Oral Health Literacy in Iran: Insights from a Cross-Sectional Study on the Adult Population

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ABSTRACT

Background and Objectives: It is important to note that Oral Health Literacy (OHL) not only pertains to dental health but also has a broader impact on overall quality of life. Therefore, this cross-sectional study aimed to assess the level of OHL in the adult population of Tehran, Iran.

Materials and Methods: A sample of 700 Iranian adults (Tehran), aged 18-64 years, participated in this study (October 2021 and March 2022). A researcher-developed questionnaire was used to collect data on demographic variables and OHL. The questionnaire consisted of four domains: cognitive, behavioral, media, and communication skills. The data was analyzed by software SPSS 19. Data analysis included descriptive statistics, independent-samples t-tests, one-way analysis of variance (ANOVA), chi-square tests, and multiple regression analysis. Statistical significance was set at $P < 0.05$.

Results: The average age of the subjects was 35.50±8.87 years, ranging from 18 to 61 years. The mean OHL score was 67.62±15.53, indicating a moderate level of OHL. Among the dimensions of the questionnaire, cognitive skills received the highest scores and Communicative skill lowest. The results revealed significant associations between OHL and demographic variables. Multiple regression analysis showed that income, education level (academic and below diploma), and marital status (married) significantly predicted OHL.

Conclusion: This study highlights the need for improved OHL in the Iranian adult population. The findings suggest that educational interventions targeting low-educated individuals and specific demographic groups could help enhance OHL. Efforts should be directed towards improving communication skills in oral health settings.

Paper Type: Research Article.
Keywords: Oral health literacy, adult population, Tehran.

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Introduction

Over the past decade, there has been increasing recognition of the importance of health literacy (HL) in dentistry. Dental practice and research have made increasing efforts to incorporate the concept of HL (1). OHL refers to the extent to which individuals can receive, process, and understand essential information about oral health services, enabling them to make informed decisions about their health (2). It is not only a crucial factor in overall health but also a significant determinant of health disparities among different population groups (2).

Adequate OHL play a vital role in enabling individuals to comprehend the information provided in healthcare settings, thereby facilitating their response to self-care instructions, postoperative precautions, medications, and follow-ups (3, 4). Furthermore, OHL skills are essential for reducing oral health inequalities and promoting oral health information (5). It is important to note that OHL not only pertains to dental health but also has a broader impact on overall quality of life (6).

Research suggests that communities with limited OHL tend to underutilize preventive and curative services provided by healthcare professionals as well as public health information disseminated by organizations (5, 7). A systematic review conducted in Iran revealed evidence of limited OHL in the population (8). Previous studies have highlighted significant associations between OHL and oral health status (9-11). Additionally, evidence suggests that sociodemographic characteristics influence both OHL and oral health behaviors (12). Factors such as occupation, socioeconomic status, and overall health status may contribute to variations in OHL and oral health behaviors (13). More recently, low OHL has emerged as a potential underlying factor that contributes to poor oral health (14). Several studies have indicated that individuals with higher OHL tend to report better oral health behaviors, including frequency of tooth brushing, brushing techniques, use of floss or mouthwash, regular dental visits, and utilization of oral hygiene products (9, 15).

The initiation of the current study was prompted by several compelling factors within the context of OHL. Notably, the significance attributed to OHL, the introduction of a novel measurement tool specific to OHL in Iran, and the paucity of extensive research endeavors in this domain, particularly in Tehran, collectively underscored the imperative for this investigation. Recognizing the existing research gap and the critical need for a comprehensive understanding of OHL among adults in Tehran, the research team undertook the present study with the aim of investigating the OHL of adults in Tehran.

Materials and Methods

Study Design

This cross-sectional study aimed to evaluate the level of OHL in the adult population of Tehran, Iran, between October 2021 and March 2022.

Sample Size and Sampling

The sample size was estimated using the following formula: Due to a lack of accurate information regarding OHL in Iran's adult population, we assumed that half of the population had an adequate level of OHL. With a significance level of p=0.5, precision

level of d=0.05, and design effect of 1.8 (accounting for high variance within clusters), the estimated sample size was approximately 700.

A multistage sampling method was employed to collect data. Tehran is divided into five geographical areas: north, south, east, west, and center. From each region, a conveniently accessible health center was selected as the cluster head. Participants were then selected from each cluster using a convenience sampling method. The selection process began with the first street to the right of the health center, considered the cluster head, where individuals who met the inclusion criteria were invited to learn about the study's purpose. Participants included residents of residential buildings (limited to one person per household), individuals conducting business in the neighborhoods, and visitors to the health centers. Data collection was continued within each cluster until the required sample size of 140 participants per cluster was reached.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: aged between 18 and 64 years, literacy (ability to read and write), willingness to participate in the study, and Iranian citizenship. Incomplete completion of the questionnaire was the exclusion criterion.

Instrumentation

A researcher-developed questionnaire, validated by the research team, was used to collect the data. The questionnaire consisted of two sections: a demographic variable section and oral/dental health literacy section.

A. Demographic Variables

This section includes variables such as age, marital status, gender, education level, income, place of residence, and occupation.

B. OHL Assessment Items

This section comprises forty-eight items, divided into four domains:

Cognitive Skill Domain

This domain contains twenty-eight items that assess cognitive skill. A question was in the form of a table required participants to mark ten words related to oral health from a list of words related and unrelated to oral health (ten points). For the other twenty-seven questions, the correct answer was given a score of one and the incorrect answer was given a score of zero. The cognitive skill domain contributed 37 points to the overall score.

Behavioral Skill Domain

This domain consisted of thirteen questions, each worth 1 point, to evaluate behavioral skill. The total score for this domain was 13.

Media Skill Domain

The media skill domain included four items, contributing four points to the overall score.

Communication Skill Domain

This domain contained three questions assessing communication skills related to OHL. The total score for this section was 3.

Instrument Validity and Reliability

The validity of the instrument was established through face, content, and construct validity. Out of the 51 selected items of the TOHLA instrument, were modified in face validation. Also, 3 items were removed by experts in content validation (a score < 0.54 in the table of contents and a CVI < 0.79). Finally, 48 items were examined for construct validity. Exploratory factor analysis method was used

for construct validation. The KMO test results for the instrument was 0.730. and Bartlett test (chi-square estimate = 343482; P <0.001) (16, 17). It is noteworthy that the investigators of the present study have previously conducted a pertinent inquiry concerning the design and psychometrics of the OHL instrument. In the section dedicated to construct validity, the authors, aligning with the research's exclusive aim of identifying underlying structures rather than hypothesis testing, exclusively employed exploratory factor analysis.

Reliability was assessed through internal consistency testing and test-retest reliability. A panel of experts and the general public was consulted to evaluate the instrument's writing and scientific framework. Test-retest reliability was assessed by collecting data from 30 adult participants in Tehran twice, with a two-week interval between tests. Additionally, 700 participants were included in the study to assess their internal consistency. The results for each domain are listed in Table 1.

Table 1. The internal consistency test (Cronbach's alpha) and the test-retest results

Factors	Number of items	Cronbach's α (N=700)	ICC (N= 30)
Cognitive skill	28	0.83	0.81
Behavioral skill	13	0.77	0.76
Media skill	4	0.85	0.79
Communicative skill	3	0.78	0.89
Total	48	0.81	0.83

Scoring

The total score on the questionnaire was 57, calculated out of 100, with a coefficient of 1.75, representing the total OHL score. According to the scoring instructions, a score between 0 and 59 indicates an inadequate level of OHL, a score between 59 and 74 indicates borderline OHL, and a score between 74 and 100 indicates adequate OHL. Participants were given 20 min to complete the questionnaire.

Data Analysis

Responses were entered into the Statistical Package for the Social Sciences (SPSS 19.0; SPSS Inc., Chicago, IL, USA) for Windows. Descriptive statistics, including relative and absolute frequency distributions, means, and standard deviations were used to describe the data. Independent-samples t-test and one-way analysis of variance (ANOVA) were used to examine relationships and comparisons between variables. Chi-square test and multiple regression analyses were conducted for further data analysis. Statistical significance was set at $P < 0.05$. Normality of distribution was assessed using the Kolmogorov-Smirnov test. Educational level, marital status, and gender were measured using dummy variables.

Results

The study achieved an almost 100% response rate, with the questionnaires completed under the supervision of the research team. Participants were recruited from various geographical areas in Tehran, including the north, south, east, west, and center. The average age of the subjects was 35.50 ± 8.87 years. The highest frequency (69.85%)

belonged to the 25-45 age group, were married (86.1%), were female (68.1%), had a diploma (40.9%), were self-employed (48.3%), and had an income of less than three million tomans (57%).

The mean OHL score was found to be 67.62±15.53. Analysis of the data revealed that 13.3% of the participants had inadequate literacy, 59% had borderline literacy, and 27.7% had adequate literacy in oral health. Among the subgroups, the cognitive skill component received the highest score (72.9 ± 16.25), and Communicative skill lowest (33.42 ± 30.77) (Table 2).

Table 2. Distribution of the participants' demographic variables and mean score of OHL (N= 700)

Variable	Group	n.	%
Age	<25	112	16
	25-45	482	68.85
	>45	106	15.15
Marital status	single	97	13.9
	married	603	86.1
Gender	male	223	31.9
	female	477	68.1
Education	< diploma	131	18.7
	Diploma	286	40.9
	University degree	283	40.4
Occupation	employed	277	39.6
	freelancer	338	48.3
	student	85	12.1
Income	< 3 million	399	57
	3-5 million	167	23.9
	> 5 million	134	19.1
Variable	Number of items	Mean	Standard deviation (SD)
Cognitive skill	28	72.9	16.25
Behavioral skill	13	61.68	21.43
Media skill	4	52.42	41.81
Communicative skill	33	33.42	30.77

Statistical analysis using ANOVA demonstrated a significant association between the research variables and mean OHL score ($P < 0.05$). Specifically, participants under the age of 25, those with incomes above five million tomans, students, and individuals with a university degree exhibited the highest average scores. Furthermore, the independent-samples t-test results revealed a statistically significant relationship between sex, marital status, and mean OHL score ($P < 0.05$) (Table 3).

Table 4 presents the results of a regression analysis of a sample of 700 adults, examining the relationship between demographic variables and OHL. The goodness of fit of the model, with an Adjusted R-squared (ADJ.R2) of 0.428, suggests that 42.8% of the variance in OHL can be explained by the included independent variables. Notably, income exhibited a positive relationship with OHL, as higher income levels corresponded to higher OHL scores (coefficient = 5.320, $p < 0.001$). Education level also plays a significant role,

with individuals holding an academic education showing higher OHL scores than those with education below a diploma (coefficient = 7.915, $p < 0.001$). Conversely, marital status exhibited a negative relationship, as married individuals had lower OHL scores (coefficient = -12.535, $p < 0.001$). Age and sex (male) were not significantly associated with OHL. Among the predictors, education level stood out as the strongest, with each unit increase associated with an approximately 7.915 unit increase in the OHL score. These findings highlight the importance of income, education, and marital status in understanding OHL disparities among adults.

Table 3. Comparison of mean and standard deviation of OHL across demographic variables (n = 700)

Variable	Group	n	OHL(Mean ± SD*)	P-value
Age	<25	112	76.46±10.51	<0.001
	25-45	482	66.90±16.90	
	>45	106	61.51±7.59	
(Monthly) Income	< 3 million	399	61.71±16.11	<0.001
	3-5 million	167	74.43±10.69	
	> 5 million	134	76.69±10.14	
occupation	freelancer	338	67±16.07	<0.001
	employed	277	64.95±14.77	
	student	85	78.72±10.21	
Education level	< diploma	131	53.7±16.14	<0.001
	Diploma	286	63.45±12.61	
	University degree	283	78.27±9.78	
Marital status	Single	97	79.81±10	<0.001
	Married	603	65.65±15.37	
Gender	Male	223	71.36±15.79	<0.001
	Female	477	65.86±15.06	

* Standard deviation

Table 4: Regression analysis of the relationship between demographic variables and OHL in adults' population (N=700)

Variable	Unstandardized Coefficients		Standardized Coefficients	t	P	95.0% Confidence Interval	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	67.461	3.162		21.336	<0.001	61.253	73.669
Age	-.100	.079	-.057	-1.262	.207	-.255	.055
Income	5.320	.641	.333	8.301	<0.001	4.061	6.578
Gender= Male	-2.895	1.826	-.069	-1.585	.113	-6.481	.692
Education < diploma	-7.218	1.686	-.181	-4.282	<0.001	-10.527	-3.908
Education= Academic	7.915	1.457	.250	5.431	<0.001	5.054	10.776
Marital status= Married	-12.535	2.343	-.279	-5.349	<0.001	-17.136	-7.934
ADJ.R2 = 0.428 R2 = 0.433 R = 0.658							

Discussion

This cross-sectional study aimed to assess the level of OHL in the adult population 18 to 64 years of Tehran, Iran. It investigated the relationship between OHL and demographic variables, such as age, income, education level, gender, and marital status.

The study found that the mean OHL score was 67.62 ± 15.53. Based on the three levels of OHL, most of the frequency was related to the borderline level. Comparing the present findings with previous studies, Ueno et al. reported that 31.6% of the participants had inadequate OHL, 39.9% had moderate OHL, and 28.5% had high OHL (3). Jones et al. found that 46% of the participants had low OHL (18). Sandho et al. reported that 33.1%, inadequate OHL in 37.6% had moderate OHL in 29.3% of adequate OHL (19). Sistani et al. found low OHL in a group of Iranians (20). In Lee et al.'s study, 45.5% of the participants had low OHL, 20.8% had medium OHL, and 33.7% had sufficient OHL (21). Similarly, a study by Long et al. revealed low OHL among Senegalese mothers (22). Furthermore, Jones et al. (23) and studies conducted in India and Northern Caronilla also reported low OHL levels (24, 25).These variations in OHL levels can be attributed to differences in study populations and the measurement instruments used to assess OHL. Conversely, a study in Canada showed that the majority of participants (89%) were literate and had good oral health, which was attributed to the higher education levels of person visiting the Toronto City clinic (26).

In the present study, similar to other studies (20, 22, 27), a statistically significant relationship was found between educational level and OHL. Highly educated individuals demonstrated higher OHL levels, potentially due to receiving oral health information during their education and benefiting from training programs and counseling. A better understanding of oral health teaching allows for a more effective impact. Based on the present findings and similar studies (28), future interventions should focus on improving OHL among adults with low education.

The investigation further elucidated a noteworthy correlation between monthly income and OHL, aligning with previous scholarly inquiries (9, 29). This finding substantiates existing research, thereby underscoring the robustness and consistency of the observed association. The established link between economic factors, specifically monthly income, and OHL adds depth to our comprehension of the intricate interplay between socioeconomic variables and health literacy. This alignment with prior studies enhances the credibility and generalizability of our research outcomes, emphasizing the need for comprehensive interventions that consider the economic dimensions of health education and promotion.

The study's findings highlight a notable disparity between age and health literacy status, with younger participants demonstrating higher levels of OHL (compared to their older counterparts. This aligns with Naghibi et al.'s study, where older age groups exhibited lower literacy levels (30). Consistent with this trend, Javadzadeh et al.'s research indicated that older age groups displayed a diminished level of oral and dental hygiene literacy, indicative of a poorer understanding of oral and dental health practices (31). Notably, Factors

contributing to this difference may include decreased cognitive function; reduced ability to visit healthcare centers regularly; difficulty in accessing up-to-date information; and physical, psychological, and social changes associated with aging (32). However, the current study's results diverge from the findings of Malek Mohammadi and colleagues, as well as Jones et al., suggesting a lack of uniformity in the relationship between age and OHL.

The present study reveals a significant association between gender and OHL, corroborating findings from Naghibi et al.'s study conducted in Tehran, where female participants exhibited a notably higher level of OHL, aligning with our own results (30). This observed gender-based discrepancy is elucidated by the tendency of women to accord greater attention to matters pertaining to oral health and hygiene. Additionally, women appear to engage more frequently with oral health-related information disseminated by the media. In contrast, other studies analyzing diverse countries have reported no statistically significant differences in OHL between genders (33, 34). This disparity underscores the importance of recognizing regional variations and sociocultural factors that may contribute to distinct patterns in OHL across different populations.

It is worth noting that, among the dimensions of OHL in this study, the lowest score was observed in communication skills. Communication is vital in health care, and it is not surprising that the average score for communication skills was low in this study. This can be attributed to the limited number of questions in this dimension, which mainly focused on decision making and seeking new information about oral health. Moreover, a common tendency among individuals is to rely on dentists' expertise in determining the most suitable treatment processes, trusting in their ability to make informed decisions. Therefore, relevant authorities must develop strategies to bridge this communication gap. To identify the most important factors related to OHL in Iran, cross-sectional studies at a broader level in Tehran and other provinces of Iran are suggested, followed by interventional studies aimed at improving OHL.

Study Limitations and Strengths: The study focused on the adult population of Tehran, Iran, and may not capture the OHL levels of other age groups or regions within the country. These findings should be interpreted in the context of this limited scope.

Conclusion

The findings indicated a moderate OHL level, with cognitive skills receiving the highest scores. Significant links were identified between OHL and variables such as age, income, education, gender, and marital status, with younger individuals, higher-income earners, students, and those with a university degree exhibiting higher OHL scores. These results underscore the imperative for enhanced OHL in the Iranian adult population to facilitate informed decision-making, and promote overall well-being. Educational interventions targeting specific demographics and improved communication skills in oral health settings are recommended. Future research should broaden its scope to different regions in Iran and assess the efficacy of interventions,

contributing to evidence-based strategies for bolstering OHL nationwide. Future research should use a random sampling method to obtain a more representative sample of the Iranian adult population. This would enhance the generalizability of the findings and provide a more accurate understanding of OHL. However, to obtain a comprehensive understanding of OHL in Iran, future research should expand its scope beyond Tehran and include different regions of the country.

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Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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References

1. Ghaffari M, Rakhshanderou S, Ramezankhani A, Mehrabi Y, Safari-Moradabadi A. Systematic review of the tools of oral and dental health literacy: assessment of conceptual dimensions and psychometric properties. BMC Oral Health. 2020; 20:1-12. https://doi.org/10.1186/s12903-020-01170-y. PMid: 32620108 PMCid: PMC7333397

2. Safari-Moradabadi A, Rakhshanderou S, Ramezankhani A, Ghaffari M. Explaining the concept of oral health literacy: Findings from an exploratory study. Community Dentistry and Oral Epidemiology. 2022; 50(2):106-14. https://doi.org/10.1111/cdoe.12637. PMid: 33760244.

3. Ueno M, Takeuchi S, Oshiro A, Kawaguchi Y. Relationship between oral health literacy and oral health behaviors and clinical status in Japanese adults. Journal of Dental Sciences. 2013; 8(2):170-6. https://doi.org/10. 1016/ j.jds.2012.09.012.
4. Ghaffari M, Rakhshanderou S, Ramezankhani A, Mehrabi Y, Safari-Moradabadi A. Protocol of the TOHLA instrument: a test of oral health literacy in adults. Journal of Education and Health Promotion. 2020; 9: 11. https://doi.org/10.4103/jehp.jehp_413_19
5. Horowitz AM, Kleinman DV. Oral health literacy: a pathway to reducing oral health disparities in Maryland. Journal of public health dentistry. 2012; 72:S26-S30. https://doi.org/10.1111/j.1752-7325.2012.00316.x
6. Bress LE. Improving Oral health literacy-the new standard in dental hygiene practice. American Dental Hygienists' Association. 2013; 87(6):322-9.
7. Rakhshanderou S, Safari-Moradabadi A, Bahrambeygi F, Ghaffari M. Designing Health Literacy Measurement Tools: A Critical Review of Common Paths and Probable Mistakes. Journal of Health Literacy. 2023; 8(3):90-102
8. Abdollahi M, Dadashi Tonkaboni N, Peyman N. Oral health literacy status among adult population of Iran: A systematic review. Journal of Health Literacy. 2023; 8(4): 77-88.
9. Bado FMR, De Checchi MHR, 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. European journal of oral sciences. 2020; 128(3):218-25. https://doi.org/10.1111/eos.12695 PMid:32350954.
10. An R, Chen W-f, Li S, Wu Z, Liu M, Sohaib M. Assessment of the oral health literacy and oral health behaviors among nurses in China: a cross-sectional study. BMC Oral Health. 2022; 22(1):602. https://doi.org/10.1186 /s12903-022-02658-5 PMid: 36514081 PMCid: PMC 9746556
11. Baskaradoss JK. Relationship between oral health literacy and oral health status. BMC oral health. 2018; 18:1-6. https://doi.org/10.1186/s12903-018-0640-1. PMid: 30355347 PMCid: PMC6201552.
12. Noor NM, Rani H, Zakaria ASI, Yahya NA, Sockalingam S. Sociodemography, oral health status and behaviours related to oral health literacy. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2020; 19. https://doi.org/10.4034/PBOCI.2019.191.120.
13. Maida CA, Xiong D, Marcus M, Zhou L, Huang Y, Lyu Y, et al. Quantitative data collection approaches in subject-reported oral health research: a scoping review. BMC oral health. 2022; 22(1):435. https://doi.org/10.1186 /s12903-022-02399-5. PMid: 36192721 PMCid: PMC 9528129.
14. Lee JY. Lower oral health literacy may lead to poorer oral health outcomes. Journal of Evidence Based Dental Practice. 2018; 18(3):255-7. https://doi.org/10.1016 /j.jebdp.2018.05.003. PMid: 30077381.
15. Yao K, Yao Y, Shen X, Lu C, Guo Q. Assessment of the oral health behavior, knowledge and status among dental and medical undergraduate students: a cross-sectional study. BMC oral health. 2019; 19(1):1-8. https://doi.org/10.1186/s12903-019-0716-6. PMid: 30696440 PMCid: PMC6352450.
16. Ghaffari M RS, Ramezankhani A, Mehrabi Y, Safari-Moradabadi A. Concept Explanation of Oral Health Literacy, Development, Psychometrics and Application of Its Instrument for Iranian Adult Population. Shahid Beheshti University of Medical Sciences: Shahid Beheshti University of Medical Sciences; 2021.
17. Ghaffari Mohtasham, Rakhshanderou Sakineh, Mialhe Fábio Luiz, Mehrabi Yadollah, Safari-Moradabadi A. Test of Oral Health Literacy in Adults (TOHLA): new scale's development & psychometric evaluation. Brazilian Oral Research. 2024; In Press.
18. Jones K, Brennan DS, Parker EJ, Mills H, Jamieson L. Does self-efficacy mediate the effect of oral health literacy on self-rated oral health in an Indigenous population? Journal of public health dentistry. 2016; 76(4):350-5. https://doi.org/10.1111/jphd.12162. PMid: 27222211.
19. Sandhu KS, Gupta N, Bansal M, Arora V, Gupta P, Thakar S. Health literacy and oral health literacy: are they associated? A cross sectional survey among undergraduate students of tricity (Chandigarh, Mohali, Panchkula), India. Przegl Epidemiol. 2017; 71(1):111-8.
20. Sistani MMN, Virtanen J, Yazdani R, Murtomaa H. Association of oral health behavior and the use of dental services with oral health literacy among adults in Tehran, Iran. European journal of dentistry. 2017; 11(02):162-7. https://doi.org/10.4103/ejd.ejd_332_16. PMid: 28729786 PMCid: PMC5502558.
21. Lee C-J, Ho M-H, Joo JY, Montayre J, Lin Y-K, Chang C-C, Liu MF. Gender differences in the association between oral health literacy and oral health-related quality of life in older adults. BMC Oral Health. 2022; 22(1):205. https://doi.org/10.1186/s12903-022-02237-8. PMid: 35614446 PMCid: PMC9131657.
22. Dieng S, Cisse D, Lombrail P, Azogui-Lévy S. Mothers' oral health literacy and children's oral health status in Pikine, Senegal: A pilot study. Plos one. 2020; 15(1):e0226876. https://doi.org/10.1371/journal.pone.0226876. PMid: 31971936 PMCid: PMC6977722.
23. Jones M, Lee JY, Rozier RG. Oral health literacy among adult patients seeking dental care. The Journal of the American Dental Association. 2007; 138(9):1199-208. https://doi.org/10.14219/jada.archive.2007.0344. PMid: 17785385.
24. Hom JM, Lee JY, Divaris K, Baker AD, Vann Jr WF. Oral health literacy and knowledge among patients who are pregnant for the first time. The Journal of the American

Dental Association. 2012; 143(9):972-80. https://doi.org/10.14219/jada.archive.2012.0322. PMid: 22942142 PMCid: PMC3711860.

25. Haridas R, Supreetha S, Ajagannanavar SL, Tikare S, Maliyil MJ, Kalappa AA. Oral health literacy and oral health status among adults attending dental college hospital in India. Journal of international oral health: JIOH. 2014; 6(6):61.
26. Sabbah W, Tsakos G, Chandola T, Sheiham A, Watt R. Social gradients in oral and general health. Journal of dental research. 2007; 86(10):992-6. https://doi.org/10.1177/154405910708601014. PMid: 17890677.
27. Saied Moallemi Z, Haghighi M. Assessing oral health literacy among the residents of Isfahan in 2014-2015. Journal of Isfahan Dental School. 2016; 12 (3): 268 - 79.
28. Lee KE, Yom Y-H, Kim SS, Han JH. Gender differences in oral health literacy related factors among elderly people. Journal of Korean Academy of Community Health Nursing. 2014; 25(1):54-64. https://doi.org/10.12799/jkachn.2014.25.1.54.
29. Vilella KD, Alves SGA, de Souza JF, Fraiz FC, Assunção LRdS. The association of oral health literacy and oral health knowledge with social determinants in pregnant Brazilian women. Journal of community health. 2016; 41:1027-32. https://doi.org/10.1007/s10900-016-0186-6. PMid: 27013224.
30. Sistani M, 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.
31. Javadzade SH, Sharifirad G, Radjati F, Mostafavi F, Reisi M, Hasanzade A. Relationship between health literacy, health status, and healthy behaviors among older adults in Isfahan, Iran. Journal of education and health promotion. 2012; 1. https://doi.org/10.4103/2277-9531.100160. PMid: 23555134 PMCid: PMC3577376.
32. Endres LK, Sharp LK, Haney E, Dooley SL. Health literacy and pregnancy preparedness in pregestational diabetes. Diabetes care. 2004; 27(2):331-4. https://doi.org/10.2337/diacare.27.2.331. PMid: 14747209.
33. Atchison KA, Gironda MW, Messadi D, Der-Martirosian C. Screening for oral health literacy in an urban dental clinic. Journal of public health dentistry. 2010; 70(4):269-75. https://doi.org/10.1111/j.1752-7325.2010.00181.x. PMid: 20545829 PMCid: PMC3661197.
34. Mohammadi TM, Malekmohammadi M, Hajizamani HR, Mahani SA. Oral health literacy and its determinants among adults in Southeast Iran. European journal of dentistry. 2018; 12(03):439-42. https://doi.org/10.4103/ejd.ejd_429_17. PMid: 30147413 PMCid: PMC6089060.