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Oral health-related quality of life and its association with oral health literacy and dental caries experience among a group of pregnant women

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ABSTRACT

Background: Oral health plays an important role in the general health of pregnant women and their newborns. Our aim was to assess oral health-related quality of life and its association with oral health literacy and dental caries among a group of Iranian pregnant women.

Materials and Methods: A cross-sectional study was conducted on 200 pregnant women attending a governmental hospital in Isfahan, Iran, applying a convenient sampling method. Self-administrated questionnaires requested information about demographics, oral health-related quality of life utilizing Oral Health Impact Profile-14 (OHIP-14), and oral health literacy. A senior dental student conducted a clinical examination to record dental caries with Decayed, Missing, and Filled Teeth (DMFT) index. Kolmogorov–Smirnov test, Mann–Whitney *U*-test, Kruskal–Wallis test, Spearman correlation coefficient, and logistic regression model served for analysis ($P < 0.05$).

Results: The prevalence of oral health impacts on quality of life was 36%. In terms of the severity, the mean score of OHIP-14 was 13.2 ± 9.0 (range: 0–38). The mean score of oral health literacy was 9.7 ± 3.2 (range: 1–16). The mean DMFT was 9.8 ± 5.2. No significant relationship existed between oral health-related quality of life and oral health literacy ($P = 0.347$). A higher score of OHIP-14 was revealed among participants with higher DMFT index ($P = 0.003$, $r = 0.21$). In multivariate analysis, DMFT was independently associated with the likelihood of reporting one or more oral health impacts on quality of life ($P < 0.05$).

Conclusions: Higher caries experience was associated with poorer oral health-related quality of life among pregnant women. Thus, it is recommended to increase quality of life through preventive measures to control the dental caries experience.

Key Words: Dental caries, health literacy, oral health, pregnancy, quality of life

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INTRODUCTION

A higher risk of oral complications exists during pregnancy including gingivitis and periodontal diseases.[1] Furthermore, pregnant women are at greater risk of developing dental caries due to either behavioral factors such as vomiting, higher sugar consumption, and ignoring the oral hygiene, or systemic factors such as metabolic changes and mineral deficiency.[2] Oral health during pregnancy

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plays an important role in the general health of both the pregnant women and their newborns. Low birth weight, preeclampsia, and gestational diabetes mellitus have been reported to be associated with periodontitis during pregnancy.[1,3]

Most oral complications are not fatal but might affect the patients' quality of life through their effects on individuals' physical, social, and psychological health.[4] Oral health-related quality of life indicates the patients' comfort while eating, sleeping, and participating in social interaction, and their satisfaction with their oral health.[5] Pregnancy-related changes in the oral cavity play an important role in women's quality of life.[6] According to the results of a systematic review, dental and gingival health during pregnancy affect the oral health-related quality of life of pregnant women.[7]

Health literacy affects the women's ability to understand and use health information during pregnancy.[8] Oral health literacy is defined as the individuals' ability to receive, analyse, and understand basic oral health information and necessary services to make appropriate decisions regarding their oral health.[9] Based on the report of Divaris *et al*., pregnant women with low level of oral health literacy reported more effects of oral problems on their quality of life.[10] However, according to the results of a systematic review by Firmino *et al*., the association of oral health literacy with oral health perception and behaviors, and dental treatment outcomes is inconclusive.[11] Several studies have indicated the association between parents' oral health literacy and their child's dental health status.[12-14] In a systematic review, an association was revealed between parents' or caregivers' low level of oral health literacy and high prevalence of dental caries in children's deciduous dentition.[15] In a study among pregnant women, those with the highest level of health literacy showed higher knowledge regarding their infant's nutritional habits and oral health.[16]

Due to the importance of oral health literacy as a new determinant of oral health,[17] and since the pregnant women are at greater risk of oral complications and poor quality of life, the present study aimed to evaluate oral health-related quality of life and its association with oral health literacy and dental caries experience among a group of pregnant women.

MATERIALS AND METHODS

Study design and sampling

The present study employed an analytical cross-sectional design. Utilizing a convenient sampling method, we conducted the study on pregnant women attending a governmental hospital in Isfahan, Iran, in 2019. In Isfahan, low-risk pregnancies are usually referred to the offices or the prenatal clinic of private or governmental hospitals. In addition, a few reference centers exist for high-risk pregnancies. The abovementioned governmental hospital serves as the largest referral center for low-risk pregnant women in Isfahan. Moreover, it is a central facility where all clients from other prenatal care centers are required to refer at least once during their pregnancy. Therefore, this site provides access to a broad range of the population of pregnant women.

Low-risk pregnant women in Iran are scheduled to have eight prenatal visits throughout the pregnancy period (at approximately the 6–10th, 16–20th, 24–30th, 31–34th, 35–37th, 38th, 39th, and 40th weeks). Therefore, our sampling was conducted across various gestational stages to ensure maximum diversity and to include participants from the first, second, and third trimesters. This approach aimed to provide a more comprehensive understanding of oral health literacy and quality of life across the entire course of pregnancy. Thus, the inclusion criteria were low-risk pregnant women at any stage of pregnancy who agreed to participate in the study and those who were able to read and write in Persian language. Pregnant women were excluded from the study if they did not provide informed consent to participate, and if they were diagnosed with high-risk pregnancies and referred to specialized referral centers.

The minimum sample size of 194 was estimated to calculate the simple correlation coefficient of oral health-related quality of life with oral health literacy and dental caries experience considering the precision of 0.05, power of 80% ($\beta = 0.2$), a minimum correlation coefficient of 0.2 (medium effect size)[18] for the significant association in a hypothesis test of $\rho = 0$ compared to $\rho \neq 0$.

Data collection

The data were collected with a self-administered questionnaire and clinical examination at the maternity ward of the hospital. The average number of pregnant attendees in this hospital was at least 500 monthly.

Three questionnaires requested information regarding participants' oral health-related quality of life as the dependent variable, and women's demographic characteristics (age, education, occupation, and number of family members) and their oral health literacy as independent variables. Completing the questionnaires took around 30 min with each participant.

Oral health-related quality of life

To assess mothers' oral health-related quality of life, we used the Persian version of Oral Health Impact Profile-14 (OHIP-14).[19] This instrument comprises 14 items in 7 domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Responses to the questions are rated based on a 5-point Likert scale (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, and 4 = very often). The total score ranges from 0 to 56. A higher score indicates poorer oral health-related quality of life.[19] The total OHIP-14 score constitutes the measure of "severity" of impacts. The "prevalence" of impacts was calculated by identifying individuals who had reported one or more OHIP items as "very often" or "fairly often."

Oral health literacy

The Oral Health Literacy-Adult Questionnaire (OHL-AQ) comprises 17 questions in four sections: (I) reading comprehension, (II) numeracy, (III) listening, and (IV) decision-making. Assigning a score of 1 to each correct answer, a total score for the questionnaire ranges between 0 and 17. OHL-AQ is a standard questionnaire in the Persian language which was developed and pilot-tested in a sample of the Iranian population by Naghibi *et al*.[20]

Dental caries experience

A senior dental student was trained and calibrated by a specialist in community oral health. To assess intra-examiner reliability, a group of 20 dental patients at dental school was re-examined after 2 weeks of their first examination (Kapa coefficient of intraexaminer reliability = 0.82). She conducted the clinical examination based on the World Health Organization criteria[21] to record the Decayed, Missing, and Filled Teeth (DMFT) index and its components: Decayed Teeth, Filled Teeth, and Missing Teeth under the light of a headlamp using a disposable mirror. Following the examination, treatment suggestions were given to each participant.

Statistical analysis

We applied the Statistical Package for the Social Sciences (SPSS 20.0/PC; SPSS, Chicago, IL, USA). To test the normal distribution of the continuous variables, we used the Kolmogorov–Smirnov test. Since these variables were not normally distributed, Mann–Whitney *U*-test, Kruskal–Wallis test, and Spearman correlation coefficient served for statistical analysis ($P < 0.05$). A multivariate logistic regression model was fitted to the data to analyze the factors associated with reporting one or more oral health impacts on quality of life versus no impacts.

RESULTS

In total, 200 pregnant women participated in our study. We invited 235 women, however, because of the lack of time or unwillingness to participate, 35 cases were rejected to enter the study (Response rate = 85%). The mean age of the women was 28.8 ± 5.5 (range: 18–41 years). Most participants were homemakers (84%), and almost half of them had high school diplomas (49.5%). The mean number of their family members was 2.9 ± 0.9, range: 2–6 [Table 1].

Dental caries experience

The mean DMFT of pregnant women was 9.8 ± 5.2, range 0–28, median 9.5 (interquartile range [IQR] = 7). Filled Teeth comprised the main part of the index (mean: 5.5 ± 4.1, range: 0–16, median 6 [IQR = 6]), followed by decayed teeth (mean: 2.4 ± 2.5, range: 0–14, median 2 [IQR = 4]) and missing teeth (mean: 2.0 ± 3.7, range: 0–28, median 1 [IQR = 2]).

Table 1: Demographic characteristics of pregnant women attending a governmental hospital in Iran (*n*=200)

Variable	*n* (%)
Education	
Less than diploma	31 (15.5)
Diploma	99 (49.5)
University education	70 (35)
Job status	
Employed	15 (7.5)
Student	17 (8.5)
Homemaker	168 (84)
Number of family members (persons)	
Two	74 (37)
Three	85 (42.5)
Four	30 (15)
Five or more	11 (5.5)

Mean±SD number of family members=2.9±0.9. SD: Standard deviation

Oral health literacy

The mean score of oral health literacy among pregnant women was 9.7 ± 3.2, range: 1–16, median 10 (IQR = 5). The mean score of its subscales includes comprehension: 3.2 ± 1.5 (median 3 [IQR = 2]), calculation: 3.2 ± 1.0 (median 3 [IQR = 1]), listening: 0.7 ± 0.6 (median 1 [IQR = 1]), and decision-making: 2.5 ± 1.4 (median 2 [IQR = 2]). A direct weak correlation was revealed between oral health literacy and the participants' age (P = 0.001, r = 0.23). In addition, a significant association existed between oral health literacy and education (P < 0.001). However, oral health literacy showed no significant association with pregnant women's occupation (P = 0.618), and their number of family members (P = 0.672).

Although no significant correlation existed between participants' oral health literacy and their DMFT index (P = 0.071), subscale of reading comprehension (P = 0.021, r = 0.16) revealed a direct weak correlation with dental caries experience.

Oral health-related quality of life

In terms of the prevalence of impacts, 72 individuals (36%) reported one or more OHIP items as "very often" or "fairly often." In terms of the severity, the mean score of OHIP-14 among pregnant women was 13.2 ± 9.0, range: 0–38, and median 12 (IQR = 12). Figure 1 presents the mean score of each OHIP-14 subscale. Physical pain and psychological discomfort were the domains with the most impact on quality of life, followed by psychological disability. Oral health-related quality of life showed no significant correlation with participants' age (P = 0.702) and the number of family members (P = 0.363). No significant association existed between pregnant women's oral health-related quality of life and their education (P = 0.160) and occupation (P = 0.658) as well.

A direct weak correlation was revealed between OHIP-14 and the DMFT index (P = 0.003, r = 0.21).

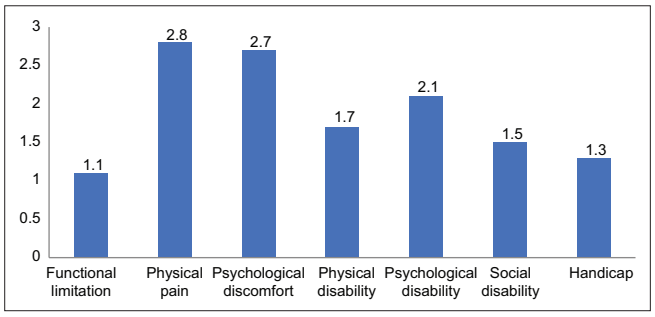

Figure 1: The mean score of Oral Health Impact Profile-14 subscales among pregnant women (n = 200).

All subscales of OHIP-14 showed a significant correlation with DMFT except for functional limitation (P > 0.05) [Table 2]. No significant correlation existed between OHIP-14 and oral health literacy (P = 0.347).

Based on the multivariate logistic regression model [Table 3], only DMFT was independently associated with the likelihood of reporting one or more impacts (P = 0.023, odds ratio = 1.07, 95% CI = 1.01–1.14) after controlling for other variables in the model.

DISCUSSION

In the present study of oral health-related quality of life among pregnant women, and its association with oral health literacy and dental caries experience, we found no significant association between oral health literacy and oral health-related quality of life. However, participants with higher scores of DMFT reported poorer oral health-related quality of life.

Table 2: Correlation between oral health impact profile-14 subscales and decayed, missing, and filled teeth index among pregnant women (n=200)

Subscales of OHIP-14	r	P
Functional limitation	0.05	0.512
Physical pain	0.16	0.027
Psychological discomfort	0.18	0.013
Physical disability	0.16	0.028
Psychological disability	0.25	<0.001
Social disability	0.17	0.018
Handicap	0.16	0.025

OHIP-14: Oral Health Impact Profile-14

Table 3: Logistic regression model of factors associated with reporting one or more oral health impacts on quality of life (n=200)

Variable	P	OR	95% CI
Age (years)	0.056	0.94	0.88–1.00
Number of family members (persons)	0.397	1.18	0.81–1.71
Education (less than diploma*)			
Diploma	0.405	0.69	0.29–1.65
University	0.633	1.26	0.49–3.24
Job status (homemaker*)			
Student	0.179	0.43	0.12–1.48
Employed	0.993	1.01	0.32–3.19
Oral health literacy	0.124	0.92	0.83–1.02
DMFT	0.023	1.07	1.01–1.14

*Reference group. Nagelkerke R^2=0.093, Goodness of fit with Hosmer and Lemeshow test (P=0.38). OR: Odds ratio; CI: Confidence interval; DMFT: Decayed, Missing and Filled Teeth

The mean score of OHIP-14 among pregnant women in our study was 13.2. Considering the possible range of OHIP-14 total score (0–56), the impact of oral problems on their quality of life was low. This score was almost similar to that of Brazilian pregnant women (12.1)[6] but worse than that of a group of low-income female caregivers in North Carolina (10.6)[10] and that of a sample of pregnant women in China (7.92).[22] As explained by Divaris *et al*., "the dimensionality of oral health-related quality of life may differ between diverse populations or ethnic groups."[10]

Physical pain and psychological discomfort were the domains with the most impact on quality of life followed by psychological disability. Similarly, based on the results of a systematic review, the most affected domains of quality of life among pregnant women were mental and psychological discomfort, followed by physical and functional problems.[7]

Among pregnant women, a higher score of DMFT was associated with poorer oral health-related quality of life. This finding is supported by the result of a meta-analysis among pregnant women indicating a positive association between DMFT and poor oral health-related quality of life.[23] Similar findings have been reported in studies among other target groups.[24-26] As explained by Gift and Redford, oral and dental complications have significant effects on individual's physical, mental, and social well-being and can affect a person's quality of life through impaired interpersonal relationships.[27]

No association was revealed between oral health literacy and OHIP-14 in our study. Similar result was reported by Navabi *et al*. among patients attending dental clinics in Iran.[28] In contrast, based on other reports, a higher level of oral health literacy was associated with less effect of oral problems on quality of life.[10,29,30] As suggested by Divaris *et al*., "the association between oral health literacy and oral health-related quality of life may be modified by race." As a proxy of unmeasured factors, race might mediate between oral health literacy and the perceived effects of oral problems on quality of life.[10]

The mean score of oral health literacy among pregnant women in our study (9.7) was lower than that of their counterparts in the general population (OHL-AQ mean score: 10.9)[17] which might be due to different socioeconomic characteristics of the participants. Considering the stratified multistage random sampling method, Naghibi *et al*. studied the oral health literacy of citizens from all socioeconomic regions of Tehran (the capital city of Iran)[17] However, we studied only the pregnant women attending one governmental hospital in Isfahan. Similarly, oral health literacy of pregnant women from a low-income group in North Carolina was lower than that of other target groups.[8] This finding is important due to its possible effect on child's oral health status, as several studies have indicated the association between parents' oral health literacy and their child's dental health status.[12-15]

Oral health literacy was higher among more educated women in our study. Several reports have also emphasized the direct association between oral health literacy and educational level.[8,10,16,20,31-34] Women's ability to understand and use health information during pregnancy is affected by health literacy.[8] Thus, as suggested by Vilella *et al*., health professionals should consider their clients' level of education in order to improve their communication with patients and to provide effective health information and recommendations.[16]

No significant association was revealed between oral health literacy and DMFT index. It seems that other more important factors might affect dental caries experience among our participants than do oral health literacy; factors including oral health behaviors, access to preventive care, nutritional habits, and socioeconomic status. Similar results were reported among pregnant women as indicated by Afshar *et al*.[32] and Bashirian *et al*.[35] The association of oral health literacy with oral health perception, oral health behaviors, and oral health-related treatment outcomes was inconclusive based on a systematic review by Firmino *et al*.[11]

To the best of our knowledge, this is the first study to report oral health literacy, dental caries experience, and oral health-related quality of life simultaneously among pregnant women. In addition, clinical examinations utilizing standard questionnaires and a high response rate are other strengths of this study. However, the cross-sectional nature of the study makes it impossible to interfere a causal relationship. In addition, we selected the participants from one governmental hospital thus, the results could not be generalized to all pregnant women including those from other medical centers or even private practices. Furthermore, we should consider the social desirability

due to the use of questionnaires. Participants might have a tendency to answer questions in such a way as to present themselves in socially acceptable terms. However, we tried to overcome this limitation by anonymous self-administered questionnaires.

CONCLUSION

In the present study of oral health-related quality of life among pregnant women, no relationship was revealed between oral health literacy and oral health-related quality of life. However, higher caries experience was associated with poorer oral health-related quality of life. Thus, it is recommended to design and implement preventive oral health programs for pregnant women in order to control their dental caries experience and to increase their oral health-related quality of life.

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Conflicts of interest
The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or non-financial in this article.

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