

## Oral Health Literacy and Associated Factors in Adults Attending a University Dental Clinics, Saudi Arabia: A Cross Sectional Study

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### Abstract

**Background:** Oral Health Literacy (OHL) has been linked to better oral health outcome and presumably healthy decisions. This study aimed to assess (OHL) level. Also, to evaluate the association between OHL with clinical and socioeconomic factors.

**Materials and Methods:** The study was designed as a cross-sectional study using adult sample from Umm Al-Qura University dental teaching hospital. The validated, Arabic translated, comprehensive measure of oral health knowledge tool was used to assess OHL. Decayed, Missed and Filled Teeth (DMFT) and missing teeth status (yes/no) were measured via clinical and radiographic oral examination. Several covariables were also collected including age, gender, educational level, presence of any chronic diseases, nationality and whether the subjects were recruited from the screening or clinics.

**Results:** The mean (standard deviation) for OHL was 12.51 (4.59) out of 23. There was no significant difference in OHL with varying levels of DMFT (P-value 0.467) as well as whether subjects lost their teeth (P-value 0.50). However, there was a significant difference in OHL score in subjects with various educational levels (P-value < 0.001), being Saudi (P-value 0.0116), being females (P-value 0.0043) and examined during dental treatment (P-value 0.01).

**Conclusion:** From the studied sample, OHL was largely poor or fair. Disparities in OHL were observed with demographic and socio-economic factors.

**Keywords:** Dental Caries; Missing Teeth; Oral Health Literacy; Oral Health

### Introduction

Health literacy has been defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” [1]. The United Nations (UN) recognized the importance of health literacy and emphasized the link between health literacy and health outcomes as internationally agreed upon goal for global public health [2]. Oral Health Literacy (OHL) was defined in 2005 after the emergence of health literacy. Moreover, the need to study OHL in relation to a wide array of dimensions including preventive and therapeutic aspects as well as oral health status were stressed [3]. More recent evi-

dence suggested that OHL was associated with oral health outcomes [8-4] and health disparity [9]. Moreover, subjects with higher health literacy also had high self-reported OHL and better dentist-patient communication [10].

A study, among Saudi adolescents residing in the Eastern province, showed that tooth loss was linked to socioeconomic status, regular dental visits, eating habits, oral hygiene practices, smoking, and behavioural features [11]. A study that was conducted among dental assistants and nurses showed inadequate Dental Knowledge and OHL among the majority of medical nurses, while dental assistants had better OHL in comparison to nurses [12]. Another study conducted among caregivers of 300 children at a paediatric dental center to assess the relationship between caregivers' OHL and the dental caries experience of their child. The results showed that higher OHL levels in caregivers were associated with lower caries experience for their children [13].

### Aim of the Study

The aim of this study was to evaluate the levels of oral health literacy in a selected adult sample at Umm Al-Qura University and to assess the association with clinical and socio-economic factors.

### Materials and Methods

The study was designed as a cross-sectional study. Ethical approval was attained from the Institutional Research Ethics Board at Umm Al-Qura University Approval No. (HAPO-02-K-012-2021-11-852). Informed consent with voluntary participation was obtained from study subjects. The participants were selected using a convenience sampling from the dental clinics at Umm Al-Qura University, college of dental medicine, Makkah, Saudi Arabia. The inclusion criteria were adult patients, 18 years or older, who visited the dental clinics. As the number of extracted teeth were counted in this study; subjects with congenitally missing teeth and extracted teeth for orthodontic treatment were excluded from the study.

The outcome variable was OHL. The Arabic translation of the Comprehensive Measure of Oral Health Knowledge (CMOHK-A) tool was used to assess OHL [13]. According to Guillemin and colleagues (1993) [14], the validation of CMOHK into Arabic (CMOHK-A) was carried out in four separate stages [13], after that, the CMOHK-A tool underwent a pilot test; then test-retest reliability was evaluated; most participants reported the questionnaire was clear and easy to understand [13]. The CMOHK-A tool included 23 multiple-choice questions to assess respondents' knowledge and understanding of oral health. The questions comprised of 10 basic knowledge questions, 6 dental caries prevention and management questions, 5 periodontal disease prevention and management questions, and 2 oral cancer prevention and management questions. The total score for CMOHK was categorized into three levels: poor: score of 0 - 11, fair: score of 12 - 14, and good: score of 15 - 23 [13].

Clinical examination was conducted for the subjects. Decayed Missed and Filled Teeth (DMFT) index was used. Four examiners completed the clinical examination; inter as well intra-examiner reliability was estimated using kappa statistic; each examiner conducted examination on ten subjects not included in the current study. No examiner was allowed as a calibrated examiner till at least 90% agreement was achieved. Also, the number of extracted teeth were counted for each subject. The number of extracted teeth were verified by checking the panoramic radiograph. The number of extracted teeth was categorized into two groups: subjects with missing teeth and subjects who no missing teeth. Wisdom teeth were not counted in this study due to variation in eruption and extraction patterns.

Several covariables were collected including: age (years), gender (male or female), education (primary school, intermediate school, secondary school, bachelor degree, post gradation degree), systemic diseases and nationality (Saudi, non-Saudi). Also, the subjects who responded to the OHL survey at the screening visit were recorded as 'screening' while subjects who started dental treatment was recorded as 'treatment'. Total OHL score was obtained by adding all OHL questions. Dental caries experience measured by DMFT and it was divided into quartiles for comparison with OHL.

Total OHL was compared with the main exposure variables and covariables using t-test or analysis of variance (ANOVA). Multiple linear regression analysis was used incorporating all listed covariables as well as the main exposure. The STATA 15.1 (StataCorp LP, College Station, Texas, USA) software was used for all statistical analyses.

## Results

The collected sample size was 203 subjects. The mean and Standard Deviation (SD) for total OHL was  $12.51 \pm 4.59$  (out of 23 as the maximum score). About 50.74% had poor OHL; 21.18% had fair OHL and 28.08% had good OHL. From clinical and radiographic examination, about 28.08% of the sample had no missing teeth and 71.92% had at least one missing tooth. The median was 2 teeth, 25<sup>th</sup> percentile was 0 and 75<sup>th</sup> percentile was 5. The mean and SD for DMFT was  $9.46 \pm 5.99$ . About 96.55% of the sample had dental caries experience. About 48.77% of the sample were males and 51.23% were females. The mean age and SD was  $33.93 \pm 12.24$ . Approximately 15.76% of the sample had an elementary education, 17.73% had an intermediate education, about 40.39% had a certificate of secondary education, 5.42% had a bachelor's degree, and 20.20% held a postgraduate degree. Most of the respondents were non-Saudi (71.92%) and the rest were Saudi (28.08%). Regarding self-reported systemic diseases, approximately 88.18% of the respondents had no chronic diseases. Most of the respondents were recruited from clinics during dental treatment (71.92%), and the rest were recruited from screening clinics before starting treatment (28.08%) (Table 1). Regarding OHL, there was no significant difference (P-value 0.467) between those who had varying levels of DMFT as well as those who had missing teeth compared to those who had no missing teeth (P-value 0.50). Higher total OHL score was observed with subjects who had higher education (P-value < 0.001), being Saudi (P-value 0.0116), being females (P-value 0.0043) and examined during dental treatment rather than at screening, initial, visit (P-value 0.01). However, there was no significant difference in total OHL between those who chronic disease (P-value 0.4298) and age (P-value 0.3169) (Table 2). Multiple linear regression confirmed the univariable findings; DMFT and missing teeth did not show statistical significance with total OHL controlling for the collected covariables, data not shown.

## Discussion

The result of this study revealed that two-thirds of the sample had poor or fair OHL. In this study, there was no difference in total OHL score between those missed at least a tooth and those who did not. Subjects with various levels of dental caries did not show remarkable difference in total OHL scores. There was, however, a positive association with other factors, such as educational status, gender, and nationality, as well as whether the patient was attending a follow-up appointment.

An Arabic translated version of the CMOHK (CMOHK-A) was utilized in this study. This tool was chosen because it showed high validity after Arabic translation to match the language of the subjects participated in this study [13]. There are some other available tools [15,16] to measure OHL such as the Rapid Estimate of Adult Literacy in Dentistry (REALD) and the Test of Functional Health Literacy in Dentistry (ToFHLiD) [17]. These two tools were commonly used and developed using English language. They primarily focused upon word recognition that may not hold similar validity when used in other languages including Arabic. Moreover, except for CMOHK, a validated Arabic version could not be found.

The associations observed in this study between OHL and dental caries and education were consistent with the findings reported by Baskaradoss and colleagues, 2018 [18]. Moreover, OHL was lower in subjects with more periodontally involved teeth. In contrast to our findings, Baskaradoss and colleagues, 2018 [18] found that subjects with lower OHL had more missed teeth. A possible reason was the older subjects recruited in the Baskaradoss and colleagues, 2018 study (mean age was  $53.3 \pm 16.8$  compared to mean age  $33.93 \pm 12.24$  in our study). Our findings were in agreement with the original study by Macek, 2010 [19] reported that gender (female) and education level (> 12 years) were most likely to have good oral health. Sabbahi, *et al.* 2009 [20] reported no significant association between OHL and patients age, gender or education levels. According to Ueno, *et al.* 2013 [6] adults who visited the dentist regularly also had higher OHL.

<b>Variable</b>	<b>Frequency (%)</b>
<b>Total OHL</b>	
Poor	87 (42.86%)
Fair	45 (22.17%)
Good	71 (34.98%)
<b>DMFT</b>	
DMFT = 0	7 (3.45%)
DMFT ≥ 1	196 (96.55%)
<b>Number of missing teeth</b>	
Missing teeth = 0	57 (28.08%)
Missing teeth = More than 1	146 (71.92%)
<b>Education</b>	
Primary school	32 (15.76%)
Intermediate school	36 (17.73%)
Secondary school	82 (40.39%)
Bachelor	11 (5.42%)
Post grad.	41 (20.20%)
<b>Nationality</b>	
Non-Saudi	146 (71.92%)
Saudi	57 (28.08%)
<b>Gender</b>	
Male	99 (48.77%)
Female	104 (51.23%)
<b>Type of dental visit</b>	
Screening	57 (28.08%)
Clinic	146 (71.92%)
<b>Age</b>	
18 - 30 years	100 (49.26%)
More than 30 years	103 (50.74%)
<b>Chronic disease</b>	
No	179 (88.18%)
Yes	24 (11.82%)

**Table 1:** Characteristics of study participants from Umm Al-Qura University (N = 203).

Variable	Obs	Mean	Std. Dev.	Test	P-Value
<b>DMFT</b>					
Quartile 1	62	12.32	4.62	ANOVA	0.4669
Quartile 2	47	13.40	4.48		
Quartile 3	54	12.43	4.04		
Quartile 4	40	11.88	5.31		
Total	203	12.51	4.59		
<b>Number of missing teeth</b>					
Missing teeth = 0	57	12.86	4.58	t-test	0.5014
Missing teeth = More than 1	146	12.38	4.59		
<b>Education</b>					
Primary school	32	9.38	4.87	ANOVA	< 0.001
Intermediate school	36	10	4.34		
Secondary school	82	13.82	4.11		
Bachelor	11	13	3.44		
Post grad.	41	14.39	3.66		
<b>Nationality</b>					
Non-Saudi	146	12.01	4.65	t-test	0.0116
Saudi	57	13.81	4.18		
<b>Gender</b>					
Male	99	11.57	3.97	t-test	0.0043
Female	104	13.40	4.95		
<b>Type of dental visit</b>					
Screening	57	11.19	4.89	t-test	0.0101
Clinic	146	13.03	4.37		
<b>Age</b>					
18 - 30 years	100	12.84	4.86	t-test	0.3169
More than 30 years	103	12.19	4.30		
<b>Chronic disease</b>					
No	179	12.42	4.60	t-test	0.4298
Yes	24	13.21	4.48		

**Table 2:** Comparing oral health literacy with clinical, demographic and socioeconomic factors.

This finding supports what we found in our study, which showed that patients who visited the dentist because of pain or an emergency were more likely to have low OHL, as Parker and Jamieson 2010 [9] also discovered among Aboriginal adults in Australia.

### **Limitation of the Study**

Limitations of the study included cross-sectional nature of the study that limit any cause and effect relationship. To expand on the findings presented here, additional longitudinal research or clinical trials may be needed. This study was nonprobability convenience sample which reflects the patients attending a university-based dental clinic seeking for dental care only and not the population. Also, some of the covariables were self-reported. Our sample was relatively young with less missing teeth and chronic conditions that may not allow proper evaluation for these two variables. The DMFT index is a well-known epidemiological tool that has been in use for a long time. However, it appears there are behavioural and cultural reasons besides biological for restoring or losing a tooth. The results from this article can be used in future investigations about oral health literacy to determine and control variables that could improve the oral health of the community.

### **Conclusion**

From the study findings, the following conclusions can be outlined:

- About two-thirds of the subjects showed poor to fair OHL.
- OHL was associated with education, nationality, and gender, as well as being treated in the dental clinics; however, it was not associated with the number of extracted teeth as well as dental caries.

### **Bibliography**

1. Ratzan SC and RM Parker. "Health literacy". National library of medicine current bibliographies in medicine". Bethesda: National Institutes of Health, US Department of Health and Human Services (2000).
2. Quisumbing AR. "Implementing the internationally agreed goals and commitments in regard to gender equality and empowerment of women. Gender equality and poverty eradication: Good practices and lessons learned. Commission on the Status of Women, Fifty-fourth session". New York: United Nations.
3. Service, Public Health, and Human Services. "The invisible barrier: literacy and its relationship with oral health. A report of a work-group sponsored by the National Institute of Dental and Craniofacial Research, National Institute of Health, US Public Health Service, Department of Health and Human Services". *Journal of Public Health Dentistry* 65.3 (2005): 174-182.
4. Firmino Ramon Targino., *et al.* "Oral health literacy and associated oral conditions: A systematic review". *The Journal of the American Dental Association* 148.8 (2017): 604-613.
5. Horowitz Alice M and Dushanka V Kleinman. "Oral health literacy: the new imperative to better oral health". *Dental Clinics of North America* 52.2 (2008): 333-344.
6. Ueno Masayuki., *et al.* "Relationship between oral health literacy and oral health behaviors and clinical status in Japanese adults". *Journal of Dental Sciences* 8.2 (2013): 170-176.
7. Wehmeyer Meggan MH., *et al.* "The impact of oral health literacy on periodontal health status". *Journal of Public Health Dentistry* 74.1 (2014): 80-87.
8. Haridas Reshmi., *et al.* "Oral health literacy and oral health status among adults attending dental college hospital in India". *Journal of International Oral Health: JIOH* 6.6 (2014): 61.
9. Parker Eleanor J and Lisa M Jamieson. "Associations between indigenous Australian oral health literacy and self-reported oral health outcomes". *BMC Oral Health* 10.1 (2010): 1-8.

10. Guo Yi., *et al.* "Health literacy: a pathway to better oral health". *American Journal of Public Health* 104.7 (2014): e85-e91.
11. Atieh Momen A. "Tooth loss among Saudi adolescents: social and behavioural risk factors". *International Dental Journal* 58.2 (2008): 103-108.
12. Sabbahi Dania A. "Measuring Oral Health Literacy for Nurses and Dental Assistants". *Egyptian Dental Journal* (2020): 1451-1460.
13. Baskaradoss Jagan Kumar., *et al.* "Relationship between caregivers' oral health literacy and their child's caries experience". *Community Dental Health Journal* 36.2 (2019): 111-117.
14. Guillemin Francis., *et al.* "Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines". *Journal of Clinical Epidemiology* 46.12 (1993): 1417-1432.
15. Dickson-Swift Virginia., *et al.* "Measuring oral health literacy: a scoping review of existing tools". *BMC Oral Health* 14.1 (2014): 1-13.
16. Parthasarathy Divya S., *et al.* "Efficacy of instruments measuring oral health literacy: a systematic review". *Oral Health and Preventive Dentistry* 12.3 (2014): 201-207.
17. Gong Debra A., *et al.* "Development and testing of the test of functional health literacy in dentistry (TOFHLiD)". *Journal of Public Health Dentistry* 67.2 (2007): 105-112.
18. Baskaradoss Jagan Kumar. "Relationship between oral health literacy and oral health status". *BMC Oral Health* 18 (2018): 1-6.
19. Macek Mark D., *et al.* "Measuring conceptual health knowledge in the context of oral health literacy: preliminary results". *Journal of Public Health Dentistry* 70.3 (2010): 197-204.
20. Sabbahi Dania A., *et al.* "Development and evaluation of an oral health literacy instrument for adults". *Community Dentistry and Oral Epidemiology* 37.5 (2009): 451-462.

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