ORIGINAL ARTICLE

Sociodemography, Oral Health Status and Behaviours Related to Oral Health Literacy

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Abstract

Objective: To assess the relationships of socio-demography, self-reported oral health status, and behaviour with oral health literacy (OHL) among adults. **Material and Methods:** A cross-sectional study was conducted during a mega carnival in Kuala Lumpur. Socio-demographic, oral health status, and oral health behaviour data were obtained using a questionnaire, and OHL was determined by a validated Malay version of the 14 items Health Literacy in Dentistry Scale (HeLD-14). A total of 165 data of participating adults were tested using Pearson's correlation, Independent t-test and One-way ANOVA with a significance level set at p<0.05. **Results:** The mean age of participants was 30.4 years (S.D. 9.7 years). Malay HeLD-14 scores were higher among those who were from better socio-economic class (household income within the top 20% of the population) (p<0.005) those with good self-reported oral health status (good oral health status, no active caries) (p<0.005) and those with good oral health behaviours (brushed daily, flossed daily, does not vape) (p<0.05). **Conclusion:** Household income, self-reported oral health status, and behaviours were significantly associated with oral health literacy. Therefore, oral health literacy assessment is vital to help tailor appropriate oral health education and care.

Keywords: Health Education; Health Literacy; Attitude to Health; Oral Health.

Introduction

Despite advances in the health sector, almost all countries in the world spend a huge cost on health treatment annually. The burden of diseases seems to increase by year and remain a global battle. According to the WHO Global status report on noncommunicable diseases 2010, noncommunicable diseases deaths are projected to increase by 15% globally between 2010 and 2020 (to 44 million deaths) [1]. The WHO Global Health Expenditure Atlas reported that in 2011, US$ 6.9 trillion was spent on health [2].

A systematic review on Global Burden of Untreated Caries revealed the data that in 2010, untreated caries in permanent teeth affected 35% of the global population, or 2.4 billion people [3]. Also, a recent study has calculated the global financial burden based on the treatment cost of dental diseases from 168 countries, which accounted for 172 billion US dollars [4]. The global number of disability-adjusted life years (DALYs) due to oral diseases rose from 11.3 million DALYs in 1990 to 19.0 million DALYs in 2016 [5]. The disability-adjusted life year (DALY) measures health loss due to both fatal and non-fatal disease burden. As treating and curing existing health conditions are not cost-efficient, the world is now looking into a more holistic approach to combat this problem. One of the main strategies is by enhancing preventive measures that contribute to significant effects on health outcomes [1].

Health literacy was first defined by The World Health Organization in 1998 as, "Cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use the information in ways which promote and maintain good health". Health literacy is a concept that suggests that health status would be improved if people can access health information and have the capacity to use it effectively. On that account, health literacy skills are critical to empowering people's ability to promote and improve their health [6]. Currently, the spike of attention in health literacy is precipitated by the significant association between health literacy and outcomes. Low health literacy is associated with limited health knowledge, unhealthy lifestyles, underuse of preventive services, low health status, and high hospital admission rates. People without health literacy skills to consider sensible health decisions in their lives are more vulnerable and have poorer health outcomes [7].

Moreover, looking at the complexity of the healthcare system, it is well understood by how low health literacy is associated with poor health. Besides, low health literacy may also cause a negative psychological effect. People with low health literacy skills reported a sense of shame about their skill level [8]. As a result, they may hide reading or vocabulary difficulties to maintain their dignity [9]. A study by Bress 2013 revealed that health literacy skills impact a person's health more than age, income, employment status, education level, and racial or ethnic group [10].

More than a decade after health literacy was defined by WHO, oral health literacy (OHL) was given its first definition by the Healthy People 2010, and is in agreement with the definition for general health literacy: "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"

[6]. Since then, many studies have been conducted to investigate the association between low levels of OHL and poor oral health outcomes, compromised self-care behaviour, difficulties to understand health instructions or failure to see the importance of preventive dental procedures using a range of validated OHL instrument available to a different range of population in the world [11].

To date, there are four studies on oral health literacy in the Malaysian population [12-15]. All studies translated and adapted OHL tools from English to Malay, and all tools included components of reading or comprehension. Apart from the Malay Dental Health Literacy Assessment (DHLA) instrument, other existing studies on Malay OHL tools [13-15] did not report how the reliability and validity of the tools used were established. As for the Malay DHLA, the reliability of the tool used was 0.67, slightly lower than the accepted values of Cronbach Alpha that is between 0.7 to 0.9 [16].

Evaluating public understanding and their oral health literacy level becomes an important agenda for the nation in order to achieve the National Oral Health Goals 2020 with improved oral health status among Malaysians [17]. However, looking at the current situation of oral health literacy studies conducted in the country, it is evident that they are still inadequate to address the afore-mentioned national agenda. The time was right to conduct this study with the objective to evaluate the relationships of self-reported oral health status, oral health behaviour and sociodemography with the level of OHL using a simple OHL tool suitable for a multilingual country.

Findings from this study not only add on to the body of knowledge and provide current evidence on oral health literacy, but it may also provide valuable information on socio-demography, oral health behaviour and self-reported oral health status related to oral health literacy that is important for designing preventive and interventional approach in oral health care.

Material and Methods

Study Design and Sample

A cross-sectional study was conducted in July 2018 during a mega carnival held in Kuala Lumpur. Only Malaysian adults age 18 to 59 were invited to participate. Those who were not able to understand instructions on how to answer the questionnaire, and those who could not engage in Malay were excluded. Self-administered questionnaires were given to the respondents to be answered and were retrieved immediately. Informed consent was obtained from all those who participated. A total of 165 participants' data were used for analyses.

Instrument

A translated and validated Malay version of the 14 items Health Literacy in Dentistry (HeLD-14) was used to evaluate the level of OHL. The Health Literacy in Dentistry (HeLD) scale is an oral health literacy measurement tool that estimates an individual's capacity to obtain, process or interpret, and understand basic oral health information and services needed to make appropriate oral health-related decisions. The 14 items in the form represent seven conceptual domains: access,

understanding, support, utilization, economic barriers, receptivity, and communication. Each item was scored using a 5-point Likert scale ranging from 1 ("without any difficulty") to 5 ("Unable to do"). After re-coding of 5 to 0, 4 to 1, 3 to 2, 2 to 3, and 1 to 4, the possible range of summary scores is from 0-56 (HeLD-14). Higher scores indicate higher oral health literacy.

The original English version of HeLD-14 was translated to Malay language using a forward and backward technique to produce cross-cultural adaptation [18]. The forward translation was done by two certified translators. The two translated versions were reviewed by a questionnaire development committee comprising five dental specialists. The committee harmonized the translated versions to produce a preliminary forward translation version. This preliminary translated version was then translated back to English by two dentists who are fluent in both languages.

As the backward translation was semantic with the original English version of HeLd-14, the preliminary forward translation version was pre-tested on 30 adults at the Dental Faculty, The National University of Malaysia, Kuala Lumpur. The feedback by the respondents was used for the face and content validity of the questionnaire. A final review was done, and the definitive version of Malay HeLD-14 was approved by the questionnaire development committee.

Cronbach's alpha was used to assess the internal consistency of the instrument. The overall value for the Cronbach's alpha coefficient was 0.77, which is considered a satisfactory level of reliability for research instruments. Further, a test-retest reliability test was done on the same 23 respondents who participated in the pre-test after one week. The Intra-Class Correlation (ICC) was used to evaluate test-retest reliability. The ICC value for the total score of the Malay HeLD-14 was 0.761, with a 95% CI (Confidence Interval) from 0.444 to 0.898, which showed good agreement between the test-retest results. The Malay version HeLD-14 questionnaire is available upon request from the corresponding author.

Self-administered questionnaire was used to assess socio-demographic data (age, residential area, gender, race, household income, educational level); self-reported oral health status (overall oral health status, periodontal disease, caries, tooth-loss, malocclusion); and oral health behaviours (toothbrushing, flossing, mouth rinsing, snacking, smoking, vaping and dental visit). These specific oral health behaviours indicators were adapted from a previous study [19].

Statistical Analysis

The statistical analysis of descriptive statistics and relationships of socio-demography, oral health status, and behaviours with OHL were conducted using SPSS, version 24 (IBM Corp., Armonk, New York, USA). Pearson's correlation, independent sample t-test, and one-way ANOVA were used with a significance level set at $p < 0.05$.

Ethical Approval

Research and ethical approvals were obtained from the Research and Ethics Committee of UKM (Ref No: UKM PPI/111/8/JEP-2018-052) and National Medical Research Register (NMRR) of the Ministry of Health Malaysia (Research ID: 43617).

Results

The mean age of the participants was 30.4 years (SD=9.7 years). More than half of the participants were females (53.3%), Malays (54.5%), from the middle-income bracket, M40 (62.4%) and, diploma or degree and above holders (57.6%).

Socio-demography and OHL

The mean OHL evaluated by the Malay HeLD-14 was 45.9 (SD=10.1, median= 49.0, range 10-56). Table 1 shows the relationships between socio-demographic variables and OHL scores. Significant differences of OHL scores were noted between races (p<0.001) where Malays scored the highest of compared to others. For household income, participants with household income within the top 20% of the country's population (T20) had the highest OHL score while those in the bottom 40% (B40) scored the lowest (p<0.005). Pearson's correlation between OHL and age shows a low correlation (ρ=0.201; p<0.01).

Table 1. Mean score of HeLD-14 by socio-demographic characteristics.

Variables	N	%	OHL Scores Mean	OHL Scores SD	F statistic (df)	p-value[a]
Gender						
Male	77	46.7	45.4	10.61	0.39	0.533
Female	88	53.3	46.4	9.73	1; 163	
Race						
Malay	90	54.5	48.7	8.91	7.50	<0.001[b]
Chinese	52	31.5	43.4	9.07	3; 161	
Indian	17	10.3	38.2	13.79		
Others	6	3.6	48.2	9.56		
Household Income						
Bottom 40% of Population, B40 (<RM3855)	46	27.9	41.1	12.16	7.63	<0.005[b]
Middle 40% of Population, M40 (RM3856-RM8135)	103	62.4	47.7	8.74	2; 162	
Top 20% of Population, T20 (>RM8135)	16	9.7	48.1	7.91		
Educational Level						
Never Attend School	1	0.6	36.0	–	0.341	0.796
Completed Primary School	6	3.6	45.7	6.71	3; 161	
Completed Secondary School	63	38.2	45.7	11.57		
Diploma, or Degree and Above	95	57.6	46.1	(9.34)		

[a]One-way ANOVA test; [b]All 3 and 4 pairs of mean OHL score are significantly different by post-hoc test (Games-Howell's procedure); SD: Standard Deviation; df: Degrees of freedom.

Self-Reported Oral Health Status and OHL

Table 2 shows the relationships between self-reported oral health status and OHL scores. Participants with lower OHL scores rated themselves as having bad oral health status (p<0.005) and having carious teeth (p<0.05).

Table 2. Mean score of HeLD-14 by self-reported oral health status.

Variables	N	%	OHL Scores		Mean Difference	t statistic	p-value[b]
			Mean	SD	(95% CI)	(df)	
Oral Health Status							
Good	150	90.9	46.6	9.27	7.8 (2.5, 13.1)	2.91	<0.005
Bad	15	9.1	38.8	15.09		(163)	
Gum Disease							
Yes	31	18.8	47.4	9.58	1.8 (-2.2, 5.8)	0.89	0.374
No	134	81.2	45.6	10.26		(163)	
Tooth Decay							
Yes	60	36.4	43.6	11.43	-3.6 (-6.8, -0.4)	-1.77	<0.05
No	105	63.6	47.2	9.11		(163)	
Tooth Loss							
Yes	60	36.4	46.8	11.14	1.5 (-1.8, 4.7)	0.90	0.368
No	105	63.6	45.3	9.52		(163)	
Bad Breath							
Yes	37	22.4	43.4	10.34	-3.2 (-6.9, 0.5)	-1.7	0.090
No	128	77.6	46.6	9.99		(163)	
Poor Teeth Alignment							
Yes	77	46.7	45.8	9.08	-0.2 (-3.3, 2.9)	-0.1	0.907
No	88	53.3	46.0	11.01		(163)	

[b]Independent t-test; SD: Standard deviation; CI: Confidence interval; df: Degrees of freedom.

Oral Health Behaviours and OHL

Table 3 shows the relationships between oral health behaviours and OHL scores. Higher OHL scores were observed in those who brushed twice or more per day (p<0.001), flossed (p<0.05), rinsed (p<0.01), non-vapers or past-vapers (p<0.05) and those who visited the dental clinic once or more per year (p<0.005).

Table 3. Mean score of HeLD-14 by oral health behaviours.

Variables	N	%	OHL Scores		Mean difference	F statistic	p-value[a]
			Mean	SD	(95% CI)	(df)	
Brushing Habit							
< 2 Times Daily	15	9.1	34.3	13.39	-12.8 (-17.8, 7.7)	3.96	<0.001
2 Times or More Daily	150	90.9	47.1	9.01		(163)	
Toothpaste							
Not Using Toothpaste or Using Non-Fluoridated Toothpaste	17	10.3	43.4	9.97	-2.8 (-7.9, 2.3)	0.02	0.277
Using Fluoridated Toothpaste	148	89.7	46.2	10.14		(163)	
Flossing							
Never Floss	86	52.1	44.2	10.54	-3.5 (-6.6, -0.4)	0.45	<0.05
Use Floss	79	47.9	47.7	9.38		(163)	
Mouth Rinse							
Never Use Mouth Rinse	76	46.1	43.5	10.60	-4.4 (-7.5, -1.3)	3.43	<0.01
Use Mouth Rinse	89	53.9	47.9	9.30		(163)	
Snacking Between Meals							
< 2 Times Daily	147	89.1	45.9	9.91	-0.3 (-5.3, 4.7)	0.32	0.903
2 Times or More Daily	18	10.9	46.2	12.09		(163)	
Smoking Status							
Current Smoker	29	17.6	45.6	11.28	-0.3 (-4.4, 3.8)	0.99	0.875
Non-Smoker or Past Smoker	136	82.4	46.0	9.91		(163)	
Vaping Status							
Current Vaper	7	4.2	38.3	15.72	-7.9 (-15.6, -0.3)	2.95	<0.05
Non-Vaper or Past Vaper	158	95.8	46.2	9.75		(163)	

Alcohol Drinking Status							
Drink Alcohol	21	12.7	42.2	10.00	-4.2 (-8.8, 0.5)	0.70	0.077
Never Drink or Not Anymore	144	87.3	46.4	10.07		(163)	
Dental Visit							
Less Than Once Per Year	108	65.5	44.0	10.14	-5.4 (-8.6, -2.2)	2.46	<0.005
Once or More Visit Per Year	57	34.5	49.4	9.20		(163)	

cIndependent t-test; SD: Standard Deviation; CI: Confidence Interval; df: Degrees of freedom.

Discussion

This study was conducted at a popular non-health related mega carnival in Kuala Lumpur instead of at clinics or health care facilities set. This is to reduce bias as the utilization of health care facilities is a sign of having good health literacy [20]. The HeLD-14 comprises seven domains (access, understanding, support, utilization, economic barriers, receptivity, and communication) [21]. It was chosen for this study for its reliability, validity, and cultural suitability to assess oral health literacy [21]. Further, it can capture the three concepts of health literacy considered critical [20]. The three concepts are (i) basic/functional OHL for everyday life; for example, sufficient basic skills in reading and writing; ii) communicative/interactional, for example, the ability to extract and apply new information; and (iii) critical health literacy, for example, the ability to manage oral health-related information and/or to have control over oral health-related situations.

Compared to other earlier tools a such as Rapid Estimate of Adult Literacy in Dentistry (REALD) or Test of Functional Health Literacy in Dentistry (ToFHLiD), which are mainly on word recognition, numeracy, and reading skills, HeLD-14 assesses multi-dimensional aspects in OHL and was validated to have a good psychometric property. The tool was also cross-culturally adapted by other countries such as India [22], Indonesia [23,24], and the United States of America [25]. The advantage of HeLD-14 is, it is a simple, sensitive, comprehensive, easy to use and low-cost assessment tool that aims to capture a person's ability to seek, understand and use oral health information and then being able to access and benefit from oral health care services [26].

This is particularly important when conducting a health literacy study in multicultural and multilingual nations like Malaysia. Education in Malaysia is unique as it inherited the divide-and-rule system from the colonial era where one particular language is used as the primary teaching medium such as Malay, or Chinese, or Tamil, or English medium schools while other languages may be taught as subjects. This division caused language segregation among Malaysians, making Malaysia one of those rare countries in South East Asia, where not all her citizens can understand or use the national language well [27]. This unique identity of a multilingual nation explains why a tool like HeLD-14 may be more suitable over other existing tools available in the country [12-15]. It is simple enough for everyone to answer regardless of the level of understanding of the medium of instruction, and yet able to measure all dimensions of oral health literacy. Further, the Malay HeLD-14 used has a better reliability score compared to existing OHL tools in Malay [12].

Looking at the socio-demographic background, those whose household income falls in the top 20% of the country's population had a significantly higher score of OHL compared to other income-brackets. This supports findings reported by others where income influences OHL [28-31].

The difference by race was also evident as OHL scores were significantly higher among Malays (54.5%), followed by others (Iban, Kadazan) (3.6%), Chinese (31.5%) and Indian (10.3%). However, this finding could not be supported, as there was no data from other literature comparing OHL and races in Malaysia. As in most studies [30,32], there was no significant difference in OHL level found between genders. For the level of education, even though the OHL score increased from the lower to the upper level of education, the difference was not significant.

Caries and periodontal disease among adults remain to be global challenges. According to the National Oral Health Survey of Adults in Malaysia [33], the prevalence of dental caries and periodontal disease among adults are 88.9% and 94.0% respectively. Lower OHL level would result in poor oral health status [34]. Our study strengthened this finding where those with lower OHL scores self-reported to have bad oral health status (9.1%) and decayed teeth (36.4%). However, there was no significant difference in OHL of those who reported having gum disease and those who did not. This might be due to the fact that periodontal disease is a silent disease, and it is more difficult to self-detect compared to caries. However, when assessing oral health literacy among patients, it would be best to conduct an intra-oral examination to confirm self-reported oral health status as well as assess their relationships.

Oral health literacy is the key determinant of good oral health status. People with adequate oral health literacy will have the cognitive, literacy as well as social skills to make decisions on their oral health such as exercising good oral health habits as recommended and proper service utilization [20]. These are in line with our study, as those who practice good oral hygiene habits such as brushed at least two times per day, flossed and used a mouth rinse, had higher OHL scores compared to those without the habits. Further, one's ability to have a regular dental check-up or seek dental treatment is crucial to the betterment of oral health status [33]. The ability for service navigation or utilization is one of the main aspects of oral health literacy [20]. Some studies have reported that those who were able to go for regular dental visits have higher OHL level [29,34,35]. Our study strengthened these findings, where those who reported visiting the dentist at least once a year have a higher OHL score.

There are limitations to this study that should be considered when looking at the findings. Sampling was limited to convenient sampling. Careful measures were taken to ensure the proportions of participants resemble Malaysian population in term of racial and income distribution. However, more efforts need to be taken to include participants from the bottom 40% and top 20% income brackets as income has been proven to be a risk factor for poor health literacy [28-31]. Future studies should include an oral examination to confirm the self-reported oral health status among the subjects and assess their relationships with OHL. Despite these limitations, this study has valuable strength. Using a simplified tool that can capture the multidimensional aspect in OHL, it gives an insight of OHL and its relationships with the socio-demography, self-reported oral health status, and behaviours in a multilingual population.

Conclusion

Household income, self-reported oral health status, and behaviours were significantly associated with oral health literacy. Determination of oral health literacy is, therefore, vital to help tailor appropriate oral health education and care for dental patients.

Authors' Contributions: NMN, HR, ASIZ, NAY, and SNMPS designed the study. NMN performed the data collection. NMN and HR conducted the data analysis and interpretation. NMN and HR wrote the manuscript. NMN, HR, ASIZ, NAY, and SNMPS reviewed the manuscript. All authors declare that they contributed to the critical review of intellectual content and approval of the final version to be published.

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