

Oral Health Literacy and Its Correlation with Socioeconomic Status in an Iranian Population

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Abstract

Background and Aim: This study aimed to assess the oral health literacy (OHL) and its correlation with socioeconomic status (SES) in residents of Zanzan city, Iran by introducing a new questionnaire for this purpose.

Materials and Methods: This cross-sectional study was conducted on 1,513 individuals residing in Zanzan city, Iran, in 2019. The demographic information, OHL, and SES of the participants were evaluated by using relevant questionnaires. The reliability of the questionnaire designed for assessment of OHL was evaluated by calculation of the intra-class correlation coefficient and Cronbach's alpha, while its validity was assessed by calculation of content validity index and content validity ratio. Data were analyzed by the Chi-square test and one-way ANOVA ($\alpha=0.05$).

Results: Data of 1,513 individuals with a mean age of 33.3 ± 9.93 years were analyzed, including 59.6% males and 40.4% females. The Cronbach's alpha and intra-class correlation coefficient were found to be 0.71 and 0.81, respectively. OHL was inadequate in 29.1%, marginal in 37.4%, and adequate in 33.4% of the participants. The mean level of OHL of females was higher than males. Those with low SES had low OHL and this correlation was statistically significant ($P<0.001$).

Conclusion: The OHL of the study population was moderate. Since there is no specific practical method for enhancement of OHL of the general population, educational OHL programs are recommended with particular attention to older individuals and those with lower SES.

Key Words: Oral Health; Dental Health Surveys; Patient Health Questionnaire

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Introduction

Literacy is a necessity for a healthy normal living in the 21st century [1]. People have to continuously enhance their knowledge to reach their goals, improve their level of literacy, use their potentials, and have a more solid presence

in the society [2]. Literacy is no longer limited to reading and writing. It currently encompasses several skills such as reading and writing, counting, and verbal communication. The outcomes of poor health literacy are costly for the people and governments [3]. Several

definitions are available for health literacy describing it as the necessary skills to achieve, perceive, and properly use health information to promote and preserve health [4-6].

Oral health literacy (OHL) is commonly defined as the required literacy for an individual to perceive and process the necessary information about oral and dental health and its related services [7]. OHL remains an important determinant of oral health in the literature [3,8-11]. Tehrani Banihashemi et al. [12] in their national survey of OHL of five provinces of Iran in 2007 reported a generally low level of OHL.

Several studies have proposed socioeconomic status (SES) as a determinant of OHL and clinical oral health status in different age groups [13-15]. Those with lower SES have shown poorer oral health status than those with higher SES [16-19].

The currently available questionnaires for assessment of OHL such as the Test of Functional Health Literacy in Dentistry [20], Oral Health Literacy Instrument [21], and the Comprehensive Measure of Oral Health Knowledge [22] have limited objectives. They measure the OHL according to the ability of individuals to perceive specific oral health terms or their ability in reading and interpretation of oral health data. Also, these tools are highly complex [20,21], and some of them are not applicable to all individuals. They are not self-reported questionnaires and some of them require a special place to play a sound for filling out some parts of the questionnaire [20-22]. Considering the significance of OHL, and having a comprehensive and understandable questionnaire that includes culturally qualified new criteria for verbal literacy skills, this study aimed to assess the OHL and its correlation with SES in residents of Zanjan city, Iran by introducing a new questionnaire for this purpose.

Materials and Methods

This cross-sectional study was conducted in Zanjan city, Iran from April to December 2019.

The protocol of this study was ethically approved by Zanjan University of Medical Sciences (IR.ZUMS.REC.1398.363).

After designing the appropriate instrument, participants from Zanjan city were enrolled for a pilot study. The questionnaire was completed by 25 individuals from different SES [23] presenting to the dental clinic of Zanjan University of Medical Sciences to assess the validity, clarity, and readability of the items. To design a valid and reliable questionnaire to assess the OHL of adults, some of the previous OHL questionnaires [20-22,24] were also used. The initially designed questionnaire had 25 questions. The content validity of the questionnaire was then evaluated. For this purpose, 8 experts (4 oral medicine specialists, 2 methodologists, and 2 health instruction specialists) were asked to assess the validity, clarity, simplicity, and necessity of each question to calculate the content validity index and content validity ratio of the questionnaire.

The experts were asked to analyze each question by using a 3-point scale of necessary, beneficial but not necessary, and not necessary. After evaluation of all 25 questions, 2 questions were omitted, and the content validity index and content validity ratio were calculated to be 0.93 and 0.87, respectively. Although the results of the pilot study confirmed that the questionnaire was acceptably readable and perceivable, some questions were slightly modified. For example, some answer choices were added, or the writing style or order of questions were changed. The final version of the questionnaire had 23 questions. All questions and answer choices are presented in Tables 1 and 2. The SES questionnaire was used to assess the SES of the participants, which is reliable (with a Cronbach's alpha of 0.83) and valid according to Eslami et al [25]. Some important demographic factors such as age, gender, marital status, and level of education of the participants were also assessed through the questionnaire. Thus, the final questionnaire had three sections of demographics, SES, and OHL. The OHL section of

the questionnaire with 23 questions asked for the public knowledge about oral and dental health, and oral health maintenance in daily life.

The participants were selected by stratified random sampling to prevent bias. Two districts from each of the north, west, east, south and center of Zanjan city were randomly selected. In each district, five blocks were randomly chosen, and 15 households in each block were systematically selected. The participants who met the eligibility criteria (the ability to read and write, and age between 18 to 65 years) were randomly selected from the members of each household. The questionnaire was administered after giving instructions on how to fill out the different parts.

A total of 1548 questionnaires were filled out by eligible participants; out of which, 35 were

excluded. Finally, data of 1,513 questionnaires were statistically analyzed. To assess the reliability of the questionnaires, 230 participants received a gift and were asked to fill out the questionnaire again after a one-week interval. The reliability of the questionnaire was then analyzed by test-retest reliability assessment using the intraclass correlation coefficient [26].

Also, the Cronbach's alpha was calculated to analyze the internal consistency. According to the final total score of the questionnaire, the participants were categorized into three groups with inadequate (scores 0-12), marginal (scores 13-15), and adequate (scores 16-23] OHL using the S-TOFHLA categories (0-53: inadequate, 54-66: marginal, and 67-100: adequate).

Table 1. Correlation of answers to the OHL questions with SES

Questions	Categories	SES Number (%)			Total	P value*
		Low	Moderate	High		
Is there any correlation between oral and dental diseases and other diseases of the body?						
	Yes	1011(85.2)	82(79.6)	192(87.3)	1285(85.2)	0.015
	No	67(5.6)	2(1.9)	10(4.5)	79(5.2)	
	I do not know	108(9.1)	19(18.4)	18(8.2)	145(9.6)	
	Total	1186	103	220	1509	
2 Is there any correlation between smoking and oral cancer?						
	Yes	1049(88.3)	93(90.3)	199(90.5)	1341(88.7)	0.009
	No	71(6.0)	0(0.0)	5(2.3)	76(5.0)	
	I do not know	68(5.7)	10(9.7)	16(7.3)	94(6.2)	
	Total	1188	103	220	1511	
3 Is hookah smoking more harmful than cigarette smoking?						
	Yes	1084(91.7)	95(93.1)	195(89.4)	1374(91.5)	0.369
	No	47(4.0)	4(3.9)	15(6.9)	66(4.4)	
	I do not know	51(4.3)	3(2.9)	8(3.7)	62(4.1)	
	Total	1182	102	218	1502	
4 Is daily flossing necessary to prevent dental caries?						
	Yes	972(82.0)	93(91.2)	176(80.7)	1241(82.5)	0.177
	No	122(10.3)	5(4.9)	26(11.9)	153(10.2)	
	I do not know	91(7.7)	4(3.9)	16(7.3)	111(7.4)	
	Total	1185	102	218		
5 Does flossing create gaps between the teeth?						
	Yes	355(30.2)	31(30.4)	39(17.8)	425(28.4)	0.002
	No	618(52.6)	56(54.9)	145(66.2)	819(54.8)	
	I do not know	201(17.1)	15(14.7)	35(16.1)	251(16.8)	
	Total	1174	102	219	1495	
6 Is reducing the consumption of foods which are high in sugar content and stick to the tooth effective for prevention of dental caries?						
	Yes	954(81.2)	92(89.3)	190(86.8)	1236(82.6)	0.001
	No	113(9.6)	4(3.9)	4(1.8)	121(8.1)	
	I do not know	108(9.2)	7(6.8)	25(11.4)	140(9.4)	

	Total	1175	103	219	1497	
7	Does cigarette smoking cause dental caries?					
	Yes	1006(84.8)	96(94.1)	197(90.0)	1299(86.2)	0.030
	No	105(8.9)	2(2.0)	14(6.4)	121(8.0)	
	I do not know	75(6.3)	4(3.9)	8(3.7)	87(5.8)	
Total	1186	102	219	1507		
8	Can the use of brine replace the use of a medical mouthwash?					
	Yes	613(51.9)	48(47.5)	79(35.9)	740(49.3)	0.001
	No	336(28.5)	29(28.7)	84(38.2)	449(29.9)	
	I do not know	231(19.6)	24(23.8)	57(25.9)	312(20.8)	
Total	1180	101	220	1501		
9	Can using a mouthwash alone be replaced with toothbrushing?					
	Yes	177(15.1)	8(7.8)	9(4.1)	194(13.0)	<0.001
	No	917(78.0)	84(81.6)	200(90.9)	1201(80.2)	
	I do not know	81(6.9)	11(10.7)	11(5.0)	103(6.9)	
Total	1175	103	220	1498		
10	Is toothbrushing with salt better than using a toothpaste?					
	Yes	323(27.3)	16(15.7)	28(12.9)	364(24.2)	<0.001
	No	584(49.3)	56(54.9)	132(60.8)	772(51.4)	
	I do not know	277(23.3)	30(29.4)	57(26.3)	367(24.4)	
Total	1184	102	217	1503		
11	Is baking soda effective for tooth whitening and treatment of aphthous ulcers?					
	Yes	522(44.1)	47(46.1)	81(36.8)	650(43.2)	0.087
	No	257(21.7)	14(13.7)	51(23.2)	322(21.4)	
	I do not know	405(34.2)	41(40.2)	88(40.0)	534(35.5)	
Total	1184	102	220	1506		
12	Can dental scaling and root planning cause enamel abrasion and tooth loss?					
	Yes	440(37.3)	31(30.4)	73(33.3)	544(36.3)	0.127
	No	440(37.3)	43(42.2)	100(45.7)	583(38.9)	
	I do not know	299(25.4)	28(27.5)	46(21.0)	373(24.9)	
Total	1179	102	219	1500		
13	A dentist prescribes antibiotics for you. However, your dental infection symptoms such as pain and swelling resolve before you run out of your medication. Should you continue taking the capsules?					
	Yes	736(61.9)	60(58.3)	144(65.5)	940(62.2)	0.008
	No	227(19.1)	32(31.1)	33(15.0)	292(19.3)	
	I do not know	226(19.0)	11(10.7)	43(19.5)	280(18.5)	
Total	1189	103	220	1512		
14	Do you inform your dentist about your food or drug allergies, medical history, and medication intake before dental procedures?					
	Yes	952(80.1)	82(79.6)	182(83.1)	1216(80.5)	0.243
	No	150(12.6)	17(16.5)	28(12.8)	195(12.9)	
	I do not know	87(7.3)	4(3.9)	9(4.1)	100(6.6)	
Total	1189	103	219	1511		
15	Dental caries is a common oral disease that can be prevented by brushing your teeth at least once daily					
	Agree	835(70.5)	77(74.8)	162(74.0)	1074(71.3)	0.050
	Disagree	203(17.1)	21(20.4)	41(18.7)	265(17.6)	
	I do not know	147(12.4)	5(4.9)	16(7.3)	168(11.1)	
Total	1185	103	219	1597		
16	What is the number of permanent teeth in the oral cavity?					
	28	235(19.8)	21(20.4)	27(12.3)	283(18.8)	<0.001
	32	793(67.0)	66(64.1)	186(84.9)	1045(69.4)	
	I do not know	156(13.2)	16(15.5)	6(2.7)	178(11.8)	
Total	1184	103	219	1506		
17	At what age the first permanent tooth erupts?					
	8 years	383(32.4)	50(48.5)	69(31.5)	502(33.4)	0.007
	6 years	643(54.4)	39(37.9)	126(57.5)	808(53.7)	

	I do not know	157(13.3)	14(13.6)	24(11.0)	195(13.0)	
	Total	1183	103	219	1505	
18	How long should you avoid eating and drinking after using a mouthwash?					
	Half an hour	654(55.6)	44(43.1)	131(60.4)	829(55.4)	<0.001
	2 hours	420(35.7)	56(54.9)	66(30.4)	542(36.2)	
	6 hours	103(8.8)	2(2.0)	20(9.2)	125(8.4)	
	Total	1177	102	217	1496	
19	For how long you should keep the gauze over the tooth extraction area?					
	15 minutes	380(32.4)	44(44.0)	83(38.4)	507(34.0)	0.087
	Half an hour	300(25.6)	22(22.0)	54(25.0)	376(25.2)	
	One hour	494(42.1)	34(34.0)	79(36.6)	607(40.7)	
	Total	1174	100	216	1490	
20	For how long should you avoid eating hot foods after tooth extraction?					
	8 hours	327(27.8)	29(28.4)	75(34.9)	431(28.9)	0.171
	12 hours	466(39.6)	40(39.2)	86(40.0)	592(39.7)	
	24 hours	383(32.6)	33(32.4)	54(25.1)	470(31.5)	
	Total	1176	102	215	1493	
21	In case of minor gingival bleeding after toothbrushing or flossing, what would be the best action?					
	Giving up daily toothbrushing and flossing	202(17.1)	9(8.7)	26(11.9)	273(15.8)	0.022
	Using a toothpick instead of a toothbrush and toothpaste	46(3.9)	2(1.9)	6(2.7)	54(3.6)	
	Continuing daily toothbrushing and flossing	331(28.1)	23(22.3)	66(30.1)	420(28.0)	
	Visiting a dentist	601(50.9)	69(67.0)	121(55.3)	791(52.7)	
	Total	1180	103	219	1502	
22	If you feel pain and swelling in your mouth, what would be the best action?					
	Taking antibiotics	136(11.6)	8(7.8)	11(5.0)	155(10.3)	<0.001
	Taking pain relievers	180(15.3)	15(14.6)	14(6.4)	209(13.9)	
	Consulting a family member	44(3.7)	1(1.0)	6(2.7)	51(3.4)	
	Visiting a dentist	767(65.2)	76(73.8)	178(81.3)	1021(68.1)	
	I do not know	50(4.2)	3(2.9)	10(4.6)	63(4.2)	
	Total	1177	103	219	1499	

*Chi-square test

Table 2. Results of the Chi-square and ANOVA for the correlation of OHL with SES, sex, and age

Categories of OHL	SES			Total	P value
	lower	middle	Upper		
Inadequate	378(31.7)*	24(23.3)	39(17.7)	441(29.1)	<0.001**
Marginal	440(36.9)	56(54.3)	70(31.8)	566(37.4)	
Adequate	372(31.2)	23(22.3)	111(50.4)	506(33.4)	
Total	1190	103	220	1513	
Categories of OHL	Sex		Total	P value	
	Male	Female			
Inadequate	228(37.3)	213(23.6)	441(29.1)	<0.001	
Marginal	243(39.7)	323(35.8)	566(37.4)		
Adequate	140(22.9)	366(40.5)	506(33.4)		
Total	611	902	1513		
Categories of OHL	Age		Total	P value	
Inadequate		32.89(10.1) [†]		0.9 [‡]	
Marginal		32.99(10.0)			
Adequate		34.12(9.5)			
Total		33.33(9.9)			

* Frequency percentage; ** Chi-square test; [†]Mean (std. deviation); [‡]one-way ANOVA

Results

A total of 1,513 individuals participated in this study including 902 males (59.6%) and 611 females (40.4%) with a mean age of 33.3±9.93 years (range 18 to 61 years). Table 3 presents the characteristics of the participants. One participant did not completely answer the questions; nonetheless, questionnaires with only one or two unanswered questions were not omitted. The Cronbach’s alpha was 0.71, and the intra-class correlation coefficient was found to be 0.81, indicating good reliability and internal consistency. SES had a significant correlation with OHL (P<0.05, Tables 1 and 2). However, the correlation of OHL and age was not significant (P=0.9).

Table 3. SES, sex, marital status, and educational level of the participants

SES	Low	1190(78.4)
	Moderate	103(6.8)
	High	220(14.5)
Sex	Male	902(59.6)
	Female	611(40.4)
Marital status	Single	604(39.9)
	Married	909(60.0)
Educational level	High-school diploma or lower	588(38.8)
	Associate degree	191(12.6)
	Bachelor’s degree	536(35.4)
	Master's degree and higher	198(13.0)

Discussion

According to the present results, the OHL of 33.3% of the participants was adequate (high), which was close to the value of 40% reported in a recent study [27]. However, Mohammadi et al. [28] considered 37.5% OHL as marginal level, and reported that 62% of their participants had moderate OHL.

In the present study, the OHL of those with lower SES was lower than others while Mohammadi et al. [28] and Naghibi Sistani et al. [29] concluded that OHL was independent of educational level and other determinants of SES.

Since income information is not reliable in Iran, SES is usually evaluated according to a combination of level of income, level of education, owning or renting a house, and surface area of the house.

Poor OHL can cause problems in receipt of preventive services, limit self-management skills, delay the diagnosis in diseased conditions, lead to poor hygiene outcomes, and increase the healthcare costs [30].

In the recent decade, OHL has gained increasing significance in dental literature [8]. The significance of OHL, similar to health literacy, in promotion of oral health and reduction of its variance has been well documented [31]. Also, it has been demonstrated that individuals with inadequate OHL are at high risk of oral and dental diseases and their consequences [32]. The World Health Organization has emphasized on OHL as a major parameter involved in oral health status [33]. Despite the increase in investigations on OHL, the main causes of inadequate OHL include lack of oral hygiene information, complex oral health instructions, and incompetent dentists. Assessment of OHL of patients can help improve their level of OHL in developing countries and reorganization of shortcomings in this respect [7].

Evidence shows that the mean level of OHL of females is higher than that of males, which is in agreement with the present results [27-29]. They also more commonly use oral health information available in the media. However, Sabbahi et al. [21] evaluated the OHL of adults in Canada and showed that gender had no significant effect on OHL. Similar results were reported by Atchison et al. [34], and Jones et al [35]. This difference may be explained by the fact that women often pay more attention to hygienic behaviors and take better care of their oral and dental health. The present results also showed low OHL in those with low SES. However, the correlation of OHL and age was not significant.

Considering the present results, it appears that knowledge enhancement of the public regarding oral health through the media can promote OHL of the general population. Studies on OHL have shown shortcomings in OHL of some specific groups such as those with lower educational level, the elderly, and the deprived individuals [35,36]. Information about the knowledge level of general population about important parameters in oral health is required for correct strategy planning for oral health knowledge enhancement in different communities. Considering the present results, educational interventions are required particularly for those with low SES to enhance their OHL.

Due to the large sample size, persuading the individuals to participate in the study was difficult. However, large sample size enabled generalizability of the results to the entire population of Zanjan city. The correlation of OHL and SES had not been evaluated in any previous study, and the present study appears to be the first to address this correlation in this geographical region. The results in this respect can aid in strategy planning for oral health knowledge enhancement in specific groups.

Conclusion

The OHL of the study population was moderate. Since there is no specific practical method for enhancement of OHL of the general population, educational OHL programs are recommended with particular attention to older individuals and those with lower SES.

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