting with ten experts and its reliability was confirmed based on Cronbach alpha (above 0.08). The third section of the questionnaire was related to the oral hygiene status of pregnant women, assessed using the WHO standardized questionnaire (20). The major index in dental information is DMFT. Therefore, based on this index, the numbers of decayed, filled and extracted teeth were determined. The samples were selected by midwifery researchers according to inclusion and exclusion criteria at Fatemeh hospital in Hamadan. The subjects were examined from childbirth to mother's discharge from hospital and if the periodontal disease was found in them, they would be excluded from the study.

Among the eligible individuals, those who filled out the consent form were included in the study. The first and second sections of the questionnaire were completed by the midwifery researcher. Then, at the same time, the eligible subjects were introduced to the dental researcher as blind to complete the third section of the questionnaire.

The decayed, missing, and extracted teeth were identified using a dental mirror and under a flashlight and their numbers were recorded. Descriptive and analytical statistics were used for data analysis. The chi-square test was used to compare the qualitative variables in the two groups. The independent *t* test was also used to compare the quantitative variables in the two groups. $P < 0.05$ was considered as significant level in all tests. The obtained data were entered into SPSS software version 16.0 and the results were analyzed and reported.

Results

The total number of the samples in this study was 227 pregnant women, 113 of whom were studied in the control group and 114 were studied in the case group. The mean age of mothers in the case and control groups was 28.21 ± 5.88 and 28.61 ± 6.65 years, respectively. Additionally, 95.6% of the subjects were housewives, 43.2% had high school education, 84.1% had a monthly income of less than 10 million Rials, 97.8% received prenatal cares, 95.6% referred to a dentist only when they had a toothache, and 46.7% used toothbrushes only once per day.

The results of chi-square test showed no significant difference between case and control groups in terms of the mean of the variables such as age ($P = 0.988$), job status ($P = 0.49$), level of education ($P = 0.256$) monthly income level ($P = 0.8$), receiving prenatal care ($P = 0.1$), pattern of referring to the dentist ($P = 0.92$) and oral hygiene status ($P = 0.47$). The results of the independent *t* test showed that there was a significant difference between the women of case and control groups in terms of the number of decayed teeth ($P = 0.030$). Women in the case group had more decayed teeth than women in the control group. The results showed that there was no significant difference between the two groups in terms of the mean number of missing teeth, restored teeth, and dental plaque. In general, there was a significant difference between case and control groups in terms of the DMFT index ($P = 0.005$) (Table 1). With regard to the main objective of the study, the results showed that there was no significant relationship between the DMFT index and preterm labor ($P = 0.779$) (Table 2).

Discussion

The results showed that the mean score of the DMFT index in the case and control groups was significantly different ($P = 0.005$). The DMFT index score of the case group was higher than that of the control group. The results showed that there was no significant relationship between DMFT index and preterm labor ($P = 0.779$).

In the present study, the majority of mothers (97.8%) received prenatal care, 95.6% reported that they referred to a dentist only when they had toothache. In the study conducted by Bica et al in 2013 (21), the majority of mothers (1.84%) were under gynecological care during pregnancy and 72.8% of mothers received dental care at least 6 times or more. This rate is different from that

Table 1. Distribution of Dental Variables in Case and Control Groups

Variables	Case Mean \pm SD	Control Mean \pm SD	P Value ^a
Decayed	7.14 \pm 4.5	5.87 \pm 4.17	0.030
Filled	1.14 \pm 2.21	1.25 \pm 2.4	0.726
Missed	4.72 \pm 5.38	3.57 \pm 4.19	0.697
Dental plaque	76.16 \pm 21.68	71.74 \pm 23.38	0.141
Total DMFT score	13.02 \pm 6.20	10.70 \pm 6.12	0.005

DMFT: decayed, missing, and filled teeth index.

^a *t* test.

Table 2. The Correlation Between Preterm Labor and the DMFT Index

DMFT	<i>t</i>	df	Sig (2-tail) ^a
	0.28	113	0.779

^a *t* test.

of our study because only 0.8% of samples in our study referred to dentistry every 6 months. It can be stated that during prenatal care, provided at least 8 times during pregnancy in Iran, pregnant women were asked about dental problems and they were referred to the dentist if the midwife diagnosed that they needed to be referred directly to the dentist.

In the present study, the mean number of decayed teeth in the case group was higher than that of the control group (7.14 ± 4.5 versus 5.87 ± 4.17). The results showed that 87.1% of the mothers in the control group and 92.1% of the mothers in the case group had decayed teeth. In a study conducted by Bica et al, using the DMFT index, researchers examined the oral hygiene status of 653 Portuguese mothers and reported that 15.9% of the studied samples had dental decays and 2.4% had gingivitis during pregnancy (21). Moreover, Gesase et al in 2018 (22) reported the prevalence of periodontal disease to be 14.2% and Kumar et al in 2013 reported periodontal disease to be 17.94% (23).

In a case-control study on 70 pregnant women, Andonova et al in 2015 (24) showed that 66% of the women in the case group and 35% of the women in the control group had chronic periodontitis, indicating that there was a significant difference between the two groups ($P = 0.01$). Given the emphasis of studies on the prevalence of dental disease during pregnancy and its possible complications, having a proper plan for educating and enhancing the oral hygiene knowledge of pregnant women before and during pregnancy is essential. There was no significant difference between the two groups in terms of the mean number of extracted teeth ($P = 0.69$) and filled teeth ($P = 0.72$). In a study conducted by Al-Attas, researchers evaluated the oral hygiene status of 47 women using the DMFT index. The mean number of decayed teeth in the case and control

groups was 3.89 and 4.10, respectively, the mean number of missing teeth was also 1.13 and 1.09, respectively, and the mean number of filled teeth was 1.23 and 1.52, respectively (25). In the study conducted by Márquez-Corona et al, the mean number of missing teeth was significantly different between the case and control groups (26). Hence, taking actions to promote oral hygiene in women seems to be necessary to prevent negative pregnancy outcomes. In the present study, the mean DMFT score of the case group (13.02 ± 6.20) was higher than that of the control group (10.70 ± 6.12).

In line with the results of our study, Dasanayake et al reported the DMFT index of mothers in the case and control groups to be 4.8 and 3.4, respectively (27). In the study carried out by Al-Attas, the mean DMFT score in the case and control groups was reported to be 6.26 and 6.71, respectively (25). Compared to the present study, the mentioned studies had a better status in terms of DMFT index, which may be due to differences in the sample size and differences in decayed, toothed, and extracted teeth, which might affect the results. The results of this study showed that there was no significant relationship between DMFT and preterm labor ($P=0.779$). Consistent with results of the present study, in a study conducted by Salman et al in 2010 on 90 pregnant women, no relationship was found between periodontal disease and preterm labor (28). Studies conducted by Martínez-Martínez et al in 2015 and Matevosyan in 2011 also found no association between periodontitis and preterm labor (17,29). It can be stated that preterm labor is a multifactorial condition and the role of only dental diseases is not sufficient for preterm labor. Therefore, it is recommended that studies with sample size and different methodologies should be carried out and all confounding factors be controlled.

In contrast to the results of our study, some studies have reported a significant association between dental decays and preterm labor. In a study conducted by Mattheus et al on 4309 pregnant women during 2009-2011, the results revealed that one in five women received dental services during pregnancy and the incidence of preterm labor was higher in these women (30). In a case-control study on 111 pregnant women, Márquez-Corona et al in 2019 found a significant relationship between the rate of preterm labor and the severity of dental disease (26). Other studies also confirmed the association between preterm labor and periodontal disease (16,22,31). It should be noted that the risk of preterm labor with regard to periodontal disease differs in different populations and periodontal disease has been reported as an independent risk in most studies, but these studies have emphasized that this association cannot be a definite sign of causality. Differences between the results of the present study and those of other studies can be due to different demographic characteristics of individuals and inclusion and exclusion criteria and the data collection tools, sample size, and statistical methods. The majority of studies, including the present study,

reported a higher incidence of preterm labor in people with dental diseases. Therefore, it is important to pay special attention to periodontal diseases in the prenatal and pregnancy program to control the risk of this disease due to the complications of pregnancy. Additionally, identifying the groups that are at risk of midwifery complications and designing useful plans in this area can also be helpful. On the other hand, randomized clinical trials should be planned by managers and health policymakers to assess the effects of periodontal treatment in reducing periodontal incidents. The strengths of this study were the use of the World Health Organization (WHO) guidelines and the proposed questionnaire of the WHO to assess the DMFT index in the study group. Given that one limitation of this study was the type of study that was a case-control study, cohort studies should be carried out to yield more accurate results.

Conclusions

Based on the results of the study, the mean score of DMFT index is high in women with preterm labor, so providing necessary education before and during pregnancy by health service providers and mass media for pregnant women is essential to maintain and promote oral hygiene and reduce the complications of pregnancy. In addition, considering the different results of studies, further studies controlling the confounding factors are recommended in this regard.

Conflict of Interest Disclosures

The authors declare that they have no competing interests.

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Ethical Statement

The present study was approved by the Ethics Committee of Hamadan University of Medical Sciences under the code IR.UMSHA.REC.1395.77.

Authors' Contribution

MT supervised all stages of the study, analyzed and interpreted the data and wrote the manuscript. AT and MSH participated in the planning and supervised all stages of the study. GHR and LR analyzed and interpreted the data. ST and ZM wrote the manuscript. All authors critically reviewed and revised the manuscript for important contents. All the authors have read and approved the final manuscript.

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