



# Oral health literacy and oral health behaviors of disadvantaged women residing in the slum area of Zahedan, Iran: A cross-sectional study

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## Abstract

**Background:** Disadvantaged subjects are considered a high-risk group due to limited access, insufficient awareness of oral health and lack of preventive behaviors. This study explores oral health literacy (OHL), oral health behaviors (OHB), and factors associated with OHL among women living in the slums of Zahedan in Iran.

**Methods:** A cross-sectional study was carried out on 216 disadvantaged women in the slums of Zahedan city in Iran in 2020. The women's OHL and OHB data were collected using the Persian version of the previously validated Oral Health Literacy-Adult Questionnaire. Statistical analyses, including descriptive and analytical statistics, such as multivariable linear regression analysis, were conducted using the STATA software version 14.2.

**Results:** All 216 female subjects residing in the slum areas of Zahedan city completed the questionnaire (response rate: 100%). The mean age of participants was 26.7 ( $\pm$ 5.03) years. The respondents' mean score of OHL was 7.6 ( $\pm$ 2.47) out of 17. Of the participants, 18.98% reported brushing their teeth twice or more daily, 83.3% used fluoride toothpaste, 37.96% had visited a dentist within the past year, 50.93% consumed sugary snacks less than twice per day, and 87.96% did not smoke. In the regression analysis, there was a significant positive relationship between OHL and age (P<0.001), occupation (P=0.03), and education level (P<0.001).

**Conclusion:** The level of OHL among women in the slum area was insufficient. The significant positive associations between OHL and factors such as age, occupation, and education level suggest that targeted educational interventions and community-based programs may be needed to improve this population's oral health knowledge and behaviors. **Keywords:** Oral health, Health literacy, Health behavior, Poverty areas, Vulnerable populations

**Citation:** Dahmardeh A, Yazdani R, Pakdaman A, Shamshiri AR. Oral health literacy and oral health behaviors of disadvantaged women residing in the slum area of Zahedan, Iran: a cross-sectional study. *J Oral Health Oral Epidemiol.* 2024;13(3):127–132. doi: 10.34172/johoe.2312.1604

Received: December 10, 2023, Accepted: August 27, 2024, ePublished: October 22, 2024

# Introduction

In order to have optimal oral health, acquiring knowledge on preventing oral disease, practicing good oral health behavior (OHB), and using preventive oral healthcare are essential.<sup>1,2</sup> Oral health literacy (OHL) is the degree to which people can understand oral health information and make appropriate health decisions.<sup>3</sup> OHL is crucial in determining a community's oral health.<sup>4</sup> Previous research demonstrated that OHL is complex and influenced by individual, social, and demographic differences across regions and subgroups.<sup>5,6</sup>

Over the past 60 years, slum populations have increased, especially in low and middle-income countries.<sup>7</sup> People residing in slum areas are often afflicted by poverty, unsafe housing, and unhealthy lifestyles.<sup>7,8</sup> By 2030, about

2 billion global residents will live in slums, especially in Africa and Asia.<sup>7</sup> Low socioeconomic status, limited access to healthcare, low level of education, and poor behaviors in slums deteriorate oral health and are barriers to health promotion.<sup>2,7,9,10</sup> This results in more oral diseases in these populations, which represent typical disadvantaged communities.<sup>11,12</sup> Given the prevalence of oral diseases in slum areas, understanding OHL and OHB can be beneficial and may contribute to planning oral health promotion programs in these communities.

To our knowledge, despite the lack of research exploring OHL, there are a few studies investigating the OHB of people living in slums. In light of this gap, this study aimed to assess OHL, OHBs, and factors influencing OHL among women living in the slums of Zahedan city.



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## Methods

This descriptive-analytical cross-sectional study was conducted on 216 women in the slum area of Zahedan city, Sistan and Baluchestan Province, Iran, in 2020. The study was reported following the STROBE guidelines.

# **Study population**

The sampling was conducted among women referring to Zahedan slum health centers in 2020. Subjects over 18 years old who were interested in the study were included. Due to cultural barriers and limited access, the research team enlisted the help of community health volunteers (CHVs) who serve as a bridge between the community residents and health centers. The CHVs were recruited among local women with basic literacy, social acceptance, and motivation to carry out health activities. Every CHV supports ten households and participates in training and transferring the health content and information to individuals through effective communication.<sup>8</sup>

According to the primary interview with health center authorities of the region, most women in the area could not read and write adequately or were illiterate. Therefore, data collection was performed by CHVs by interviewing the subjects.

# Sample size and sampling

The sample size was calculated using a formula for quantities variable in a cross-sectional study.<sup>13</sup>

$$n = \frac{(z_{1-\frac{\alpha}{2}})^2 \times \sigma^2}{d^2}$$

With a confidence interval of 0.95, a margin of error of 0.5, and a standard deviation of 3.38,<sup>14</sup> the estimated number of participants was at least 176. After accounting for a 15% non-response rate, the minimum required sample size was estimated to be 202 subjects.

Due to cultural barriers, a non-random sample was chosen. Out of eight health centers in the slums of Zahedan city, two volunteer centers were chosen. The CHVs who had worked for at least six months in these health centers were selected. Then, the women covered by each CHV were included in the study. The total sample was 216 subjects.

## Data collection procedure

After acquiring ethics approval, the researchers contacted the Zahedan Health Deputy about the study. With the authorities' approval, the researchers met the CHV supervisors. The supervisors contacted the experienced volunteers to invite them to participate in the study. Afterward, the researcher gave the CHVs information on data collection protocols and questionnaire completion procedures. The CHVs utilized the previously validated Oral Health Literacy Adults Questionnaire (OHL-AQ)<sup>15</sup>

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for face-to-face interviews to gather data on OHL, OHBs, and demographic information. The CHVs read questions aloud and recorded the responses.

# Variables

The data were collected using the OHL-AQ. This questionnaire was designed in Persian by Naghibi Sistani et al in 2013.<sup>15</sup> The reliability of this questionnaire has been evaluated using Cronbach's alpha coefficient, which was found to be 0.72, and the intraclass correlation coefficient, which was determined to be 0.84.15 The OHL-AQ15 assesses OHL in four sections. The comprehension section consists of six items, which examine the relationship of oral diseases with other diseases, tooth decay prevention, the number of teeth, and their eruption time. The calculation section includes four items and measures the comprehension of prescriptions and mouthwash usage instructions. In the listening section, the CHVs read a text before asking the questions, and then the participant answers two relevant questions. The decision-making section includes five items about dealing with prevalent oral health issues and two sentences about the concepts of the dentistry history form.

The answers to the questions had one correct option. Each correct option scored 1, while the incorrect and "I don't know" answers scored 0. The participants were classified into three OHL levels based on their total score: insufficient (0–9), borderline (10–11), and sufficient (12–17). For the statistical analyses, the total OHL score was used quantitatively.

OHBs were evaluated based on five questions; the frequency of tooth brushing, use of fluoridated toothpaste, last dental visit, consumption of sugary snacks, and smoking status. Each question has 4 to 7 options. OHBs were classified based on evidence for the statistical analysis. Toothbrushing frequency was divided into "twice a day or more" and "less than twice a day",<sup>16</sup> while use of fluoridated toothpaste was categorized as either "yes" or "no".<sup>17</sup> Consumption of sugary snacks was classified as "less than twice a day" or "twice a day or more",<sup>18</sup> and the time of the last dental visit was categorized as "within the previous year" or "before the previous year".<sup>19</sup> Smoking status was also divided into two categories: "yes" or "no".<sup>18</sup>

Demographic data, including age, educational level, economic status, and occupation, were also recorded. Age was divided into dichotomous categorical variables for statistical analysis based on the median score. Education level was assessed by the last degree obtained and categorized as "elementary school and lower" or "higher than elementary school." Economic status was measured by the living area per person (m2/p), a reliable indicator of economic status in Iran,<sup>20,21</sup> and was categorized into < 20, 20–39, and  $\geq$  40 m2/p. Occupation was classified as either "employed" or "unemployed."

# Statistical analysis

Descriptive statistics were reported as the mean (standard deviation) for continuous variables and number (percentage) for categorical variables. After checking for normality, the statistical significance of OHL mean differences between subgroups was compared by one-way analysis of variance (ANOVA) and the independent samples *t*-test. The relationship between OHL as the dependent variable and age, educational level, occupation, and living area per person (independent variables) were reported using multivariable linear regression.

The significance level was set as 0.05. The data were analyzed using STATA software version 14.2 (STATA Corp., 2015; TX, USA).

## Results

Overall, 216 women living in slums were examined by responding to the questionnaire. The mean (SD) age of study participants was 26.7 (5.03). Of the women who participated in the study, 129 (59.72%) had education above elementary school (Table 1).

The mean score of the women's OHL in this study was  $7.69 \pm 2.47$  out of 17. Among the participants, only 8 (3.7%) demonstrated sufficient OHL, 45 (20.8%) were classified as borderline, and 163 (75.5%) were deemed insufficient.

The OHB of the subjects is reported in Table 2. Of all women, only 41 (18.98%) subjects brushed their teeth twice or more daily. Dental visits were made at least once last year by about 38% of the women.

Table 3 displays the positive and significant relationship between OHL and age (P < 0.001), occupation (P = 0.03), and education level (P < 0.001). Women with education levels higher than primary school had OHL scores 3.5

Variables	Number (%)	OHL (mean±SD)	P value
Age (y)			0.02*
≤26	109 (50.46)	$7.30 \pm 2.39$	
>26	107 (49.54)	$8.10 \pm 2.50$	
Education level			< 0.001*
≤Elementary	87 (40.28)	$5.64 \pm 1.93$	
>Elementary	129 (59.72)	$9.08 \pm 1.73$	
Occupation			< 0.001*
Employed	16 (7.41)	$10.06 \pm 1.53$	
Unemployed	200 (92.59)	$7.50 \pm 2.44$	
Living area (m2/p)			0.14**
<20	43 (19.91)	$7.07 \pm 2.46$	
20–39	138 (63.89)	$7.78 \pm 2.46$	
≥40	35 (16.20)	$8.11 \pm 2.46$	

SD: standard deviation.

\* By independent samples t-test; \*\* By ANOVA test.

points higher than those without. Women aged 26 and above scored 0.8 points higher in OHL than their younger counterparts. Additionally, employed women demonstrated a higher level of OHL compared to unemployed women.

### Discussion

The current research aimed to investigate OHL, OHBs, and the factors that impact the OHL of women living in slums in Zahedan. The results showed that the OHL

Table 2. Frequency of oral health behaviors by the mean score of oral health literacy (OHL) among women living in slums in Zahedan city, Iran, 2020 (N=216)

Oral health behavior	Number (%)	OHL (mean±SD)	P value*
Tooth brushing			0.38
≥Twice daily	41 (18.98)	$8 \pm 2.78$	
<twice daily<="" td=""><td>175 (81.02)</td><td><math>7.62 \pm 2.40</math></td><td></td></twice>	175 (81.02)	$7.62 \pm 2.40$	
Use of fluoride toothpaste			0.02
Almost or always (yes)	180 (83.33)	$7.86 \pm 2.50$	
Rarely or never (no)	36 (16.67)	$6.83 \pm 2.18$	
Last dentist visit			0.57
≤1 year	82 (37.96)	$7.81 \pm 2.34$	
>1 year	134 (62.04)	$7.62 \pm 2.56$	
Sugary snack consumption			0.98
<twice day<="" td=""><td>110 (50.93)</td><td><math display="block">7.69 \pm 2.54</math></td><td></td></twice>	110 (50.93)	$7.69 \pm 2.54$	
≥Twice/day	106 (49.07)	$7.70 \pm 2.42$	
Smoking			0.55
No	190 (87.96)	$7.73 \pm 2.54$	
Yes	26 (12.04)	$7.42 \pm 1.92$	

SD: standard deviation.

\* By independent samples t-test.

Table 3. Linear regression analysis of oral health literacy scores with socio-demographic variables among women living in slums in Zahedan city, Iran, 2020 (N=216)

Independent variables	Beta coefficient	Standard error	95% CI	P value
Age (y)				
>26	0.80	0.24	0.32, 1.27	< 0.001
≤26	Referent	-	-	-
Education level				
>Elementary	3.31	0.25	2.81, 3.80	< 0.001
≤Elementary	Referent	-	-	-
Occupation				
Employed	1.01	0.47	0.08,1.94	0.03
Unemployed	Referent	-	-	-
Living area (m2/p)				
≥40	0.49	0.40	-0.30, 1.29	0.22
20–39	0.15	0.31	-0.46, 0.75	0.64
<20	Referent	-	-	-

CI: confidence interval.

level of the participants was insufficient. There was a relationship between OHL and education level, age, and occupation.

The study found insufficient OHL among these women. The lack of prior research on OHL among slum residents hinders comparison. However, this study reveals a lower OHL score than urban Iranian populations, which have already been studied for their OHL using the OHL-AQ.<sup>21-24</sup> For example, in the study by Naguib Sistani et al conducted in Tehran, the mean OHL score for women was 10.9.21 The markedly lower level of OHL in the current study compared to previous urban studies is due to numerous factors; the most important one may be the socioeconomic status (SES) of the participants in slum areas in the present study. The subjects in the current research reside in one of Iran's provinces with the lowest SES.25 This finding aligns with those of other studies reporting the OHL of populations with low SES.<sup>26,27</sup> For example, Batista et al found low OHL to be more prevalent among lower- and middle-class individuals.26

In the present study, 19% of the subjects brushed twice daily, consistent with earlier studies showing low toothbrushing frequency in slums in Nigeria and India.<sup>11,28</sup> According to the findings of Patel et al, 26.7% of individuals in urban areas brush their teeth twice daily, while in the urban slum, this proportion is 17.2%.<sup>28</sup> The average OHL score is slightly higher for individuals who brush their teeth at least twice daily compared to those who brush less frequently, which may partially explain the overall low frequency of twice daily brushing in this study.

Most women in slum areas use fluoride toothpaste. The findings are consistent with Patel and colleagues' study, indicating that 68.2% of the study population in the urban slum area used toothpaste and a toothbrush for brushing.<sup>28</sup> The widespread use of fluoridated toothpaste among slum populations may be attributed to increased availability and affordability.

Nearly one-third of women had visited a dentist in the previous year, similar to Osuh and colleagues' study results.<sup>11</sup> In these regions and other parts of Iran, public oral healthcare services are available as part of the broader healthcare system managed by the Ministry of Health and Medical Education.<sup>29</sup> Despite their crucial role in improving oral health, factors such as lack of awareness, accessibility challenges like long distances and transportation issues, and the relatively lower priority of oral health due to socioeconomic status contribute to low utilization of these services among this population.

One of the findings of this study was that the majority of participants refrained from smoking, which is in contrast with Alure's findings, which reported that the majority of slum residents consumed both smokeless and smoked forms of tobacco.<sup>2</sup> The tobacco avoidance in this study may be due to cultural norms against women smoking.

In the present study, OHL is positively associated

with educational level, which is consistent with other studies.<sup>22,27,30,31</sup> For example, in the study by Naghibi Sistani et al, individuals with higher levels of education generally exhibit a higher level of OHL.<sup>30</sup> This is because subjects with a higher level of education have better OHL, mainly because they acquire knowledge during their studies and participate in educational programs.

The current study found that older women had higher OHL scores. This finding is consistent with Saied-Moallemi and Haghighi's study, which also reported higher OHL among older individuals in their Iranian sample.<sup>22</sup> Older age may lead to increased OHL due to accumulated knowledge and more encounters with oral health problems.

Employed women living in slums had higher OHL, consistent with previous studies.<sup>32-34</sup> For example, Prakash et al suggest that individuals' occupation can influence their level of OHL.<sup>33</sup> One possible explanation is that employed individuals may have greater access to oral health information through interactions with coworkers.

## **Strengths and Limitations**

One strength of this study is that answers were rechecked after each interview to ensure all questions were answered, resulting in no missing data.

The limitations of this study included non-random sampling and recruitment from selected health centers, which may limit the generalizability of this finding. Moreover, self-reported data on OHBs may be subject to recall and social desirability biases, reducing reliability. Additionally, cross-sectional studies cannot reveal causal relationships.

## Conclusion

This study found that women living in slums in Zahedan city had insufficient OHL and suboptimal OHBs. OHL was positively associated with higher education, older age, and employment. These results highlight the need to improve OHL and OHBs among slum populations.

#### **Authors' Contribution**

**Conceptualization:** Azam Dahmardeh, Reza Yazdani, Afsaneh Pakdaman.

Data curation: Azam Dahmardeh, Reza Yazdani.

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#### **Competing Interests**

The authors have declared that no conflict of interest exists.

#### **Data Availability Statement**

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

#### **Ethical Approval**

The Ethics Committee of the Dentistry School of Tehran University of Medical Sciences, Tehran, Iran, approved the study protocol (code: IR.TUMS.DENTISTRY.REC.1398.187).

#### Funding

The study was part of a PhD thesis supported by the Research Center for Caries Prevention, Dentistry Research Institute, Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran, under grant No. 1400-1-238-46826.

#### References

- 1. Jeboda SO. Implications of low dental awareness in Nigeria. Niger Dent J. 2008;16(1):43-6. doi: 10.4314/ndj.v16i1.42124.
- Alure SB, Dodamani AS, Vishwakarna P, Jain VM, Mali GV, Kulkarni GP. Oral hygiene behaviour and practices of urban slum population: a cross-sectional study. Int J Community Med Public Health. 2021;8(9):4423-31. doi: 10.18203/2394-6040.ijcmph20213547.
- 3. Isman B. Healthy People 2010: Oral Health Toolkit. National Institute of Dental and Craniofacial Research, Centers for Disease Control and Prevention; 2007.
- 4. Horowitz AM, Kleinman DV. Oral health literacy: the new imperative to better oral health. Dent Clin North Am. 2008;52(2):333-44. doi: 10.1016/j.cden.2007.12.001.
- VanWormer JJ, Tambe SR, Acharya A. Oral health literacy and outcomes in rural Wisconsin adults. J Rural Health. 2019;35(1):12-21. doi: 10.1111/jrh.12337.
- Noor NM, Rani H, Zakaria AS, Yahya NA, Sockalingam SN. Sociodemography, oral health status and behaviours related to oral health literacy. Pesqui Bras Odontopediatria Clin Integr. 2019;19:e5109. doi: 10.4034/pboci.2019.191.120.
- Ezeh A, Oyebode O, Satterthwaite D, Chen YF, Ndugwa R, Sartori J, et al. The history, geography, and sociology of slums and the health problems of people who live in slums. Lancet. 2017;389(10068):547-58. doi: 10.1016/s0140-6736(16)31650-6.
- 8. World Health Organization (WHO). Good Practices in Delivery of Primary Health Care in Urban Settings. WHO; 2012.
- Ali R, Ahmad R, Ul Haq HS, Khan RS, Hassan R, Siddiqui AA. Knowledge and attitudes regarding oral hygiene among urban slum dwellers in Pakistan. Int J Contemp Med Res. 2018;5(8):13-6. doi: 10.21276/ijcmr.2018.5.8.17.
- Habib MF, Mahmood H, Khizar A, Idrees S, Pervaiz F, Khan J. Oral health status and oral hygiene practices among urban slum dwellers in Rawalpindi, Islamabad, Pakistan: oral health and hygiene practices among urban slum dwellers. Pak J Health Sci. 2022;3(6):114-8. doi: 10.54393/pjhs.v3i06.306.
- 11. Osuh ME, Oke GA, Lilford RJ, Owoaje E, Harris B, Taiwo OJ, et al. Prevalence and determinants of oral health conditions and treatment needs among slum and non-slum urban residents: evidence from Nigeria. PLOS Glob Public Health. 2022;2(4):e0000297. doi: 10.1371/journal.pgph.0000297.
- Osuh ME, Oke GA, Lilford RJ, Osuh JI, Lawal FB, Gbadebo SO, et al. Oral health in an urban slum, Nigeria: residents' perceptions, practices and care-seeking experiences. BMC Oral Health. 2023;23(1):657. doi: 10.1186/s12903-023-

03303-5.

- 13. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Indian J Psychol Med. 2013;35(2):121-6. doi: 10.4103/0253-7176.116232.
- Karimi Afshar M, Torabi M, Raeisi Afshar M, Deldar M. Oral health literacy and oral health behavior in pregnant women referring to health centers in south of Kerman province. Iran J Obstet Gynecol Infertil. 2020;23(3):39-49. doi: 10.22038/ ijogi.2020.15996.
- Naghibi Sistani MM, Montazeri A, Yazdani R, Murtomaa H. New oral health literacy instrument for public health: development and pilot testing. J Investig Clin Dent. 2014;5(4):313-21. doi: 10.1111/jicd.12042.
- Bado FM, De Checchi MH, Cortellazzi KL, Ju X, Jamieson L, Mialhe FL. Oral health literacy, self-rated oral health, and oral health-related quality of life in Brazilian adults. Eur J Oral Sci. 2020;128(3):218-25. doi: 10.1111/eos.12695.
- 17. Amirchaghmaghi M, Movahhed T, Mosannen Mozaffari P, Torkaman F, Ghazi A. Health literacy and its determinants in adult patients referred to dental clinics: a cross-sectional study in Mashhad, Iran. Shiraz E Med J. 2019;20(9):e86582. doi: 10.5812/semj.86582.
- Fazli M, Yazdani R, Mohebbi SZ, Shamshiri AR. Oral health literacy and socio-demographics as determinants of oral health status and preventive behavior measures in participants of a pre-marriage counseling program. PLoS One. 2021;16(11):e0258810. doi: 10.1371/journal.pone.0258810.
- Piyakhunakorn P, Sermsuti-anuwat N. The associations between oral health literacy and oral health-related behaviours among community-dwelling older people in Thailand. Glob J Health Sci. 2021;13(3):1-7. doi: 10.5539/gjhs.v13n3p1.
- 20. Donyavi T, Holakouie Naieni K, Nedjat S, Vahdaninia M, Najafi M, Montazeri A. Socioeconomic status and mortality after acute myocardial infarction: a study from Iran. Int J Equity Health. 2011;10:9. doi: 10.1186/1475-9276-10-9.
- Naghibi Sistani MM, Yazdani R, Virtanen J, Pakdaman A, Murtomaa H. Determinants of oral health: does oral health literacy matter? ISRN Dent. 2013;2013:249591. doi: 10.1155/2013/249591.
- 22. Saied-Moallemi Z, Haghighi M. Assessing oral health literacy among the residents of Isfahan in 2014-2015. J Isfahan Dent Sch. 2016;12(3):268-79. [Persian].
- 23. Malek Mohammadi T, Malekmohammadi M, Hajizamani HR, Ayobi Mahani S. Oral health literacy and its determinants among adults in Southeast Iran. Eur J Dent. 2018;12(3):439-42. doi: 10.4103/ejd.ejd\_429\_17.
- Navabi N, Shahravan A, Behnood R, Hashemipour MA. Is there a correlation between oral health-related quality of life and oral health literacy? J Oral Health Oral Epidemiol. 2020;9(4):180-6. doi: 10.22122/johoe.v9i4.1068.
- 25. Karimi Moughari Z, Barati J. Determining the level of regional inequality in provinces of Iran: analysis of multidimensional composite index. Economic Growth and Development Research. 2017;7(26):49-70. [Persian].
- Batista MJ, Lawrence HP, da Luz Rosário de Sousa M. Oral health literacy and oral health outcomes in an adult population in Brazil. BMC Public Health. 2017;18(1):60. doi: 10.1186/ s12889-017-4443-0.
- Vilella KD, Alves SG, de Souza JF, Fraiz FC, da Silva Assunção LR. The association of oral health literacy and oral health knowledge with social determinants in pregnant Brazilian women. J Community Health. 2016;41(5):1027-32. doi: 10.1007/s10900-016-0186-6.
- 28. Patel AB, Shah RR, Ramanuj VB. Comparative study of oral hygienic practices and oral health status among people residing in urban and urban slum of Ahmedabad municipal corporation.

Int J Community Med Public Health. 2017;4(6):2181-5. doi: 10.18203/2394-6040.ijcmph20172199.

- 29. Khoshnevisan MH, Ghasemianpour M, Samadzadeh H, Baez R. Oral health status and healthcare system in IR Iran. J Contemp Med Sci. 2018;4(3):107-8.
- Naghibi Sistani MM, Yazdani R, Virtanen J, Pakdaman A, Murtomaa H. Oral health literacy and information sources among adults in Tehran, Iran. Community Dent Health. 2013;30(3):178-82. doi: 10.1922/CDH\_3159Yazdani05.
- Atchison KA, Gironda MW, Messadi D, Der-Martirosian C. Screening for oral health literacy in an urban dental clinic. J Public Health Dent. 2010;70(4):269-75. doi: 10.1111/j.1752-7325.2010.00181.x.
- 32. Sheikhi S, Shekarchizadeh H, Saied-Moallemi Z. The relationship between mothers' oral health literacy and their children's oral health status. J Dent Med. 2018;31(3):175-84. [Persian].
- Prakash D, Murthy AK, Paul A, Eremba K, Gupta G, Alex P. Oral health literacy among caregivers in Bangalore city, India. Int Healthc Res J. 2019;3(3):116-22. doi: 10.26440/ ihrj/0303.06243.
- 34. Barati M, Bashirian S, Barati M, Khazaei S, Jenabi E, Gholami L, et al. The relationship between oral health literacy and dental caries experience among pregnant women in Arak, Iran in 2021. J Oral Health Oral Epidemiol. 2023;12(3):123-9. doi: 10.34172/johoe.2023.21.