The Associations between Oral Health Literacy and Oral Health-Related Behaviours among Community-Dwelling Older People in Thailand

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Abstract

Objective: This study aimed to investigate the associations between oral health literacy and oral health behaviours among community-dwelling older adults in Thailand.

Material and Methods: This community-based cross-sectional study was conducted at the District Health Promoting Hospitals (DHPH), Panarae district, Pattani province, Thailand, between 1-30 June 2020. A total of 271 community-dwelling older adults participated in the study. The inclusion criteria were independent living elderly who were 60 years or over and had at least one remaining tooth. Those who had a communication problem, severe chronic diseases, or disabilities were excluded. Data were collected by questionnaire interviewing. Binary logistic regression was analyzed.

Results: In the final model of regression analyses, older age (OR = 1.810, p = 0.035), limited education levels (OR = 2.113, p = 0.027), and participants who had the frequency of tooth brushing less than two times per day (OR = 1.905, p = 0.047) were statistically significant predictors of lower oral health literacy levels.

Conclusions: The findings confirmed the strong associations between OHL and age, education levels, including the frequency of toothbrushing in the participants. This evidence indicates that an appropriate education program about oral health promotion probably induce adequate oral health literacy among the older population.

Keywords: oral health, geriatrics, oral health literacy, oral health-related behaviour

1. Introduction

United Nations reported that the proportion of the elderly (aged 60 years or over) had grown globally, driven by rising life expectancy levels and decreasing levels of fertility. People are living longer lives; the number of older persons in the total population is rapidly increasing. Worldwide, the population aged 65 years or over is expected to more than double, reaching over 1.5 billion in 2050. (UN, 2020) Similarly, Thailand has become an aging society; in 2018, the Thai older population was 12 million or 18% of the total Thai people, and the number possibly increases to 20.5 million or 32.1% in 2040 (TGRI, 2018). According to biological deterioration, the Thai elderly are at serious risk for health problems, chronic and non-communicable diseases, including oral diseases (MOPH, 2017; Somrongthong, Dullyaperadis, Wulff, & Ward, 2014; Somrongthong, Hongthong, Wongchalee, & Wongtongkam, 2016).

The 8th National Oral Health Survey 2017 reported that approximately 77.6% of the Thai elderly had missing teeth and poor oral health. The older population were at a high risk of developing oral diseases such as root caries, dental caries, tooth loss, and periodontal diseases (MOPH, 2017). Peterson et al. concluded that the essential mechanisms for improving oral health in the elderly were national oral health policy, oral health education programs, training for oral health care providers, and appropriate oral health interventions (Petersen & Yamamoto, 2005). Therefore, improving oral health literacy (OHL) levels among the elderly is a significant public health issue. Several previous studies have reported that limited OHL influences inappropriate oral health-related behaviours and poor oral health in adults (Baskaradoss, 2018; Batista, Lawrence, & Sousa, 2018; Mohammadi, Malekmohammadi, Hajizamani, & Mahani, 2018). However only a few studies focused on OHL in older population, for instance, Hjertstedt et al.

investigated OHL's impact on oral hygiene of the elderly using the Rapid Estimation of Adult Literacy in Dentistry (REALD–30) (Hjertstedt, Barnes, & Sjostedt, 2014). A study from Brazil evaluated OHL's influence on oral health dissatisfaction among older people, using the Health Literacy in Dentistry questionnaire (HeLD-14), validated in Brazil (Tenani et al., 2020).

There is currently a shortage of dental research that focuses on the relationship between OHL and oral health-related behaviours among the Thai elderly. To our knowledge, this is the first scientific research that directly measured OHL from the older people's perspective by using the Health Literacy in Dentistry scale (HeLD-Th) validated in Thai (Sermsuti-Anuwat & Pongpanich, 2019). HeLD-Th is a comprehensive OHL assessment tool to identify the core competencies at the health care level and the broader community levels. This study aimed to investigate the associations between OHL and oral health-related behaviours among older adults in Thailand.

2. Method

2.1 Study Design and Setting

This community-based cross-sectional study was conducted at the District Health Promoting Hospitals (DHPH), Panarae district, Pattani province, Thailand, between 1-30 June 2020.

2.2 Ethical Consideration

The research protocol was approved by the Research Ethics Review Committee for Research Involving Human Research Participant, Health Sciences Group, Chulalongkorn University, Thailand (COA No 058/2020). The study was carried out following the Helsinki Declaration.

2.3 Participant (Subject) Characteristics

The sample size was calculated based on a previous study (Sermsuti-Anuwat & Pongpanich, 2019); therefore the sample size was 271 samples. Convenient community-dwelling older adults were invited to participate in the study. The inclusion criteria were both males and females aged 60 years or over, had at least one remaining tooth, and independent living. The exclusion criteria were older adults with a communication problem or severe chronic illnesses or disabilities.

2.4 Data Collection

Data were collected through a self-report questionnaire modified from the standard oral health questionnaire for adults of the 8th National Oral Health Survey 2017, Thailand (MOPH, 2017). Additionally, OHL information was collected using the HeLD-Th, which consists of 14 items which cover seven oral health literacy domains: communication, receptivity, understanding, economic, support, access, utilization. The HeLD-Th is a 5-point Likert scale with ranging 0-4 as follows: 0 = unable to do so, 1 = with great difficulty, 2 = with some difficulty, 3= with a little difficulty, 4 = without any difficulty. The HeLD-Th total score ranges 0-56, a higher score indicating a higher level of OHL. The HeLD-Th was qualified by psychometric properties which content validity shown Item-Objective Congruence Index (IOC) was 0.76. Internal consistency of HeLD-Th was proved by Cronbach's alpha coefficient was 0.945 (Sermsuti-Anuwat & Pongpanich, 2019).

2.5 Data Analysis

SPSS software was used for data analyses. A Shapiro–Wilk normality test indicated that all continuous variables were non-normally distributed. The median HeLD-TH score was 38, and this value was used to categorize the participants into two groups: low OHL (< 38) and high OHL ($\geq$ 38). Fisher's Exact tests were performed to test the association between OHL levels (low OHL versus high OHL) and the related categorical variables. Binary logistic regression with enter method was analyzed; the associated variables with a p-value less than 0.25 from the initial univariate analyses were included in the multivariate analysis. Then, the final model was developed to evaluate the associations between OHL levels and selected independent variables. All analyses were two-sided, considering a significance level with a p-value < 0.05.

3. Results

Table 1 presents a total of 271 older adults, aged 60-94 years with a mean of 71.10 years. The Thai Modified Barthel ADL Index's average score was 19.31; thus, participants were commonly independent living. The average score of HeLD-Th was 37.18. For categorical variables, 51.3 % of study participants had high OHL. The main demographic characteristics were female (74.2%) with age $\leq$ 74 years (69.0%), educated $\leq$ primary schooling (77.6%), income less than 15,000 THB ($475) per month (87.5%), most of them did not report history of chronic diseases. Regarding oral health-related behaviours, the majority of participants had frequency toothbrushing $\geq$ two times per day (76.0%) and had duration of tooth brushing $\geq$ two minutes (64.8%). Surprisingly, although all

participants were Universal Healthcare Coverage (UHC) scheme beneficiaries (100%), they mostly did not report regular dental care attendance (90.4%) in the past 12 months.

In Table 2, Fisher's Exact tests revealed statistically significant associations between OHL levels and age groups (p = 0.004), education levels (p < 0.001), income per month (p = 0.045), frequency of tooth brushing (p = 0.002); duration of tooth brushing (p = 0.005).

In table 3, Binary logistic regression analyses were performed. In the final model analysis, older age (OR = 1.810, p = 0.035), lower education levels (OR = 2.113, p = 0.027) and participants with < 2 time per day for frequency of tooth brushing (OR = 1.905, p = 0.047) were statistically significant predictors of lower OHL.

Table 1. General characteristics of the study participants (N = 271)

Continuous variables	Mean (SD)	Median (Range)
Activity of daily living scores: Barthel (ADL)	19.31 (1.599)	20 (2-20)
Oral health literacy (OHL)	37.18 (10.322)	38 (5-56)
Age (years)	71.10 (6.844)	70 (60-94)
Categorical variables	**Number**	**%**
OHL levels:		
High OHL ($\geq$ 38)	139	51.3
Low OHL (< 38)	132	48.7
Age:		
Age $\leq$ 74	187	69.0
Age > 74	84	31.0
Gender:		
Female	193	71.2
Male	78	28.8
Education levels:		
> Primary education	70	25.8
$\leq$ Primary education	201	74.2
Income per month:		
$\geq$ 15,000 THB ($475)	34	12.5
< 15,000 THB ($475)	237	87.5
Diabetes Mellitus:		
No	228	84.1
Yes	43	15.9
Cardiovascular Disease		
No	257	94.8
Yes	14	5.2
Frequency of tooth brushing:		
$\geq$ 2 times per day	206	76.0
< 2 times per day	65	24.0
Duration of tooth brushing:		
$\geq$ 2 minutes	175	64.8
< 2 minutes	96	35.4
A dental care visit in previous 12 months:		

Yes	26	9.6
No	245	90.4
Government health insurance (UHC):	271	100

Note. SD = Standard deviation; UHC = Universal Healthcare Coverage scheme.

Table 2. Factors associated with oral health literacy of the study participants (N=271)

Variables	OHL < 38	OHL >= 38	p-value[a]
	Number (%)	Number (%)	
Total	132 (48.7)	139 (51.3)	
Age:			**0.004**
Age ≤ 74	80 (42.8)	107 (57.2)	
Age > 74	52 (61.9)	32 (38.1)	
Gender:			0.227
Female	99 (51.3)	94 (48.7)	
Male	33 (42.3)	45 (57.7)	
Education levels:			**< 0.001**
> Primary education	21 (30.0)	49 (70.0)	
≤ Primary education	111 (55.2)	90 (44.8)	
Income per month:			**0.045**
≥ 15,000 THB ($475)	11 (32.4)	23 (67.6)	
< 15,000 THB ($475)	121 (51.1)	116 (48.9)	
Diabetes Mellitus:			0.323
No	108 (47.4)	120 (52.6)	
Yes	24 (55.8)	19 (44.2)	
Cardiovascular disease:			0.102
No	122 (47.5)	135 (53.5)	
Yes	10 (71.4)	4 (28.6)	
Frequency of tooth brushing:			**0.002**
≥ 2 times per day	89 (43.2)	117 (56.8)	
< 2 times per day	43 (66.2)	22 (33.8)	
Duration of tooth brushing:			**0.005**
≥ 2 minutes	74 (42.3)	101 (57.7)	
< 2 minutes	58 (60.4)	38 (39.6)	
A dental care visit in previous 12 months:			0.307
Yes	10 (38.5)	16 (61.5)	
No	122 (49.8)	123 (50.2)	

Note. [a] = Statistical calculation by Fisher's Exact Test.

Table 3. Simple bivariate and multivariate binary logistic regression analyses of OHL of participants

	Unadjusted		Adjusted	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age:				
Age ≤ 74	1	0.004	1	**0.035**
Age > 74	2.173 (1.283-3.682)		1.810(1.043-3.142)	
Education levels:				
> Primary education	1	< 0.001	1	**0.027**
≤ Primary education	2.878 (1.608-5.150)		2.113 (1.087-4.107)	
Income per month:				
≥ 15,000 THB ($475)	1	0.045	1	0.740
< 15,000 THB ($475)	2.181 (1.018-4.674)		1.161 (0.481-2.802)	
Cardiovascular disease:				
No	1	0.092	1	0.187
Yes	2.766 (0.846-9.049)		2.285 (0.670-7.789)	
Frequency of tooth brushing:				
≥ 2 times per day	1	0.002	1	**0.047**
< 2 times per day	2.569 (1.434-4.603)		1.905 (1.010-3.594)	
Duration of tooth brushing:				
≥ 2 minutes	1	0.005	1	0.126
< 2 minutes	2.083 (1.254-3.460)		1.546 (0.885-2.700)	

Note. OHL = Oral Health Literacy; The sample size was n = 271; OR = Odds Ratio; CI = Confidence Interval.

4. Discussion

This study reports the substantially significant association between OHL levels and demographic characteristics, including OHL levels and oral health-related behaviours among the elderly in Thailand.

We found that older participants were approximately 1.8 times more likely to have limited OHL (p = 0.035). This finding consists of a study from Thailand, which reported that older adults had inadequate oral health literacy than younger adults (Sermsuti-Anuwat & Pongpanich, 2019). Similar studies also mentioned the shortage of OHL among the elderly; therefore, enhancing oral health literacy is a solution to improve the oral health-related behaviours, oral hygiene practices, satisfaction with oral health, and oral health status of the elderly (Jones, Parker, Mills, Brennan, & Jamieson, 2014; Tenani et al., 2020).

Moreover, participants who had lower education than primary schooling were roughly 2.113 times more likely to had low OHL (p = 0.027). Several studies similarly reported strong positive correlations between OHL and education levels: Baskaradoss suggested that educated participants had sufficient OHL when compared to others; Macek et al. reported the strongly significant associations between age and OHL levels, the same as education and OHL levels; Messadi et al. mentioned that more educated individuals had higher OHL scores compared to those participants who reported less education. (Baskaradoss, 2018; Macek et al., 2016; Messadi, Macek, Markovic, & Atchison, 2018). Nevertheless, some previous studies mentioned that education levels alone are insufficient to identify a person's capacity to obtain oral health information and make appropriate decisions on oral health-related behaviours (Batista et al., 2018; Sabbahi, Lawrence, Limeback, & Rootman, 2009). In this study, educated participants could read, understand, and obtain oral health information better than others who had limited education.

The elderly who had lower OHL levels were probably 1.905 times more likely to brush their teeth less than twice per day (p = 0.047). This finding presents the influence of OHL levels on oral hygiene practices in the same way as the existing evidence, which reported positive associations between adequate OHL and proper oral health-related behaviours. A study from Australia conducted among 400 Indigenous adults reported that OHL scores were

significantly associated with toothbrush ownership, toothbrush use, and dental care accessibility (Jones, Parker, Mills, Brennan, & Jamieson, 2014). A study carried out among Thai independent living adults also revealed that there were substantially significant positive correlations between OHL and toothbrushing behaviours and dental care visiting (Sermsuti-Anuwat & Pongpanich, 2019). In contrast, a research stidied among independent living and assisted living older people by Hjertstedt et al. concluded that participants' characteristics and OHL levels could not predict the change of oral hygiene (Hjertstedt et al., 2014). In this present study, all participants were independent living, and the change of health behaviours depended on their own decision. Therefore, OHL levels could predict oral hygiene practicing in this group of the Thai elderly.

4.1 Limitations

Although this study possibly achieved its purpose with remarkable findings, there are a few limitations. In this cross-sectional study, the data were conducted by the self-report questionnaire in a small community. Hence, the generalization of the study should be considered. Future research should study various dimensions of OHL among a large group of the study population.

5. Conclusions

The findings confirmed the strong associations between OHL and age, education levels, including the frequency of toothbrushing among the Thai elderly in this community. This evidence indicates that an appropriate education program about oral health promotion induce adequate oral health literacy, and this strategy positively influencing appropriate oral health-related behaviours and better oral health outcomes among the elderly.

Acknowledgments

Competing Interests Statement

The authors declare that they have no conflicts of interest.

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