

Social backgrounds, oral behaviors and dental service utilization among Thai older adults: data from the national oral health survey

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Abstract

Purpose – The number of older adults in Thailand is currently increasing. To create the appropriate oral health service for this age group requires an understanding of the factors that are associated with their dental service utilization. This study aimed to determine the associations between social backgrounds, oral behaviors and dental service utilization among Thai older adults.

Design/methodology/approach – This was a cross-sectional study on a representative sample of older adults in the 8th Thai National Oral Health Survey (TNOHS). Data of 4,130 Thai older adults were collected through interviews. The association between social backgrounds, oral behaviors and dental service utilization were investigated using chi-square and logistic regression models.

Findings – Of the older adults aged 60–74 years old, 38.4% had used dental services in the last 12 months. Smokers used dental services the least (32.1%). Location, income, education and social welfare were significantly associated with dental service utilization. Among the oral behaviors evaluated, smoking was significantly associated with low dental service utilization.

Originality/value – Thai older adults with a poor social background including location, income, education, entitlement to the Universal Coverage Scheme (UCS) and smoking made less use of dental services.

Keywords Dental service utilization, Older adults, National survey, Oral behaviors, Social backgrounds, Thailand

Paper type Research paper



Introduction

The population of individuals aged 65 years old and over is increasing, and the number is expected to reach approximately 1.6 billion worldwide by 2050, resulting in the faster increasing percentage of older adults than any other age group [1]. Similarly, in Thailand, the number of older adults (defined as age 60 and over) has increased rapidly and will continue to do so in future decades. By 2040, Thailand's aging population is expected to be approximately 17 million, which is more than 25% of the population [2]. As people age, they become susceptible to chronic and acute infections those are exacerbated by compromised immune systems [3]. Studies have demonstrated a relationship between reduced functional capacities and poorer personal oral hygiene along with declining use of dental services [4, 5]. Data from the 7th Thai National Oral Health Survey (TNOHS) showed that 37.9% of the adults ranging 35–44 years old had used dental services in the previous year, while the percentage of older adults ranging 60–74 years old who used dental services was reduced to 34.2% [6]. Factors that deter older adults from visiting the dentist include impaired mobility, financial hardship and negative attitudes [3]. Furthermore, the lack of financial support from the government and/or third parties makes dental services unaffordable for them [7]. Policymakers in Thailand have been focusing on the rapid increase in this population, which poses a tremendous challenge to health policymakers.

Health insurance schemes in Thailand consist of the Civil Servant Medical Benefit Scheme (CSMBS), Social Security Scheme (SSS) and Universal Coverage Scheme (UCS). Older adults are entitled to the CSMBS and UCS. These schemes provide free dental care at government health facilities composed of restorations, periodontal treatment, extraction and acrylic-based dentures. In addition, with the CSMBS, treatment such as endodontic and fixed prosthesis (crown and bridge) are included but with a limited rate of reimbursement [8]. Thai older adults who were entitled to the CSMBS were more likely to utilize dental services than those in the UCS [9].

Older adults with poor health use dental services less than those with good health [4, 10]. Dental service utilization rates decline relative to age [11, 12]. Sex also reported to affect dental service usage rates amongst older adults. A study from southern China revealed that females over 65 were more likely to visit a dentist compared with men [13]. Marital status is also associated with dental service utilization [14, 15]. Moreover, numerous reports demonstrated that older adults with low socioeconomic status use fewer dental services [4, 9, 13, 16–18]. A lower education level is also associated with underutilization of dental services [13, 18, 19]. Moreover, older adults who live in rural areas tend to utilize dental services less compared with older adults who live in urban areas [9, 20]. Reduced access to dental services in rural areas might be attributed to a lack of transportation and fewer service providers [9, 21, 22].

In addition to social backgrounds, oral behaviors also affect the use of dental services. Gilbert reported that nonregular dental attenders performed preventive behaviors, such as brushing and flossing less frequently than regular dental attenders did [23]. Osterberg *et al.* reported that smoking was significantly associated with a reduced probability of visiting a dentist during the previous year [24]. Another study showed that older adults who were current smokers were markedly less likely to utilize dental services compared with nonsmokers [19].

However, to the best of our knowledge, no study in Thailand has used the national oral health data to identify what social factors or oral behaviors are associated with dental service utilization among Thai older adults. Therefore, this study aimed to explore the association between social backgrounds, oral behaviors and dental service utilization among Thai older adults. This study's research question was which factors were associated with dental service utilization using the data from the 8th TNOHS. Lessons from Thailand's experience might be beneficial to other countries, especially for developing nations and also help to develop the situation in Thailand into the future.

Methods

This was a cross-sectional study on a representative sample of older adults in the 8th TNOHS. The subjects were selected using a stratified multi-stage method. Thailand was divided into five strata: Bangkok and four regions (north, south, central and north east). The four regions were divided into 12 health sectors. In total, two provinces in each health sector and Bangkok, making a total of 25 provinces, were selected. Among 25 provinces, four districts and six sub districts from each province and Bangkok, respectively, were randomly selected. Subjects within each selected area were randomly drawn from the citizen's registry. The sample size within each selected area was based on the municipal and rural population proportion, calculated using the dental caries prevalence in each age group obtained from the 7th TNOHS, a relative of 10–15%, a 95% confidence interval and a design effect of two [25].

The sample size of our study was calculated using the proportions of high (9.54%) and low (7.07%) income older adults who visited a dental clinic in the last 12 months [9], using an 80% power and a 95% confidence interval level. The calculated sample size was 3,108 older adults. Due to the possibility of subject absence or loss of data, the sample size was increased by 10%, resulting in a sample size of 3,418. However, the present study used data from the 8th TNOHS; thus, the data of 4,130 older adults were used.

The 8th TNOHS was conducted during June – August 2017. The data were collected using interviews by trained interviewers. For the face and content validity, the questionnaire was created and adjusted by experts in community oral health following the oral health survey basic method [26], considering its appropriateness to the Thai cultural context, its practicality and the time consumed during data collection. The questionnaire was tested on a group of older adults who were not the study sample to ensure that older adults understood the questions and did not feel uncomfortable answering them. The results were reevaluated by the experts; subsequently, items that were difficult to answer or irrelevant were excluded. The questionnaire and data collecting procedure were approved by the Bureau of Dental Health, Department of Health and Ministry of Public Health of Thailand. Prior to performing interviews, the interviewers attended a seminar and training about the survey process, the questionnaire, the appropriate way to interview individuals in this age group and agreed on standard adjustment with the Bureau of Dental Health of Thailand. This method was similar to that used in the 7th TNOHS [6].

Variables of interest

This study used social backgrounds, oral behaviors and dental service utilization data. The social backgrounds questionnaire comprised questions on (1) living area (urban/rural), (2) sex (male/female), (3) age (60–64, 65–69 and 70–74), (4) marital status (married/single, widow or divorced), (5) social welfare (UCS, SSS or CSMBS), (6) monthly income ($\leq 15,000$ / $> 15,000$ Baht/USD500), (7) education (primary or less/middle or more) and (8) functional capacity (stable/declining or lost). The oral behavior questionnaire was composed of questions on (1) brushing frequency (more than two times/less than two times per day) and (2) smoking status (yes/no). The dental service utilization questionnaire was composed of one question: (1) Did you use dental services during the past years? (yes/no).

Statistical analysis

The data were entered twice to ensure reliability. The data were analyzed using the SPSS software package (version 22.0, SPSS, USA). The significance level was set at 5%. Descriptive statistics were used to report social backgrounds, oral behaviors and dental service utilization. The univariate analysis used the χ^2 test to explore the associations between social backgrounds, oral behaviors and dental service utilization. Dependent variables with a

p-value < 0.1 for their association with independent variables in the univariate analysis were entered into the multiple logistic regression models. The enter method was used in the multiple logistic regression models.

Ethical considerations

The study protocol was approved by the Human Research Ethics Committee of the Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand (HREC-DCU 2019-002).

Results

There were 4,130 older adult participants in the survey. The participants' characteristics are shown in Table 1. In total, 36% of participants were 70–74 years old. Half of the participants were female (51.5%). Almost 70% were married (67.9%). Approximately 46% lived in rural areas. Moreover, 22% of the older adults had an education level higher than middle school. Most of the older adults had an income less than 15,000 Baht (90.9%), were entitled to UCS (79.8%) and had a stable functional capacity (95.9%). Furthermore, over half of the older adults brushed their teeth more than two times per day (58.5%). The majority of the older adults were nonsmokers or exsmokers (86.4%). A total of 38% of the older adults attended dental clinics (data not shown).

The univariate analysis revealed significant associations between dental service utilization and some social backgrounds and oral behaviors (Table 1). Older adults who lived in an urban area were educated higher than middle school, had a high income, were entitled to CSMBS and were more likely to use dental services compared to their counterparts. For oral behaviors, older adults who brushed their teeth at least two times per day and were nonsmokers or exsmokers used dental services more than their counterparts. However, social

Variables		<i>n</i> (%)	Dental service utilization (% yes)
Age (years)	60–64	1,383 (33.4)	39.6
	65–69	1,262 (30.6)	36.9
	70–74	1,485 (36.0)	38.7
Sex	Male	2,001 (48.5)	37.7
	Female	2,129 (51.5)	39.1
Marital status	Single/widow/divorce	1,325 (32.1)	39.2
	Married	2,805 (67.9)	38.0
Location	Urban	2,242 (54.3)	41.7
	Rural	1,888 (45.7)	34.5***
Education	Primary or less	3,222 (78.0)	36.1
	Middle school or more	908 (22.0)	46.7***
Income (Baht)	≤15,000 Baht (500 US\$)	3,756 (90.9)	36.7
	>15,000 Baht (500 US\$)	374 (9.1)	55.6***
Social welfare	UCS	3,294 (79.8)	36.1
	SSS	142 (3.4)	40.8
	CSMBS	694 (16.8)	49.1***
Capacity of older adults	Stable	3,961 (95.9)	38.5
	Declining and loss	169 (4.1)	36.7
Brushing frequency	Less than two times	1,712 (41.5)	35.8
	Two times or more	2,418 (58.5)	40.3**
Smoking status	Never smoked or ex-smoker	3,570 (86.4)	39.4
	Smoker	560 (13.6)	32.1**

Note(s): *** indicate *p* < 0.001; ** indicate *p* < 0.01 (Chi-square test); UCS: Universal Coverage Scheme; SSS: Social Security Scheme and CSMBS: Civil Servant Medical Benefit Scheme

Table 1. Association between social backgrounds, oral behaviors and dental service utilization in Thai elderly (*n* = 4,130).

backgrounds of age, sex, marital status and functional capacity were not associated with dental service utilization.

The multiple logistic regression models are shown in Table 2. When social backgrounds and oral behaviors were entered into the model, older adults who had a higher income were significantly, 1.6-fold, (95% CI: 1.31, 2.14) more likely to attend a dental clinic when compared with low-income older adults. Older adults with an education level higher than middle school were significantly, 1.2-fold, (95% CI: 1.02, 1.43) more likely to attend a dental clinic than those of an education level of primary school or less. Older adults who lived in a rural area were significantly, 0.7-fold, (95% CI: 0.65, 0.84) less likely to use dental services than those of who lived in an urban area. Older adults with CSMBS were significantly, 1.3-fold, (95% CI: 1.08, 1.58) more likely to use oral health services than those of UCS. For oral behaviors, smokers were significantly, 0.7-fold, (95% CI: 0.61, 0.91) less likely to visit a dental clinic when compared with their counterparts. However, the association between brushing frequency and dental service utilization was not significant in the adjusted model.

Discussion

The study investigated the association between social backgrounds, oral behaviors and oral health-care utilization by older Thai adults from the latest national data. Our study indicated that socioeconomic status, social welfare and smoking behavior were associated with dental service utilization. Older adults who lived in an urban area had an income over 15,001 Baht, graduated from middle school or higher, entitled to CSMBS, were exsmokers or never smoked and were more likely to visit a dental clinic.

As expected, socioeconomic status was positively associated with dental service utilization. This study found that older adults who had a higher income utilized dental services more than those who had a low income. This is likely because dental treatment is typically optional, and after retiring, older adults often have less or no income. Thus, if a dental illness does not cause any difficulty in their daily life, they would not utilize dental services. This finding was consistent with those of a previous study investigating the association between socioeconomic status, social welfare and dental service utilization among Thai older adults. Somkotra demonstrated that wealthier older adults were more

Table 2. Logistic regression models for the association between social backgrounds and oral behaviors and dental service utilization among Thai elderly (*n* = 4,130)

Variables	Dental service utilization (yes)	
	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Location	Urban	1
	Rural	0.73 (0.65, 0.83) ***
Education	Primary or less	1
	Middle school or more	1.55 (1.33, 1.80) ***
Income (Baht)	≤15,000 Baht (500 US\$)	1
	>15,000 Baht (500 US\$)	2.16 (1.74, 2.67) ***
Social welfare	UCS	1
	SSS	1.22 (0.86, 1.72)
	CSMBS	1.71 (1.45, 2.02) ***
Brushing frequency	Less than two times	1
	Two times or more	1.20 (1.06, 1.37) **
Smoking status	Never smoked or exsmoker	1
	Smoker	0.72 (0.60, 0.88) **

Note(s): **** indicate $p < 0.001$; *** indicate $p < 0.01$; ** indicates $p < 0.05$; CI: confidence interval; UCS: Universal Coverage Scheme; SSS: Social Security Scheme; CSMBS: Civil Servant Medical Benefit Scheme and adjusted odd ratio: adjusted for location, education, income, social welfare, brushing frequency and smoking status

likely to use dental services in the past 12 months compared with their counterparts [9]. Moreover, our study found that education level was associated with utilizing dental services among older adults. Higher levels of education could indicate having higher health literacy; older adults with higher health literacy likely understand that their oral health is related to their general health [27]. This finding was consistent with an earlier study. *Lo et al.* reported that education level was significantly associated with dental service utilization among southern Chinese older adults [13]. The present study indicated that older adults who live in urban areas utilized dental services more than those in rural areas. There are more dentists in urban as compared with rural areas [22], and there is also a lack of transportation for older adults in rural areas [21]. This finding is comparable to a previous study showing an association between dental service utilization and living area among older adults in China [20]. *Wu* reported that dental service utilization in older adults was associated with place of residence, older adults who lived in urban were 2.2-fold more likely to receive oral care in the past 12 months when compared with older adults who lived in rural areas [20].

In addition to socioeconomic status, our study found that older adults entitled to CSMBS used dental services the most. The reason behind this finding might be that the CSMBS provides more dental treatment options. This finding was consistent with a previous study investigating the association between insurance schemes in Thai older adults and dental care utilization. *Somkotra* reported that older adults entitled to CSMBS were more likely to use dental services [9]. A previous study reported an association between age and dental service utilization rate; however, the present study did not find an association between age and dental service utilization [11]. This may be due to differences in subject age, the range of our subjects' age was 60–74 years old, whereas the other study used 70 years and above. A study from southern China reported an association between sex and dental service utilization; however, the present study did not find an association [13]. The differences in findings may be due to the number of participants taken part studies, and the number of participants in our study was more than three-fold of the previous study. Although numerous reports suggested that marital status is associated with dental service utilization, the present study did not find this association [14, 15]. The dissimilar findings in our study might be due to the different number of participants, age range and question concerning their last dental visit, *Burr and Lee* asked “did you visit a dentist in the past two years?” However, our study used the previous year only [14]. The number of participants in *Lau and Kirby* [15] was two-fold larger than ours and the age range was higher; their study age group was 65 to more than 80 years; however, in our study the range was 60–74. The present study did not find an association between functional capacity and dental service utilization, which contrasted with other studies. The disparate finding in our study might be due to the small numbers of declining and frail older adults; therefore, the association between older adults' capacity and using dental services might be weak [4, 10].

This study confirmed that smoking was significantly associated with a reduced probability of using dental services [19, 24]. *Slack-Smith and Hyndman* found that those who currently smoked were significantly less likely to use oral health services compared with those who were exsmokers or never smoked in the previous year [19]. *Osterberg et al.* demonstrated that among older adults in a Swedish population who reported not visiting a dentist in the past year, lifestyle factors such as smoking was a significant risk indicator [24]. *Sakki et al.* reported that unhealthy lifestyle behavior, such as smoking, was associated with poor dental health behavior, e.g. adding more sugar in their coffee, longer periods of time between their last dental visit, less tooth brushing and less use of additional tooth cleaning methods [28]. Smokers are less likely to use dental services when compared with nonsmokers and are less likely to be concerned about their own health [28]. Moreover, our study showed that among older adults, smokers were the group that utilized dental service the least, and the percentage of smokers utilizing dental services was only 32.1%. This suggests that the

overall attitudes of smokers toward their own health may be the underlying cause of their low dental service use.

Our study found that after adjusting confounding factors, the brushing frequency in older adults was not significantly associated with using dental services. This finding was inconsistent with a previous study. Gilbert *et al.* [23] found that routine dental attenders brushed their teeth more than once a day; however, confounding factors were not included in their study. The difference between findings may be due to different analysis methods. Our study used multiple logistic regression in contrast with Gilbert *et al.* [23] who used the chi-square or fisher's exact test.

An important limitation of this study was that it was cross-sectional; thus, we were not able to determine changes in dental service use over time. Additional longitudinal studies and time-series data are required to test the validity of these factors. Another limitation of the current study was the questions used in the questionnaires. This study used secondary data from the 8th TNOHS; thus, the questions were limited to the questions from the survey. To better understand dental service utilization in Thai dental adults, questions related to social support, depressive symptoms, attitudes toward dental care and disability level would help us to better understand what factors affect the dental utilization of Thai older adults [11, 14, 29]. However, there are several strengths to this study. The study was conducted on a national scale with over 4,000 Thai older adults representing the Thai older adult population in terms of social backgrounds and oral behaviors. Moreover, due to the large number of subjects in this study, the power was approximately 90%; higher power decreases the possibility of a type II error. The standardized data collection method in this study was created and adjusted by experts in community oral health according to the oral health survey basic method. The questionnaires were tested and reevaluated by these experts and were approved by the Bureau of Dental Health, the interviewers received calibration training and agreed on standard adjustment by the Bureau of Dental Health. Finally, we analyzed our results using multiple logistic regression, adjusting for social backgrounds and oral behaviors with dental service utilization. This method avoids confounding effects during the analysis and allows multiple comparisons simultaneously.

Conclusion

Thai older adults with poor social backgrounds, including location, income, education, entitled to UCS and smoking, utilized less dental service. To increase the utilization rate of dental services among older adults, policymakers should increase the number of dental-care providers and make transportation more easily available for older adults in rural areas, such as enhancing the efficiency of primary-care units by having a dentist on duty or providing free transportation for older adults. Heath providers should promote more oral health literacy, preventive behavior and smoking cessation. Lastly, policymakers should consider adding additional benefits to the available health insurance schemes.

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