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

Mojdeh Shahpari
Islamic Azad University

Hajar Shekarchizadeh (shekarchizadeh@razi.tums.ac.ir)
Islamic Azad University

Mahsa Sadat Mousavi
Islamic Azad University

Research Article

Keywords: Pregnancy, Oral health, Health literacy, Quality of life, Dental caries

Posted Date: August 12th, 2022

DOI: https://doi.org/10.21203/rs.3.rs-1924110/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License
Abstract

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

**Methods:** Applying a convenient sampling method, a cross-sectional study was conducted on 200 pregnant women attending a governmental hospital in Isfahan, Iran, in 2019. Self-administrated questionnaires requested information about women's demographics, their oral health-related quality of life utilizing Oral Health Impact Profile-14 (OHIP-14), and their oral health literacy utilizing Oral Health Literacy-Adult Questionnaire. A senior dental student conducted clinical examination under the artificial light of a headlamp based on the WHO (World Health Organization) criteria to record dental caries experience with Decayed, Missing and Filled Teeth (DMFT) index. Mann-whitney U test, Kruskal–Wallis test, spearman correlation coefficient, and a linear regression model served for statistical analysis (p<0.05).

**Results:** The mean age of the pregnant women was 28.8 ± 5.5. About half of the women (49.5%) had a high school diploma, and 84% were homemaker. 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. In multivariate analysis, higher score of OHIP-14 was associated with higher caries experience (p<0.05).

**Conclusions:** Higher caries experience was associated with more effects of oral problems on pregnant women's quality of life. Thus, it is recommended to increase their oral health-related quality of life via preventive measures to control the dental caries experience.

Background

Higher risk of oral complications exists during pregnancy. Pregnancy hormones, by changing the inflammatory mediators and the immune response, predispose the oral cavity to problems such as gingivitis and periodontitis. Periodontal diseases might lead to gingival bleeding, pain, halitosis, tooth loss and even individuals’ poor quality of life [1, 2]. Furthermore, pregnant women are in greater risk of developing dental caries due to increased acidity of the oral cavity, higher tendency to eat sweet foods, and ignoring the oral hygiene during pregnancy [1].

Oral health during pregnancy plays an important role in 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 fetal 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, 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, analyze 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 [12-15]. In a systematic review, an association revealed between parents’ or caregivers’ low level of oral health literacy and high prevalence of dental caries in children's deciduous dentition [12]. Other studies have also reported the relationship between parents’ inadequate oral health literacy and their children's tooth decay [13-15]. In a study among pregnant women, those with 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.

Methods

Utilizing a convenient sampling method, we conducted a cross-sectional study on 200 pregnant women attending a governmental hospital in Isfahan, Iran, in 2019. 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% (β = 0.2), a minimum correlation coefficient of 0.2 (medium effect size) for the significant association in a hypothesis test of \( \rho = 0 \) compared to \( \rho \neq 0 \). The data were collected with self-administered questionnaire and clinical examination. Three questionnaires requested information regarding participants’ oral health-related quality of life as the dependent variable, and women's demographic characteristics (age, education, occupation, number of family members) and their oral health literacy as independent variables. Completing the questionnaires took around 30 minutes with each participant.

To assess mothers’ oral health-related quality of life, we used the Persian version of Oral Health Impact Profile-14 (OHIP-14) [18]. 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. higher score of OHIP-14 indicates poor oral health-related quality of life [18].

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 Persian language which was developed and pilot tested in a sample of Iranian population by Naghibi et al [19].

A senior dental student who was trained and calibrated by a specialist in community oral health (Kappa coefficient of intra-examiner reliability=0.82), conducted the clinical examination based on the WHO (World Health Organization) criteria [20] 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 Social Science (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 linear regression model was fitted to the data to analyze the factors associated with participants’ oral health-related quality of life.

Ethical considerations

The study was approved by the secretory of the Medical Ethics Committee in the research committee of Islamic Azad University of Isfahan (Research Code: 23810201961006). Participation in the study was voluntarily. All participants filled in anonymous questionnaires, and provided the written informed consent.

Results

In total, 200 pregnant women participated in our study (Response rate = 85%). The mean age of the women was 28.8 ± 5.5 (range 18-41 years), and 62% were between 25-34 years of age. Most participants were homemaker (84%), and had high school diploma (49.5%). The mean number of their family members was 2.9 ± 0.9, range: 2-6 (Table 1).

Table 1- Demographic characteristics of pregnant women attending a governmental hospital in Isfahan, Iran, in 2019 (n=200)
<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>40 (20)</td>
</tr>
<tr>
<td>25-34</td>
<td>124 (62)</td>
</tr>
<tr>
<td>35≤</td>
<td>36 (18)</td>
</tr>
<tr>
<td><strong>Mean (SD) = 28.8 (5.5)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>Less than diploma</td>
<td>31 (15.5)</td>
</tr>
<tr>
<td>Diploma</td>
<td>99 (49.5)</td>
</tr>
<tr>
<td>University education</td>
<td>70 (35)</td>
</tr>
<tr>
<td><strong>Job status</strong></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>15 (7.5)</td>
</tr>
<tr>
<td>Student</td>
<td>17 (8.5)</td>
</tr>
<tr>
<td>Homemaker</td>
<td>168 (84)</td>
</tr>
<tr>
<td><strong>Number of family members</strong></td>
<td></td>
</tr>
<tr>
<td>Two</td>
<td>74 (37)</td>
</tr>
<tr>
<td>Three</td>
<td>85 (42.5)</td>
</tr>
<tr>
<td>Four</td>
<td>30 (15)</td>
</tr>
<tr>
<td>Five or more</td>
<td>11 (5.5)</td>
</tr>
<tr>
<td><strong>Mean (SD) = 2.9 (0.9)</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Dental caries experience**

The mean DMFT of pregnant women was 9.8 ± 5.2, range 0-28. Filled Teeth comprised the main part of the index (5.5 ± 4.1, range 0-16), followed by Decayed Teeth (2.4 ± 2.5, range 0-14) and Missing Teeth (2.0 ± 3.7, range 0-28).

**Oral health literacy**

The mean score of oral health literacy among pregnant women was 9.7 ± 3.2, range 1-16. The mean score of its subscales includes comprehension: 3.2 ± 1.5, calculation: 3.2 ± 1.0, listening: 0.7 ± 0.6, and decision making: 2.5 ± 1.4. A direct week correlation revealed between oral health literacy and the participants’ age (p = 0.001, r = 0.23) and their education (p < 0.001, r = 0.32). 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 week correlation with dental caries experience.

**Oral health-related quality of life**
The mean score of OHIP-14 among pregnant women was $13.2 \pm 9.0$, range 0-38. Table 2 presents the mean score of each OHIP-14 subscale. Physical pain and psychological discomfort were the domains with most impact on quality of life followed by psychological disability. Oral health-related quality of life showed no significant correlation with participants’ age ($p = 0.702$), their education ($p = 0.091$), 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 occupation ($p = 0.658$) as well.

Table 2- The mean score of OHIP-14 subscales among pregnant women attending a governmental hospital in Isfahan, Iran, in (n=200)

<table>
<thead>
<tr>
<th>Subscales of OHIP-14</th>
<th>Mean ± SD</th>
<th>minimum</th>
<th>maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional limitation</td>
<td>1.1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Physical pain</td>
<td>2.8</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>2.7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Physical disability</td>
<td>1.7</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Psychological disability</td>
<td>2.1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Social disability</td>
<td>1.5</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Handicap</td>
<td>1.3</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

A direct week correlation revealed between OHIP-14 and the DMFT index ($p = 0.003$, $r = 0.21$). Table 3 shows the correlation between subscales of OHIP-14 and the DMFT. All subscales of OHIP-14 showed significant correlation with DMFT except for functional limitation ($p > 0.05$). No significant correlation existed between OHIP-14 and oral health literacy ($p = 0.347$).

Table 3- Correlation between subscales of OHIP-14 and DMFT index among pregnant women attending a governmental hospital in Isfahan, Iran, in 2019 (n=200)

<table>
<thead>
<tr>
<th>Subscales of OHIP-14</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional limitation</td>
<td>0.05</td>
<td>0.512</td>
</tr>
<tr>
<td>Physical pain</td>
<td>0.16</td>
<td>0.027</td>
</tr>
<tr>
<td>Psychological discomfort</td>
<td>0.18</td>
<td>0.013</td>
</tr>
<tr>
<td>Physical disability</td>
<td>0.16</td>
<td>0.028</td>
</tr>
<tr>
<td>Psychological disability</td>
<td>0.25</td>
<td>0.001&lt;</td>
</tr>
<tr>
<td>Social disability</td>
<td>0.17</td>
<td>0.018</td>
</tr>
<tr>
<td>Handicap</td>
<td>0.16</td>
<td>0.025</td>
</tr>
</tbody>
</table>
In multivariate analysis, only participants with higher caries experience revealed higher score of OHIP-14 (Table 4).

Table 4 - Factors associated with OHIP-14 among pregnant women attending a governmental hospital in Isfahan, Iran, based on a linear regression model

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error</th>
<th>Beta</th>
<th>P</th>
<th>95% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.058</td>
<td>0.129</td>
<td>-0.035</td>
<td>0.654</td>
<td>-0.313 - 0.197</td>
</tr>
<tr>
<td>Education</td>
<td>1.294</td>
<td>0.694</td>
<td>0.142</td>
<td>0.064</td>
<td>-0.075 - 2.663</td>
</tr>
<tr>
<td>Number of family members</td>
<td>0.708</td>
<td>0.808</td>
<td>0.067</td>
<td>0.382</td>
<td>-0.885 - 2.301</td>
</tr>
<tr>
<td>Job status (Homemaker)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>0.737</td>
<td>2.442</td>
<td>0.022</td>
<td>0.763</td>
<td>-4.079 - 5.553</td>
</tr>
<tr>
<td>Employed</td>
<td>-1.454</td>
<td>2.275</td>
<td>-0.045</td>
<td>0.523</td>
<td>-5.941 - 3.032</td>
</tr>
<tr>
<td>DMFT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.308</td>
<td>0.128</td>
<td>0.178</td>
<td>0.017</td>
<td>0.056 - 0.560</td>
</tr>
<tr>
<td>Oral health literacy</td>
<td>-0.060</td>
<td>0.215</td>
<td>-0.021</td>
<td>0.780</td>
<td>-0.484 - 0.364</td>
</tr>
</tbody>
</table>

<sup>a</sup> Reference group

<sup>b</sup> Decayed, Missing and Filled Teeth

R²=0.06

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 score of DMFT reported more effects of oral problems on their quality of life.

Oral health-related quality of life 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) [21]. Different methodology of the studies or different study target groups might justify such difference in the results. Physical pain and psychological discomfort were the domains with most impact on quality of life fallowed 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].

We found no association between oral health-related quality of life and participants’ educational level. This is in line with the study by Ikebe et al. who reported no association between education and OHIP-14 among elderly Japanese [22]. However, based on available evidence among other target groups, those with higher education reported less effects of oral problems on their quality of life [23, 24].

Among pregnant women, higher score of DMFT was associated with more effects of oral problems on 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 [25]. Similar findings have been reported in studies among other target groups [26–28]. As explained by Gift and Redford, oral and dental complications have significant effects on individual's physical, mental and social wellbeing, and can affect a person's quality of life through impaired interpersonal relationships [29].

No association revealed between oral health literacy and OHIP-14 in our study. In contrast, based on other reports, higher level of oral health literacy was associated with less effect of oral problems on quality of life [10, 30, 31]. As suggested by Divaris et al, the relationship between oral health literacy and oral health-related quality of life seems to be different among different ethnic groups [10].

The mean score of oral health literacy among pregnant women in our study (9.7) was lower than that of their counterparts in 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 oral health literacy of citizens from all socioeconomic regions of Tehran (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, 19, 32–36]. 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 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 result was reported among a group of Iranian pregnant women attending a
health governmental institute [33], and among dental patients in a university dental clinic in America [35]. In contrast, lower level of oral health literacy was associated with higher score of DMFT in patients attending a university dental center in India [37], and was associated with more untreated dental caries among Brazilian adult patients [30]. Among adult dental patients in Belarus, those with adequate oral health literacy had fewer missing teeth and more filled teeth [36]. 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. However, we tried to overcome this limitation by anonymous data collection.

**Conclusions**

The impact of oral problems on Iranian pregnant women's quality of life was low. No association revealed between oral health literacy and oral health-related quality of life. However, higher caries experience was associated with more effects of oral problems on pregnant women's 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.

**Abbreviations**

OHL-AQ: Oral Health Literacy-Adult Questionnaire

OHI-P-14: Oral Health Impact Profile-14

DMFT: Decayed, Missing, Filled Teeth

**Declarations**

Ethics approval and consent to participate: The study was approved by the secretory of the Medical Ethics Committee in the research committee of Islamic Azad University of Isfahan (Research Code: 23810201961006). All methods were performed in accordance with the relevant guidelines in Declaration of Helsinki. Participation in the study was voluntarily. All participants filled in anonymous questionnaires, and provided written informed consent.

Consent for publication: Not applicable.
Availability of data and materials: The dataset used and/or analyzed during the current study is available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Funding: Not applicable.

Authors' contributions: All authors contributed to design and conception of the study. M.Sh. collected the data. M.S.M. and H.Sh. interpreted the data. All authors participated in either drafting or critical revising the manuscript. All authors approved the final version of the manuscript.

Acknowledgements: Not applicable.

References


