Original Article

Factors Affecting Pregnant Women's dental Services Use in Razavi Khorasan Province of Iran

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Abstract

Background: Despite recommendations from guidelines and institutions, dental care utilization during pregnancy remains uncommon. This study aimed to investigate the prevalence and associated factors of poor dental care during pregnancy in Razavi Khorasan. **Materials and Methods:** A population-based, cross-sectional study was carried out randomly on 670 mothers in 2022. Dental care utilization, oral health, and reasons for dental care usage were measured by a reliable and validated questionnaire. The data collection included information about parents, pregnancy, oral health, and dental care. Predictors associated with barriers to receiving dental care were identified and reported as Odds Ratios (ORs) and confidence intervals. For statistical analysis, Stata14 software was also used. **Results:** In general, 80.89% of mothers did not visit the dentist during pregnancy, 3.73% of them brushed and flossed twice or more a day, and 8.66% of them received dental care twice or more a year. Mothers with higher education received more dental care during pregnancy (OR = 3.42 (1.06, 11.07); $p = 0.03$). Nevertheless, mothers who had adhered to yearly dental care received less dental care during pregnancy (OR = 0.36 (0.17; 0.74); $p = 0.00$). Based on information about pregnancy history, dental care was less likely to be considered important during pregnancy, when there was multiparity and short pregnancy distances (OR = 0.39 (0.16; 0.96); $p = 0.04$). **Conclusions:** Results of this study showed that awareness among pregnant women and healthcare providers about the importance of oral healthcare during pregnancy was very poor and the consequences of neglecting it were often underestimated, especially during crises and epidemics.

Keywords: *Dental health services, dental prophylaxis, maternal health, oral hygiene*

Introduction

Oral Hygiene (OH) is a critical component of over life, especially during pregnancy. Cavities and gingivitis are mostly caused by poor OH.[1,2] Oral and dental care during pregnancy refers to the prevention and treatment of oral health issues that may affect pregnant women and their unborn babies. OH issues may include tooth decay, gum disease, tooth loss, oral infections, and oral cancer.[3] The aim of oral and dental care during pregnancy is to maintain good OH, avoid risk factors, and seek timely dental interventions when needed, and it is important for the wellbeing of both the mother and the baby as poor OH can lead to negative consequences such as preterm birth, low birth weight, preeclampsia, and neonatal sepsis.[4]

During pregnancy, various hormonal and physiological changes occur in the woman's body to support the growth and development of the fetus and prepare the mother for labor and delivery.[5] In pregnancy, women have a higher tendency to develop dental caries due to a more intense desire to consume sweets. In addition, there is an increase in oral acidity and a rise in estrogen and progesterone levels that may lead to periodontitis.[5,6] Pregnant women may also suffer from oral and dental diseases, which can reduce their quality of life and can cause infections in their offspring, which may result in preterm delivery and low birth weight.[4,6,7] Pregnant women are hindered from receiving dental care due to fear, anxiety, economic hardships, and lack of preventive information. Additionally, many physicians and dentists prefer to wait until parturition to offer dental care for this group.[6] A regular routine OH (twice a day brushing, once a day flossing, as recommended by the American Dental Association) and universaly dental care (two times per year) can help prevent these conditions.[8,9] As part of prenatal

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care, dental care and related education are among the topics mentioned in several dental guidelines.[10-13] Pregnant women have always been less likely to receive oral and dental care, even those with higher education and income.[10,13] A national study in Iran revealed that more than half of the pregnant women did not receive dental care.[12] The findings of studies in the United States and Saudi Arabia were nearly similar.[10,14]

To establish decision making according to evidence-based information about oral health and dental service utilization in pregnant women, it is necessary to have knowledge about the issue and its potential causes. This study aims to investigate the prevalence of dental care utilization and identify the factors associated with poor OH among pregnant women in Razavi Khorasan province. By understanding these factors, we can develop effective interventions to improve oral health outcomes for pregnant women and their infants.

Materials and Methods

This population-based cross-sectional study was conducted in 2022 at Mashhad University of Medical Sciences (MUMS). This study employed stratified random sampling. At first, rural and urban areas were stratified. The capital city was selected as the largest city, while a small and a medium city were chosen at random. Rural areas were also randomly chosen. After that, a Primary Health Care office (PHC) was randomly selected in each city or rural area. The Sina Electronic Health Record System (SinaEHR®) was used to document these services. According to a study in Iran, 54% of pregnant women did not receive dental care,[12] so with a level of precision of 0.05 and a 95% confidence level, a minimum sample size of 397 mothers was required. A larger sample size was, however, recommended to cover the possibility of nonresponse or incomplete data. This study also considered adding a margin of nonresponse to the sample size calculation to ensure adequate power, so 670 random samples of women experiencing stillbirth, neonatal death, and live births within 2 months of starting the survey (September to October 2022) were selected from PHC services. In this way, we ensured that the mothers involved in this study had recently completed their pregnancies, thereby allowing a more accurate recall of their healthcare experiences. To minimize the potential for inaccuracy in their responses, we minimized the time gap between the end of pregnancy and the study.

Some women were excluded from the survey if they had given birth more than 2 months prior to the study, if they had miscarried or had abortions, if they were unable or unwilling to take part, if they had a history of mental illness or cognitive impairment that could interfere with their ability to provide accurate information, or if they did not speak Persian. Mothers' phone numbers and baseline data were extracted from the Sina Electronic Health Record System. In this study, data were collected using a questionnaire previously used by Rahebi *et al*. and Asgari *et al*.[12,15] The questionnaire demonstrated good reliability (Cronbach's alpha = 0.75) and validity (split-half correlation = 0.74). This questionnaire included parents' personal information, pregnancy information, and OH and dental care information. Descriptive analysis was used to determine the prevalence use of dental care in total and according to demographic and pregnancy characteristics. The logistic regression method was used to determine prognoses for dental care utilization (binary outcome). Subgroup analyses were conducted using univariable logistic regression, focusing on variables with p values less than or equal to 0.25.[16,17] In the final model, nonsignificant variables (p values greater than 0.05) were excluded. Throughout the study, 95% CIs were reported as two-sided test results. All analyses were done with Stata14 software (StataCorp, College Station, TX, USA).

Ethical considerations

This study was approved by the Ethics Committee of Mashhad University of Medical Sciences (Ethics ID: IR.MUMS.REC.1401.144). Informed consent was obtained from all participants.

Results

This study shows the dental care status and related factors of pregnant women in Razavi Khorasan province. Figure 1 summarizes the oral health and dental care received during pregnancy by the subjects. The main variables of interest were dental care during pregnancy, oral health behaviors, knowledge of dental care timing, and pregnancy outcomes. The descriptive statistics of these variables are presented in Table 1 along with the demographic characteristics of the subjects.

Table 2 shows the results of the unadjusted and adjusted logistic regression models predicting receipt of dental care during pregnancy.

According to the final analysis, a mother's educational level, proximity to health care facilities, awareness of proper dental care during pregnancy, and perceived importance of oral health were significant predictors of receiving dental care during pregnancy. Multiple logistic regression models were used to identify these factors. However, the model's pseudo R^2 was 6.91%, indicating that these variables explained

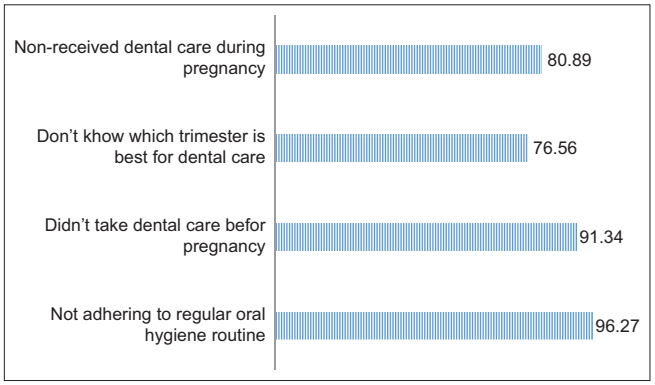

Figure 1: Oral health indicators of pregnant mothers (%) in Razavi Khorasan Province, 2022

Table 1: Women's characteristics and dental care overall and by maternal characteristics in Razavi Khorasan Province, 2022

Parental characteristic	Sample, *n* (%)	Mothers Received dental care during pregnancy, *n* (%)	Mothers Not received dental care during pregnancy, *n* (%)
Mother age (years)			
1524	146 (22.12%)	24 (18.89%)	122 (22.51%)
2534	356 (53.93%)	73 (57.48%)	292 (53. 87%)
≥35	158 (23.93%)	30 (23.62%)	128 (23.61%)
Residence			
Urban	537 (80.39%)	98 (77.17%)	439 (81.15%)
Rural	131 (19.61%)	29 (22.83%)	102 (18.85%)
Ethnicity			
Iranian	520 (77.73%)	101 (79.53%)	419 (77.31%)
Others	149 (22.27%)	26 (20.47%)	123 (22.69%)
Mothers' educational level			
Illiterate	17 (2.54%)	5 (3.94%)	12 (2.21%)
15 years	95 (14.20%)	22 (17.32%)	73 (13.47%)
69 years	131 (19.58%)	19 (14.96%)	112 (20.66%)
1012 years	214 (32.99%)	43 (33.86%)	171 (31.55%)
Academic	212 (31.69%)	38 (29.92%)	174 (32.10%)
Father's educational level			
Illiterate	20 (2.99%)	3 (2.36%)	17 (3.14%)
15 years	78 (11.66%)	17 (13.39%)	61 (11.25%)
69 years	149 (22.27%)	30 (23.62%)	119 (21.96%)
1012 years	208 (31.09%)	35 (27.56%)	173 (31.92%)
Academic	214 (31.99%)	42 (33.07%)	172 (31.73%)
Mothers' employment status			
Housewife	596 (89.09%)	109 (85.83%)	487 (89.85%)
Outdoor jobs	73 (10.91%)	18 (14.17%)	55 (10.15%)
Father's employment status			
Selfemployed	396 (59.20%)	80 (62.99%)	316 (58.30%)
Civil servant	239 (35.72%)	40 (31.50%)	199 (36.72%)
Others	34 (5.08%)	7 (5.51%)	27 (4.98%)
Parity			
1st birth	187 (27.95%)	31 (24.41%)	156 (28.78%)
2nd-4th birth	441 (65.92%)	84 (66.14%)	357 (65.86%)
≥5th birth	41 (6.13%)	12 (9.45%)	29 (5.35%)
Distance between current and previous pregnancies			
First pregnancy	187 (27.99%)	31 (24.41%)	156 (28.84%)
One year or less	33 (4.94%)	10 (7.87%)	23 (4.25%)
13 years	124 (18.56%)	27 (21.26%)	97 (17.93%)
More than 3 years	324 (48.50%)	59 (46.46%)	265 (48.98%)
Pregnancy intention			
Not intended	174 (25.97)	41 (32.8%)	132 (24.35%)
Intended	496 (74.03)	86 (67.72%)	410 (75.65%)
History of stillbirth			
Yes	15 (2.24%)	4 (3.15%)	11 (2.03%)
No	654 (97.76%)	123 (96.85%)	531 (97.97%)
History of neonatal death			
Yes	19 (2.84%)	6 (4.72%)	13 (2.40%)
No	650 (97.16%)	121 (95.28%)	529 (97.60%)
Daily brushing habit			
Never	16 (2.39)	6 (4.72%)	10 (1.85%)
Irregular	78 (11.66)	14 (11.02%)	64 (11.81%)

Contd...

Table 1: Contd...

Parental characteristic	Sample, *n* (%)	Mothers Received dental care during pregnancy, *n* (%)	Mothers Not received dental care during pregnancy, *n* (%)
Once	344 (51.42%)	61 (48.03%)	283 (52.21%)
Twice or more	231 (34.53%)	46 (36.22%)	185 (34.13%)
Daily flossing habit			
Never	401 (59.94%)	78 (41.05%)	323 (59.59%)
Irregular	124 (18.54%)	24 (12.63%)	100 (18.45%)
Once	91 (13.60%)	19 (10.00%)	72 (13.28%)
Twice or more	53 (7.92%)	69 (36.32.7%)	47 (8.67%)
Regular routine oral hygiene (brushing twice a day, flossing once a day)			
Yes	24 (3.59%)	6 (4.72%)	18 (3.32%)
No	645 (96.41%)	121 (95.28%)	524 (96.68%)
Appropriate trimester of pregnancy for dental care by mother's knowledge			
First trimester	70 (10.48%)	16 (12.60%)	54 (9.98%)
Second trimester	155 (23.20%)	46 (36.22%)	109 (20.15%)
Third trimester	52 (7.78%)	5 (3.94%)	47 (8.69%)
All time useful	22 (3.29%)	2 (1.57%)	20 (3.70%)
All time harmful	126 (18.86%)	26 (20.47%)	100 (18.85%)
I don't know	243 (36.38%)	32 (25.20%)	211 (39.00%)
Dental care before pregnancy			
≥Twice a year	56 (8.38%)	17 (13.39%)	39 (7.21%)
Once a year	150 (22.46%)	34 (26.77%)	116 (21.44%)
Without receiving dental care	120 (17.96%)	22 (17.32%)	98 (18.11%)
Never	246 (36.83%)	39 (30.71%)	207 (38.26%)
Can't recall	96 (14.37%)	15 (11.81%)	81 (14.97%)

6.91% of the variance in receiving dental care during pregnancy. The widespread availability of dental services in the region suggests that programmatic issues may be involved in preventing people from accessing dental care.

Discussion

It is important to screen and refer pregnant women to dentists for dental and oral health care during pregnancy and to provide them with preventive care as well as health care during pregnancy.[18,19] According to this study, 80.89% of pregnant women did not receive dental care; however, a study in Iran found that 54.70% of pregnant women did not receive dental care.[15] A study by Rahebi *et al*.[12] in 2021 found that only 18.40% of pregnant women visited a dentist during their pregnancy. Another study by Bayat *et al*.[20] in 2016 conducted in Hamedan indicated that half of pregnant women did not visit the dentist during their last pregnancy, and a study by Singhal *et al*. showed 48% of pregnant women visited the dentist during pregnancy.[21] Another study in Pakistan (2020) showed that 10.5% of pregnant women visited a dentist during their pregnancy.[22] Approximately 30% of women in the United States, 50% of women in Australia, and 66.5% to 75.5% of women in Latin America, Africa, and Asia did not receive dental care during pregnancy.[23] While these studies reported sometime similar amounts of demand and received dental care, our findings in this study are alarming for our healthcare system. The discrepancies between our findings and those of previous studies may be attributable to the COVID-19 pandemic, which have induced fear of viral transmission and consequently altered dental care-seeking behaviors.[24-26]

While previous Iranian research indicated that 3.7% of men and 7.7% of women practiced optimal OH (brushing twice daily and flossing at least once daily),[12,15] another Iranian study found 41.8% of Iranians brushed twice and 2.7% flossed once daily,[15] which is greater than 3.73% for pregnant women in our study. Although 23.44% of pregnant women were awarded that dental care was beneficial during the second trimester, there was only a 0.57 (0.31; 1.03) chance of receiving dental care compared to those who believed it was harmful. The result implies that despite knowledge of the ideal time for dental visits, a significant number of women who were aware still did not seek dental care. It was found that 8.38% of mothers in this study received regular dental care before pregnancy but that the utilization of dental care reduced significantly during pregnancy (OR = 0.36, 95% CI: 0.17–0.74), which indicates a considerable lack of oral health awareness among women.

In pregnancy, low awareness and misinformation about OH can contribute to low dental care rates.[19] The results of this study indicate a broader issue of insufficient OH practices that extend beyond the prenatal period, particularly concerning routine oral care and dental visits prior to pregnancy. On the other hand, this study reveals a strong association between maternal education and prenatal dental care. During pregnancy,

Table 2: Odds Ratio for receipt of dental care during pregnancy in Razavi Khorasan Province, 2022

Parental characteristic	Crude OR (95% CI)	*p**	Adjusted OR (95% CI)	*p***
Mother age (years)				
1524	1.00			
2534	0.78 (0.47; 1.30)	0.35		
≥35	0.83 (0.46; 1.51)	0.56		
Residence				
Urban	1.00			
Rural	0.78 (.49; 1.25)	0.31		
Ethnicity				
Fars	1			
Others	1.14 (0.70; 1.83)	0.58		
Mothers' educational level				
Illiterate	1		1	
15 years	1.38 (0.43; 4.35)	0.58	1.37 (0.42; 4.47)	0.59
69 years	2.45 (0.77; 7.76)	0.12	3.34 (1.01; 11.00)	0.04
1012 years	1.65 (0.55; 4.95)	0.36	2.57 (0.81; 8.07)	0.10
Academic	1.90 (0.63; 5.73)	0.25	3.42 (1.06, 11.07)	0.03
Father's educational level				
Illiterate	1			
15 years	0.63 (0.16; 2.41)	0.50		
69 years	0.70 (0.19; 2.54)	0.58		
1012 years	0.87 (.24; 3.13)	0.83		
Academic	0.72 (.20; 2.58)	0.61		
Mothers' employment status				
Housewife	1		1	
Outdoor jobs	0.68 (.38; 1.21)	0.19	0.57 (0.29; 1.12)	0.10
Father's employment status				
Selfemployed	1			
Civil servant	1.25 (0.82; 1.91)	0.28		
Others	0.97 (0.41; 2.32)	0.95		
Parity				
1st birth	1		1	
2nd-4th birth	0.84 (0.53; 1.32)	0.46	0.88 (0.52; 1.49)	0.65
≥5th birth	0.48 (0.22; 1.04)	0.06	0.59 (0.25; 1.40)	0.23
Distance between current and previous pregnancies				
First pregnancy	1		1	
One year or less	0.45 (0.19; 1.05)	0.06	0.39 (0.16; 0.96)	0.04
13 years	0.71 (0.40; 1.26)	0.25	0.67 (0.37; 1.24)	0.21
More than 3 years	0.89 (0.55; 1.43)	0.64	0.90 (0.54; 1.49)	0.68
Pregnancy intention				
intended	1			
Not intended	0.67 (0.44; 1.01)	0.67		
History of stillbirth				
Yes	1			
No	1.56 (0.49; 5.01)	0.44		
History of neonatal death				
Yes	1		1	
No	2.01 (0.75; 5.41)	0.16	1.45 (0.50; 4.28)	0.48
Daily brushing habit				
Never	1		1	
Irregular	2.74 (0.85; 8.79)	0.09	1.96 (0.55; 6.92)	0.29
Once	2.78 (0.97; 7.94)	0.05	2.04 (0.63; 6.53)	0.22
Twice or more	2.41 (0.60; 4.58)	0.10	1.56 (0.48; 5.08)	0.45
Daily flossing habit				

Contd...

Table 2: Contd...

Parental characteristic	Crude OR (95% CI)	*p**	Adjusted OR (95% CI)	*p***
Never	1			
Irregular	1.00 (0.60; 1.67)	0.98		
Once or more	1.14 (0.69; 1.88)	0.58		
Regular routine OH (brushing twice a day, flossing once a day)				
Yes	1			
No	0.69 (0.26; 1.78)	0.44		
Appropriate trimester of pregnancy for dental care by mother's knowledge				
All time harmful	1		1	
I don't know	1.71 (0.96; 3.03)	0.06	1.86 (1.2; 3.41)	0.04
All time useful	2.60 (0.57; 11.84)	0.21	3.14 (0.67; 14.74)	0.14
First trimester useful	0.87 (0.43; 1.77)	0.71	0.79 (0.38; 1.66)	0.55
Second trimester useful	0.61 (0.35; 1.07)	0.08	0.57 (0.31; 1.03)	0.06
Third trimester useful	2.44 (0.88; 6.76)	0.08	2.47 (0.87; 7.00)	0.08
Dental care before pregnancy				
Never	1		1	
Can't recall	1.01 (0.53; 1.94)	0.95	1.07 (0.54; 2.12)	0.82
Without receiving dental care	0.83 (0.47; 1.49)	0.55	0.74 (0.40; 1.37)	0.34
Once a year	0.64 (0.38; 1.07)	0.09	0.51 (0.29; 0.90)	0.02
≥Twice a year	0.43 (0.22; 0.84)	0.01	0.36 (0.17; 0.74)	0.00

*$p \leq 0.25$ is significant in univariate regression, and included to multiple regression **$p \leq 0.05$ is significant and included to final model

mothers with higher educational levels were significantly more likely to access dental care (OR = 3.42, 95% CI: 1.06–11.07). Interestingly, the education level of the mother's partner did not seem to influence her decision to seek dental care.

In pregnant women, oral health is usually neglected due to the risk of preterm birth.[21] We found that mothers with a history of stillbirth or neonatal death were less likely to use dental care; however, the small sample size of 34 individuals limited the validity of this finding. Even though more than 72% of the participants in this study had experienced multiple pregnancies, these women were less likely to receive adequate dental care, although the finding was not statistically significant. According to Rahebi *et al*.'s[12] study, women with multiple pregnancies had a significantly higher risk of dental neglect, with odds ratios ranging from 1.33 to 1.37. This emphasizes the potential health risks associated with inadequate dental care.

Multiparous women's dental care is lower than that of primiparous mothers due to the high sensitivity of a pregnant women during their first pregnancy compared to subsequent pregnancies, which may lead to more regular prenatal care. Additionally, longer pregnancy intervals (compared to their first pregnancy) may increase the chance of pregnant women seeking dental care.[5,23]

As previously discussed, one of the most important factors influencing pregnant women to seek dental care and to be referred to dental providers is their knowledge and awareness and how they perceive its benefits and safety. It is therefore vital that providers of birth services, such as nurses, midwives, and doctors, promote pregnant mothers' knowledge and awareness of oral health issues during pregnancy and encourage and refer them to dental care services.[10,27]

The strength of this study is that it was conducted among the general population, so the results are representative of all of the community. A primary limitation of this study was the reliance on self-reported dental care utilization rather than objective dental records. In health services research, self-reporting is a common methodology; however, it is subject to both recall bias and social desirability bias. Recall bias is the second limitation. The temporal gap between participants' pregnancy experiences and data collection likely exacerbated recall bias. To mitigate this problem, mothers who recently terminated their pregnancies were contacted and asked about their recent pregnancy-related OH experiences. Although social desire bias cannot completely be ruled out, particularly in regard to health behaviors, this bias might have been less pronounced among mothers than in other groups, although it was possible for mothers to overreport their dental care utilization to present a more health-conscious image.

Conclusion

The results of this study indicate that pregnant women in Razavi Khorasan province suffer from poor OH. The study was conducted during the COVID-19 outbreak and ignored offset transformations of health. Study results underscore the need for enhanced oral healthcare for pregnant women, particularly during times of crisis such as COVID-19 pandemics. Due to concerns over virus transmission, dental clinics closed temporarily and patient visits reduced, highlighting pregnant women's vulnerability to poor oral health. To mitigate these challenges, dental practices must prioritize the adoption of innovative technologies and safety protocols to ensure uninterrupted access to care and minimize risks. The study offers policymakers and healthcare providers insights that can

help them develop strategies to enhance pregnant women's oral health, even in the face of unforeseen disruptions. We hope this research can contribute to a more comprehensive approach to maternal and child health by raising awareness among pregnant women and healthcare providers about the importance of oral health during pregnancy.

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Conflicts of interest

Nothing to declare.

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