

Oral Health Literacy and Oral Health Behavior of Senior Medical and Pharmacy Students

R. Yazdani ¹, S.Z. Mohebbi ¹✉, S. Chehree ².

¹ Associate Professor, Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

² Dentist, Private Office, Tehran, Iran

Abstract

Background and Aim: Oral health literacy plays an important role in oral health promotion. This study aimed to assess the level of oral health literacy of senior medical and pharmacy students.

Materials and Methods: This cross-sectional study was conducted on senior medical and pharmacy students (n=300) of Tehran University of Medical Sciences in 2015. The oral health literacy-adult questionnaire (OHL-AQ) was used for data collection. This questionnaire has 17 items in four sections. The first section relates to the assessment of the perception of oral health. The second section is for the assessment of the ability to calculate values related to antibiotic and mouthwash prescriptions. The third section assesses the efficacy of communication skills, and the fourth section is about decision-making with regard to oral health problems. Chi-square and linear regression were used for descriptive analyses.

Results: The mean score of oral health literacy was 12.09 ± 3.85 for medical students and 10.48 ± 4.29 for pharmacy students. University degree of the father ($P < 0.001$) and being a medical student ($P = 0.002$) were significantly correlated with a higher level of oral health literacy. The comparison of the mean score of oral health literacy and its association with oral health behavior showed a significant correlation between a high level of oral health literacy and a higher frequency of tooth brushing, use of toothpaste, regular dental visits, and dental visits during the last 1-2 years ($P = 0.001$).

Conclusion: Considering the moderate level of oral health literacy of medical and pharmacy students, it is necessary to include oral health topics in the curricula of medical and pharmacy schools.

Key Words: Oral Hygiene, Oral Health Literacy, Health Behavior, Medicine, Pharmacy

✉ Corresponding author:
S.Z. Mohebbi, Associate
Professor, Department of
Community Oral Health, School
of Dentistry, Tehran University
of Medical Sciences, Tehran,
Iran

smohebbi@tums.ac.ir

Received: 27 March 2017

Accepted: 14 Sep 2017

➤ **Cite this article as:** Yazdani R, Mohebbi S.Z, Chehree S. Oral Health Literacy and Oral Health Behavior of Senior Medical and Pharmacy Students. *J Islam Dent Assoc Iran*. 2017; 29(4):141-148. DOI: 10.30699/jidai.29.4.141

Introduction

Health literacy is one of the factors determining the incidence of health problems as individuals with a low level of health literacy often have greater health problems [1]. Limited health literacy is a global dilemma, and about half of the adults in the United States, one-fifth of the British and Canadian

adults, and over half of the Iranian adults have a limited health literacy [2-6].

Oral health literacy, similar to general health literacy, plays an important role in the maintenance and promotion of oral health [7]. Oral health literacy is described as the ability of individuals to perceive and analyze oral health information for

decision-making with regard to oral health problems [8]. A low level of oral health literacy can independently be a predictor of a poor oral health status in adults [9].

All health-care providers, aside from dentists, can play a role in oral health promotion. People more commonly refer to pharmacists and physicians than to dentists, and this can be an opportunity to promote their oral health [10,11]. Pharmacists and physicians should participate in preventive and educational programs and should refer the patients to dental centers [12]. Obviously, they can be influential in public oral health promotion given that they have an adequate level of oral health literacy themselves. The Association of American Medical Colleges (AAMC) has designed and incorporated oral health instruction guidelines in medical education curricula [13].

Since studies on oral health literacy of medical and pharmacy students are limited, this study aimed to assess the level of oral health literacy and oral health behavior of senior medical and pharmacy students attending Tehran University of Medical Sciences in 2015.

Materials and Methods

This cross-sectional study was conducted on senior medical (n=200) and pharmacy (n=100) students of Tehran University of Medical Sciences in 2015. The data collection tool in our study was the oral health literacy-adult questionnaire (OHL-AQ). The validity and reliability of this questionnaire for use among the Iranian and English-speaking population have been previously confirmed [14,15]. The self-administered questionnaire was distributed among the students at their classes, dormitories, hospital, and pharmacy. This questionnaire has 17 items in four sections for the assessment of oral health literacy. The first section (perception) includes six questions to assess the perception and knowledge of the students with regard to oral health. The second part is the calculation section and includes four questions for the assessment of calculation skills related to mouthwash and antibiotic prescriptions. The third section is the listening section and includes two questions for the assessment of communication skills, and the last section is the decision-making section and includes five questions related to

common dental problems and items retrieved from the medical history form. Each correct answer was allocated a score of one, while each wrong answer or no answer was given a score of zero. Based on this scoring system, the lowest and highest acquired scores were 0 and 17, respectively. For further analysis, the scores were assigned into three categories of 0-9: inadequate, 11-12: borderline, and 12-17: adequate [9,14].

The demographic variables including age, gender, level of education, and the grade point average (GPA), and oral health behaviors such as the frequency of tooth brushing, consumption of sugary foods between meals, use of toothpaste, and dental visits were also included as well as self-report questions regarding oral health status. Socioeconomic status was self-reported by each student as very good, good, moderate, poor, or very poor.

Data were analyzed by using descriptive and analytical statistics. Chi-square test was applied to compare the answers to each question, while multiple linear regression was used to compare the level of oral health literacy between the groups and to determine its correlation with the demographics and oral health behavior and practice. The confounders were adjusted as covariates. The significance level was set at 0.05.

The study protocol was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.REC.1394.822). The students participated in the study voluntarily and filled out the questionnaire anonymously.

Results

Out of 300 distributed questionnaires, 265 were answered and returned. 178 questionnaires belonged to medical students (response rate=89%), while 87 questionnaires were answered by pharmacy students (response rate=87%). The mean age of medical students was 24.99 ± 1.80 years, and the mean age of pharmacy students was 25.04 ± 1.89 years. Also, 88 (50.9%) medical and 38 (44.2%) pharmacy students were males. The mean GPA was 15.43 ± 1.52 (of a total of 20) for medical students and 15.81 ± 1.48 for pharmacy students. With regard to the level of education of the parents, the majority of the parents had a bachelor's degree in both groups. Also, most

medical students reported a moderate socioeconomic status, while most pharmacy students reported their socioeconomic status to be poor. The mean score of oral health literacy was 12.09 ± 3.85 (of a total of 17) for medical and 10.48 ± 4.29 for pharmacy students. The results showed that 31.6% of medical and 51.2% of pharmacy students had an inadequate level of oral health literacy (Diagram 1).

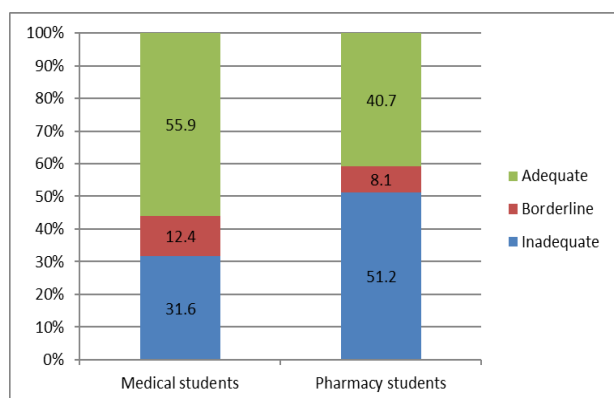


Diagram 1. Frequency distribution (%) of the level of oral health literacy of senior medical and pharmacy students of Tehran University of Medical Sciences (n=265) in 2015

Regarding the knowledge of medical and pharmacy students about oral and dental conditions, the highest frequency of correct answers belonged to pharmaceutical instructions as 164 (95.9%) medical and 80 (95.2%) pharmacy students gave correct answers to the question “if you take the first capsule at 2 p.m., at what time should you take the next capsule?”. In both groups, the lowest number of correct answers was given to the question “what teeth erupt in the mouth at six years of age?” since 67 (39.2%) medical and 31 (36.5%) pharmacy students gave a correct answer to this question (Table 1).

Most students in both groups responded correctly to the questions regarding how to manage oral and dental problems and to the following two questions: What does this sentence mean?: "The dentist is not held responsible for unwanted consequences." and "What does it mean to have a history of hypersensitivity or allergy?". The lowest

number of correct answers by medical students was given to the question “What is the best action when bleeding following the use of dental floss?” as ninety (52.3%) medical students gave a correct answer to this question. Among pharmacy students, the lowest frequency of correct answers belonged to the question “What is the best action when feeling swelling and pain in the mouth?” as only 33 (38.8%) pharmacy students gave a correct answer to this question (Table 2).

In terms of the oral health behaviors and practice, 90 (51.7%) medical students and 51 (60%) pharmacy students replied “once daily” to the question regarding the frequency of tooth brushing per day. Ten (5.7%) medical students and one (1.2%) pharmacy student reported that they never or rarely brush their teeth. In both groups, most students had visited a dentist during the last 1-2 years. Medical students reported a higher frequency of consuming sugary snacks compared to pharmacy students. About one-third of the students stated that they have a good oral health status (Table 3).

The current results showed that oral health literacy was not significantly correlated with gender ($P=0.313$). On the other hand, the father's level of education ($P<0.001$) and the field of study (pharmacy or medicine, $P=0.002$) were significantly correlated with oral health literacy. The higher the father's level of education, the higher the oral health literacy of the students. Medical students had a higher level of oral health literacy compared to pharmacy students. However, the mother's level of education, GPA, and socioeconomic status showed no significant association with the level of oral health literacy ($P>0.05$). The comparison of the mean score of oral health literacy and oral health behaviors showed a significant association between a high level of oral health literacy and a higher frequency of tooth brushing per day, use of toothpaste, regular dental visits, and the date of the last dental visit ($P=0.001$). No significant association existed between consumption of sugary snacks and the self-reported oral health status of students and the mean level of oral health literacy ($P>0.05$).

Discussion

This study was conducted on senior medical and

Table 1. Knowledge about oral health topics, pharmaceutical instructions, and prevention of oral diseases among senior medical and pharmacy students of Tehran University of Medical Sciences (n=265) in 2015

Questions	Choices	Medical students N (%)	Pharmacy students N (%)
Correlation between oral diseases and other diseases	Skin diseases	4 (2.3)	2 (3.2)
	Myocardial infarction*	77 (43.8)	32 (37.2)
	Psychological diseases	19 (10.8)	10 (11.6)
	Muscular disorder	17 (9.7)	9 (10.5)
	I do not know	59 (33.5)	33 (38.4)
Effective ingredients in toothpastes against caries	Flavors	0 (0.0)	2 (2.3)
	Whitening agent	10 (5.6)	8 (9.3)
	Abrasives	17 (9.6)	5 (5.8)
	Fluoride*	14 (81.9)	69 (80.2)
	I do not know	5 (2.8)	2 (2.3)
Twice tooth brushing is adequate in this time interval	One month	0 (0.0)	0 (0.0)
	After meal	12 (6.9)	15 (17.4)
	One day*	152 (87.9)	58 (67.4)
	Week	7 (4.0)	11 (12.8)
	I do not know	2 (1.2)	2 (2.3)
Nutrients causing dental caries	Salt	0 (0.0)	2 (2.3)
	Pepper	2 (1.2)	0 (0.0)
	Fat	10 (5.8)	12 (14.0)
	Sugar*	156 (90.2)	62 (72.1)
	I do not know	5 (2.9)	10 (11.6)
Knowledge about number of teeth (n=32)	Incisors	8 (4.6)	7 (8.2)
	Primary teeth	4 (2.3)	18 (21.2)
	Molars	10 (5.7)	11 (12.9)
	Permanent teeth*	137 (78.7)	43 (50.6)
	I do not know	15 (8.6)	6 (7.1)
Knowledge about eruption time of permanent teeth at the age of six years	Most	51 (29.8)	24 (28.2)
	First*	67 (39.2)	31 (36.5)
	Last	16 (9.4)	13 (15.3)
	All	9 (5.3)	11 (12.9)
	I do not know	28 (16.4)	6 (7.1)
Drug instruction, determining the time of next antibiotic dose	Before 8 hours	2 (1.2)	1 (1.2)
	Right at the time*	164 (95.9)	80 (95.2)
	After 8 hours	2 (1.2)	3 (3.6)
	I do not know	3 (1.8)	0 (0.0)
Continuation of antibiotic therapy after resolution of symptoms	Yes*	143 (83.6)	79 (94.0)
	No	20 (11.7)	3 (3.6)
	I do not know	8 (4.7)	2 (2.4)
Instructions for mouthwash, swallow after rinse	Yes	18 (10.5)	11 (13.1)
	No*	133 (77.3)	69 (82.1)
	I do not know	21 (12.2)	4 (4.8)
Time of food intake after use of a mouthwash	Less than 30 minutes	0 (0.0)	0 (0.0)
	30 minutes*	147 (90.7)	62 (81.6)
	After 30 minutes	9 (5.6)	6 (7.9)
	I do not know	6 (3.7)	8 (10.5)
Instructions for tooth extraction, proper time of keeping the gauze in the mouth	Before 8:20-8:30	1 (0.6)	0 (0.0)
	8:20-8:30*	155 (92.8)	67 (89.3)
	After 8:20-8:30	6 (3.6)	5 (6.7)
	I do not know	5 (3.0)	3 (4.0)
Intake of hot food after tooth extraction	Yes	40 (23.3)	25 (30.9)
	No*	116 (67.4)	53 (65.4)
	I do not know	16 (9.3)	3 (3.7)

*Correct answer

Table 2. Decision-making by senior medical and pharmacy students of Tehran University of Medical Sciences (n=265) with regard to oral and dental problems

Questions	Choices	Medical students N (%)	Pharmacy students N (%)
Best action after gingival bleeding when using dental floss	Not using toothbrush or dental floss		
	Chewing gum instead of tooth brushing and dental flossing	31 (18.0)	22 (26.2)
	Continue using toothbrush and dental floss*	4 (2.3)	4 (4.8)
	Use of toothpicks instead of toothbrush and dental floss	90 (52.3)	37 (44.0)
	I do not know	18 (10.5)	14 (16.7)
Best action in case of swelling and pain	Use of toothpicks instead of toothbrush and dental floss	29 (16.9)	7 (8.3)
	Antibiotic use		
	Analgesic use	58 (33.5)	26 (30.6)
	Family consultation	15 (8.7)	21 (24.7)
	Visiting a physician or dentist*	3 (1.7)	3 (3.5)
Best action to eliminate calculus and stains	I do not know	93 (53.8)	33 (38.8)
	Chewing hard stuff such as apple	4 (2.3)	2 (2.4)
	Use of a mouth rinse		
	Use of anti-calculus and whitening toothpastes	7 (4.0)	6 (7.2)
	Getting a dental cleaning*	10 (5.8)	7 (8.4)
What does this sentence mean? "The dentist is not held responsible for unwanted consequences"	I do not know	43 (24.9)	28 (33.7)
	The dentist is responsible for unwanted complications	111 (64.2)	36 (43.4)
	I am completely satisfied with the treatment procedures	2 (1.2)	6 (7.2)
	I give permission to the dentist to do whatever needs to be done		
	The dentist is not responsible for unwanted consequences*.	11 (6.3)	10 (12.0)
What does it mean to have a history of hypersensitivity or allergy?	I do not know	12 (6.9)	14 (16.9)
	I develop impaired speech and convulsion after using some medications		
	I develop severe chest pain after taking some medications	0 (0.0)	4 (4.8)
	I develop dyspnea and skin rash after taking some medications*	11 (6.4)	5 (6.0)
	I develop anxiety and dizziness after taking some medications	132 (76.3)	49 (59.0)
	I do not know	16 (9.2)	14 (16.9)
		14 (8.1)	11 (13.3)

*Correct answer

Table 3. Oral health behaviors and self-reported oral health status of senior medical and pharmacy students of Tehran University of Medical Sciences (n=265)

Questions	Choices	Medical students N (%)	Pharmacy students N (%)
Use of toothbrush	Rarely or never	10 (5.7)	1 (1.2)
	Once a week	1 (0.6)	3 (3.5)
	Two or three times a week	24 (13.8)	9 (10.6)
	Once a day	90 (51.7)	51 (60.0)
	Two times a day or more	49 (28.2)	21 (24.7)
Use of toothbrush and toothpaste	Always	97 (56.1)	42 (50.6)
	Most of the time	59 (34.1)	34 (41.0)
	Rarely	15 (8.7)	6 (7.2)
	Never	2 (1.2)	1 (1.2)
Last dental visit	Within the past six months	29 (16.6)	11 (13.1)
	Within the past six months to one year ago	46 (26.3)	25 (29.8)
	One to two years ago	61 (34.9)	36 (42.9)
	Two to five years ago	21 (12.0)	5 (6.0)
	More than five years ago	3 (1.7)	5 (6.0)
	I do not recall	8 (4.6)	2 (2.4)
	Never done that	7 (4.0)	0 (0.0)
Consumption of sugary snacks between meals	Three times a day or more		
	Two times a day	32 (18.6)	8 (9.5)
	Once a day	56 (32.6)	12 (14.3)
	Sometimes but not every day	40 (23.3)	32 (38.1)
	Rarely. I do not usually eat snacks between meals	32 (18.6)	22 (26.2)
		12 (7.0)	10 (11.9)
Self-reported oral health status	Very good	8 (4.6)	1 (1.2)
	Good	56 (32.0)	28 (32.9)
	Moderate	76 (43.4)	39 (45.9)
	Poor	26 (14.9)	8 (9.4)
	Very poor	4 (2.3)	3 (3.5)
	I do not know	5 (2.9)	6 (7.1)

pharmacy students as health-care providers. These individuals can promote community oral health as non-dental professionals [10]. The AAMC has included oral health guidelines in medical curricula to achieve this goal [13]. The level of oral health literacy and oral health behavior of these groups can, to some extent, determine their role in oral health promotion. Physicians and pharmacists can

play a role in public oral health promotion only when their level of oral health literacy and oral health behaviors improve [16].

Our study showed that the level of oral health literacy and oral health behavior of senior medical and pharmacy students was inadequate and similar to that of the general population of Tehran city [9]. One-third of medical and half of pharmacy

students had an inadequate oral health literacy. This difference can be explained by the fact that most courses provided for medical students in their curriculum are clinical, while pharmacy students mainly receive paraclinical and basic science courses. Pharmacy students require more extensive oral health educational programs in their curriculum. This finding is in line with that of other studies on the oral health knowledge of medical students [17,18]. The lack of educational programs on oral health is the reason behind the low level of knowledge about oral health among students. These results highlight the need for oral health instructions and inclusion of such courses in the curricula of medical and pharmacy schools.

Our study showed that oral health literacy had no significant association with gender. Naghibi et al [9] evaluated the health literacy of adults in Tehran in 2013 and showed that the mean level of health literacy of females was higher than that of males. In 2009, Sabbahi et al [4] evaluated adults in Canada and showed that gender was not correlated with health literacy. Our study was conducted on medical and pharmacy students; this may explain the difference with the results of the studies conducted on the general population since males and females of the general population may have different levels of education. However, there is no need to provide separate oral health instruction programs for males and females in universities.

In terms of the perception of the topic and decision-making with regard to dental problems, approximately one-third of the students gave correct answers to the questions in our study. These results confirm the low mean level of oral health literacy and highlight the inadequate dental knowledge of the students. This indicates the need for inclusion of oral health topics in the educational curricula. These programs can promote the oral health of students and the public since these students are the future health-care providers of the community.

The mean score of oral health literacy and its association with oral health behaviors showed significant correlations between a high level of oral health knowledge and a higher frequency of tooth brushing per day, use of toothpaste, regular dental visits, and the date of the last dental visit. These results show that a high level of oral health literacy

results in proper oral health behaviors which lead to individual and public oral health promotion. Parker and Jamieson [19] showed that individuals who do not regularly brush their teeth have a lower level of oral health literacy.

Based on the results of the present study, subjects with a higher level of oral health literacy reported a better oral health status. This finding was in agreement with those reported by Naghibi et al [9] and Parker and Jamieson [19] on oral health status of adults. However, the present assessment was subjective (self-reported by students); therefore, future clinical studies are required to confirm this finding and to validate the accuracy of self-reports by students.

We used the OHL-AQ in our study, which is one of the most comprehensive and up-to-date questionnaires for the assessment of oral health literacy in adults [14,15]. This questionnaire simultaneously evaluates perception, knowledge, calculation skills, communication skills, and decision-making. Clinical examinations combined with the use of this questionnaire can yield more accurate results in future studies.

Conclusion

The results of the present study showed that senior medical and pharmacy students, as future health-care providers, demonstrated a moderate level of oral health literacy. The oral health literacy of these students can be promoted by inclusion of oral health courses in their educational curricula.

References

1. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med.* 2011 Jul 19;155(2):97-107.
2. Nielsen-Bohlman L, Panzer AM, Kindig DA, editors. *Health Literacy: A Prescription to End Confusion.* Institute of Medicine (US) Committee on Health Literacy. Washington (DC): National Academies Press (US); 2004.
3. Sihota S, Lennard L. Health literacy: being able to make the most of health. National Consumer Council. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.618.6960&rep=rep1&type=pdf> Accessed January 19, 2017.

4. Sabbahi DA, Lawrence HP, Limeback H, Rootman I. Development and evaluation of an oral health literacy instrument for adults. *Community Dent Oral Epidemiol.* 2009 Oct;37(5):451-62.
5. Tehrani Banihashemi S, Amirkhani MA, Haghdooost AA, Alavian S, Asgharifard H, Baradaran H, et al. Health literacy and the influencing factors: a study in five provinces of Iran. *Strides Dev Med Educ.* 2007;4(1):1-9.
6. Hajizamani HR, Malek-Mohammadi T, Hajizamani A, Malek-Mohammadi M. Assessment of knowledge and practice of pharmacists regarding oral health in Kerman, Iran. *J Oral Health Oral Epidemiol.* 2017 Jan;6(1):8-13.
7. Kanj M, Mitic W. Health Literacy and Health Promotion: Definitions, Concepts and Examples in the Eastern Mediterranean Region. Individual Empowerment Conference Working Document. Available at: http://www.dors.it/documentazione/testo/201409/02_2009_OMS%20Nairobi_Health%20Literacy.pdf /Accessed January 19, 2017.
8. NIH: National Institute of Dental and Craniofacial Research. Healthy People 2010 Oral Health Toolkit. Available at: https://stacks.cdc.gov/view/cdc/11474/cdc_11474_DS1.pdf /Accessed January 19, 2018.
9. Naghibi Sistani MM, Yazdani R, Virtanen J, Pakdaman A, Murtomaa H. Determinants of oral health: does oral health literacy matter? *ISRN Dent.* 2013;2013:249591.
10. U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000. Available at: <https://www.nidcr.nih.gov/DataStatistics/SurgeonGeneral/Documents/hck1ocv.@www.surgeon.fullrpt.pdf> / Accessed January 19, 2018.
11. Ramirez JH, Arce R, Contreras A. Why must physicians know about oral diseases? *Teach Learn Med.* 2010 Apr;22(2):148-55.
12. Crall JJ. Development and integration of oral health services for preschool-age children. *Pediatr Dent.* 2005 Jul-Aug;27(4):323-30.
13. Association of American Medical Colleges. Report IX: Contemporary Issues in Medicine: Oral Health Education for Medical and Dental Students. Medical School Objectives Project. Available at: <https://members.aamc.org/eweb/upload/Contemporary%20Issues%20in%20Med%20Oral%20Health%20Report%20IX.pdf> / Accessed January 19, 2017.
14. Naghibi Sistani MM, Montazeri A, Yazdani R, Murtomaa H. New oral health literacy instrument for public health: development and pilot testing. *J Invest Clin Dent.* 2014 Nov;5(4):313-21.
15. Flynn PM, John MT, Naik A, Kohli N, VanWormer JJ, Self K. Psychometric properties of the English version of the Oral Health Literacy Adults Questionnaire - OHL-AQ. *Community Dent Health.* 2016 Dec;33(4):274-280.
16. Silk H, O'Grady Stille S, Baldor R, Joseph E. Implementation of STFM's "Smiles for Life" oral health curriculum in a medical school interclerkship. *Fam Med.* 2009 Jul-Aug;41(7):487-91.
17. Åström AN, Masalu JR. Oral health behavior patterns among Tanzanian university students: a repeat cross-sectional survey. *BMC Oral Health.* 2001;1(1):2.
18. Al-Ansari J, Honkala E, Honkala S. Oral health knowledge and behavior among male health sciences college students in Kuwait. *BMC Oral Health.* 2003 May 7;3(1):2.
19. Parker EJ, Jamieson LM. Associations between indigenous Australian oral health literacy and self-reported oral health outcomes. *BMC Oral Health.* 2010 Mar 26;10:3.