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Original Article

Studying the Relationship between Oral Health Literacy Level, Oral Health Attitudes and Behavior in Students

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ABSTRACT

Awareness of the status of oral health behaviors and community habits is essential for health system decision-making. The purpose of the present study was to explain the relationships between variables affecting oral health behavior such as oral health literacy and oral health attitudes among students. The present study was a cross-sectional descriptive study conducted using a survey method. Data collection was conducted using a researcher-made and standardized questionnaire. In this study, a sample of 363 students was selected by simple random sampling and voluntarily participated in the study. The condition for entering the study was to be employed. Data analysis was performed using SPSS version 23 software. According to the results of this study, 81% of students achieved high scores in oral health literacy; the variables of age, gender, and level of education did not play an effective role in students' health literacy, attitudes, and oral health behavior; the relationship between health literacy and attitude was significant and inverse, and most students who had a negative attitude towards oral health literacy achieved low health literacy scores. In addition, there was no significant relationship between oral health attitude and behavior, but the relationship between oral health literacy and oral health behavior was significant and direct. According to the results, oral health literacy has a significant and inverse relationship with attitude and a significant and direct relationship with oral health behavior.

Keywords: Oral health attitudes, Oral health literacy, Behavior, Students

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Introduction

Health literacy refers to the ability of individuals to acquire, process, and understand basic health information and services that are necessary for appropriate health-related decisions [1, 2]. The level of health literacy is directly related to the use of health care services, hospitalization, mortality rates, and other treatment programs [3]. Oral health literacy refers to the ability of individuals to interact with oral and dental information that is necessary for appropriate oral health decisions [4-6].

Oral health behavior describes the impact of oral health habits, dietary preferences, and the pattern of use of dental services on an individual's oral health [7, 8]. Researchers believe that the level of oral health literacy is directly related to the level of attention to oral care behaviors [9-16]. Therefore, people with low levels of oral health literacy show less attention to positive behaviors related to maintaining oral health and

generally do not have a good oral health status [15]. Given the importance of the validity of health information, efforts to improve oral health literacy lead people to dental professionals to receive oral health information. As a result, people receive valid, accurate, and up-to-date information in this regard. Valid information can improve people's health behaviors and increase their quality of life. Attitude is a person's feeling or way of thinking, and one of the factors related to oral health is attitude [17].

With increasing age and level of education, positive attitudes toward oral health increase [18-20], and positive attitudes can lead to improved oral health behavior. In examining the relationships between literacy, oral health attitudes, and behavior, some studies have reported a direct relationship between literacy and oral health behavior [9-11, 13, 15, 16, 21]. Some studies have pointed to a direct and significant relationship between oral health literacy and attitude and the need to improve health literacy to improve attitude [22, 23], and some have pointed to the relationship between attitude and health behavior [24, 25].

Students are considered one of the important groups in any society. Students are in contact with various groups such as family, friends, professors, classmates, etc., and the level of their information and literacy can be reflected in these relationships. They can be health ambassadors in families and, by having sufficient health literacy, contribute to the balanced flow of health information in society. In policy-making related to oral health, the need to be aware of the current status of oral health behaviors and habits of society seems obvious. Therefore, the present study aims to examine oral health literacy among medical students and assess its relationship with attitude toward oral health and oral health behavior.

Materials and Methods

The present study was a descriptive-cross-sectional study conducted using a survey method. Based on the Cochran formula, the sample size was determined as 363 people. The research samples were randomly selected and participated in the study voluntarily. The inclusion criteria for the study were student willingness and employment in education.

The research instrument was a questionnaire that was prepared using the studies of Vishwanathaiah, Ahamed *et al*. and Scaglia and Niknamdeh [26-28]. The questionnaire consisted of 42 questions in four sections: demographic information (3 items: gender, education, and age group), attitude towards oral health (7 items), oral health literacy (23 items), and oral health behavior (9 items). Health literacy questions were set as correct and incorrect answers with a score of one and zero. The minimum score in this section is zero and the maximum is 23, and the hypothetical mean is 11.5. Attitude questions were arranged on a five-point Likert scale from "very little" to "very much" with a score of 1 to 5. Health behavior questions were arranged in two sections: yes-no and multiple-choice. Questions related to timing (such as the duration of brushing, timing of toothbrush replacement, etc.) were designed as multiple-choice. The questionnaire was provided to 10 information science specialists working in medical universities to determine face and content validity, and after confirming the validity, it was distributed to a test population of 50 students to determine reliability. To measure the reliability of the oral health literacy section, the Koder-Richardson test was used, and the k21 formula was used due to the equal difficulty level of the questions. The r^2 value was 0.765, which indicated the reliability of the test. Cronbach's alpha was used to measure the reliability of the two parts of oral health attitude and oral health behavior, and the value was 0.841, which indicated the reliability of the questionnaire. After this stage, 363 questionnaires were distributed in person among the research sample, and 334 questionnaires were returned. Of these, 312 questionnaires were analyzable.

Data analysis was performed using SPSS version 23 software. Data analysis was performed using descriptive (such as frequency, mean) and inferential statistical methods (such as Kolmogorov-Smirnov, Mann-Whitney U, Kruskal-Wallis, Spearman correlation coefficient, etc.).

Results and Discussion

The present study was conducted on 312 students, whose demographic information is presented in **Table 1**.

Table 1. Frequency distribution of descriptive demographic information

Demographic variables		N	%
Gender	Female	211	67.6
	Male	101	32.4
Educational level	BSc.	80	25.6
	MSc.	65	20.8
	MD	166	53.2
	Ph.D.	1	0.3
Age group (years)	18-22	111	35.6
	23-27	130	41.7
	28-32	57	18.3
	33-37	12	3.8
	38-42	2	0.6

The overall mean score of students in oral health literacy was 18.33, which is higher than the average (11.5). To examine the status of oral health literacy, the scores were divided into 3 categories: high, average, and poor (quartile cut-off line). The results showed that 81.1% of students obtained high scores on the oral health literacy test. In examining the attitude towards oral health, the overall mean was 2.84. An examination of the components of the attitude toward oral health showed that the highest mean was related to the component of "high dental costs" (4.27) and the lowest mean was related to "proximity of the dental clinic to the place of residence" (1.97). The mean scores of the attitude components, considering a minimum score of 1 and a maximum of 5, are presented in **Table 2**.

Table 2. Average scores of students' attitude components towards oral health

Items	Mean ± Standard Deviation
I don't have enough time to go to the dentist	2.69 ± 1.31
Dental treatments are expensive	4.27 ± 0.84
I'm afraid of dental tools	2.41 ± 1.45
I'm afraid of syringes	2.56 ± 1.54
I'm afraid of sitting in the dentist's waiting room	1.97 ± 1.31
I don't need to go to the dentist	2.37 ± 1.45
I don't think there is a dental clinic around here	1.97 ± 1.19

The average attitude towards oral health in the male group was 2.72 and in the female group was 2.89, and in both groups, it was lower than the average (3) determined in the study. Therefore, students do not have a positive attitude towards oral health. The status of oral health behavior among students is reported in **Table 3**.

Table 3. Oral health behavior status among students

Items		Number (Percentage)	P-value
Brushing	Yes	132 (100)	0.000
	No	0 (0)	
Using toothpaste with a toothbrush	Yes	127 (96.2)	0.192
	No	5 (3.8)	
Using oral hygiene tools, such as mouthwash and dental floss	Yes	92 (69.7)	0.461
	No	40 (30.3)	
Tongue cleaning	With a tongue cleaner	8 (6.1)	1.035
	Toothbrush	73 (55.3)	
	Other	3 (2.3)	
	I don't clean	48 (36.4)	
Duration of brushing	1-3 minutes	79 (59.8)	0.525
	3-5 minutes	51 (38.6)	
	More than 5 minutes	2 (1.5)	
Rinse your mouth	Morning, night, and after eating sweets	33 (25.0)	1.546
	Morning and night	31 (23.5)	
	After eating food	17 (12.9)	
	Morning, after waking up	16 (12.1)	
	Night, before bed	23 (17.4)	
	I don't have a specific schedule	12 (9.1)	
Timing of Toothbrush Replacement	Every 3 months	51 (38.6)	1.138
	Every 6 months	48 (36.4)	
	I don't have a specific schedule	23 (17.4)	
	Every month	6 (4.5)	
	Every 12 months	4 (3.0)	
Bad Breath Problem	Have	34 (25.8)	0.439
	Don't have	98 (74.2)	
Seeing the Dentist	Only when there is a toothache	83 (62.9)	1.511
	Once every 6 months	22 (16.7)	
	Regularly every 6 to 12 months	9 (6.8)	
	Every 3 months	8 (6.1)	

	Never	6 (4.5)	
	Every month	4 (3.0)	
Taking Care of Teeth Like Other Parts of the Body	Yes	95 (72.0)	0.824
	No	9 (6.8)	

As **Table 3** shows, all students use a toothbrush and 96.2% use a toothbrush and toothpaste to clean their teeth; 69.7% of students use oral hygiene tools such as mouthwash and dental floss; 55.3% of students use a toothbrush to clean their tongue; 59.8% of students spend between 1 and 3 minutes brushing their teeth; 25% of students rinse their mouths "morning, night, and after eating sweet foods"; 38.6% of students change their toothbrushes every 3 months; 74.2% of students do not have bad breath; 62.9% of students only visit the dentist when they have a toothache, and 72% of students take care of their teeth like they do other parts of their body.

A comparison of health literacy scores showed that the average scores in the male group were 17.13 and in the female group were 18.81. A comparison of health literacy scores in the male and female groups was performed using the Mann-Whitney test. The results were reported with a test value of 1528, a statistic of -1.909, and a significance of 0.056, indicating that the average oral health literacy scores in the male and female groups were not significantly different. The Kruskal-Wallis test was used to compare health literacy scores in educational groups (bachelor's, master's, professional doctorate, and specialized doctorate). The results showed that there was no significant difference between health literacy scores in different educational groups with a chi-square value of 1.092 and a significance of 0.779. To compare the health literacy scores in age groups, the Kruskal-Wallis test was used. The results showed that there was no significant difference between the health literacy scores in different age groups with a chi-square value of 6.112 and a significance level of 0.191.

To compare the attitude toward oral health based on gender among students, the Kolmogorov-Smirnov test was used. The results showed that there was no significant difference between the attitude towards oral health of female and male students with a test value of 0.874 and a significance level of 0.430. The Kruskal-Wallis test was used to compare the attitudes toward oral health of students of different educational levels. The chi-square value of 6.558 and a significance level of 0.087 showed that there was no significant difference between the attitudes toward oral health of the students of different educational levels. To examine the attitude of students based on age, the Kruskal-Wallis test was used. The chi-square value of 6.699 at a significance level of 0.153 showed that there was no significant difference between the attitudes of the students surveyed towards oral health based on different age groups.

To examine the relationship between oral health literacy and attitude towards oral health among students, Spearman's correlation coefficient was used, considering the nature of the variables. The correlation coefficient of -0.158 at a significance level of 0.001 indicated a significant inverse relationship between the two variables. Considering the nature of the questions related to oral health attitudes, it can be said that the higher the level of oral health literacy of students, the more positive their attitude towards oral health will be. To examine the relationship between the level of oral health literacy of the students surveyed and their oral health behavior, the chi-square test was used. Table 4 shows the results of the test.

Table 4. The relationship between oral health literacy level and health behavior

Health behavior	Schedule of toothbrush replacement	Duration of brushing	Use of toothpaste	Timely brushing and rinsing of the mouth	Cleaning the tongue	Use of oral hygiene tools	Bad breath
$\chi 2$	75.803	69.045	112.758	16.545	101.515	20.485	31.030
P-value	0.000	0.011	0.000	0.005	0.001	0.000	0.001

As can be seen in **Table 4**, there is a significant relationship between the health literacy level of the students studied and all components of health behavior, except for the component of visiting the dentist.

The relationship between attitude toward oral health and health behavior was examined using the Mann-Whitney test. The results showed that there is a significant relationship between attitude and "visiting the dentist only when there is a toothache" (test value

1568 and significance level of 0.006), but the relationship between attitude and other components of health behavior is not significant. Therefore, the more negative the attitude of individuals toward oral and dental health, the more they prefer to visit the dentist only when there is a toothache, and the attitude factor plays a role in periodic and regular dental care of individuals.

In the present study, the status of oral health literacy, attitude toward oral health, and oral health behavior among medical students were examined. The findings showed that 81% of the students scored high on the oral health literacy test. The present study indicated that students had a negative attitude toward oral health. The most important factor in this regard was the high cost of dentistry. This finding is in line with the findings of the study by Aljauid *et al*. which was conducted on Saudi students [29]. It seems that factors such as high dental costs and anxiety related to dental services are effective in this regard.

The present study showed that the relationship between oral health literacy and attitude towards oral health is significant and its direction is inverse. It can be stated in the interpretation of this finding that the higher the oral health literacy of students, the more positive their attitude toward oral health increases. This finding is in line with the study by Yao *et al*. [23]. In the study of the relationship between demographic characteristics and the variables studied in the present study, no significant relationship was observed. This finding is consistent with the study of Pacauskiene *et al*. [17]. However, it is not consistent with the study of Hamasha *et al*. which showed a relationship between gender and education with oral health behavior [24].

In the study of the relationship between oral health attitude and oral health behavior among the students studied, no significant relationship was observed. However, based on the results obtained from some components related to attitude, it can be inferred that the more negative the attitude of people towards oral health, the less likely they are to visit the dentist and they often only visit the dentist when they have a toothache. This result is consistent with the results obtained from the study of Ying *et al*. [9]. In addition, the relationship between the level of oral health literacy and oral health behaviors among the students studied was positive and significant.

The results showed that as the level of oral health literacy among students increases, people spend more time brushing their teeth, have a regular schedule for changing their toothbrushes, rinse their mouths on time, and follow the schedule in the morning after waking up, at night before going to bed, and after eating sweet foods, always use toothpaste when brushing their teeth, use oral hygiene tools (such as dental floss and mouthwash), clean their tongue in addition to brushing their teeth, and generally do not have a problem with bad breath. In general, the higher the level of oral health literacy, the higher the level of oral health compliance by people. These results are consistent with the studies of Calvasina *et al*., Ying *et al*., Ueno *et al*., Firmino *et al*., Neves *et al*. and Silva-Junior *et al*. [9-11, 13, 16, 21].

The findings showed that high oral health literacy scores in students are related to the appropriate status of oral health behavior. Oral health literacy is an effective factor in students' attitudes toward oral health, and there is a significant relationship between the level of oral health literacy and oral health behavior. Since literacy is achieved through education and exposure to information, experience, and skills, education related to health, self-care, etc. can play an effective role in improving oral health behavior.

The findings of this study and their comparison with other related studies indicate the importance of context or background in oral health literacy; because the high level of oral health literacy in medical students can be due to their high proximity to health information. These students, considering the nature of their field of study and their attendance at the University of Medical Sciences, have a high proximity to health information during their student years, consciously and unconsciously. Health information provided in classrooms, proximity to health and wellness professors, the presence of posters and workshops related to medicine and health, etc. are among the factors that have directly or indirectly led to the improvement of their health literacy. Individuals' attitudes are formed in interaction with the realities of society, and this study showed that the high cost of dentistry (which is one of the major problems caused by the lack of health insurance coverage) is a fact that is associated with students' negative attitudes towards oral health literacy. However, despite having a negative attitude, individuals in this same society observe oral health behaviors, and there is a direct and significant relationship between health literacy and their health behavior. It is suggested that more research be conducted in the medical science student community to further analyze these relationships and further explain the role of these variables and their relationships.

Since this study was conducted in the student community, generalizing its results to the entire society should be done with caution; because the student population is mainly different in terms of literacy level

compared to other segments of society, and this feature can affect the results related to their health literacy. In addition, students are mainly in the same age group, which makes them different from the age homogeneity in real society. Therefore, it is suggested that similar research be conducted by considering different age and educational groups in society.

Conclusion

The purpose of the present study was to explain the relationships between variables affecting oral health behavior such as oral health literacy and oral health attitudes among students. According to the results of this study, 81% of students achieved high scores in oral health literacy; the variables of age, gender, and level of education did not play an effective role in students' health literacy, attitudes, and oral health behavior; the relationship between health literacy and attitude was significant and inverse, and most students who had a negative attitude towards oral health literacy achieved low health literacy scores. In addition, there was no significant relationship between oral health attitude and behavior, but the relationship between oral health literacy and oral health behavior was significant and direct. According to the results, oral health literacy has a significant and inverse relationship with attitude and a significant and direct relationship with oral health behavior.

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