

**An Investigation of Dental and Periodontal Health of Pregnant Women by DMF and GI Indices in Khorramabad**

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**Abstract**

**Introduction:** Oral health has an important impact on public health, and is more prominent during pregnancy. The oral health of pregnant women and the related corrective behaviors will play an embossed role in maternal and fetal health. The present study was conducted in 2019 to evaluate the oral health of pregnant women in Khorramabad using two indices of DMFT and GI and their relationship with their oral health behaviors.

**Methods:** This study had a cross-sectional correlation design, in which 292 pregnant mothers in health centers of Khorramabad, Iran were randomly selected and included in the study. To observe inflammation and gum

disease, careful periodontal examination of the gums was performed using a dental mirror and periodontal probe, and the data were recorded. Finally, the obtained data were analyzed in SPSSv21 software and the results were reported at a significant level of 0.5.

**Results:** The results of the present study showed that dental decay index (DMFT) and gingival index (GI) had a significant relationship with oral health behaviors, i.e. improving oral health behaviors significantly reduced dental decay index (DMFT) and gingival index (GI) ( $p < 0.001$ ). The study of the relationship between the two indices also showed that there was a significant correlation between the two indices ( $p < 0.001$ ), i.e. as

the amount of DMFT index increased, the GI index also increased.

**Conclusion:** Increasing oral health education and improving oral health-related behaviors can prevent relevant diseases and improve the oral health of pregnant women.

**Keywords:** Pregnant women, GI, DMFT, Oral health behaviors

### **Introduction**

Dental and periodontal healthcare is among the most important preventive objectives in dentistry which is attained only by promoting awareness and knowledge in the community. Dental/ periodontal health has great effects on public health, especially during pregnancy. World Health Organization (WHO) has defined dental/ periodontal health as a necessity and a part of public health in life and declares that poor periodontal healthcare, as well as untreated periodontal diseases, could have consequences on the quality of life. Additionally, some chronic diseases like diabetes, cardiovascular diseases, and other mental conditions like positive self-image and, consequently, mental health is related to dental/ periodontal healthcare [1].

Pregnancy is not a disease, but it is an indication of women's health condition. Pregnancy is a transitional physiological condition with big changes in hormones in women that influences both the general health of pregnant women and provide oral conditions for dental/ periodontal diseases in that period.

The most important index is caries. In DMFT, M is the first letter of "Missing" meaning lost or pulled teeth. F stands for "Filling" and T stands for "Teeth".

Paying attention to the dental/periodontal healthcare among vulnerable groups like pregnant women is very important for the sake of their general health and that of their infant, for, pregnancy is accompanied by great

changes in the body, especially in teeth and mouth, that can lead to dental/periodontal consequences without care or treatment. Hormone and nutritional changes provide conditions for dental/periodontal diseases and caries among pregnant mothers [2].

Untreated periodontal diseases of pregnant women are a considerable risk factor for premature birth, pregnancy below 37 weeks, and low weight (less than 2500 g) infants [3].

The present study has been conducted to provide a basis for future research and studies for improving dental/periodontal health and access to dentistry services among pregnant women of Khoramabad city, Iran, with the title: An Investigation of Dental and Periodontal Health of Pregnant Women in Khoramabad, Iran, Using DMF and GI Indices in 2019 and Its Relationship with Dental and Periodontal Healthcare Behavior.

### **Materials and methods**

The present study is a cross-sectional correlative study. The population consisted of pregnant women referring to healthcare centers of Khoramabad city.

### **Sampling method**

First of all, healthcare centers and health bases in Khoramabad were considered clusters, and then, by random sampling, the health bases were selected. After referring the pregnant women to these centers, the sample was selected regarding their inclusion/ exclusion criteria. Regarding the sampling method, 292 samples were selected.

### **Administration method**

After the samples were selected, and the study goals, as well as confidentiality of the results, were explained, oral consent was taken from the pregnant women. With a formal introduction from the research administration bureau, the researchers went to the healthcare centers and health bases. The questionnaires were unanimous

and the elicited information in them was only used for the study. Participation was voluntary and the participants could go out of the research whenever they wanted. Before data collection, the introduction of the researcher and their goals and objectives were introduced.

#### **Instruments for collecting data**

The instruments of data collection were physical examination (to assess GI and DMFT indices and a questionnaire, consisting of some questions about demographic features, as well as a questionnaire of the dent/ and periodontal health behavior with 8 items. The range of the scores was between 5-8: never (1 score), rarely (2 scores), sometimes (3 scores), often (4 scores), and always (5 scores). The validity and reliability of the questionnaire were evaluated by Kazemi et al [5] and Cronbach's alpha was 78%. The physical examination was done by medical students using appropriate instruments.

Disposable gloves were used for each of the patients. To evaluate the DMFT index, using a disposable mirror (with an herbal formula to minimize any chance of sensitivity for the pregnant women), tongue depressors, pigtail catheters, and a torch (to examine anterior caries), the examination data were collected and recorded by the assistant. GI index was also investigated using a disposable sterile mirror and periodontal probe. Proper light was adjusted by the assistant and the data was recorded.

#### **Data analysis**

The data was collected after some organizational interviews and examinations and then analyzed by SPSS21. First, descriptive analysis was done. After calculating the normality of the data, mean normality and standard deviation were measured for the quantitative variables and frequency for qualitative

variables was measured. To compare the quantitative variables within the groups, a Student t-test was administered. During the analysis, Pearson's correlation test was used to evaluate the relationship between the variables. All the results were reported to have a significance level of 0.05.

The present study had a thesis format with taken code of conduct from the Ethics Committee of Lorestan Medical University to admit its morality. The questionnaires were unanimous and the elicited data was only used for the study. The participation was voluntary and the participants could go out of the study whenever they wanted. Before collecting the data, first of all, the introduction of the researcher and the research objectives was done. The researchers were obliged to be moral in analyzing and interpreting or publishing the information.

#### **Results**

In the present study, 292 pregnant women entered the study, of whom 28 were excluded because they didn't complete the questionnaire and 264 individuals were included.

#### **Descriptive analysis**

The mean of the participants' age was  $29\pm 6$  years and the minimum and maximum age of the participants was 25 and 29, respectively. Most of the participants (88%) were in the age range of 25-29. In addition, most of them had middle school education (Table 1).

For the description of other background variables, 62% of the mothers who participated in the study had their first pregnancy. Most of them had incomes lower than 30 million Rials and they were housewives. Besides, 54.6% of the participants were in their third trimester (Table 2).

#### **The condition of dental/periodontal indices**

Results of the study indicated that most of the participants: had no lost teeth (47.3%), brushed teeth

once a day (83.3%), had Gingivitis (58.87%), drank sugar drinks during a week (51.9), had dental/periodontal checkups every 6 months (53.9%), and had to decay in 2 or more teeth (Table 3).

#### **Distribution of GI and DMFT indices**

Mean and standard deviation for DMFT and GI were  $8.53 \pm 3.63$  and  $1.57 \pm 0.47$ , respectively; in addition, maximum and minimum were 16.00 and 1.00 for DMFT and 2.81 and 0.64 for GI.

The relationship between DMFT and GI indices and dental/ periodontal healthcare behaviors with demographic variables

Results of the study showed that there was a relationship between DMFT and GI indices and dental/ periodontal healthcare behaviors with the age range of pregnant women so that when the age increased the DMFT and GI indices and the scores of dental/ periodontal healthcare behaviors decreased (table 4). Results also indicated that with higher numbers of pregnancies, a significant decrease in DMFT and GI indices, as well as the scores of dental/ periodontal healthcare behaviors, was observed (Table 4). The study indices had a significant relationship with the economical status of the families (table 4) so that families with higher than 50 million Rials had better scores for dental/ periodontal healthcare behavior. Results of DMFT and GI indices also indicated that a higher educational degree was associated with lower DMFT and GI indices and higher dental/periodontal healthcare scores (table 4). The study also showed that with higher age of the pregnancy, DMFT and GI indices and dental/ periodontal healthcare behaviors increased significantly (table 4). It was also shown that avoiding smoking, more brushing times, more flossing, no bleeding during probing were associated with lower DMFT and GI indices and higher dental/periodontal healthcare scores (table 4).

**The correlation between DMFT and GI indices and dental/periodontal healthcare behaviors**

Results of the studies showed that there was a significant relationship between DMFT and GI indices so that higher scores of DMFT index were related to higher GI scores ( $R=0.74$ ). Besides, there was a negative significant relationship between DMFT and GI indices and dental/periodontal healthcare behaviors, i. e., increasing one index led to decreasing the other ( $R=0.71$ ).

**The relationship between and dental/periodontal healthcare behaviors with DMFT index using a regression model**

The results of multivariable regression analysis showed that with other variables being constant, for every unit increase in scores of dental/periodontal healthcare behaviors, the DMFT index decreased by 0.3 on average. In addition,  $r^2 = -0.63$  in this model showed the efficacy of the model (Table 5).

**The relationship between and dental/periodontal healthcare behaviors with GI index using a regression model**

The results of multivariable regression analysis showed that with other variables being constant, for every unit increase in scores of dental/periodontal healthcare behaviors, the GI index decreased up to 0.4 on average. In addition,  $r^2 = -0.69$  in this model showed the efficacy of the model (Table 6).

#### **Discussion**

The present study aimed to determine the condition of dental/periodontal healthcare among pregnant women in Khoramabad, Lorestan, Iran, incorporating DMFT and GI indices and their relationship with healthcare behavior in 2919. The present study indicated that the mean DMFT index was  $8.53 \pm 3.36$  in pregnant women of Khoramabad City of which the highest percentage was

for decayed teeth with  $5.47 \pm 3.18$ , and 84.8% of the pregnant women had at least one decayed tooth. Likewise, previous studies reported that pregnant women have no good healthcare conditions all over the world. According to the Pregnancy Risk Assessment Monitoring System (PRAMS) of the Centers for Disease Control and Prevention (CDC), only 23 to 24 percent of pregnant women in the world receive dentistry services of which 67% are from the U.S. Shamsi [6] conducted cross-sectional research in 2013 in Arak, Iran with DMFT index of 5.4 for pregnant women. Results of the present study showed that the score of dental/periodontal healthcare was  $31.32 \pm 4.52$ ; About 46% of the participants brushed their teeth once or less in a day and only 33% flossed their teeth daily which seems insufficient for pregnant women. Besides, 25% of pregnant women drank sugary drinks daily that in turn could lead to teeth decay. On the other hand, the study also indicated that 23% of pregnant women have smoking in their background which in turn enhances the risk of periodontal diseases and other diseases related to smoking in the mother and the infant. In addition, 46% of the subjects had no checkups and received no dentistry services in the recent year, that is, before pregnancy. Nakoninieczna et al [7] conducted a study in Poland which indicated that 50% of women had no appropriate healthcare conditions and 31% had bad dental/periodontal conditions. While 24.14% of non-smoking pregnant women have good dental/periodontal healthcare conditions and 22.58% had no adequate such conditions. Boggess [8] also found consistent results. Since boredom and unawareness as well as lacking enough operational skills are characteristics of the pregnancy period, training applicable skills and promoting awareness among these mothers on the importance of dental/periodontal healthcare and its

potential effects on pregnancy results should be considered. In a study on pregnant women, Salati et al [9] observed that bleeding on probing (BOP) was more frequent in women with no teeth flossing than in other pregnant women (1.3 times). The study also showed that the pregnant women who were in their third trimester had higher MDFT and GI indices than the other two groups and their dental/periodontal healthcare scores were relatively lower which was consistent with Figuero [10]. Lower scores of the indices were likely associated with their special hormonal conditions. In the present study, the MDFT mean was 8.53 which was much higher than that of Muram in Finland [11] which possibly relates to the high-sugar diet in Iran. This was similar to Gharizadeh [12]. At the same time, Torabi [13] found a higher score than the present study which is due to bad personal habits and poor dental/periodontal healthcare conditions throughout the society. The score of tooth decay was 5.47 for the present study which was consistent with Mansouri [14] for Isfahan, Iran, the result of which may be different population types, where the population of Isfahan consisted of ordinary adults while the population of the present study was vulnerable pregnant women. In the present study, the results indicated that most of the mothers were familiar with factors influencing tooth decay, which can be the result of integrating periodontal healthcare with primary healthcare (PHC) that was consistent with Vignarajahas [15] in Iceland. In contrast, Haji Kazemi [16] had research in Hamadan City that showed 70% of mothers had negative attitudes toward dentistry stuff during pregnancy. In that research, they found that economical and educational status had great effects on conducting healthcare behaviors toward one's teeth and mouth. Moin Taghva [17] conducted research, too, in which they found that the level of knowledge about

dental/periodontal healthcare was low among practitioners as well as the pregnant women which in turn led to tooth decay problems in them. Machuca [18] and Silva [19] attained similar results higher educational levels can result in more healthcare behaviors. Kerise [22] researched in Adelaide City where they showed that monetary costs were a major obstacle for dental/periodontal healthcare during pregnancy. In the present study, there was a significant difference between the frequency of teeth decay and health insurance coverage that was consistent with Bayat [20] and Mona [21].

### Limitations

Regarding the fact that the present study was a cross-sectional study, one of the limits of the present study is that one cannot certainly comment on the obtained relationships and more analyses are needed for the certainty of the study.

### Conclusion

The present study aimed to investigate the health condition of pregnant women in Khoramabad, Lorestan, Iran using DMFT and GI indices in 2019 and its relationship with dental/periodontal healthcare behavior among these women. Results of the study showed that pregnant women were in undesirable conditions of dental/periodontal healthcare behavior. Reviews also indicated that pregnant women in Khoramabad City had poor performance in doing dental/periodontal healthcare activities, so that only a few of them brushed or flossed their teeth regularly, or even went to dentists. It is recommended that interventions based on preplanned behavior theory in pregnant women be administered aiming at promoting dental/periodontal healthcare in healthcare centers. Another strategy is training operational skills through media as well as time management, planning, and life skills training.

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**Legend Tables**

Table 1: frequency distribution of demographic variables

Variable		Number (%)
Age		
	<25 years	54 (20.5)
	29-29 years	88 (33.3)
	30-32 years	67 (25.4)
	≥34 years	55 (20.8)
Education		
	Elementary	28 (10.6)
	Middle school	161 (61.0)
	High school	75 (28.4)
Occupation		
	Housewife	193 (73.1)
	Employee	71 (26.9)

Table 2: frequency distribution of background variables

Variable		Number (%)
Age of pregnancy		
	First trimester	26 (10.6)
	Second trimester	94 (61.0)
	Third trimester	146 (28.4)
Pregnancy times		
	First pregnancy	166 (62.9)
	Second pregnancy	72 (27.3)
	Third pregnancy	23 (8.7)
	>three times	3 (1.1)
Family income		
	<30 million Rials	104 (39.4)
	30-50 million Rials	65 (34.6)
	>50 million Rials	95 (36.0)



Table 3: frequency distribution of other variables

Variable		Number (%)
Number of lost teeth		
	0	125 (47.3)
	1	45 (17)
	2	52 (19.7)
	3 or more	42 (16)
Brushing		
	2 or 3 times a week	20 (7.6)
	Once in a day	102 (38.6)
	Twice a day	80 (30.3)
	Three times a day	62 (23.5)
Flossing		
	No brushing	83 (31.4)
	A few times a week	94 (35.6)
	Daily	87 (33.0)
Gingivitis		
		155 (58.7)
		109 (41.3)
Bleeding on probing		
	Has	150 (56.8)
	Does not have	141 (43.2)
Frequency of dentistry checkups		
	Every 6 months	142 (53.9)
	Every year	94 (35.8)
	Not regular	27 (10.3)
Drinking sugar drinks		
	Never or rarely	61 (23.1)
	A few times a week	137 (51.9)
	Once or a few times a day	66 (25.0)
Number of decayed teeth		
	0	40 (15.2)
	1	87 (32.95)
	2 or more	137 (51.89)
Treatment needed situation		

	No need to treatment	40 (15.2)
	Needed treatment	224 (84.8)

Table 4: the relationship of dental/periodontal healthcare behaviors with DMFT index using the regression model

Variable/index	DMFT p-value	GI p-value	Healthcare behavior p-value
Age	<0.01	<0.01	<0.01
Pregnancy times	<0.01	<0.01	<0.01
Income	<0.01	<0.01	<0.01
Education	<0.01	<0.01	<0.01
Pregnancy age	<0.01	<0.01	<0.01
Smoking	<0.01	<0.01	<0.01
Teeth brushing	<0.01	<0.01	<0.01
Flossing	<0.01	<0.01	<0.01
Bleeding on probing	<0.01	<0.01	<0.01

Table 5: the relationship of dental/periodontal healthcare behaviors with DMFT and GI indices with the variables

variable	Variable coefficient (B)	P-value
Health score	0/35	<0/001
Age	0.52	<0.002
Pregnancy times	0.17	<0.942
Income	0.07	<0.820
Residence area	0.28	<0.378
Smoking	0.18	<0.596
Times of teeth brushing	0.64	<0.110
Teeth flossing	0.41	<0.143
Insurance	0.46	<0.233
	0.23	<0.087
Percent of needed care	-0.01	<0.464
Bleeding at the time of probing	0.13	<0.869
Gingivitis	0.91	<0.290

Table 6: the relationship of dental/periodontal healthcare behaviors with GI index using the regression model

variable	Variable coefficient	P-value
Health score	-0/35	<0/001

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Age	0.19	<0.427
Pregnancy times	0.40	<0.232
Income	0.05	<0.264
Residence area	0.60	<0.230
Smoking	0.01	<0.939
Times of teeth brushing	0.07	<0.044
Teeth flossing	0.02	<0.643
Insurance	0.02	<0.682
Education	-0.01	<0.919
Percent of needed care	-0.01	<0.464
Bleeding at the time of probing	0.01	<0.932
Gingivitis	0.30	<0.015