Oral Health Literacy and its Determinants in Young Couples

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Article Info	A B S T R A C T
Article type: Original Article	**Objectives:** Oral health literacy (OHL) is an interplay of cultural, social and individual factors and plays an effective role in public health promotion. This study aimed to assess OHL and its socioeconomic and demographic determinants among young couples.
	Materials and Methods: This analytical cross-sectional study was conducted on 828 adults between 15 to 35 years in 2018 in Zanjan city. Data regarding their OHL were collected by using a 17-item Oral Health Literacy-Adult Questionnaire (OHL-AQ) that was filled out by a combination of self-report and interview. OHL was categorized as adequate, marginal, and inadequate. The effects of age and gender as demographic variables, and floor area per person as a proxy of financial status on OHL were also assessed. Data were analyzed using the linear and multinomial logistic regression models.
* Corresponding author: Research Center for Caries Prevention, Dental Research Institute, Tehran University of Medical Sciences, Tehran, Iran. Email: ryazdani@tums.ac.ir	**Results:** The mean OHL score was 7.86±3.83 out of 17 in equal number of males and females. Only 21% of the couples had adequate OHL. The socioeconomic, but not demographic variables had significant correlations with the qualitative and quantitative variables of OHL even after controlling for the effect of confounders. A correlation was particularly found between inadequate OHL and years of education [odds ratio:6.00; 95% CI: 3.86-9.28); P<0.001].
	Conclusion: Socioeconomic factors had independent correlations with inadequate OHL. Participants with higher levels of education, those living in urban areas, and individuals with better financial status had higher levels of OHL and lower odds of inadequate OHL.
	Keywords: Health Literacy; Demography; Socioeconomic Factors; Young Adult

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INTRODUCTION

In order to make healthy choices, individuals should have a basic knowledge about how to access reliable health information and how to use them. Also, they need to know why these choices are important. This is the definition of health literacy [1]. Oral health literacy (OHL) is an integrated part of health literacy [2]. It is an interplay of cultural, social and individual factors. Thus, in order to find reasons for inadequate OHL, the cultural and social constructs of a community, the supporting healthcare system and education, and the interactions of these factors with individual parameters should be scrutinized [3]. At present, it has been confirmed that health literacy is an important determinant of health status and health promotion of individuals [4, 5]. The public health approach is one suggested strategy to enhance health literacy, which allows us to recognize the problem and the influential factors, and overcome it by implementation of interventional strategies, and promote the public health as such. Despite the importance of oral health literacy, the frequency of inadequate OHL is high [3].

The effects of health literacy on general health, preventive measures [6], and efficient use of health services [7] have been extensively studied. However, studies on determinants of oral health literacy are limited [3]. In this regard, the role of socioeconomic and demographic factors in health literacy should not be overlooked [8,9]. On the other hand, national studies regarding the level of OHL and its determinants in different age groups are limited [10,11] Considering the confirmed role of family in health promotion [12], young couples, as the central core of a family unit, are worthy of special attention. On the other hand, the mandatory pre-marriage courses held for the young couples as part of the primary healthcare program in Iran, which has been designed by the Ministry of Health, can be used for assessment and enhancement of OHL of the young couples.

Oral health can be promoted by translating the findings regarding OHL into practical strategies [3,13,14]. Thus, this study aimed to assess the OHL of young couples, determine the frequency of its different levels, and find its socioeconomic and demographic determinants. By doing so, the gap of information regarding OHL can be addressed to enhance future strategy planning in this respect.

MATERIALS AND METHODS

Study design and sampling:

This descriptive analytical study was conducted on the preliminary data obtained from the "Save Couples' Smile" project which obtained ethical approval from the Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.DENTISTRY.REC.1397.068). This project was conducted in Zanjan city, which is the capital city of Zanjan Province located in the north-west of Iran with a population of 1 million people. This study was carried out on young couples between 15 to 35 years who were selected from the participants of pre-marriage counseling and educational courses held in the only center of this province for this purpose. According to the Ministry of Health of Iran, pre-marriage counseling programs as part of the primary healthcare system are mandatory for all couples. The participants were selected by purposeful convenience sampling. Males and females presenting to the only pre-marriage counseling center in Zanjan city were invited and enrolled in the study to complete the sample size. The sample size was calculated to be 828 considering adequate OHL frequency of 0.4 [10], precision of 0.04, and 95% confidence interval using the sample size calculation formula by Daniel et al, [15] and adding 30% extra, considering the more representatively rom a population with a mean of 9000 marriages per year in Zanjan Province according to the Iranian Center of Statistics.

Study population:

A total of 902 couples presented to the pre-marriage counseling center in the last 3 months of 2018; among which, 828 eligible couples who were willing to participate in the study were enrolled (according to the calculated sample size).

Data collection:

The Oral Health Literacy-Adult Questionnaire (OHL-AQ), which is a valid and reliable questionnaire in Farsi (with an intraclass correlation coefficient of 0.84, S-content validity index of 0.90, and content validity ratio of 0.85) [16] was used for assessment of OHL of the participants. The participants filled out the self-administered questionnaire and return it to the researcher. If any question left unanswered, the researcher would complete it by interviewing the participant. This tool includes three domains of oral health knowledge (6 questions), numeracy skills (6 questions) and decision making skills (5 questions), yielding a total of 17 questions. Correct answers were scored 1 and wrong or I do not know answer choices were scored zero. The scores of OHL, oral health knowledge, numeracy skills, and decision making skills were separately calculated. The OHL was categorized into three categories of inadequate (scores < 9), marginal (scores 10 and 11), and adequate (scores 12-17).

Also, this questionnaire included a section

regarding the demographic information and socioeconomic factors. Age and gender were recorded as demographic variables. Since direct questioning of the level of income could not disclose the correct information in this regard, the floor area per person was considered as a proxy of financial status. Years of education and place of residence were also evaluated as social variables [17]. According to the UN definition of young in UN Agenda 21, age was divided into two groups of <22 and ≥22 years, and place of residence was categorized into three groups of urban, suburbs, and rural. The floor area per person was categorized as < 20m^2 per person, 20-30m^2 per person, and ≥ 40m^2 per person [10]. Years of education were also categorized into two groups of < 12 years and ≥ 12 years. The participants independently filled out the OHL-AQ prior to participation in pre-marriage courses.

Ethical considerations:

Participants between 15 to 35 years who could read and write in Farsi and were willing to participate in the study were enrolled after signing informed consent forms. The study was conducted in accordance with the Declaration of Helsinki. Despite the fact that individuals over 15 years of age are considered as adults according to the civil law in Iran, parents of participants aged 16 or under also signed the informed consent forms.

Statistical analysis:

In this study, OHL and its components were first considered as quantitative dependent variables, and the mean and standard deviation values were reported for them. Also, their correlation with independent variables was analyzed by the univariate and multivariate linear regression models. In the second step, the level of OHL as a qualitative dependent variable was reported as frequency and standard deviation. The odds ratio of different levels of OHL as the outcome based on demographic and socioeconomic measures as independent variables were analyzed using univariate and multivariate multinomial logistic regression models and compared with the odds of adequate OHL. In this analysis, the last variable in levels of each

variable was considered as the reference and P<0.05 was considered statistically significant. The likelihood ratio was calculated to assess the interactions.

RESULTS

A total of 828 individuals (equal number of males and females) participated in this study. The mean age of participants was 24.22±5.44 years. Of all participants, 38% were over the age of 22 years, and 65.2% had lower than 12 years of education. In 49.4%, the floor area per person was <20m^2. Also, 62.2% were living in urban, 15.1% were living in suburban, and 22.7% were living in rural areas.

The response rate was 100%. The mean OHL score of the participants was 7.86±3.83 out of 17 with a median of 8. The mean scores of oral health knowledge, numeracy skills, and decision making skills were 2.65±1.56 out of 6, 3.24±1.84 out of 6 and 1.97±1.42 out of 5, respectively. As shown, the participants acquired a lower score in decision making skills than other domains. After categorization of OHL of the participants, it was revealed that 63.8% had inadequate, 15.3% had marginal, and 20.9% had adequate OHL.

In general, the mean score of OHL and its domains was significantly different according to demographic and socioeconomic variables. As shown in Table 1, the mean score of OHL was higher in older individuals (P<0.001), those with 12 years of education and more (college and university degree) (P<0.001), those living in urban areas (P<0.001) and in participants with more floor area (better financial status (P<0.001). However, the OHL score of males and females was not significantly different (P=0.910). Table 2 presents the frequency and percentage of participants with different levels of OHL according to demographic and socio-economic variables. As demonstrated, the majority of the participants (79.8%) with lower than 12 years of education had inadequate OHL and 42.7% of those with ≥12 years of education had adequate OHL. No significant difference was noted between males and females regarding different levels of OHL.

Table 1 Mean score and standard deviation of oral health literacy and its domains according to demographic and socioeconomic indicators (N=828)

		N (%)	OHK Mean(SD)	NS Mean(SD)	ADM Mean(SD)	OHL Mean(SD)
Gender	**Male**	410(50)	2.62(1.64)	3.30(1.87)	1.93(1.4)	7.84(3.96)
	Female	418(50)	2.68(1.48)	3.19(1.82)	2.00(1.44)	7.87(3.69)
Age (years)	**<22**	315(38)	2.51(1.54)	2.89(1.83)	1.69(1.27)	7.10(3.49)
	≥22	513(62)	2.73(1.57)	3.45(1.82)	2.13(1.48)	8.32(3.95)
Years of education	**<12**	540(65)	2.26(1.56)	2.71(1.79)	1.54(1.24)	6.51(3.46)
	≥12	288(35)	3.38(1.27)	4.24(1.5)	2.76(1.40)	10.39(3.13)
Place of residence	**Urban**	515(62)	2.95(1.48)	3.74(1.73)	2.28(1.41)	8.97(3.6)
	Suburban	125(15)	2.49(1.58)	2.86(1.81)	1.71(1.41)	7.06(3.66)
	Rural	188923)	1.93(1.53)	2.13(1.61)	1.27(1.15)	5.33(3.16)
Floor area/person	**<20**	409(49)	2.43(1.63)	2.82(1.84)	1.67(1.3)	6.93(3.74)
	20-39	280(34)	2.71(1.48)	3.45(1.75)	2.09(1.42)	8.25(3.56)
	≥40	139(17)	3.16(1.37)	4.04(1.72)	2.60(1.53)	9.8(3.74)

SD: standard deviation; OHK: oral health knowledge; NS: numeracy skills; ADM: appropriate decision making; OHL: oral health literacy; N: number of participants

Table 2: Frequency and percentage of participants with different levels of oral health literacy (OHL) according to demographic and socioeconomic indicators (N=828).

		Inadequate N(%)	Marginal N(%)	Adequate N(%)	Total (100%)
Gender	**Male**	259(63.2)	67(16.3)	84(20.5)	410
	Female	269(64.4)	60(14.4)	89(22.2)	418
Age (years)	**<22**	230(73)	45(14.3)	40(12.7)	315
	≥22	298(58.1)	82(16.0)	133(25.9)	513
Years of education	**<12**	428(79.3)	62(11.4)	50(9.3)	540
	≥12	100(34.7)	65(22.6)	123(42.7)	288
Place of residence	**Urban**	303(74.1)	57(13.9)	49(12)	409
	Suburban	164(58.6)	49(17.5)	67(23.9)	280
	Rural	61(43.9)	21(15.1)	57(41.0)	139
Floor area/person	**<20**	272(52.8)	93(18.1)	150(29.1)	515
	20-39	92(73.6)	18(14.4)	15(12)	125
	≥40	164(87.2)	16(8.5)	8(4.3)	188

Inadequate OHL: 0-9; Marginal OHL: 10-11; Adequate OHL: 12-17

Table 3 shows the correlation of demographic and socioeconomic variables with OHL score according to univariate and multivariate linear regression models. After adjusting for confounders in multivariate analysis, no significant correlation was noted between the OHL score and demographic variables. However, the OHL score had a significant positive correlation with years of education. the OHL score had a significant correlation with place of resident and floor area per person.

Table 4 presents the odds ratios and confidence intervals in univariate and multivariate multinomial logistic regression models. The odds of adequate OHL were compared once with inadequate OHL and once with marginal OHL.

Comparison of the odds of adequate and inadequate OHL in the final model, after eliminating the confounders, revealed that level of education and living in rural areas (compared with urban) remained as influential factors in the model, and the rest of the demographic factors were eliminated. Comparison of the odds ratios indicated that level of education had a greater effect on OHL than other variables in this model. However, when comparing marginal and adequate OHL, all demographic and socio-economic variables were eliminated, and only floor area <20m[2] per person remained in the model. Thus, no significant difference was found between marginal and adequate OHL in this respect.

Table 3. Association of demographic, social and economic indicators with oral health literacy scores and its domains in the study participants (N=828), as shown by the linear regression model

		Oral health knowledge		Numeracy skills		Appropriate decision making		Oral health literacy	
		Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender (female/male)	*B*(SE)	0.06(0.11)	0.08(0.12)	-0.10(0.13)	0.04(0.13)	0.07(0.1)	0.24(0.1)	0.03(0.27)	0.36(0.26)
	P*	0.566	0.503	0.430	0.736	0.490	0.02	0.912	0.166
Age (≥22 years/<22)	*B*(SE)	0.22(0.11)	-0.14(0.13)	0.56(0.13)	0.02(0.14)	0.44(0.1)	0.13(0.11)	1.22(0.27)	0.02(0.28)
	P*	0.043	0.271	<0.001	0.866	<0.001	0.228	<0.001	0.948
Years of education (≥12/<12)	*B*(SE)	1.13(0.11)	0.92(0.12)	1.54(0.12)	1.07(0.13)	1.22(0.1)	0.92(0.1)	3.88(0.24)	2.20(0.26)
	P*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Place of residence (rural to urban)	*B*(SE)	-0.51(0.06)	-0.33(0.06)	-0.81(0.07)	-0.56(0.07)	-0.51(0.06)	-.029(0.06)	-1.83(0.15)	-0.18(0.14)
	P*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Floor area (m²)/person (<20, 20-30, ≥ 40)	*B*(SE)	0.34(0.07)	0.13(0.07)	0.61(0.08)	0.30(0.08)	0.46(0.06)	0.23(0.06)	1.41(0.17)	0.66(0.16)
	P*	<0.001	0.068	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

B: coefficient; SE; standard error
*Linear regression (P<0.05)

Table 4. Odds ratio and confidence interval obtained from univariate and multivariate multinomial logistic regression models (N:828)

		Unadjusted OR(CI)	P*	Adjusted OR(CI)	P*
Odds of inadequate oral health literacy					
Gender (reference: female)	Male	1.02(0.72-1.44)	0.909	1.33(0.79-2.24)	0.282
Age (reference: ≥22 years)	<22	2.57(1.73-3.8)	<0.001	1.44(0.91-2.26)	0.118
Years of education(reference: ≥12)	<12	10.53(7.10-15.62)	<0.001	6.00(3.86-9.28)	<0.001
Residence (reference: rural)	Urban	0.09(0.04-0.19)	<0.001	0.19(0.08-0.41)	<0.001
	Suburban	0.30(0.12-0.73)	0.008	0.49(0.19-1.24)	0.132
Floor area/person(reference: ≥40)	>20	5.78(3.61-9.25)	<0.001	3.04(1.77-5.24)	<0.001
	20-39	2.29(1.45-3.62)	<0.001	1.85(1.09-3.12)	0.022
Odds of marginal oral health literacy					
Gender (reference: female)	Male	1.18(0.75-1.87)	0.472	1.61(0.87-2.99)	0.132
Age (reference: ≥22 years)	<22	1.82(1.10-3.03)	0.02	1.63(0.95-2.78)	0.075
Years of education(reference: ≥12)	<12	2.35(1.45-3.79)	<0.001	1.60(0.94-2.71)	0.084
Place of residence (reference: rural)	Urban	0.31(0.13-0.75)	0.01	0.45(0.18-1.13)	0.09
	Suburban	0.60(0.20-1.79)	0.359	0.81(0.27-2.46)	0.709
Floor area/person (reference: ≥40)	>20	3.16(1.68-5.93)	<0.001	2.55(1.32-4.94)	0.006
	20-39	1.99(1.07-3.7)	0.031	1.83(0.97-3.45)	0.061

OR: odds ratio; CI: 95% confidence interval
*Multinomial logistic regression (P<0.05),

DISCUSSION

This study showed that around two-thirds of the participants in this study had inadequate OHL. Among the background variables, socioeconomic factors had a significant correlation with OHL level and score. Such a correlation was not found for age and gender. To the best of the authors' knowledge, this study is the first on OHL of young couples in primary healthcare settings.

This study revealed that the study population had many shortcomings regarding OHL, and all OHL domains required reinforcement. Of all domains, the decision making skills, which is an important domain in functional health literacy, required greater attention than other domains. Regarding the frequency of different levels of OHL, younger individuals in this study had lower frequency of adequate OHL compared with the results of Sistani et al, [10] who used the same tool for measurement of OHL among male and female adult population.

However, aside from age, this difference can also be due to the place of conduction of study, which was the capital city of Tehran with a more diverse population in the study by Sistani et al [10].

Haerian et al. [18] evaluated the relationship of OHL and gender in patients with periodontal disease. Although they used a different tool for assessment of OHL, they found no significant correlation between OHL and gender, which was similar to our finding in this respect. Studies on the correlation of demographic factors with oral health are fewer than those evaluating the relationship of demographics with general health. Similar to our study, Xie et al. [19] reported significant correlation of health literacy and level of education; although they evaluated the general health literacy. Svendsen et al. [8] discussed that inadequate health literacy was influenced by the low socioeconomic status; the same results were obtained in the present study regarding OHL. These findings highlight the necessity of integration of OHL in public health literacy [2]. Lastrucci et al. also [20] reported significant correlation of health literacy with level of education and financial status as we reported. Although the present study revealed that

among the assessed socioeconomic factors, OHL was more influenced by years of education as a proxy of social status, it should be mentioned that difference in health literacy assessment tools and number of questions of these questionnaires can decrease the possibility of accurate comparison of results. Also comparison of the regression coefficient of years of education with that of other variables revealed that years of education was the most influential factor in OHL among all the assessed variables.

The current results regarding the mean OHL score of the participants and the frequency of its different levels in Iran, which has a strong healthcare network and has integrated oral health in the primary healthcare system for more than a quarter of century, was far from expectation, and calls for studies in the healthcare system to find the influential factors in OHL.

OHL was found to be influenced by socioeconomic factors; this finding can be used to prevent discrimination in oral health [21, 22]. Soofi et al. [23] showed the significant effect of socioeconomic factors on discrimination in oral health. The present results revealed no significant difference in the mean OHL score or level of OHL between males and females. Thus, it may be concluded that no gender discrimination exists regarding OHL. However, further investigations are required in this respect since some other studies found that gender significantly affected the health literacy. This results differs from the results of studies that showed differences in OHL in females and males [24, 25], although it is consistent with the study by Cho et al [27].

Strong correlation between some socioeconomic factors and OHL in the present study indicated that such correlations can be used to design and implement strategies and interventions for promotion of OHL especially among those with lower socioeconomic class by using the risk factor approach. On the other hand, the primary healthcare setting, in which this study was conducted, can be used for implementation of population-based approaches to promote the OHL of the community.

Limitations and Strengths

It may appear that we employed a simple pattern of sampling. However, it should be noted that marriage occurs between individuals from all socioeconomic, financial, and educational levels living in rural and urban areas. Thus, our study population was a true representative of the entire community, which increases the generalizability of the results. However, it is crucial to acknowledge that the lack of participation from illiterate or poorly literate individuals (those with less than 5 years of education) should not be overlooked, as they were unable to complete the questionnaire. Consequently, our results may overestimate the actual oral health literacy (OHL) of the community. It is also worth considering that both literacy and language can impact the results of self-report questionnaire studies. In our case, different spoken languages, such as Turkish in our target population, could also have affected the outcomes. This is a common issue in countries with a high percentage of immigrants. Therefore, further research is needed to explore these factors in more depth.

One strength of this study was its large sample size, which accounted for 5% of our yearly target population of 9000 marriages. This allowed for a sufficient number of participants in each category of dependent variables, as clearly indicated in the tables. Using a valid and reliable short questionnaire in Farsi was another methodological strength of this study, which further adds to the accuracy of the results. Also, the questionnaires were filled out by using a combination of self-report and interview. Therefore, we had no missing data, taking into account that inadequate OHL increases the rate of missing data [28].

Cross-sectional design was a limitation of this study, which did not allow to find a causal relationship. Also, use of questionnaire for data collection is associated with some biases such as the recall bias, which cannot be ignored.

CONCLUSION

This study revealed low score of OHL and low prevalence of people with adequate OHL and highlighted the independent correlation of socioeconomic factors with inadequate OHL. Participants with higher level of education, those living in urban areas, and individuals with better financial status had higher levels of OHL and lower odds of inadequate OHL. Of course, longitudinal studies are required to find causal relationships in this respect.

We targeted young couples in this study, as they form the central foundation of future families, and their OHL significantly impacts the OHL of their future offspring. Therefore, it is crucial to implement upstream interventions using a public health approach to enhance their OHL levels.

CONFLICT OF INTEREST STATEMENT

None declared.

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