



## Oral Health Status and Treatment Needs of Elderly in Phitsanulok

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### Abstract

Oral health is an important part of overall wellbeing of elderly in Thailand. Studies in many countries show that oral health status of elderly is poor and there is an urgent need to improve. Assessment of the oral health status and the needs of older people will aid in the organization of a prevention-oriented oral health care program to improve the quality of life of elderly. The purpose of this study was to describe the oral health status and dental treatment needs of an elderly population. The subjects were elderly people (60–92 years old), who live in Phitsanulok, Thailand. A total of 612 participants (158 males and 454 females, mean age  $68.8 \pm 5.9$ ) agreed to join the study. The oral examination was performed by one dentist to detect periodontal status The Community Periodontal Index: (CPI) and dental caries status were reported as decayed, missing, or filled teeth (DMFT), followed those recommendation by the World Health Organization. In addition, prosthetic status and treatment needs were classified according to WHO criteria and also recorded. Information on self-perceived oral health problems, oral function and oral health behavior was obtained via questionnaires. The results showed that, thirty percent of subjects had no natural teeth. The mean DMFT score was  $18.9 \pm 8.3$  ( $DT=2.0 \pm 2.8$ ,  $MT=16.3 \pm 8.3$ ,  $FT=0.7 \pm 2.2$ ) teeth per person. The mean number of DMFT and MT significantly increased with age, with MT dominating in the DMFT index ( $p < 0.05$ ). Thirty-five percent of subjects needed dental fillings and 20 % required tooth extractions. The percentage of elderly with shallow (4–6mm) and deep (>6 mm) periodontal pockets were 9.6 and 26.6 respectively. Half (49.9%) of all subject needed periodontal treatment. Forty-eight percent of subjects need both upper and lower jaw partial dentures, 8.5 % needed complete dentures. The top five of self-perceived oral problems of elderly were: dental caries; gum disease; halitosis; difficulty in chewing hard food and tooth sensitivity. The oral health status of elderly examined in this study was poor due to high levels of tooth loss, caries experience and prevalence of periodontal pockets. Dental care, especially prosthetic care, should be focused upon. Thus, oral health program that emphasizes prevention should be considered of particular important for elderly.

**Keywords:** Oral health, DMFT, CPI, elderly, Treatment Need

### Introduction

The rapid growth of the number of aging people throughout the world becomes an important public health issue and a growing burden to countries worldwide, with advances in medicine and prolonged life expectancy (Petersen & Yamamoto, 2005; Petersen, 2003). According to the National Statistical Organization of Thailand, it is reported that the elderly population is increasing at a greater rate than any other country in SouthEast Asia (National Statistic Office, 2014). To prevent a future health burden on the country, it is important that the elderly

are as healthy as possible. However, evidence reveals that as people age, they are more susceptible to chronic and life-threatening disease as well as acute infections. Not only do general health problems increase but also, poor oral health becomes more prevalent among this age group (Petersen & Yamamoto, 2005). Poor oral health affects nutritional intake with compromised chewing and eating abilities. Similarly, systemic disease and the adverse effects of treatment can lead to increased risks of oral disease (Walls et al., 2000).

Poor oral health among older people has particularly been seen in high levels of tooth loss,



dental caries experience, and high prevalence rates of periodontal disease, xerostomia, and oral pre-cancer/cancer (Petersen & Yamamoto, 2005). The most important challenge today is to improve the quality of life of the elderly, and oral health seems to play an important role in improving their general well-being. There is little information on the oral health status of elderly in Phitsanulok province, Thailand. Assessment of the oral health status and the needs of older people will aid in the organization of a prevention-oriented oral health care program to improve the quality of life of elderly. The purpose of the present study was to describe the oral health status and treatment needs of elderly in Phitsanulok province.

### Materials and Methods

The study protocol was approved by Naresuan University Ethical Committee on Human Rights. The sample for this study was drawn from elderly people who were aged 60 or more old and lived in Muang, Phitsanulok Province, Thailand. Muang district have 20 sub-district (a mixed rural-urban district) and had old age population around 23,897 people. This was a cross-sectional study (January-June, 2015), with simple random sampling framework by computer program to select subjects. A total of 612 people (158 males and 454 females, mean age  $68.79 \pm 5.9$  years old agreed to join the study and signed the informed consent.

The oral examination was performed by one dentist to detect periodontal status. The Community Periodontal Index (CPI) and dental caries status were reported as decayed, missing, or filled teeth (DMFT), followed those recommended by the World Health Organization. In addition, prosthetic status and treatment needs were classified according to WHO

criteria and also recorded (World Health Organization, 2013).

The CPI (Community Periodontal Index) was used to determine the periodontal status of the patients. It consists of dividing the mouth into six sextants and evaluating all teeth using a periodontal probe. Each sextant must have at least two functional teeth (i.e., teeth that are not extracted). Toothless sextants with just a functional tooth were considered absent and marked with "X" on the data captured sheet. The rating scale has five codes: 0 = healthy; 1 = spontaneous bleeding; 2 = calculus; 3 = pocket depth of 4–6 mm; 4 = pocket depth > 6 mm (WHO, 2013, Annex 1).

Data were also collected on participant self-perception of oral health, and their oral hygiene practices. Self-perception of oral health asked about whether participants believed they had oral health problems or not. They were asked if they had: dental caries symptoms; gum disease; oral ulceration; temporo-mandibular joint (TMJ) problems; difficulty in chewing hard food; tooth sensitivity; swallowing problems; speaking problems; taste problems; dry mouth; halitosis; or poor dentures. Response to these questions was either yes or no. Questions were also asked about how subjects cleaned their mouth and how often they visited a dentist.

Statistical analyses were performed with the SPSS 17 software program and  $p < 0.05$  accepted as the level for statistical significance. The Chi-square test was used to compare categorical or nominal level data. Independent t-test was used to compare mean between two groups.

### Results

For socio-demographics and health behaviors, most of subjects (91.3%) had not attended school or



had only finished primary school. Systemic diseases were reported in 74.8% of subjects: hypertension 37.3%, diabetes mellitus 18.3%, heart disease 6.5% and other diseases 12.7%, and 76.1% of subjects routinely used medicines. The oral hygiene practices of subjects. 30.6% claimed to brush their teeth once a day, 61.6% claimed to brush their teeth twice or more per day, but 7.8% of all subjects did not brush their mouth. 19.1% of subjects never visited dentist, only 20% of subjects had regular (twice per year) dental check-ups.

Thirty percent ( $n = 184$ ; males = 39, females = 145 person) of all subjects were edentulous. The distribution and the significant findings of the relationship between demographic factors and caries experience were shown in Table 1. Age, for both males and females was differences in mean values of missing teeth, DMFT score and number of teeth present. The older age-group had a significantly higher mean total caries experience rate ( $20.08 \pm 8.8$  teeth/ person) than the younger age group ( $18.37 \pm 8.1$  teeth/ person), dominantly in missing teeth ( $p < 0.01$ ).

Percentage distribution of all subjects according to their highest CPI score is shown in Table 2. More than a quarter (26.6%) of subjects had deep periodontal pocket ( $> 6$  mm). Older age group were not significant different the percentage of periodontal disease than younger age group.

The percentage of subjects with tooth, periodontal and prosthetic treatment needs was shown in Table 3. About 78.8 % of subjects needed 1 or more treatments. It was shown that 41.5 % had untreated dental caries. About 35% needed dental fillings and 20 % required dental extraction. About 13.7 % needed scaling and 36.3 % required complex treatment for managing deep periodontal pockets. In total, 65.8% needed a dental prosthesis, 48.2 %

needed both upper and lower prostheses, and 8.5 % needed complete dentures.

The information from the questionnaire showed that common problems stated by the participants were; dental caries (58%), gum disease (55.8%), halitosis (51.8%), difficulties in chewing hard foods (50.3%), tooth sensitivity (41.3%), speaking problems (30.6%), taste problems (29.1%), swallow problems (28.8%), dry mouth (24.8%), poor denture (20.4%), oral ulcer problems (19.8%) and Temporomandibular joint problems (18.0%).

### Discussion

This study was carried out to assess the oral health status and treatment need of the elderly in Muang, Phitsanulok. We use the method of oral health survey for dental caries experience and periodontal status, the same as national oral health survey. For National oral health surveys used multiple setting and had kappa score for DMFT index was 0.85-1 and kappa score for CPI was 0.44-0.70, but for this study we used only one dentist for examination. National oral health survey were exam in 4 region (16 provinces) and Bangkok (8 districts) for only 1,264 elderly people. This study only survey in Muang district, Phitsanulok in total 612 elderly (Dental Health Divisions, 2012). This subject population could be a representative for elderly oral health status of Muang, Phitsanulok.

Oral health status in this study was poor due to high percentage of dental caries and periodontal disease, might be related to systemic disease and health behaviors. The caries experience variables in this study were higher for DT ( $2.02 \pm 2.79$ ), MT ( $16.3 \pm 8.33$ ), FT ( $0.66 \pm 2.24$ ) and DMFT ( $18.9 \pm 8.33$ ) than those reported in the national oral health survey in 2012 (DT=1.3, MT=13.2,

FT=0.4, DMFT=14.9 teeth/person) (Dental Health Divisions, 2012). The main component of the DMFT was M-teeth consistency with previous studies (The mean missing teeth was  $8.73 \pm 7.00$  per person in Boston elderly and the mean missing teeth was 16.54 teeth/person in elderly Norway) (Natto et al., 2014; Henriksen et al., 2004). Throughout the world, losing teeth is still seen by many people as a natural consequence of ageing (Petersen, 2003). Reports from cohort studies of older adults confirm the phenomenon of incremental tooth loss in people aged 65 or older (Warren et al., 2002; Paulander et al., 2004; De Marchi et al., 2012).

The mean number of missing teeth of this study population was high due to experience of decay and periodontal diseases, consistency with previous study, the DMFT index can be invalid in older adults due to the high M-teeth scores and the inability to exclude reasons for extraction of teeth on the basis of caries alone (Peter, 2006; Fure & Zickert, 1997; Shimazaki et al., 2003). In other words, the M-teeth component of the DMFT index used in the elderly subjects should be considered an indicator both of previous dental caries and periodontal disease. Tooth loss or dental mortality is recognized as the final outcome of a multi-factorial process that involves disease-related factors as well as health behaviors, patient preferences, and professional interventions (Copeland et al., 2004). The high missing component of the DMFT score for older people could be related to the belief in some communities that extraction is considered by many to be the most acceptable treatment for dental disease, consistency with previous study (Soh et al., 1992).

The findings of this study showed that the mean F-teeth score was on average, less than 1 tooth. The low value of F-component may due to the neglect of the respondents for their oral health, irregular check-ups, as well as because the definitive filling did not last, or their durability was

recorded due to other factors. Furthermore, the findings revealed that 41.5% of subjects had untreated dental caries which required 35% of subjects to have fillings. Treatment of dental caries is not only expensive but has simply been inaccessible to the majority of this elderly group. This indicates that prevention and early treatment of dental caries are a significant need; otherwise the problem of tooth loss will be aggravated.

Overall, 30 % of subjects were edentulous. The prevalence of edentulism among the elderly was high when compared with figures reported in other studies (23.4% of elderly Brazillians, and 7.2% of elderly Thai) (Petersen & Yamamoto, 2005; Petersen, 2003). The main causes of tooth loss include the sequelae of caries and periodontal disease. In this study caries was the primary cause of tooth loss. Economically and socially disadvantaged older adults and physically impaired are more likely to experience tooth loss and edentulism, untreated dental decay and periodontal disease (Dolan et al., 1993).

Tooth loss has been associated with several sociodemographic, behavioral, or medical factors. This indicated that a problem of tooth loss amongst elderly should be a concern in the situation where the elderly tend to live longer and the population is increasing. Tooth loss compromises the integrity of the dentition and can lead to clinically significant deficits in masticatory function and nutrition (Krall et al., 1998). Extensive tooth loss reduced chewing performance and affected food choice (Nordenram et al., 1996). In the maintenance of satisfactory nutritional status, natural and functional dentitions of at least 20 teeth play an important role (Marcenes et al., 2003). However, the problem of tooth loss became worse when subjects got older. For adequate chewing performance, keeping natural



teeth and replacement missing teeth with dentures should be concern for elderly.

The findings revealed that most elderly had inflamed periodontal tissues. The improvements of periodontal status of the elderly depend highly on dental personnel for professional cleaning and oral education. This is consistent with the global data which reported that the percentage of subjects with CPI score 4 ranged from 5 to 70 % among older people (Petersen, 2003). Compared with figures reported in other studies, the prevalence of subjects with CPI score 4 (26.6%) in this study higher than the 15.5 % of Thais 60–74 year-olds, reported in the National Oral Health Survey 2012 (Dental Health Divisions, 2012). This study had high percentage of elderly with periodontal disease may reported risk factors for periodontal disease progression are age, poor dental behavioral and systemic disease. However, it is important to reinforce the concept that periodontal disease is not a consequence of age per se, but due to chronic expose to risk factors over a number of years (Bush & Donley, 2002).

High prevalence rates and severity of periodontal disease were associated with local factors such as poor oral hygiene and high level of dental plaque (Petersen & Yamamoto, 2005). This study found 91.3% of all elderly had not attended school or had only finished primary school, 19.1% of subjects never visited a dentist, and that 60.6 % of all subjects did not go regularly for oral check ups. Consistency with Brush et al. 2002 (Bush & Donley, 2002) found that the relationship between low education, no dental check-ups, and their independent effects on the progression of periodontal disease in older adults. Most subjects (92.2%) in the present study claimed that they used tooth brushing to clean their own mouth; get periodontal conditions were high. In appropriate brushing technique and poor hygiene could explain the reasons for the periodontal disease. The culture of routine dental visits is not practiced in Muang, Phitsanulok. Most patients visit

the clinic only when they have pain or an emergency dental problem, its might be one important factor for poor oral health in this population. This indicates that there is a large gap in understanding and effectiveness of oral hygiene practices of the elderly. It indicates a clear need for accurate oral health education and skill development in effective mouth cleaning.

This study also shows the perception of oral health problem (teeth sensitivity, halitosis and dry mouth) and oral function problems (chewing ability, speaking, swallowing, tasting). Chronic dry mouth occurs in a substantial proportion of older people, affecting their speaking, enjoyment and ingestion of food and denture wearing (Locker, 2003; Cassolato & Turnbull, 2003). Good oral health and good oral function improve quality of life of elderly (Slade & Spencer, 1994; Locker, 1988). Research about causes and improvement of oral function for elderly people will be an increasing concern where community elderly populations live longer and form a far higher percentage of the total population.

### Conclusion

The oral health status of elderly examined in this study was poor due to high levels of tooth loss, caries experience and prevalence of periodontal pockets. Dental care, especially prosthetic care, should be focused upon. Thus, oral health program that emphasizes prevention should be considered of particular important for elderly.

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**Table 1** Dental health status by age and gender (mean± standard deviation) in dentate subjects (n=428) with \* = p<0.05

Age	Gender	n	Number of present teeth	DT	MT	FT	DMFT
60-69	Male	72	17.24±8.80	1.95±2.32	14.59±8.78	0.57±1.75	17.12±8.99
	Female	209	16.02±7.80	2.15±2.65	15.75±7.82	0.79±2.10	18.79±7.78
	Total	281	16.34±8.07	2.10±2.58	15.46±8.08	0.73±2.01	18.37±8.13
70+	Male	47	13.62±8.48	2.57±3.69	18.0±8.8	0.32±1.24	21.28±8.38
	Female	100	14.14±8.56	1.52±2.82	17.87±8.55	0.63±3.07	19.52±9.02
	Total	147	13.97±8.51	1.87±3.15	17.91±8.60	0.53±2.62	20.08±8.83
Total	Male	119	15.81±8.82	2.20±2.97	15.94±8.90	0.47±1.56	18.76±8.96
	Female	329	15.42±8.09	1.95±2.71	16.44±8.11	0.74±2.45	19.03±8.19
	Total	428	15.53±8.29	2.02±2.79	16.30±8.33	0.66±2.24	18.95±8.33

**Table 2** Percentage distribution of all subjects, according to their highest CPI score (n = 612)

Age	Gender	Scores 0	Scores 1	Scores 2	Scores 3	Scores 4	Scores 9
		Healthy	Bleeding	Calculus	4-6 mm pocket	> 6 mm pocket	Excluded
60-69	Male	0	28.2	16.5	10.6	27.1	17.6
	Female	0	17.8	16.0	12.3	29.4	24.5
	Total	0	20.3	16.1	11.9	28.8	22.9
70+	Male	0	16.4	13.7	8.2	23.3	38.4
	Female	0	13.0	9.2	5.9	23.8	48.1
	Total	0	14.0	10.5	6.6	23.6	45.3
Total	Male	0	22.8	15.2	9.5	25.3	27.2
	Female	0	15.9	13.2	9.7	27.1	34.1
	Total	0	17.6	13.7	9.6	26.6	32.4

**Table 3** Percentage of treatment needs (n=612)

Gender	Dentition treatment need			Periodontal treatment need			Prosthetic treatment need		
	filling n (%)	RCT n (%)	Extraction n (%)	Scaling n (%)	professional treatment n (%)	upper n (%)	Lower n (%)	Both n (%)	complete denture n (%)
Male	63(39.8)	7(4.4)	29(18.3)	24(15.2)	55(34.8)	7(4.4)	7(4.4)	87(55.1)	14(8.9)
Female	151(33.3)	42(9.3)	94(20.7)	60(13.2)	167(36.8)	12(2.6)	30(6.6)	210(46.2)	38(8.4)
Total	214(35.0)	49(8.0)	123(20.1)	84(13.7)	222(36.3)	19(3.1)	37(6.0)	297(48.5)	52(8.5)

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