ORIGINAL ARTICLE

Oral Health Literacy among Public University Undergraduate Students and Associated Factors

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ABSTRACT

Introduction: Oral health literacy is an essential element of an individual to make better oral health decision. Low oral health literacy (OHL) is associated with poor oral health decision and outcome. This study aimed to determine factors associated with oral health literacy among undergraduate students in one of the public universities of Malaysia. **Materials and methods:** This is a cross-sectional study which was undertaken among the undergraduate students of Universiti Sains Islam Malaysia (USIM). Sample selection was done randomly. A validated oral health literacy index of Malay version was used throughout the study. Ethical approval was obtained from the University Research Ethics Committee and respondents had given their consent prior to the data collection. Data analysis was performed using IBM SPSS software version 24.0 and the significant level was set at $p< 0.05$. **Results:** The mean oral health literacy of the university undergraduate students was 77.7 (95% CI= 76.75, 78.71). Multiple linear regression indicated that female has higher OHL (β= 4.19; 95% CI= 1.99, 6.39; $p< 0.001$), social science stream has lower OHL (β= -9.14; 95% CI= -11.20, -7.07; $p< 0.001$) and higher education level of father had higher OHL (β= 1.97; 95% CI= 0.10, 3.83; $p= 0.039$) than their counterparts. **Conclusion:** Oral health literacy is higher among the science streams students compared to the social sciences streams. This suggests that science education might play a significant role in health literacy and improving health outcomes.

KEYWORDS: Oral health literacy, health literacy, health information, science stream, social science

INTRODUCTION

Health literacy is defined as "the ability of a person to access, understand, appraise and apply health-related information and services in making appropriate health decision".[1,2] On the other hand, Healthy People 2010 has defined oral health literacy (OHL) as "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions".[3] Thus, in general, the concept of health literacy is broader than merely being able to read and understand health information., It also involves making wise decisions from the health information obtained from diverse health-related resources.

Health-related information can be accessed from a variety of resources. It can be in the form of printed materials (e.g. pamphlets, newspapers or magazines), the internet, audio-visual media (e.g. radio or television) and direct information from healthcare personnel (e.g. dentist).[3] The understanding of health-related information depends on the health literacy of the person. Despite using simple and straightforward materials, information can still be misunderstood by a person with low health literacy or layperson.[4] Misunderstanding of health instruction or information may lead to serious health outcomes. The problem usually arises when some of the published materials are of low-quality standard. Thus, sharing low quality information may not provide satisfactory and sufficient knowledge for a person to make appropriate decision-making.[5]

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Health literacy can enable a person to adopt a healthier lifestyle.[6] In oral health, good oral practices such as toothbrushing twice daily using fluoridated toothpaste, regular flossing, using mouthwash and visiting the dentist once a year are highly recommended practices in obtaining optimum oral health status. Ying indicated that having adequate OHL built a good oral health character as they perform better oral hygiene practice every day.[7] Contrarily, a person with low oral health literacy level usually adopts poor oral health practice, seeking more emergency treatment rather than preventive care.[8]

Previous studies have been conducted to determine factors related to oral health literacy among undergraduate students. Majority of the studies had classified the undergraduates into two major groups based on their discipline: the health and the non-health students.[9,10,11] The health science students were found to have higher oral health literacy, especially the dental students.[7] However, none of the studies conducted had specified the types of faculties involved or provide more details on the non-health disciplines.

Previous studies on systematic reviews revealed that parent's health literacy level has an impact on their children's health literacy, behaviour and outcomes.[12,13] The children whose parents have low literacy level and had low education levels are more likely to inherit their parent's poor oral health behaviour. This will have negative effects on the health outcome of the children.[14,15] A study by Evans on the other hand, indicated that there is no association between health behaviour and the parent's health literacy and education levels.[16] Additionally, there is still a significant lack of available evidence on the association between youth oral health literacy level and parents' education level, as well as factors that are associated with the OHL and health literacy. Thus, this study aimed to determine the factors associated with oral health literacy among undergraduate students in one public university in Malaysia.

MATERIALS AND METHODS

This is a cross-sectional study which was undertaken among the undergraduate students of Universiti Sains Islam Malaysia (USIM) from November 2019 until February 2020. Samples selection were executed from a total of nine faculties. The faculties were categorised into three groups: i) health science, ii) science and technology and iii) social science. The faculties were weighted proportionately based on the field of study and were randomly allocated into the sampling frame. Disabled students such as mute, blind and deaf, and international students were excluded.

The sample size was calculated using a formula of $n = (z^*\sigma/\Delta)^2 = (1.96^*0.6/0.05)^2 = 553$. The standard deviation was taken from study conducted by Kanupuru and colleagues (2015).[17] The final sample size was determined by adding 10% of samples to compensate for any sample loss. Therefore, the sample size to be recruited was 600.

A validated oral health literacy index of Malay version (OHLI-M) by Ramlay (2015)[18] was used throughout the study. The OHLI-M consists of two sections: reading comprehension section and numeracy section. The reading comprehension section includes two passages, one on dental caries and the other on periodontal disease. The dental caries passage contains 13 sentences with 18 test items with words omitted from the sentences, and the periodontal disease passage contains 14 sentences with 20 item-words omitted. The numeracy section consists of a series of prompts: 5 prescription labels of medicines frequently prescribed by dentists, 1 dental appointment card and printed post-extraction instructions. There are 19 test items in this section. Each correct answer was given one mark, and the incorrect or missing answer was given zero mark. The final score for each section is the sum of all items in the respective section. The total score for reading comprehension was multiplied by 1.316 (50/38) and the total score for numeracy sections was multiplied by 2.632 (50/19). The weighted scores for both sections ranged from 0 to 50. By summing the weighted scores for the reading comprehension and numeracy sections, the total score for OHLI-M obtained would range from 0 to 100.

The questionnaire was distributed via google form through email. Additional questions related to sociodemographic profiles and oral health behaviour/ practices were added to the questionnaire. Ethical approval was obtained from the University Research Ethics Committee prior to data collection [Ref No: USIM/FPG-MEC/2016/No.(53)]. All participants were

required to give their consent of participation before responding to the questionnaire.

Data analysis was conducted using IBM SPSS software version 24.0. Descriptive analysis was performed for categorical data using frequency (percentage), and continuous data using mean and standard deviation. Multiple linear regression was performed to determine factors associated with the dependent variable of oral health literacy. Independent variables of last dental visit and oral health perception were kept as ordinal data. Other variables were transformed into a binomial variable for further analysis. The variables transformed were mother's education level – low and high education level; father's education level – low and high education level; the field of study – science and social science stream; frequency of tooth brushing a day – less than twice and twice and more; flossing – no or yes; use of mouthwash – no or yes; type of dental services – government or private/others and dental health information – dentist or other sources. The significant level in linear regression was set at p <0.05.

RESULTS

The mean age of respondents was 22.4 years old (SD=1.67) with an age range between 20 to 28 years old. The majority of the respondents were female (77.8%), coming from an urban area (57.5%), mothers with secondary education (44.5%) and fathers with higher education (39%) (Table 1). Table 1 also depicts the highest mean score of OHL was among female (78.59 [SD=10.39]), health sciences (87.54 [SD=7.82]), urban residence (78.17 [SD=11.48]) and parents with higher education level. OHL score was found to be significantly different between health science and social science (p< 0.001), and science and technology with social science (p< 0.001).

Table 2 depicts oral health behaviour of the respondents. Most of them were practicing good basic oral health behaviour such as brushed twice daily (46.4%), used fluoridated toothpaste (89.5%) and visited dentist in last 12 months (40.0%). However, very few of them used floss (6.2%) or mouthwash (11.6%). More than half utilised public dental health services (68.4%), and 46.8% sought dental health information from the internet. Almost half of them perceived themselves of having fair oral health status.

A majority of the respondents had adequate OHL (68.5%) and the mean OHLI score was 77.7 (SD=11.52) as shown in table 3. Multiple linear regression indicated that sex, field of study and father's education level were associated with oral health literacy (Table 4). Female had significantly higher OHL by 4.19 unit than male (95% CI= 1.99, 6.39; p< 0.001). Social science students had significantly lower OHL by approximately nine unit compared to science stream students (95% CI= -11.20, -7.07; p< 0.001). Students whose father has higher education level has significantly high OHL by 1.97 unit than lower educated father. (95% CI= 0.10, 3.83; p= 0.039).

Table 1: Sociodemographic profile of respondents (n=550)

Characteristics	N (%)	OHL mean score (SD)
Sex		
Male	122 (22.2)	74.59 (14.62)
Female	428 (77.8)	78.59 (10.39)
Field of study		
Health science	41 (7.5)	87.54 (7.82)
Science and technology	106 (19.3)	83.35 (8.23)
Social science	403 (73.3)	75.12 (11.58)
Residency		
Rural	234 (42.5)	77.08 (11.68)
Urban	316 (57.5)	78.17 (11.48)
Mother's education		
No formal education	7 (1.3)	76.83 (6.52)
Primary school	32 (5.9)	72.13 (13.63)
Secondary school	245 (45.0)	76.92 (11.60)
Advance skills institute	25 (4.6)	77.00 (10.07)
College	42 (7.7)	79.98 (8.59)
University	194 (35.6)	79.23 (11.71)
Father's education		
No formal education	9 (1.7)	71.13 (9.79)
Primary school	29 (5.3)	73.69 (13.23)
Secondary school	196 (36.0)	76.49 (11.20)
Advance skills institute	49 (9.0)	75.38 (12.44)
College	49 (9.0)	78.56 (12.22)
University	212 (39.0)	79.97 (10.95)

DISCUSSION

The OHL scores among undergraduates' students in the university were found to be adequate, although a quarter of them have marginal OHL and seven percent have inadequate OHL. The current finding belief that a person with a higher education level has the ability to appraise health-related information and services, and is able to make wiser oral health

decision compared to a person with a lower education level.[19,20]

Table 2: Oral health behaviour of respondents (n=550)

Oral health practice	N (%)
Frequency of toothbrushing a day	
Once	15 (2.7)
Once or twice	70 (12.7)
Twice	255 (46.4)
> Twice	210 (38.2)
Fluoridated toothpaste	
No	58 (10.5)
Yes	492 (89.5)
Flossing	
No	344 (62.5)
Occasional	172 (31.3)
Yes	34 (6.2)
Mouthwash	
No	337 (61.3)
Occasional	149 (27.1)
Yes	64 (11.6)
Last dental visit	
None	11 (2.0)
If necessary	198 (36.0)
1 to 2 years	121 (22.0)
12 months	220 (40.0)
Type of dental services	
Government clinic	376 (68.4)
Private clinic	114 (20.7)
Others	60 (10.9)
Dental health information	
Informal printed material	10 (1.8)
Formal printed material	35 (6.4)
Mass media	133 (24.2)
Internet	257 (46.8)
Dentist	114 (20.8)
Oral health perception	
Poor	29 (5.3)
Unknown	113 (20.5)
Fair	258 (46.9)
Good	150 (27.3)

Oral health literacy was significantly higher among science stream students compared to social science students. Although descriptively health science students have higher OHL than the science and technology students, the score was statistically not significant. Therefore, the health science, and science and technology groups were combined for regression analysis. Most studies indicated that oral health literacy was higher among health-related group, especially dentistry compared to their counterparts including pharmacy and health science.[7,10]

The most probable explanation is the accustomed knowledge of this group with scientific languages, including health-related information. Science education has an inter-connectivity to health education, which can help students to make appropriate health decision in their life.[21,22] Certainty, through a proper education initiative, science education can substantiate the enhancement of health literacy among a different category of groups including non-science.[23] Therefore, the more exposed they are to health education, the more literate they can be on health-related issues.[24,25]

Table 3: Oral health literacy index scores (OHLI) and classification (n=550)

Variables	N	Mean (SD)	N (%)
OHLI score	531	77.7 (11.52)	
Comprehension	550	39.1 (4.98)	-
Numeracy	531	38.6 (8.68)	
Classification of OHLI			
Inadequate	-	-	38 (7.2)
Marginal			129 (24.3)
Adequate			364 (68.5)

Gender was found to have a significant association with OHL showing that female has higher OHL than male.[10,19] Alternatively there is a study that revealed differently.[20] According to Stock et al., female undergraduate students demonstrated a greater interest in a health-related programme and implemented better health behaviour compared to male, especially in preventive and health promotion.[26] They are more conscious about their health compared to male students. Additionally, a female student was known to be superior in accessing health information, reporting health issue, seeking health care and navigating healthcare system.[27] Likewise, male will actively seek health information when in need, especially when they are ill or persuaded by their family members or friends.[28,29]

A current study found that a student whose father had a higher education level was most likely to have higher oral health literacy. Although the mother's education was found to be associated with the level of oral health literacy, it was not significant in multiple linear regression analysis. There are limited studies that have been conducted to determine the relationship between parental education and OHL. Morais de Lima and colleague indicated that a mother's education level merely influenced their child's oral health literacy at the aged 12 years old and below after controlling for other variables including father's education level.[30] Thus, there is no concrete evidence to support the current finding.

Table 4: Factor associated with OHLI using multiple linear regression

Variable	Simple regression		Multiple regression	
	Ƀ coefficient (95% CI)	*p*-value	Adj Ƀ coefficient (95% CI)	*p*-value
Age	0.03 (-0.81, 0.87)	0.940	-	-
Sex	3.82 (1.48, 6.17)	0.001	4.19 (1.99, 6.39)	<0.001
Residency	1.10 (-0.89, 3.09)	0.277	-	-
Field of study	-9.33 (-11.39, -7.27)	<0.001	-9.14 (-11.20, -7.07)	<0.001
Mother's education	2.81 (0.85, 4.78)	0.005	-	-
Father's education	3.05 (1.07, 5.03)	0.003	1.97 (0.10, 3.83)	0.039
Frequency of toothbrushing	-0.32 (-3.04, 2.40)	0.032	-	-
Using fluoridated toothpaste	0.74 (-2.46, 3.93)	0.652	-	-
Flossing	1.95 (-0.08, 3.98)	0.060	-	-
Using mouthwash	1.59 (-0.42, 3.61)	0.121	-	-
Last dental visit	2.62 (0.63, 4.62)	0.010	-	-
Type of health services	0.61 (-1.51, 2.72)	0.573	-	-
Dental health information	0.13 (-2.31, 2.56)	0.917	-	-
Oral health perception	-1.01 (-2.19, 0.17)	0.093	-	-

CONCLUSION

The present study concluded that oral health literacy among the undergraduate students from the health science and science and technology streams are higher compared to the social sciences stream. This indicated that science education might play a significant role in health literacy and improving health outcomes. The oral health literacy among the undergraduate students is also associated with gender and father's education level. Further studies are required to evaluate the relationship between the parents' oral health literacy, levels of education and oral health.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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