FACTORS ASSOCIATED WITH THE UTILIZATION OF DENTAL HEALTH SERVICES BY THE ELDERLY PATIENTS IN HEALTH CENTER No.54, BANGKOK, THAILAND

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ปัจจัยที่สัมพันธ์กับการใช้บริการทางทันตกรรมของผู้ป่วยสูงอายุที่มารับบริการในศูนย์บริการสาธารณสุข 54 กรุงเทพมหานคร

นางสาวศรุตา แสงทิพย์บวร

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต

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ศรุตา แสงทิพย์บวร: ปัจจัยที่สัมพันธ์กับการใช้บริการทางทันตกรรมของผู้ป่วยสูงอายุที่มารับบริการในศูนย์บริการสาธารณสุข 54 กรุงเทพมหานคร (FACTORS ASSOCIATED WITH THE UTILIZATION OF DENTAL HEALTH SERVICES BY THE ELDERLY PATIENTS IN HEALTH CENTER No.54, BANGKOK, THAILAND)
อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ศ.นพ.สุรศักดิ์ ฐานีพานิชสกุล, 89 หน้า.

การศึกษานี้เป็นการศึกษาเชิงพรรณนาภาคตัดขวาง เพื่อสำรวจปัจจัยที่สัมพันธ์กับการใช้บริการทางทันตกรรมของผู้ป่วยสูงอายุที่มีปัญหาสุขภาพช่องปาก ที่มารับบริการในคลินิกเบาหวาน ความดันโลหิตสูง ผู้สูงอายุ และคลินิกทั่วไป ศูนย์บริการสาธารณสุข 54 กรุงเทพมหานคร โดยการสัมภาษณ์จากกลุ่มตัวอย่างจำนวน 335 คน วิเคราะห์ข้อมูลหาปัจจัยที่มีความสำคัญกับการใช้บริการทันตกรรมด้วยวิธีการทดสอบ Chi-square

ผลการศึกษาพบว่า ผู้ป่วยสูงอายุร้อยละ 48.9 ใช้บริการทันตกรรมในปีที่ผ่านมา ร้อยละ 48.1 ใช้บริการทันตกรรมที่ศูนย์บริการสาธารณสุข 54 ร้อยละ 48.8 ไปเพื่อรับบริการถอนฟัน ผู้ป่วยสูงอายุส่วนใหญ่ (88.5%) ใช้บริการทันตกรรมเมื่อมีอาการปวด บวม หรือเสียวฟัน และมีผู้ป่วยสูงอายุเพียงร้อยละ 9.0 ที่ตรวจสุขภาพฟันเป็นประจำ สาเหตุหลักที่ผู้ป่วยสูงอายุไม่ไปใช้บริการทันตกรรมคือไม่จำเป็นต้องได้รับการรักษา สำหรับปัจจัยที่สัมพันธ์กับการใช้บริการทันตกรรมของผู้ป่วยสูงอายุที่มีปัญหาสุขภาพช่องปากที่นัยสำคัญทางสถิติ 0.05 ได้แก่ รายได้เฉลี่ยต่อเดือน โรคประจำตัว การมีผู้ดูแลพามารับการรักษาที่ศูนย์บริการสาธารณสุข 54 ค่ารักษาทันตกรรม ชนิดการรักษาที่ได้รับครั้งสุดท้าย การใช้บัตรประกันต์สุขภาพในการรักษาทันตกรรม สถานที่ที่ใช้บริการทันตกรรม การตรวจสุขภาพช่องปากเป็นประจำ ทัศนคติต่อการรักษาทันตกรรม และสภาวะสุขภาพช่องปาก

จากการศึกษานี้ชี้ให้เห็นว่าหน่วยงานและบุคลากรที่เกี่ยวข้องกับการให้บริการทันตกรรมแก่ผู้สูงอายุ รวมทั้งบุคลากรทางการแพทย์ ควรให้ความสำคัญต่อสาเหตุที่ผู้ป่วยสูงอายุไม่ไปใช้บริการทันตกรรม และปัจจัยส่งเสริมที่มีผลต่อการใช้บริการทันตกรรม เพื่อวางแผนนโยบายและกลยุทธที่เหมาะสมต่อการดูแลสุขภาพช่องปากของผู้สูงอายุ

สาขาวิชา.....สาธารณสุขศาสตร์.....ลายมือชื่อนิสิต.....

ปีการศึกษา.....2554.....ลายมือชื่ออ.ที่ปรึกษาวิทยานิพนธ์หลัก.....

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KEYWORDS: UTILIZATION/DENTAL HEALTH SERVICES/ELDERLY PATIENTS/HEALTH CENTER NO.54

SARUTA SAENGTIPBOVORN: FACTORS ASSOCIATED WITH THE UTILIZATION OF DENTAL HEALTH SERVICES BY THE ELDERLY PATIENTS IN HEALTH CENTER No.54, BANGKOK, THAILAND
THESIS ADVISOR: PROF. SURASAK TANEEPANICHSKUL, M.D.,89 pp.

A cross-sectional descriptive study was conducted among 335 elderly patients who had oral health problems in diabetes, hypertension, elderly and general clinic in Health Center no.54, Bangkok, Thailand. The objective of this study was to explore the factors associated with the utilization of dental health services in elderly patients. The data was collected by face-to-face interview using a structured questionnaire. Data was analyzed by using descriptive statistic and Chi-square test.

48.9 percent of the elderly patients had visited a dentist in the past year. 48.1 percent were received dental health services at Health Center no.54. 48.8 percent were received extraction last time. Most of the elderly patients (88.5%) went to the dentist for emergency. And only 9.0 percent check up regularly. No need was the main reason for not using dental health services in the past. Monthly income, systemic disease, presence of supporting person to bring to Health Center no.54, cost of care, treatment received last time, using health insurance for dental health services, place of receiving dental health services, check up regular, attitude toward dental treatment and dental status were the factors associated with the utilization of dental health services in elderly patients.

This indicates a compelling need for specific strategies for oral health promotion and disease prevention activities. It is essential to increase the involvement of other health professionals for elderly patients to overcome the barriers in dental health service utilization, and improve self-care capacity in oral health.

Field of Study:……..Public Health……..Student’s Signature…….

Academic Year:.……..……2011…….Advisor’s Signature……

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LIST OF ABBREVIATION

BMA	Bangkok Metropolitian Administration
CHD	Coronary heart disease
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CVD	Cardiovascular disease
DMFT	Decay, Missing and Filling Teeth
DT	Decay teeth
FT	Filled teeth
MT	Missing teeth
ONJ	Osteonecrosis of the jaws
PEM	Protein energy malnutrition
POP	Posterior occluding pairs of natural teeth
TB	Tuberculosis
WHO	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Background & Rationale

Elderly is the population aged over 60 years (WHO). From the National Statistical Office Survey in last three times found the proportion of elderly in Thai population was increasing continuously (6.8% in 1994, 9.4% in 2002 and 10.7% in 2007). These happen as a result of baby boomers. Life expectancy at birth of Thai population was 66 years in male and 70.4 years in female. (The World Health Report 2000) The elderly is a degenerative period which high risk of systemic disease. Many of elderly people have a variety of systemic disease that will have an impact on their oral health care for example arthritis, head and neck cancer, chronic obstructive pulmonary disease (COPD), diabetes, heart disease, hypertension, mental health, osteoporosis, Parkinson disease and stroke. (Scully, 2007) From the 4th Thai National Health Examination Survey 2008-2009, showed increasing prevalence of chronic disease (dementia, arthritis, hypertension and diabetes) in elderly people.

The elderly are at greater risk for oral disease, since gains in longevity result in more medically compromising conditions or systemic disease with oral manifestations. Several oral conditions are commonly found in elderly people for example tooth loss, oral cancer, dental caries, periodontal disease, and xerostomia. (Gershin, 1991) Poor oral health may effect on general health, and several oral diseases are related to chronic disease such as diabetes mellitus. (Petersen et al., 2005) Prevention and early intervention strategies must be formulated to reduce the risk of oral disease. Risk factors for oral diseases in the elderly can be reduced by personal home-care regimens, professionally provided preventive, diagnostic and therapeutic care, change in high-risk behavior and a supportive environment. (Gershin, 1991) Oral health care is not only an effective strategy for the prevention, early diagnosis and treatment of orofacial disease and disorders, but also an essential component of general health promotion program. (Ohi et al., 2009)

Health center No. 54 is one of the active operating units, supervised by Department of Health, one department of Bangkok Metropolitian Administration (BMA).

It is located at Thung Kru District, Bangkok, Thailand. Health center No.54 is responsible for the population in Bangmod sub-district, 24 communities and 6 schools belonging to Bangkok Metropolitian Administration (BMA). The total population responsible by health center No.54 is 50,708 persons. Services in the Health center No.54 are divided in 4 parts**,** curative, health promotion, prevention and control disease and rehabilitative health service. Curative services have many clinics to take care the population for example general outpatient clinic and special clinics such as Diabetes clinic, Hypertension clinic, TB clinic, Geriatrics clinic, Sick-child clinic and General and special dental clinic.

1.2 Statement of problems

Chronic diseases was increasing in the Thai population (4th Thai National Health Examination Survey 2008-2009) and also increasing in Bang-mod sub-district. Data from Health Center no.54, patients in Diabetes and Hypertension clinic was increasing every year. Diabetes clinic had 2,339 patients in 2008, 2,812 patients in 2009 and 2,885 patients in 2010. Hypertension clinic had 2,612 patients in 2008, 4,171 patients in 2009 and 4,741 patients in 2010.

Chronic disease may increase the risk of developing dental and oral disease because of biological mechanisms directly (for example, an inflammatory response that is associated with diabetes may increase the risk of periodontal disease) or indirectly (for example, decreased salivary flow due to prescribed medications may increase the risk of dental caries) resulting from the disease. (Griffin et al., 2009) From the 6th Thai National Oral Health Survey 2006-2007, 96.15% of the population aged 60-74 years have dental caries, 84.20% of the population aged 60-74 years and 95.74% of the population aged over 80 years have periodontal disease, 77.60% of the population aged 60-74 years have posterior occluding pair of natural teeth more than 4 pairs, 10.47% are edentulism and 32.28% of the population aged 60-74 years used dental services in the last year. These results show that most of elderly Thai population had dental caries and periodontal disease and only one third of elderly Thai population use dental services.

Many studies was undertaken to assess the level and the pattern of dental health services utilization in elderly people in many countries. These studies found that elderly people experience significant barriers to obtaining the necessary dental care. (Sugihara N et al., 2010, Ohi T et al., 2009, Rubinstein HG, 2005, Evashwick C et al., 1982) Although, there was the studies of dental health services utilization in rural area of Chiang Mai province, Thailand. (Chaiyasuk K et al., 2008) As evidence elsewhere suggests that oral health is associated with general health, there is scanty information on the factors associated with the use of dental health services in elderly patients who have dental health problems in urban area. Bang-mod sub-district is one part of Bangkok which also faced the same problems, increase prevalence of chronic disease, increase proportion of elderly population, high prevalence of dental caries and periodontal disease and low rate of the use of dental health services in elderly population. The Health Center No.54 is responsible for the population in Bang-mod sub-district. This Health Center has good management for data collection, patient appointment and good collaboration from staffs in Health Center. So the Health Center No.54 is a good place to initiate the study of the factors associated with the use of dental health services in elderly patients who have dental health problems in Bangkok. This study will provide a basis for further research to increase the utilization of dental health services in elderly patients.

1.3 Research questions

What are the factors associated with the utilization of dental health services by the elderly patients who have oral health problems in Health Center no.54?

1.4 Research objectives

1.4.1 General objective

To explore the factors associated with the utilization of dental health services in elderly patients who have oral health problems in Health Center no.54, Bangkok, Thailand

1.4.2 Specific objective

- To identify the factors associated with the utilization of dental health services in elderly patients who have oral health problems in Health Center no.54, Bangkok.
- To explore the utilization of dental health services in elderly patients who have oral health problems in Health Center no.54, Bangkok.
- To explore dental health status of the elderly patients who have oral health problems in diabetes, hypertension, elderly and general clinic in Health Center no.54, Bangkok.

1.5 Conceptual Framework

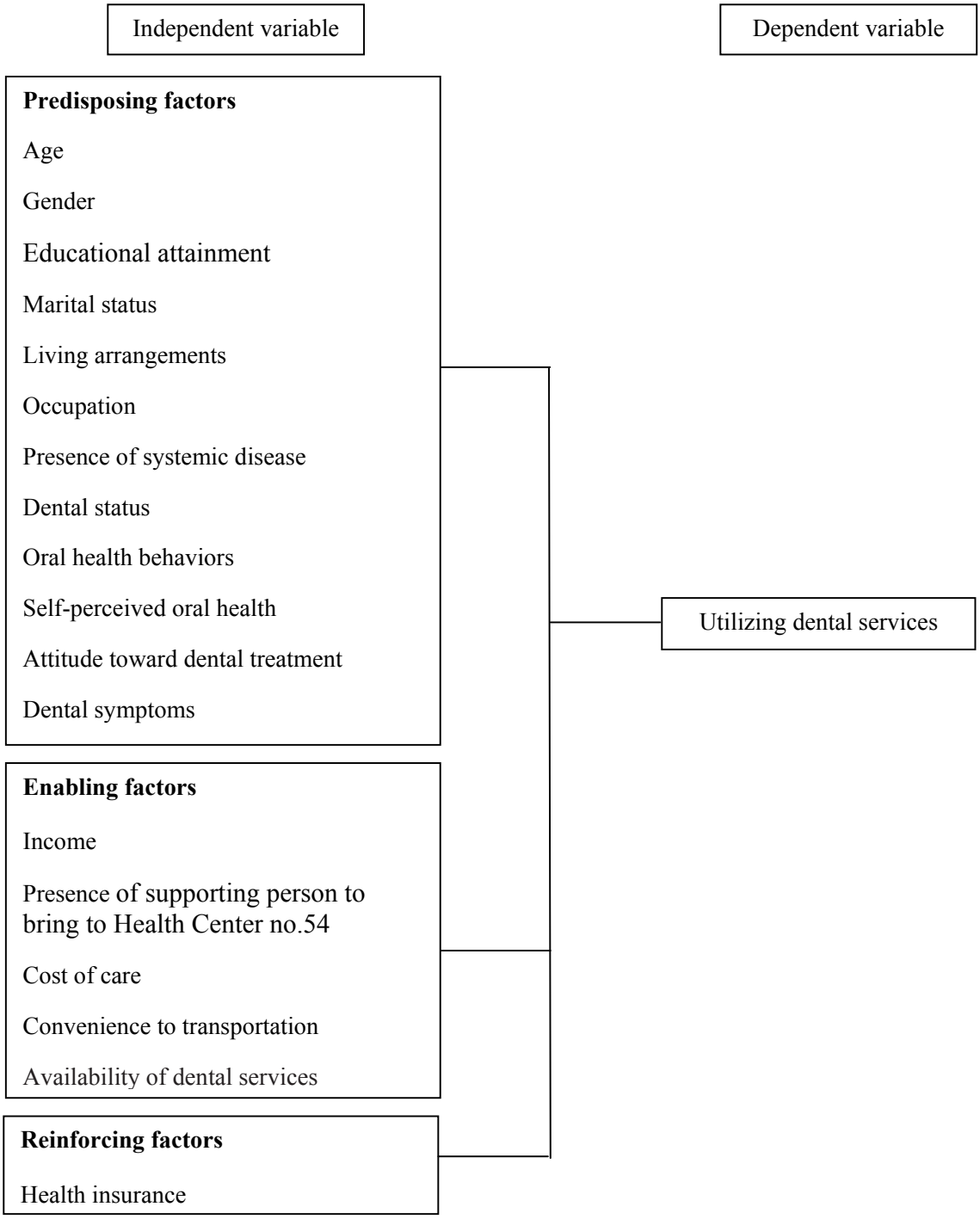

Figure 1: Conceptual framework

1.6 Operational Definitions

- **Age**: refers to how old the participant is at the time of conduct of interview
- **Gender**: refers to male and female
- **Educational level**: refers to the level of education that participant has completed at the time of interview.
- **Marital status**: refers to the civil status of the participant at the time of interview.
- **Occupation**: refers to the occupation of the participants.
- **Income**: average total monthly income.
- **Elderly** is the population aged over 60 years. (WHO)
- **Utilization** is the use of dental health services in the population.
- **Accessibility** is the ability of the population for receiving dental health services.
- **Dental service** is a clinically relevant service specified in an item, being a service rendered by or on behalf of a dental provider.
- **Systemic diseases** are diseases that involve many organs or the whole body.
- **Chronic diseases** are diseases of long duration and generally slow progression such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes. (WHO, 2011)
- **Oral health** is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that affect the oral cavity. (WHO, 2011)
- **Oral health behavior** defines as cleaning oral cavity.
- **Self-perceived oral health** refers to opinions of the patients on their oral health.

CHAPTER II
REVIEW OF LITERATURE

This topic discusses the following topics.

- The utilization of dental health services in elderly people
- Oral health problems in the elderly people
- Association between systemic disease and oral health in elderly people

2.1 The utilization of dental services in elderly people

Healthy oral status is important for maintenance and improvement of systemic health. Health status of the elderly is the important factors affecting financial security of the elderly. (Smuseneeto and Soonthorndhada, 2011) In Japan, the utilization of medical services increases, while that of dental services tends to decrease. (Ohi et al., 2009) However, the utilization of dental services in elderly Thai population was increasing 23.3% in 2001 and 32.3% in 2006 (the 5th and 6th Thai National Oral Health Survey)

Khananurak studied health equity in Thai aging from 2003 to 2006 by using secondary data from the Health and Welfare Survey, the National Statistical Office found more than 90% of Thai people got health insurance though universal health coverage. The universal health coverage can increase more access and utilization of health service among the poor elderly. Moreover it found that the equitable trend of out-patient health care utilization at standard hospital is also increase. When considering the trend in health care utilization at primary and secondary health care level it found that the poor elderly who are the outpatients utilized health services at primary and secondary health care level more than the rich elderly as a result of the pro-poor policy.

Many studies explored the utilization of dental service regularly in elderly and found 3.13% in India (Bansal and Veeresha, 2010), 28% in sub-Saharan, Africa (Varenne et al., 2006), 41% in Canada (Brothwell et al., 2008), 53.6% in Mexico (Sanchez-Garcia et al., 2007) , 64% in Japan (Sugihara et al., 2010), 66% in Sweden (Pedersen et al., 2005), and 73.1% in Chiang Mai Province, Thailand (Chaiyasuk et al., 2008)

The factors associated with the use of dental health service were a higher number of remaining teeth, younger age, presence of systemic disease, absence of depressive symptoms, higher educational attainment. (Ohi et al., 2009; Evashwick et al., 1982) Furthermore, self-perceived oral health also associated with the use of dental services. (Martins et al., 2010) Pedersen et al. (2005) reviewed the determinants of utilization among elderly people. They found accessibility of the dental office, availability of dental services, dental status, gender, personal characteristics of the individual, perceived oral health and symptom, organization of the dental health care system, income, cost of care, education, social background, geographical background, cultural background, ethnicity, social relations, lifestyle, general health status, functional disability, cognitive decline, number of drugs used and dentist limitation were the determinants of utilization among elderly people. Activities of daily living also associated with regular dental check-up. (Sugihara et al., 2010) Heaton et al. (2004) studied the factors influencing use of dental services in rural and urban communities in Kentucky found patients in the urban area reported having more dental insurance but not better dental health. Patients in more rural areas reported seeking more emergency dental treatment but not more dental fear. Moffet at al. (2010) studied in Northern California, founded diabetes patients with dental insurance have annual dental visit more than those without dental insurance.

Chaiyasuk et al. (2008) studied the factors affecting the dental health service utilization among 208 elderly people in the community of Chiang Dao District, a rural northern part in Chiang Mai Province, Thailand found high proportion of dental health service utilization (73.1%) more than half of them (61.2%) went to Chiang Dao District Hospital and 29.7% went to Health Center in Chiang Dao District but only 29% utilized a routine check-up. With regard to occupation a majority of the respondents (45.7%) were agriculture. The income range was less than 1,500 baht per month. Most of the respondents (73.1%) lived with family member. For the health insurance most of the respondents (99.5%) were covered with Universal Coverage Scheme. Half of the respondents felt convenient to use dental services. There were 4 factors related to dental service utilization: living arrangements, occupation, attitude toward any dental health

services and convenience of transportation. Furthermore, Srisaphum et al (2009) studied oral health status in diabetes patients at Changhan district, Roi et Province, Thailand among 256 diabetes patients found 2.9% of her samples had routine check-up. Most of her sample finished primary school (88.3%). 75.4% were farmer and 83.2% had Universal coverage.

Rojanaworarit et al. (2010) studied in a rural public hospital, Nakhon Si Thamarat Province, Thailand among 791 dental patients who was undertaken to primary describe characteristics of self-initiated reasons for dental services use and correspondingly received dental care interventions found oral surgery, dental coronal pathoses and periodontal disease were a most common self-initiated reason for dental service use. The three most common dental care intervention received by patients who expressed self-initiated reason were oral surgical treatment, operative treatment and periodontal treatment. Sources of getting information, extra income and having sufficient income to support their lifestyle were the factors influencing the accessibility of services in Dental Prostheses Campaign. (Watanaruangrong, 2008) Predisposing and reinforcing factors that influences the quality of life of elderly who were denture wearer and non-denture wearer in Ang Thong province, Thailand were attitude about denture wearing, social support and feeling about their oral health. (Hoopon-erb et al., 2008)

2.2 Oral health problems in the elderly people

The aging process is of course a biological reality which has its own dynamic, largely beyond human control. The aging causes changing in physical, mental and social aspect. These change included degeneration in oral and dental health due to the years of chewing, smoking, trauma and dysfunctional oral habits. Oral problems of the elderly patient are an increase of difficult-to-restore dental caries, xerostomia due to decreased salivary flow and medications, loss of natural teeth, ongoing, recognized periodontal disease, excessive tooth wear, a desire to look better and younger, impaired oral hygiene due to concomitant medical problems and loss of alveolar bone and resultant impaired use of removable prostheses. (Christensen, 2007) Gershen (1991) reviewed oral

conditions are commonly found in elderly people. One oral condition in the elderly is tooth loss. Partial or complete loss of the dentition can result in impairments to masticatory function. Also, systemic medical problems can be exacerbated when limitations are placed on the ability to chew or the ability to consume a well-balanced nutritious diet. In addition, psychological well-being and quality of life can be compromised when tooth loss affects esthetics or the ability to speak clearly.

A second condition, oral cancer, is mostly a disease of older adults. Hand and Whitehill (1986) reported an association between low levels of education and influent visits to the dentist for patients with oral mucosal lesions. Oral cancer can lead to disfigurement and the need for prosthetic appliances to restore function or esthetics. The use of radiation therapy to treat oral carcinomas can lead to other oral diseases. For example, decreased salivary flow resulting from radiation treatment can lead to increased susceptibility to infection.

A third condition, dental caries, affects elder adults mostly as recurrent caries, cervical caries and root caries. Dental caries is a multifactorial disease causes by host (tooth, saliva and acquired pellicle), food (carbohydrate and sugar) and dental plaque. Microorganism in dental plaque plays an important role in the process of dental caries. Dental caries can be disabling and can result in pain and discomfort as well as tooth loss. Many studies found an association between root caries and gingival recession (Katz and Meskin, 1986; Sugihara et al., 2010) Sugihara et al. (2010) found risk factors of root surface caries are the number of teeth with gingival recession, bleeding on probing and self-reported dry mouth.

A forth condition, periodontal disease includes problems such as gingival recession, occlusal trauma, gingivitis and periodontitis. Sugihara et al. (2010) found the factors which correlated with gingival recession are sex, number of present teeth, bleeding on probing, the presence or absence of systemic disease, denture, drinking alcohol and smoking.

Periodontal disease is an entity of localized infections that involve tooth supporting tissues, the structures that make up the periodontium (gingiva, periodontal

ligament, root cementum and alveolar bone). The designation periodontal disease includes both reversible (gingivitis) and irreversible (periodontitis) processes. This disease is multifactorial etiology, it caused by the interaction among single or multiple microbial agents, a host with some degree of susceptibility, and environmental factors. In periodontitis, there is destruction of the connective tissue of the tooth attachment apparatus accompanied by apical migration of the apparatus and eventual tooth loss. Periodontal destruction results from the action of various toxic products released from pathogenic subgingival plaque bacteria, as well as from the hosts inflammatory responses elicited against plaque bacteria and their products. The first clinical manifestation of periodontal disease is the appearance of periodontal pockets, which offer a favorable niche for bacterial colonization. It can be diagnosed by clinical examination with periodontal to determine pocket depths in combination with x-ray imaging, using microbiological techniques for a precise analysis of the infectious agents. (http://www.whocollab.od.mah.se/index.html)

A fifth condition, the oral manifestations of systemic conditions or oral conditions caused by pharmacological or therapeutic interventions, xerostomia, may be associated with Sjogren's syndrome, dysfunction of salivary glands, radiation therapy or as a side effect of medication. (Gershen, 1991; Scully, 2007; Christensen, 2007) Saliva plays an important role in the preservation and maintenance of oral health and function (Longman et al., 2000) Poor chewing ability is associated with lower mucosal moisture in elderly. (Shinkawa et al., 2009)

2.3 Association between systemic disease and oral health in elderly people

Many of elderly people have a variety of systemic disease that will have an impact on their oral health. The most common systemic disease seen in elder adults are arthritis, head and neck cancer, chronic obstructive pulmonary disease (COPD), diabetes, heart disease, hypertension, mental health condition, osteoporosis, Parkinson disease and stroke. (Scully, 2007)

Arthritis, patients with arthritis may experience restricted manual dexterity, which may compromise their ability to maintain adequate oral hygiene. (Montandon et al., 2006) Severe arthritis also can diminish quality of life for patients and alveolar bone loss has been associated with arthritis. (Al-Emadi et al., 2006) Bartold et al. (2006) hypothesized that there is a common dysregulation of proinflammatory pathways for both arthritis and periodontitis and they strongly suggested evaluating patients who have arthritis for periodotitis. Unfortunately, a clear relationship between periodontal disease and arthritis has not been established, owing to conflicting studies. (Sjostrom et al., 1989; Kasser et al., 1997; Yavuzyilmaz et al., 1992)

Head and neck cancer associate with oral health care in three stages of therapy: before, during and after therapy. (Scully, 2007)

Before therapy, the patient should implement meticulous oral hygiene and the dentist should institute preventive dental care. The dentist should restore salvageable teeth and extract neglected and unsalvageable teeth in the radiation path to minimize the risk of osteoradionecrosis.

During radiotherapy and chemotherapy can caused mucositis, xerostomia and oral ulceration.

After therapy can caused radiation caries and dental hypersensitivity furthermore, dryness of the mouth is continued.

Chronic obstructive pulmonary disease (COPD), which is characterized by progressive airflow limitations due to chronic bronchitis or emphysema, is a leading cause of mortality and morbidity. COPD commonly is associated with environmental factors such as smoking, epidemiologic studies suggest an association between periodontal disease and COPD. Although there is no evidence to date of a causal link between poor oral hygiene, periodontal disease and COPD, a three-year study of community-dwelling older adults found that gingival index and loss of attachment were significantly better in participants with normal pulmonary function than in those with an airway obstruction. (Katancik et al., 2005)

Diabetes is a metabolic disease resulting in hyperglycemia (high levels of glucose in blood) due to defective secretion/activity of Insulin usually characterized by the classic triad of polydipsia (excessive thirst), polyuria (excessive urine output) and polyphagia (excessive appetite). (Mealey, 2000)(http://www.whocollab.od.mah.se/index.html) The impaired metabolism of glucose, lipids, and proteins in diabetes produces alterations in macro- and micro-vascular circulation that are associated with the five classic complications of disease: retinopathy, nephropathy, neuropathy, cardiovascular complications and delay wound-healing. Periodontal disease has been proposed as the sixth complication of diabetes, based on the highly frequent presence of both diseases in the same patient. (Mealey, 2000) Xerostomia, periodontal disease, dental caries and diabetes neuropathy are the oral manifestation from diabetes mellitus. Type 1 diabetes results from cellular-mediated autoimmune destruction of pancreatic β-cells, which usually leads to total loss of insulin secretion; in contrast, type 2 diabetes is caused by resistance to insulin combined with failure to produce enough additional insulin to compensate for resistance. (Mealey, 2000)

Siva et al. (2010) studied the prevalence of periodontal disease in diabetes patient, Brazil found 68% exhibited gingivitis and 25.3% exhibited periodontitis.

Martinez et al. reviewed the relation between periodontal disease and diabetes mellitus found diabetes mellitus is a risk factor for periodontal disease. Hence, Mealey concluded that diabetic patients had a three-fold higher risk of periodontal disease compared with non-diabetic patients after controlling for age, sex and other confounding factors. Interrelationship between diabetes mellitus and periodontal disease, they found many reports of an increase risk of periodontal disease or if it greater severity in patients with diabetes mellitus for example studies on Pima Indians in Arizona showed that loss of periodontal attachment and bone loss were greater in diabetics versus non-diabetic individuals within different age groups. Both diabetes and periodontal disease are considered to have a hereditary component and a large number of cases have been related to a given family pattern. However, it has not yet proved possible to relate these disease

to any specific genetic mutation or disorder and both disease can therefore be describe as pyogenic. (Solskone et al., 2001)

Periodontal disease also affected diabetes mellitus. Periodontal disease is a risk factor for diabetes mellitus. Periodontal micro-organism, in particular Porphyromonas gingivalis (P.g.) and Tannerella forsythia (T.f.), were found to increase MMP-9 in gingival crevicular fluid and serum. These elevated cytokine levels in diabetic patients and thereby contribute to systemic inflammation. (Martinez et al.) Periodontal treatment that reduces periodontal inflammation may help to restore insulin sensitivity, thereby improving glycemic control. (Tunes et al., 2010)

Lee et al. (2009) investigated the effects of oral hygiene care by oral professional health in type 2 diabetes mellitus patients found intensive oral hygiene care can persistently oral inflammation status and could slow periodontal deterioration.

Many of these oral problems related to chronic disease such as diabetes mellitus, cardiovascular disease.

Cardiovascular disease (CVD) encompasses a number of disease that affect the cardiovascular system, including hypertension (high blood pressure), coronary heart disease (CHD, heart attack), cerebrovascular disease (stroke), peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease and cardiomyopathies. (http://www.whocollab.od.mah.se/index.html)

CVD is mainly caused by atherosclerosis with plaque formation. This can lead severe blockages in the arteries. The plaque, or atheroma, contains cholesterol-ester crystals, lysed cells, foam cells, and plasma proteins such as fibrin and fibrinogen, in the inner linning of an artery. It may grow large enough to significantly reduce the blood clots (thrombus) that can block blood flow or break off and travel to another part of the body (embolus). If the thrombus blocks a blood vessel that feeds the heart, it causes a myocardial infarction. If it blocks a blood vessel that feeds the brain, it causes a stroke. (http://www.whocollab.od.mah.se/index.html)

CVD is a multifactorial disease. Major risk factors such as increasing age, heredity, smoking, high blood pressure, diabetes, obesity, high cholesterol and physical

inactivity are associated with CVD. Men and postmenopausal women are at greater risk. There are also contributing risk factors, which are less precisely understood such as stress, low education level, low socioeconomic status and social isolation. However, these risk factors cannot explain all clinical features of CVD. Chronic inflammation has been suggested as another risk factor and infections with Chlamydia pneumoniae and Helicobacter pylori have been linked to CVD. (http://www.whocollab.od.mah.se/index.html)

CVD and periodontal disease share some common risk factors such as diabetes, smoking, low socio-economic status and stress, which could mean that they only are related as to the underlying cause. However, it has been proposed that periodontitis could act as a risk factor itself, contributing to the development of atherosclerosis. Mechanisms behind the association are not known, however potential pathogenic mechanisms are under investigation. Most theories are based on the fact that the process of atherosclerosis in addition to genetic and dietary influences, is affected by bacteria, bacterial products or by additional inflammation. Oral bacteria have the potential to interact both directly and indirectly in the pathogenesis of CVD. Like herpes viruses and Chlamydia pneumoniae, periodontal pathogens cause atherosclerosis in experimental animals and have been found in human atherosclerotic lesions. P. gingivalis has also been recorded to give rise to inflammatory changes with high affinity to the inner lining of blood vessels. (http://www.whocollab.od.mah.se/index.html) Loesche et al. (1998) found the significant association between a diagnosis of coronary heart disease and the number of missing teeth. Arbes et al. (1999) support finding of an association between periodontal disease and coronary heart disease. Jimenez et al. (2009) studied the association between periodontitis and incidence of cerebrovascular disease in men, found periodontal bone loss was associated with incidence of cerebrovascular disease. Desvarieux et al. (2011) study the relation between periodontal disease and carotid artery plaque found the relationship between tooth loss and subclinical CVD.

The elderly population has high risks for dental problem due to the aging, systemic disease such as diabetes mellitus, CVD. Furthermore, dental problem also

causes more severity in systemic disease due to the pathogenesis of dental disease and inadequate intake of important nutrients. (Andrade et al., 2011) So the elderly should have routine dental check up and treatment dental disease for good quality of life.

Mental health condition, dementia and depression are particular problems in elder people. Preventive dentistry and comprehensive oral as early as possible are crucial. (Scully, 2007)

Osteoporosis, bisphosphonates, such as pamidronate and zoledronate, particularly used intravenously can lead to painful refractory bone exposures in the jaws. This outcome sometimes has been termed “osteochemonecrosis” or “osteonecrosis of the jaws” (ONJ). After dental treatment, patients with ONJ usually develop painful, exposed, necrotic bone, primarily of the alveolar bone of the mandible and, to a lesser extent, the maxilla. Lamina dura sclerosis or loss and widening of the periodontal ligament space also may occur. Therefore, should avoid performing extractions and elective oral surgery in patients taking bisphosphonates. (Scully, 2007)

Parkinson disease is a progressive degenerative disorder of the central nervous system (CNS) and is not often seen in people younger than 55 years. The movements, drooling and spasmodic head positioning associated with the disease may compromise the dentist’s ability to carry out restorative care. (Scully, 2007)

Protein energy malnutrition (PEM) in elderly people is associated with loss of muscle tissue, reduced bone mass, impaired cognitive function, poor wound healing and increase morbidity and mortality. Tooth loss, dentures and decrease salivation affect the ability to eat and compromise the nutrient intake of older adults. (Moynihan, 2007) Andrade et al. (2011) concluded that oral health is related to inadequate intake of important nutrients among non-institutionalized elderly people. And found people which no posterior occluding pairs of natural teeth (POP) increase the likelihood of having an inadequate intake of vitamin C, calcium, riboflavin and zinc. Early signs of micronutrient deficiencies often are first noted in the oral tissues for example glossitis and angular chelitis are sign of iron deficiency. Therefore, the dentist plays an important role in the early diagnosis of such deficiencies. (Moynihan, 2007)

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research design

This study was a descriptive cross-sectional study.

3.2 Study area

Study area was the diabetes, hypertension, elderly and general clinic in Health center No.54, Bangkok, Thailand. (Diabetes clinic on Tuesday and Thursday, Hypertension clinic on Wednesday, Elderly clinic on Friday, and General clinic on Monday to Friday)

3.3 Study population

The patients age over 60 years who receiving services in diabetes, hypertension, elderly and general clinic, Health center No.54, Bangkok, Thailand.

3.3.1 Inclusion criteria: the patients

- age over 60 years
- both male and female
- have oral health problems
- have at least 1 natural tooth

3.3.2 Exclusion criteria: the patients

- have a communicable disorder
- do not agree to participate

3.4 Study period

Data collection was done from 4 January to 10 February 2012.

3.5 Sampling technique

Systematic sampling technique was used. And using lottery method for random sampling of the number between one to ten; the required number was selected for samples. Then use selected number for select sample in the diabetes, hypertension, elderly and general clinic.

3.6 Sample & sample size

335 participants age over 60 years who receiving services in diabetes, hypertension, elderly and general clinic, Health center No.54, Bangkok, Thailand. The sample size for estimating the population proportion was calculated using the formula below:

$$n = \frac{Z_{\alpha/2}^2 P(1-P)}{\Delta^2}$$

This formula developed by Cochran, 1963

When

P = 0.32 (the utilization of dental health services from the 6th Thai National Oral Health Survey 2006-2007)

$\alpha = 0.05$ $Z_{\alpha/2} = 1.96$

$\Delta = 0.05$

3.7 Measurement tools

1. Structure questionnaire, which consist of 5 parts 35 questions as follows

Part 1: General information consists of 16 questions included question about age, sex, income, extra income, educational level, place of living, marital status, living arrangement, occupation, systemic disease, health insurance type, transportation and price of dental services

Part 2: Oral health behavior adapted from WHO oral health questionnaire (2004) consists of 5 questions.

Part 3: Utilization of dental health services consists of 7 questions.

Part 4: Attitude toward dental treatment consists of 4 questions.

Part 5: Self-perceived oral health and dental symptoms consists of 4 questions.

Part 3, 4 and 5 was developed for this study. The structure questionnaire was carried out for

- **Validity:** The questionnaire was validated by three experts in public health. The three experts consisted of expert in elderly, research methodology and dental. The Item-Objective Congruence Index (IOC) was 0.75.
- **Reliability:** The pilot study was carried out to test the reliability of questionnaire. Another 30 elderly patients who receiving service in Health center No.39, 42 and 59 were interviewed to test the reliability of questionnaire. The Conbrach's alpha coefficient was 0.81.

2. Oral health examination form adapted from WHO ORAL HEALTH ASSESSMENT (2004) for dental health status.

3.8 Data collection

The process of data collection as follow

Preparation stage

1. Research team requested the director of Health center No.54 for permission to collect data.
2. Validated questionnaires
3. Test the reliability of questionnaire by pilot study
4. Standardize interviewer: this research had 2 assistants for interview. The assistants were selected from the same educational level. The interviewers were trained to understand the questionnaire the way for data collection. The researcher explained the statement of problem, objective, data collection tools, sampling procedures, plan for data collection and plan for data analysis of this study to the interviewers and explained the topic of questionnaire step by step. Then in-depth discussion was carried out. The interviewers were taught basic

interview technique such as asking questions in a natural manner, not showing by words or expression what answers one expects, not showing agreement, disagreement or surprise and recording answers to open questions precisely as they are provided, without sifting or interpreting them. Furthermore, clear instructions, how interviewers introduce themselves to the interviewee, what to say concerning the purpose of the study, how to ask for consent and how to close the interview also taught. Then practical training was trained by role-play and pre-test.

5. Standardize dentist: only one dentist (researcher) diagnosed elderly patient's oral cavity. The internal reliability of diagnosis dental caries and periodontal disease by recheck elderly patient's oral cavity 10% of sample size. Analysis internal reliability with statistic Kappa. Result, Kappa was 0.99, indicated that internal reliability was high belief.

Operation stage

1. Research team introduce themselves. The research assistants were explained the purpose and procedures of this study to the participants who were included in the study. If they was willing to participate in the study. The participants were sign inform consent before collect data.
2. Clinical examination was conducted by one examiner (researcher). Procedures and diagnostic criteria recommended by the World Health Organization (2004) were followed.

   The examination for dental caries was conducted with plane mouth mirrors, WHO CPI probed and using light in dental unit.

   The examination for periodontal status was conducted with WHO CPI probe, a specially designed lightweight CPI probe with a 0.5 mm. ball tip is used, with a black band between 3.5 and 5.5 mm. and rings at 8.5 and 11.5 mm. from ball tip.
3. The participants who had dental health problems were face-to-face interviewed by trained interviewers using a structure questionnaire.

3.9 Data analysis

Data was analyzed using **descriptive statistic**

- Frequency distribution and percentage were used to describe the general characteristic, oral health behavior, utilization of dental health services, attitude toward dental treatment, self-perceived oral health, dental symptom and dental status (for prevalence of caries and periodontal disease).
- Mean and standard deviation were used to describe age, monthly income, duration of time spent on transportation, duration and quantity of smoking and dental status (for DMFT).

And using **chi-square** to analyze the association between influence factors: age, gender, educational attainment, marital status, living arrangements, occupation, presence of systemic disease, dental health status, oral health behaviors, self-perceived oral health, attitude toward dental treatment, dental symptoms, income, cost of care, convenience to transportation, availability of dental services and health insurance.

3.10 Ethical consideration

Before data collection, ethics approval was sought from the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University.

3.11 Limitation

The results did not representative the entire patients due to

- the cross-sectional design, study only one period of time
- the study was done only in one health center.
- the study was done only in urban area.

3.12 Expected benefit & application

The results from this study will create new information and form a basis for further research in the utilization of dental health services by elderly patients. This will further benefit to improve dental health services and increase dental health program for elderly patients.

CHAPTER IV
RESULTS

This study was descriptive cross-sectional study aim to explore the factors associated with the utilization of dental health services in elderly patients who have oral health problems in diabetes, hypertension, elderly and general clinic, Health center No.54, Bangkok, Thailand. 335 elderly patients were collected from 4 January to 10 February 2012 by face-to-face interviewed using a structure questionnaire at the Health Center no.54. The measurement tools consist of structure questionnaire and oral health examination form which adapted from WHO ORAL HEALTH ASSESSMENT (2004) for dental and periodontal health status. The structure questionnaire consists of 5 parts

Part 1: General information included question about age, sex, income, extra income, educational level, place of living, marital status, living arrangement, occupation, systemic disease, health insurance type, transportation and price of dental services

Part 2: Oral health behavior adapted from WHO oral health questionnaire (2004)

Part 3: Utilization of dental health services

Part 4: Reason for not using dental health services and attitude toward dental treatment

Part 5: Self-perceived oral health and dental symptoms

Data was analyzed using descriptive statistic and chi-square. The finding was divided into 4 sections

1. Distribution of general characteristics, oral health behavior, utilization of dental health services, reason for not using dental health services, attitude toward dental treatment, self-perceived oral health and dental symptoms
2. Distribution of oral health status
3. Association between general characteristics, oral health behavior, attitude toward dental treatment, self-perceived oral health and dental symptoms and the utilization of dental health services.
4. Association between oral health status and the utilization of dental health services.

4.1 Distribution of general characteristics, oral health behavior, utilization of dental health services, reason for not going to received dental health services, attitude toward dental treatment, self-perceived oral health and dental symptoms

4.1.1 General characteristics

Among 335 elderly patients, most of the samples were female (255 persons, 76.1%). The average age (SD) was 66.53 (5.87) years old. 41.5 percent had income less than 1,500 baht per month. Most of the samples received financial aids for elderly (93.4%). 66.3 percent finished primary school. 66.9 percent were living in the area of Health Center no.54. 76.1% percent were married and 95.8 percent lived with family member. 75.8% percent did not work. Systemic disease, 41.5%, 66.3%, 11.6% and 50.7% had diabetes, hypertension, cardiovascular disease and cholesterol, respectively. 105 (31.3%) persons came from general clinic. 65.7 percent had universal coverage of Health Center no.54. 37.3 percent went to Health Center no.54 by hackney and 71.6 percent went to Health Center no.54 by themselves. The average duration of transportation (SD) was 17.48 (11.49) minutes. 97.3 percent felt convenient to go to Health Center no.54. 47.2 percent thought the price of dental services was inexpensive. (Table 1)

Table 1: Distribution of general characteristics

Characteristics	Number	Percentage
Gender (n=335)		
Male	80	23.9
Female	255	76.1
Age (n=335)		
60-69 years	236	70.4
70-79 years	94	28.1
≥80 years	5	1.5

Characteristics	Number	Percentage
Age (n=335)		
Mean (S.D.) = 66.53 (5.87)		
min-max = 60-88		
Monthly income (n=335)		
< 1,500 baht	139	41.5
1,501-3,000 baht	82	24.5
3,001-5,000 baht	44	13.1
5,001-10,000 baht	49	14.6
≥ 10,001 baht	21	6.3
Mean (S.D.) = 3,947.16 (5.33)		
min-max = 0-50,000		
Extra income (n=331)		
Financial aids for elderly	309	93.4
Financial aid for disable	6	1.8
Pension	14	4.2
Health volunteer	2	0.6
Educational level (n=335)		
Illiteracy	33	9.9
Primary school	222	66.3
Secondary school	49	14.6
Vocational school	12	3.6
Bachelor degree	16	4.8
Master degree	3	0.9
Place of living (n=335)		
Area of Health Center no.54	224	66.9
Out of area of Health Center no.54	111	33.1

Characteristics	Number	Percentage
Marital status (n=335)		
Single	25	7.5
Married	255	76.1
Divorce/separate	20	6.0
Windowed	35	10.4
Living arrangement (n=335)		
Lives alone	14	4.2
Lives with family member	321	95.8
Occupation (n=335)		
Agricultural	12	3.6
Employee	11	3.3
Retired	24	7.2
Merchant	20	6.0
Private business	12	3.6
Health volunteer	2	0.6
No occupation	254	75.8
Systemic disease		
Diabetes (n=335)		
Yes	139	41.5
No	196	58.5
Hypertension (n=335)		
Yes	222	66.3
No	113	33.7
Cardiovascular disease (n=335)		
Yes	39	11.6
No	296	88.4

Characteristics	Number	Percentage
Systemic disease		
Cholesterol (n=335)		
Yes	170	50.7
No	165	49.4
Clinic (n=335)		
Diabetes	96	28.7
Hypertension	62	18.5
Elderly	72	21.5
General	105	31.3
Health insurance (n=335)		
Universal coverage (Health Center no.54)	220	65.7
Universal coverage (other)	71	21.2
Social insurance	5	1.5
Government/state enterprise officer	36	10.7
Disable	1	0.3
Do not have	2	0.6
Transportation (n=335)		
By bus	64	19.1
By car	55	16.4
By hackney	125	37.3
By motorcycle	49	14.6
By walk	31	9.3
By bicycle	11	3.3
Go to Health Center no.54 with (n=335)		
By themselves	240	71.6
With family or cousin	92	27.5
With friend	3	0.9

Characteristics	Number	Percentage
Duration for transportation (n=335)		
Mean (S.D.) = 17.48 (11.49) minutes		
min-max = 2-60 minutes		
Convenient of transportation (n=335)		
Yes	326	97.3
No	9	2.7
Price of dental services (n=335)		
Inexpensive	158	47.2
Reasonable	112	33.4
Expensive	65	19.4

4.1.2 Oral health behavior

This study showed that 99.7 percent of the samples cleaned their oral cavity by tooth brushing, 50.4 percent used toothpicks. 11.9 percent used dental floss. 82.9 percent were brushing the teeth two times per day. 10 elderly patients were smoking cigarettes (3.0%) and 29 elderly patients were ever smoker (8.7%). 89.7 percent smoked more than 10 years and 51.3 percent smoked less than 10 rolls per day. (Table 2)

Table 2: Distribution of oral health behavior

Characteristics	Number	Percentage
Method for cleaning oral cavity		
Tooth brushing (n=335)		
Yes	334	99.7
No	1	0.3

Characteristics	Number	Percentage
Method for cleaning oral cavity		
Mouth rinse (n=335)		
Yes	104	31.0
No	231	69.0
Mean (S.D.) = 1.35 (0.60) times per day		
Salt solution (n=335)		
Yes	118	35.2
No	217	64.8
Mean (S.D.) = 1.32 (0.57) times per day		
Dental floss (n=335)		
Yes	40	11.9
No	295	88.1
Mean (S.D.) = 1.52 (0.78) times per day		
Tooth pick (n=335)		
Yes	169	50.4
No	49.6	49.6
Mean (S.D.) = 2.14 (0.89) times per day		
Frequency of tooth brushing(n=334)		
Once a day	26	7.8
Two times per day	277	82.9
Three times per day	28	8.4
More than three times per day	3	0.9
Smoking (n=335)		
Never	296	88.4
Ever	29	8.7
Current smoker	10	3.0

Characteristics	Number	Percentage
Duration of smoking (n=39)		
≤ 10 years	4	10.3
>10 years	35	89.7
Quantity of smoking (n=39)		
≤ 10 rolls/day	20	51.3
>10 rolls/day	19	48.7
Duration of stop smoking (n=29)		
Mean (SD) = 18.97 (10.45)		

4.1.3 Dental health service utilization

For the utilization of dental health services, 48.9 percent of the samples had visited a dentist in the past year. 3.9 percent never received dental services. 48.8 percent were received extraction last time. Most of the samples (88.5%) went to the dentist for emergency. 50.3 percent did not use health insurance for dental health services. 48.1 percent were received dental health services at Health Center no.54. 82.9 percent did not had regular dentist and 91.0 percent did not check up regularly. (Table 3)

Table 3: Distribution of dental health service utilization

Characteristics	Number	Percentage
Last time dental services were used (n=335)		
Less than 6 months	108	32.2
6-12 months	56	16.7
More than 1 year, but less than 2 years	66	19.7
More than 2 year, but less than 5 years	36	10.7
More than 5 years	56	16.7
Never received dental service	13	3.9

Characteristics	Number	Percentage
Last time treatments were received (n=322)	157	48.8
Extraction	67	20.8
Restoration	32	9.9
Cleaning/scaling	56	17.4
Denture wearing	10	3.1
Dental examination		
Reason to go to received dental services (n=322)		
Routine/planned	37	11.5
Emergency	285	88.5
Using health insurance for dental services (n=322)		
Yes	160	49.7
No	162	50.3
Received dental services at: (n=322)		
Government hospital	33	10.2
Private hospital	13	4.0
Private dental clinic	104	32.3
Health Center no.54	155	48.1
Other Health Center	14	4.3
Mobile dental unit	3	0.9
Had regular dentist (n=322)		
Yes	55	17.1
No	267	82.9
Check up regular (n=322)		
Yes	29	9.0
No	293	91.0

4.1.4 Reason for not using dental health services and attitude toward dental treatment

Reason for not using dental health services in the past for the samples who have seen a dentist more than 1 year and never received dental care (n=171), 15.2 percent strongly agree and 7.6 percent agree for not using dental health services because of cost. 25.1 percent strongly agree and 14.0 percent agree for not using dental health services because of scared. 28.7 percent strongly agree and 5.3 percent agree for not using dental health services because of bad experience. 68.4 percent strongly agree and 19.3 percent agree for not using dental health services because of no need. 7.0 percent strongly agree and 17.5 percent agree for not using dental health services because went to the dentist is a waste time. 4.7 percent strongly agree and 7.0 percent agree for not using dental health services because embarrassed about the condition of mouth. 4.1 percent strongly agree and 9.9 percent agree for not using dental health services because worried about may need a lot of dental treatment. 5.8 percent strongly agree and 10.5 percent agree for not using dental health services because they did not have enough information about dental procedures. 5.8 percent strongly agree and 6.4 percent agree for not using dental health services because they did not feeling free to ask questions. 1.8 percent strongly agree and 8.2 percent agree for not using dental health services because they did not like smells in the dental clinic. 2.3 percent strongly agree and 4.1 percent agree for not using dental health services because they did not confident about the sterilization of dental equipment. (Table 4) When consider to the score of the reason for not using dental health services in the past (strongly agree = 5, agree = 4, not sure = 3, disagree = 2, strongly disagree = 1), the highest score was no need (mean (SD) = 4.39 (1.15)) and the lowest score was not confident about the sterilization of dental equipment (mean (SD) = 1.57 (0.92)). (Table 5)

Attitude toward dental treatment, 50.1 percent of the samples were afraid about visiting a dentist for treatment. 77.3 percent were afraid in pain, 55.6

percent were afraid in injections and 55.0 percent were afraid drilling. 40.9 percent thought dental services were important only when they had symptoms. 31.9 percent thought regular visits to the dentist is necessary when they had symptoms. (Table 4) When consider to the score of the attitude toward dental treatment, the average score of overall feeling about visiting a dentist for treatment, important for receiving dental services and regular visits to the dentist is necessary (SD) were 1.96 (1.21), 3.18 (1.24) and 2.73 (1.29), respectively. (Table 5)

Table 4: Distribution of the reason for not using dental health services and attitude toward dental treatment

Characteristics	Number	Percentage
Reason for not using dental health services in the past		
Cost (n=171)		
Strongly agree	26	15.2
Agree	13	7.6
Not sure	7	4.1
Disagree	42	24.6
Strongly disagree	83	48.5
Scared (n=171)		
Strongly agree	43	25.1
Agree	24	14.0
Not sure	0	0
Disagree	38	22.2
Strongly disagree	66	38.6

Characteristics	Number	Percentage
Reason for not using dental health services in the past		
Bad experience (n=171)		
Strongly agree	49	28.7
Agree	9	5.3
Not sure	4	2.3
Disagree	47	27.5
Strongly disagree	62	36.3
No need (n=171)		
Strongly agree	117	68.4
Agree	33	19.3
Not sure	3	1.8
Disagree	6	3.5
Strongly disagree	12	7.0
Go to the dentist is a waste time (n=171)		
Strongly agree	12	7.0
Agree	30	17.5
Not sure	1	0.6
Disagree	43	25.1
Strongly disagree	85	49.7
Embarrassed about the condition of mouth (n=171)		
Strongly agree	8	4.7
Agree	12	7.0
Not sure	2	1.2
Disagree	51	29.8
Strongly disagree	98	57.3

Characteristics	Number	Percentage
Worried about may need a lot of dental treatment (n=171)		
Strongly agree	7	4.1
Agree	17	9.9
Not sure	6	3.5
Disagree	57	33.3
Strongly disagree	84	49.1
Not enough information about dental procedures (n=171)		
Strongly agree	10	5.8
Agree	18	10.5
Not sure	11	6.4
Disagree	49	28.7
Strongly disagree	83	48.5
Not feeling free to ask questions (n=171)		
Strongly agree	10	5.8
Agree	11	6.4
Not sure	10	5.8
Disagree	47	27.5
Strongly disagree	93	54.4
Do not like smells in the dental clinic (n=171)		
Strongly agree	3	1.8
Agree	14	8.2
Not sure	8	4.7
Disagree	56	32.7
Strongly disagree	90	52.6

Characteristics	Number	Percentage
Not confident about the sterilization of dental equipment (n=171)		
Strongly agree	4	2.3
Agree	7	4.1
Not sure	6	3.5
Disagree	49	28.7
Strongly disagree	105	61.4
Overall feeling about visiting a dentist for treatment (n=335)		
Not all afraid	167	49.9
Only a little afraid	83	24.8
Moderate afraid	32	9.6
Very afraid	38	11.3
Terrible	15	4.5
If you are all afraid, of what you are afraid? Pain (n=172)		
Yes	133	77.3
No	39	22.7
If you are all afraid, of what you are afraid? Injections (n=172)		
Yes	95	55.6
No	76	44.4
If you are all afraid, of what you are afraid? Drilling (n=172)		
Yes	94	55.0
No	77	45.0

Characteristics	Number	Percentage
The important for receiving dental services (n=335)		
Essential	58	17.3
Very important	104	31.0
Somewhat important	24	7.2
Important only when I am in pain	137	40.9
Not all important	12	3.6
Regular visits to the dentist is necessary (n=335)		
Essential	30	9.0
Very important	87	26.0
Somewhat important	45	13.4
Important only when I am in pain	107	31.9
Not all important	66	19.7

Table 5: The average score of reason for not using dental health services in the past and attitude toward dental treatment

Characteristics	Mean (SD)
Reason for not using dental health services in the past (strongly agree = 5, agree = 4, not sure = 3, disagree = 2, strongly disagree = 1)	
Cost (n=171)	2.16 (1.48)
Scared (n=171)	2.65 (1.68)
Bad experience (n=171)	2.63 (1.67)
No need (n=171)	4.39 (1.15)
Go to the dentist is a waste time (n=171)	2.07 (1.36)
Embarrassed about the condition of mouth (n=171)	1.72 (1.10)
Worried about may need a lot of dental treatment (n=171)	1.87 (1.13)
Not enough information about dental procedures (n=171)	1.96 (1.23)

Characteristics	Mean (SD)
Reason for not using dental health services in the past	
Not feeling free to ask questions (n=171)	1.82 (1.17)
Do not like smells in the dental clinic (n=171)	1.74 (1.00)
Not confident about the sterilization of dental equipment (n=171)	1.57 (0.92)
Attitude toward dental treatment	
Overall feeling about visiting a dentist for treatment (n=335)	1.96 (1.21)
(terrible = 5, very afraid = 4, moderate afraid = 3,	
only a little afraid = 2, not all afraid = 1)	
The important for receiving dental services (n=335)	3.18 (1.24)
(essential = 5, very important = 4, somewhat important = 3,	
important only when I am in pain = 2, not all important = 1)	
Regular visits to the dentist is necessary (n=335)	2.73 (1.29)
(essential = 5, very important = 4, somewhat important = 3,	
important only when I am in pain = 2, not all important = 1)	

4.1.5 Self-perceived oral health and dental symptoms

Self-perceived oral health, 32.5, 31.3 and 29.3 percent were state their oral health poor, fair and good, respectively. 64.5 percent satisfy their oral health. Dental symptoms within last 6 months, 18.2 percent had toothache or discomfort, 27.8 percent had tooth mobility, 20.9 percent had gingival inflammation, 56.4 percent had dental calculus, 36.7 percent had tooth sensitivity, 40.0 percent had dental caries, 15.8 percent had oral ulcer, 57.6 percent had bad breath and 15.2 percent feel pain or ill-fitting denture. (Table 6)

Table 6: Distribution of self-perceived oral health and dental symptoms

Characteristics	Number	Percentage
State of oral health (n=335)		
Excellent	10	3.0
Good	98	29.3
Fair	105	31.3
Poor	109	32.5
Very poor	13	3.9
Mean (SD) = 2.95 (0.95)		
Satisfy their oral health (n=335)		
Yes	216	64.5
No	119	35.5
Dental symptoms		
Toothache or discomfort (n=335)		
Yes	61	18.2
No	274	81.8
Tooth mobility (n=335)		
Yes	93	27.8
No	242	72.2
Gingival inflammation or bleeding on brushing (n=335)		
Yes	70	20.9
No	265	79.1
Dental calculus (n=335)		
Yes	189	56.4
No	145	43.5
Tooth sensitivity (n=335)		
Yes	123	36.7
No	212	63.3

Characteristics	Number	Percentage
Dental symptoms		
Dental caries or tooth cavity (n=335)		
Yes	134	40.0
No	201	60.0
Oral ulcer (n=335)		
Yes	53	15.8
No	282	84.2
Bad breath (n=335)		
Yes	193	57.6
No	142	42.4
Pain or ill-fitting denture (n=335)		
Yes	51	15.2
No	284	84.7

4.2 Oral health status

The prevalence of dental caries and periodontal disease of the samples were 74.3% and 86.9%, respectively. (Table 7) The mean DMFT (SD) was 19.56 (7.80) teeth per person. Mean DT (SD) was 2.87 (3.21) teeth per person. Mean MT (SD) was 14.01 (8.05) teeth per person. Mean FT (SD) was 2.68 (4.21) teeth per person. (Table 8) 60.0 and 70.4 percent did not wear upper and lower denture, respectively. (Table 9)

Table 7: Prevalence of dental caries and periodontal disease

Oral status	Number	Percentage
Dental caries (n=335)		
Yes	249	74.3
No	86	25.7
Periodontal disease (n=335)		
Yes	291	86.9
No	44	13.1

Table 8: Distribution of mean Decay, Missing and Filled Teeth (DMFT)

Oral status	Mean (S.D.)
Mean DMFT (n=335)	19.56 (7.80)
Decay teeth (DT)	2.87 (3.21)
Missing teeth (MT)	14.01 (8.05)
Filled teeth (FT)	2.68 (4.21)

Table 9: Distribution of denture wearing

Oral status	Number	Percentage
Upper denture (n=335)		
No denture	203	60.6
Partial denture	105	31.3
Full denture	27	8.1
Lower denture (n=335)		
No denture	236	70.4
Partial denture	96	28.7
Full denture	3	0.9

4.3 Association between general characteristics, oral health behavior, attitude toward dental treatment, self-perceived oral health and dental symptoms and the utilization of dental health services

4.3.1 Association between general characteristics and the utilization of dental health services

The association between general characteristics (gender, age, monthly income, extra income, educational level, place of living, marital status, living arrangement, occupation, systemic disease, clinic, health insurance, transportation, presence of supporting person to bring to Health Center no.54 , convenient of transportation and price of dental health services) and the utilization of dental health services by using Chi-square test showed that there were significant association between monthly income, hypertension, cholesterol, presence of supporting person to bring to Health Center no.54 and price of dental health services and the utilization of dental health services at P-value < 0.05. (table10)

Table 10: Association between general characteristics and the utilization of dental health services

Variable	**Dental service utilization**		χ^2	**P-value**
	Use (%)	**Not use (%)**		
Gender (n=335)				
Male	43 (53.8)	37 (46.2)	0.967	0.325
Female	121 (47.5)	134 (52.5)		
Age (n=335)				
60-69 years	113 (47.9)	123 (52.1)	0.648	0.723
70-79 years	49 (52.1)	45 (47.9)		
≥80 years	2 (40.0)	3 (60.0)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Monthly income (n=335)				
< 1,500 baht	50 (36.0)	89 (64.0)	16.321	**0.003**
1,501-3,000 baht	46 (56.1)	36 (43.9)		
3,001-5,000 baht	26 (59.1)	18 (40.9)		
5,001-10,000 baht	29 (59.2)	20 (40.8)		
≥ 10,001 baht	13 (61.9)	8 (38.1)		
Extra income (n=331)				
Financial aids for elderly	148 (47.9)	161 (52.1)	2.972	0.226
financial aid for disable	2 (33.3)	4 (66.7)		
Pension	10 (71.4)	4 (28.6)		
Health volunteer	1 (50.0)	1 (50.0)		
Educational level (n=335)				
Illiteracy	13 (29.4)	20 (60.6)	11.048	0.050
Primary school	101 (45.5)	121 (54.5)		
Secondary school	29 (59.2)	20 (40.8)		
Vocational school	9 (75.0)	3 (25.0)		
Bachelor degree	9 (56.3)	7 (43.7)		
Master degree	3 (100.0)	0 (0.0)		
Place of living (n=335)				
Area of Health Center no.54	112 (50.0)	112 (50.0)	0.295	0.587
Out of area of Health Center no.54	52 (46.8)	59 (53.2)		
Marital status (n=335)				
Single	14 (56.0)	11 (14.0)	1.141	0.767
Married	125 (49.0)	130 (51.0)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Marital status (n=335)				
Divorce/separate	8 (40.0)	12 (60.0)		
Windowed	17 (48.6)	18 (51.4)		
Living arrangement (n=335)				
Lives alone	8 (57.1)	6 (42.9)	0.392	0.531
Lives with family member	156 (48.6)	165 (51.4)		
Occupation (n=335)				
Agricultural	4 (33.3)	8 (66.7)	12.255	0.057
Employee	2 (18.2)	9 (81.8)		
Retired	16 (66.7)	8 (33.3)		
Merchant	8 (40.0)	12 (60.0)		
Private business	9 (75.0)	3 (25.0)		
Health volunteer	1 (50.0)	1 (50.0)		
No occupation	124 (48.8)	130 (51.2)		
Systemic disease				
Diabetes (n=335)				
Yes	67 (48.2)	72 (51.8)	0.054	0.816
No	97 (49.5)	99 (50.5)		
Hypertension (n=335)				
Yes	99 (44.6)	123 (55.4)	5.008	**0.025**
No	65 (57.5)	48 (42.5)		
Cardiovascular disease (n=335)				
Yes	18 (46.2)	21 (53.8)	0.139	0.710
No	146 (49.3)	150 (50.7)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Systemic disease				
Cholesterol (n=335)				
Yes	70 (41.2)	100 (58.8)	8.358	**0.004**
No	94 (57.0)	71 (43.0)		
Clinic (n=335)				
Diabetes	44 (45.8)	52 (54.2)	5.930	0.115
Hypertension	26 (41.9)	36 (58.1)		
Elderly	44 (61.1)	28 (38.9)		
General	50 (47.6)	55 (52.4)		
Health insurance (n=335)				
Universal coverage (Health Center no.54)	106 (48.2)	114 (51.8)	3.960	0.555
Universal coverage (other)	35 (49.3)	36 (50.7)		
Social insurance	1 (20.0)	4 (80.0)		
Government/state enterprise officer	21 (58.3)	15 (41.7)		
Disable	0 (0.0)	1 (100.0)		
Do not have	1 (50.0)	1 (50.0)		
Transportation (n=335)				
By bus	31 (48.4)	33 (51.6)	1.833	0.872
By car	29 (52.7)	26 (47.3)		
By hackney	59 (47.2)	66 (52.8)		
By motorcycle	22 (44.9)	27 (55.1)		
By walk	16 (51.6)	15 (48.4)		
By bicycle	7 (63.6)	4 (36.4)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Go to Health Center no.54 with (n=335)				
By themselves	129 (53.8)	111 (46.2)	7.801	**0.020**
With family or cousin	34 (37.0)	58 (63.0)		
With friend	1 (33.3)	2 (66.7)		
Convenient of transportation (n=335)				
Yes	161 (49.4)	165 (50.6)	0.903	0.342
No	3 (33.3)	6 (66.7)		
Price of dental services (n=335)				
Inexpensive	89 (56.3)	69 (43.7)	7.095	**0.029**
Reasonable	45 (40.2)	67 (59.8)		
Expensive	30 (46.2)	35 (53.8)		

4.3.2 Association between oral health behavior and the utilization of dental health services

The association between oral health behavior (method for cleaning oral cavity and smoking behavior) and the utilization of dental health services by using Chi-square test showed that there were no significant association between oral health behavior and the utilization of dental health services. (P-value > 0.05) (Table 11)

Table 11: Association between oral health behavior and the utilization of dental health services

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Method for cleaning oral cavity				
Tooth brushing (n=335)				
Yes	164 (49.1)	170 (50.9)	0.962	0.327
No	0 (0.0)	1 (100.0)		
Mouth rinse (n=335)				
Yes	50 (48.1)	54 (51.9)	0.047	0.829
No	114 (49.4)	117 (50.6)		
Salt solution (n=335)				
Yes	61 (51.7)	57 (48.3)	0.547	0.459
No	103 (47.5)	114 (52.5)		
Dental floss (n=335)				
Yes	25 (62.5)	15 (37.5)	3.335	0.068
No	139 (47.1)	156 (52.9)		
Tooth pick (n=335)				
Yes	75 (44.4)	94 (55.6)	2.859	0.091
No	89 (53.6)	77 (46.4)		
Frequency of tooth brushing (n=334)				
Once a day	9 (34.6)	17 (65.4)	5.931	0.115
Two times per day	139 (50.2)	138 (49.8)		
Three times per day	16 (57.1)	12 (42.9)		
More than three times per day	0 (0.0)	3 (100.0)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Smoking (n=335)				
Never	148 (50.0)	148 (50.0)	1.765	0.414
Ever	13 (44.8)	16 (55.2)		
Current smoker	3 (30.0)	7 (70.0)		
Duration of smoking (n=39)				
≤ 10 years	2 (50.0)	2 (50.0)	0.148	0.700
>10 years	14 (40.0)	21 (60.0)		
Quantity of smoking (n=39)				
≤ 10 rolls/day	8 (40.0)	12 (60.0)	0.018	0.894
>10 rolls/day	8 (42.1)	11 (57.9)		

4.3.3 Association between the receiving dental health services and the utilization of dental health services

The association between receiving dental health services (treatment received last time, using health insurance for dental health services, place of receiving dental health services, had regular dentist and check up regular) and the utilization of dental health services by using Chi-square test showed that there were significant association between treatment received last time, using health insurance for dental health services, place of receiving dental health services and check up regular and the utilization of dental health services at P-value < 0.05. (table 12)

Table 12: Association between the receiving dental health services and the utilization of dental health services

Variable	**Dental service utilization**		χ^2	**P-value**
	Use (%)	**Not use (%)**		
Last time treatments were received (n=322)				
Extraction	81 (51.3)	77 (48.7)	16.727	**0.002**
Restoration	43 (64.2)	24 (35.8)		
Cleaning/scaling	17 (53.1)	15 (48.9)		
Denture wearing	16 (29.1)	39 (70.9)		
Dental examination	7 (70.0)	3 (30.0)		
Reason to go to received dental services (n=322)				
Routine/planned	24 (64.9)	13 (35.1)	3.247	0.072
Emergency	140 (49.1)	145 (50.9)		
Using health insurance for dental services (n=322)				
Yes	98 (61.3)	62 (38.8)	13.548	**< 0.001**
No	66 (40.7)	96 (59.3)		
Received dental services at: (n=322)				
Government hospital	19 (57.6)	14 (42.4)	39.367	**< 0.001**
Private hospital	9 (69.2)	4 (30.8)		
Private dental clinic	31 (29.8)	73 (70.2)		
Health Center no.54	101 (65.2)	54 (34.8)		
Other Health Center	4 (28.6)	10 (71.4)		
Mobile dental unit	0 (0.0)	3 (100.0)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Had regular dentist (n=322)				
Yes	31 (56.4)	24 (43.6)	0.783	0.376
No	133 (49.8)	134 (50.2)		
Check up regular (n=322)				
Yes	29 (100.0)	0 (0.0)	30.704	**< 0.001**
No	135 (46.1)	158 (53.9)		

4.3.4 Association between attitude toward dental treatment and the utilization of dental health services

The association between attitude toward dental treatment (overall feeling about visiting dentist for treatment, the important for receiving dental health services and regular visits) and the utilization of dental health services by using Chi-square test showed that overall feeling about visiting a dentist for treatment and the important of regular visits to the dentist were significant association with the utilization of dental health services at P-value < 0.05. (Table 13)

Table 13: Association between attitude toward dental treatment and the utilization of dental health services

Variable	**Dental service utilization**		χ^2	**P-value**
	Use (%)	**Not use (%)**		
Overall feeling about visiting a dentist for treatment (n=335)				
Not all afraid	88 (52.7)	79 (47.3)	13.649	**0.009**
Only a little afraid	45 (54.2)	38 (45.8)		
Moderate afraid	14 (43.8)	18 (56.2)		
Very afraid	16 (42.1)	22 (57.9)		
Terrible	1 (6.7)	14 (93.3)		
If you are all afraid, of what you are afraid? Pain (n=172)				
Yes	61 (45.9)	72 (54.1)	0.001	0.975
No	18 (46.2)	21 (53.8)		
If you are all afraid, of what you are afraid? Injections (n=172)				
Yes	38 (40.0)	57 (60.0)	3.304	0.069
No	41 (53.9)	35 (46.1)		
If you are all afraid, of what you are afraid? Drilling (n=172)				
Yes	45 (47.9)	49 (62.1)	0.235	0.628
No	34 (44.2)	43 (65.8)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
The important for receiving dental services (n=335)				
Essential	29 (50.0)	29 (50.0)	5.422	0.247
Very important	52 (50.0)	52 (50.0)		
Somewhat important	11 (45.8)	13 (54.2)		
Important only when I am in pain	70 (51.1)	67 (48.9)		
Not all important	2 (16.7)	10 (83.3)		
Regular visits to the dentist is necessary (n=335)				
Essential	18 (60.0)	12 (40.0)	25.562	**< 0.001**
Very important	48 (55.2)	39 (44.8)		
Somewhat important	20 (44.4)	25 (55.6)		
Important only when I am in pain	63 (58.9)	44 (41.1)		
Not all important	15 (22.7)	51 (77.3)		

4.3.5 Association between self-perceived oral health and dental symptoms and the utilization of dental health services

The association between self-perceived oral health (state of oral health and satisfaction of their oral health) and dental symptoms (toothache or discomfort , tooth mobility, gingival inflammation, dental calculus, tooth sensitivity, dental caries, oral ulcer, bad breath and pain or ill-fitting denture) and the utilization of

dental health services by using Chi-square test showed that there were no significant association. (P-value > 0.05) (Table 14)

Table 14: Association between self-perceived oral health, dental symptoms and the utilization of dental services

Variable	**Dental service utilization**		χ^2	**P-value**
	Use (%)	**Not use (%)**		
State of oral health (n=335)				
Excellent	5 (50.0)	5 (50.0)	2.797	0.592
Good	43 (43.9)	55 (96.1)		
Fair	57 (54.3)	48 (45.7)		
Poor	54 (49.5)	55 (50.5)		
Very poor	5 (38.5)	8 (61.5)		
Satisfy their oral health (n=335)				
Yes	100 (46.3)	116 (53.7)	1.720	0.190
No	64 (53.8)	55 (46.2)		
Dental symptoms				
Toothache or discomfort (n=335)				
Yes	26 (42.6)	35 (57.4)	1.197	0.274
No	138 (50.4)	136 (49.6)		
Tooth mobility (n=335)				
Yes	38 (40.9)	55 (59.1)	3.376	0.066
No	126 (52.1)	116 (47.9)		
Gingival inflammation or bleeding on brushing (n=335)				
Yes	39 (55.7)	31 (44.3)	1.618	0.203
No	125 (47.2)	140 (52.8)		

Variable	Dental service utilization		χ^2	P-value
	Use (%)	Not use (%)		
Dental symptoms				
Dental calculus (n=335)				
Yes	91 (48.1)	98 (51.9)	0.113	0.737
No	73 (50.0)	73 (50.0)		
Tooth sensitivity (n=335)				
Yes	60 (48.8)	63 (51.2)	0.002	0.961
No	104 (49.1)	108 (50.9)		
Dental caries or tooth cavity (n=335)				
Yes	58 (43.3)	76 (56.7)	2.875	0.090
No	106 (52.7)	95 (47.3)		
Oral ulcer (n=335)				
Yes	25 (47.2)	28 (52.8)	0.080	0.777
No	139 (49.3)	143 (50.7)		
Bad breath (n=335)				
Yes	92 (47.7)	101 (52.3)	0.302	0.583
No	72 (50.7)	70 (49.3)		
Pain or ill-fitting denture (n=335)				
Yes	27 (52.9)	24 (47.1)	0.382	0.536
No	137 (48.2)	147 (51.8)		

4.4 Association between oral health status and the utilization of dental health services

By using Chi-square test, prevalence of dental caries was significant association with the utilization of dental health services at P-value < 0.05. (Table 15)

Table 15: Association between oral health status and the utilization of dental health services

Variable	**Dental service utilization**		χ^2	**P-value**
	Use (%)	**Not use (%)**		
Dental caries (n=335)				
Yes	114 (45.8)	135 (54.2)	3.906	**0.048**
No	50 (58.1)	36 (41.9)		
Periodontal disease (n=335)				
Yes	143 (49.1)	148 (50.9)	0.031	0.861
No	21 (47.7)	23 (52.3)		
Upper denture (n=335)				
No denture	97 (47.8)	106 (52.2)	1.685	0.431
Partial denture	56 (53.3)	49 (46.7)		
Full denture	11 (40.7)	16 (59.3)		
Lower denture (n=335)				
No denture	111 (47.0)	125 (53.0)	1.646	0.439
Partial denture	52 (54.2)	44 (45.8)		
Full denture	1 (33.3)	2 (66.7)		

CHAPTER V
DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussion

This study was descriptive cross-sectional study aim to explore the factors associated with the utilization of dental health services in elderly patients who have oral health problems in diabetes, hypertension, elderly and general clinic, Health center No.54, Bangkok, Thailand. 335 elderly patients were collected from 4 January to 10 February 2012 by face-to-face interviewed using a structure questionnaire at the Health Center no.54. The measurement tools consist of structure questionnaire and oral health examination form which adapted from WHO ORAL HEALTH ASSESSMENT (2004) for dental and periodontal health status. Data was analyzed by using descriptive statistic and chi-square.

5.1.1 General characteristics and the utilization of dental health services

- Monthly income: There was the significant association between monthly income and the utilization of dental health services ($P < 0.05$). This implied that the elderly who had higher income might be use dental health services more than who had lower income. This was consistent with the study of Varenne et al., 2006 and Wamala et al., 2006. Varenne et al., 2006 studied illness-related behavior and utilization of oral health services among adult city dwellers in Burkina Faso and Wamala et al., 2006 studied inequity in access to dental care services explains current socioeconomic disparities in oral health, Sweden. They found higher socio-economic associated with the use of oral health care services.

- Systemic disease: Hypertension and cholesterol were significant association with the utilization of dental health services ($P < 0.05$). This was consistent with the study of Ohi et al., 2009 who studied determinants of the utilization of dental services in a community-dwelling elderly Japanese

population. They founded presence of systemic disease associated with regular dental service utilization.

- Presence of supporting person to bring to Health Center no.54: There was the significant association between presence of supporting person to bring to Health Center no.54 and the utilization of dental health services ($P < 0.05$). The elderly who presence supporting person to bring to Health Center no.54 less use dental health services than who did not have supporting person. Contributing factor could be that elderly patients are more reluctant to impose on supporting person for help. (Brothwell et al., 2008) This was contrast with the study of Chaiyasuk et al., 2008 who studied dental health service utilization among the elderly people in Chiang Dao District, Chiang Mai Province, Thailand. They founded the elderly who had supporting person associated with dental health service utilization.

- Price of dental services: There was the significant association between price of dental services and the utilization of dental health services ($P < 0.05$). The elderly who thought the price was inexpensive might be more use dental health services.

There did not have significant association between age and educational level with the utilization of dental health services ($P > 0.05$). This was contrast with the study of Ohi et al., 2009 who found younger age and higher educational attainment were associated with the utilization of dental health services. Living arrangements, occupation and convenience of transportation also did not have significant association with utilization of dental health services ($P > 0.05$). This was contrast with the study of Chaiyasuk et al., 2008 who found living arrangements, occupation and convenience of transportation were the factors related to dental health service utilization. The controversy might be due to different in urban and rural area. From the study of Chaiyasuk et al., 2008 who studied in rural area, most of their respondents were farmer and still work. Only

one third their respondents was unemployed whereas in this study most of the sample did not have occupation (75.8%). The convenience of transportation, elderly in rural area was less likely than elderly in urban area to have their health needs met because limited available transportation and longer travel distances. (Chaiyasuk et al., 2008)

5.1.2 Oral health behavior and the utilization of dental health services

Most of the samples cleaned their oral cavity by tooth brushing (99.7%) and tooth brushing two times per day (82.9%). About half of samples using tooth pick (50.4%). This was consistent with the study of Srisaphum, 2009 who studied oral health status in diabetes patients at Changhan district, Roi et province, Thailand. She found 50.4% of the samples using tooth pick and tooth pick was associated with periodontal disease. Most of the samples were never smoke (88.4%). There was no significant association between oral health behavior and smoking behavior with the utilization of dental health services ($P > 0.05$). Contrast with the study of Ohi et al., 2009, they founded smoking was associated with lack of dental utilization during the previous year.

5.1.3 Receiving dental health services and the utilization of dental health services

48.9 percent of elderly patients had visited a dentist in the past year. The percentage of the utilization of dental health services in this study was more than the 6th Thai National Oral Health Survey 2006-2007 (32.3%) but less than Chaiyasuk et al., 2008 (73.1%) who studied in Chiang Mai Province, Thailand, 53.6% in Mexico (Gracia et al., 2007) and 64% in Japan (Sugihara et al.,2010).

- Treatment received last time: There were the significant association between treatment received last time and the utilization of dental health services ($P < 0.05$). 48.8 percent of the samples received extraction last time. Consistent with Chaiyasuk et al., 2008 who found 35.6% received extraction last time and

Rojanawarit et al., 2010 who found 50.7% received oral surgical treatments last time.

- Using health insurance for dental health services: 49.7% of the samples were using health insurance for dental health services. There were the significant association between using health insurance for dental health services and the utilization of dental health services ($P < 0.05$). The samples who had health insurance might be more use dental health services. Moffet et al., 2010 studied in Northern California founded dental insurance associated with annual dental visit. Furthermore, Jian Hu, 2009 studied in Kanchanaburi province, Thailand also founded health insurance was played an important role in improving the health service utilization. Consistent with the study of Chaiyasuk et al., 2008, they found 99.5% were covered with the Universal Coverage Scheme and 73.1% of their samples using dental health services.

- Place of receiving dental health services: The percentage of receiving dental health services at Health Center no.54 (48.1%) nearby the percentage of receiving dental health services at private dental clinic (32.3%). This was contrast with the study of Srisaphum, 2009. She founded her samples received dental health services at private dental clinic only 14.1% and mostly of her samples received dental health services at government hospital (72.7%). This controversy might be due to the different in urban and rural area. However, when consider between two groups for utilize and non-utilize dental health services. There were the significant association between place of receiving dental health services and the utilization of dental health services ($P < 0.05$). The samples who did not use dental health services within 1 year received dental health services in private dental clinic (70.2%) more than the samples who used dental health services in 1 year (29.8).

- Check up regular: There were the significant association between check up regular and the utilization of dental health services ($P < 0.05$). Only 11.5% of

the samples went to received dental services for routine and 9% check up regularly. This lower than the study of Chaiyasuk et al., 2008 who studied in Chiang Mai Province, Thailand founded 29% of their samples had a routine check-up whereas Srisaphum, 2009 studied in Roi et province, Thailand founded 2.7% of her samples had a routine check-up.

5.1.4 Reason for not using dental health services

The reason for not using dental health services in the past that most of the samples answered (87.7%) and had the highest score (mean (SD) = 4.39 (1.15)) was no need. This was consistent with the study of Arpin et al., 2008 who studied dental caries, problems perceived and use of services in Canada, they founded their samples not using dental health services because of no need. Consider to the studied of Chaiyasuk et al., 2008 in Chiang Mai Province, Thailand. They founded their samples agreed that visiting dental health personnel is needed only when having oral health problem. They founded 83.1% not using dental health services because of no need. The samples felt no need may be because they did not have symptoms. Dental caries and periodontal disease are multifactorial etiology which using time to pathogenesis of disease. Most of people did not have any symptoms between pathogenesis of disease so they felt no need to use dental health services. However, when they have symptoms, dental disease can be disabling as well as tooth loss. (Katz and Meskin, 1986; Sugihara et al., 2010)

5.1.5 Attitude toward dental treatment and the utilization of dental health services

- Overall feeling about visiting a dentist for treatment: There was the significant association between overall feeling about visiting a dentist for treatment and the utilization of dental health services ($P < 0.05$). The samples who afraid for treatment might not use dental health services. However, there were not significant association between specific afraid in pain, injection and drilling with

the utilization of dental health services (P > 0.05). This was contrast with the study of Heaton et al., 2004 who studied factors influencing use of dental services in rural and urban communities. They founded positively correlated between dental fear and specific fear. Consider to the studied of Chaiyasuk et al., 2008. They founded their samples felt dental treatment was frightful.

- The necessary of regular visits: There was the significant association between necessary of regular visits and the utilization of dental health services (P < 0.05) which consistent with the studied of Chaiyasuk et al., 2008. 77.3% of the samples who did not use dental health services in 1 year thought regular visits were not all important whereas 60.0% and 55.2% of the samples who used dental health services in 1 year thought regular visits were essential and very important, respectively.

5.1.6 Self-perceived oral health, dental symptoms and the utilization of dental health services

- State of oral health: There did not have significant association between state of oral health and the utilization of dental health services (P > 0.05). The samples informed their oral health nearby between good (29.3%), fair (31.3%) and poor (32.5%). However, 64.5% of the samples satisfy their oral health. This meant that although they thought their oral health were poor, they satisfy their oral's condition. Contrast with the studied of Martin et al., 2010 who studied self-perceived oral health among Brazilian elderly individuals. They founded the majority of edentates perceived their oral health as good.

- Dental symptoms: There did not have any significant association between dental symptoms and the utilization of dental health services (P > 0.05). Consider to the studied of Varenne et al., 2006, they founded only 27.7% of the individuals who having experienced an oral health problem used oral health facilities.

5.1.7 Oral health status and the utilization of dental health services

- Prevalence of dental caries: Prevalence of dental caries was 74.3% which less than the 6th Thai National Oral Health Survey 2006-2007 (96.15%). There was the significant association between dental caries and the utilization of dental health services ($P < 0.05$).

- Prevalence of periodontal disease: Prevalence of periodontal disease was 86.9% which nearby the 6th Thai National Oral Health Survey 2006-2007 (84.2%). There was no significant association between periodontal disease and the utilization of dental health services ($P > 0.05$).

- Mean DMFT: The mean DMFT (SD) was 19.56 (7.80) teeth per person which more than the 6th Thai National Oral Health Survey 2006-2007 in Bangkok (18.37 teeth per person). Mean DT (SD) was 2.87 (3.21) teeth per person which more than the 6th Thai National Oral Health Survey 2006-2007 in Bangkok (1.53 teeth per person). Mean MT (SD) was 14.01 (8.05) teeth per person which less than the 6th Thai National Oral Health Survey 2006-2007 in Bangkok (15.22 teeth per person). Mean FT (SD) was 2.68 (4.21) teeth per person which more than the 6th Thai National Oral Health Survey 2006-2007 in Bangkok (1.63 teeth per person).

- Wearing denture: From the results, the average missing teeth of the samples (SD) was 14.01 (8.05) teeth per person. Only 39.4% and 29.6% of the samples were wearing upper and lower denture, respectively. However, there was no significant association between wearing denture and the utilization of dental health services ($P > 0.05$).

Ohi et al., 2009 who studied determinants of the utilization of dental services in a community-dwelling elderly Japanese Population and founded oral health (in terms of higher number of remaining teeth and the use of removal dentures) was a predictive factor for the utilization of dental services within 1

year. Contrast with the study of Chaiyasuk et al., 2008 who studied in Chiang Mai province, Thailand founded oral health was not the factor for the utilization of dental services.

From the conceptual framework, Using PRECEDE Framework (Green, et. al. 1980) for the independent variable that might influence the utilization of dental health services (dependent variable) was divided into 3 sections: predisposing factors, enabling factors and reinforcing factors.

Predisposing factors consist of age**,** gender**,** educational attainment**,** marital status**,** living arrangements**,** occupation**,** presence of systemic disease**,** dental status**,** oral health behaviors, self-perceived oral health**,** attitude toward dental treatment and dental symptoms. This study founded systemic disease (hypertension and cholesterol), dental status (prevalence of dental caries) and attitude to dental treatment were associated with the utilization of dental health services at 95% confident interval.

Enabling factors consist of monthly income, presence of supporting person to bring to Health Center no.54, cost of care, convenience to transportation and availability of dental services. This study founded monthly income, presence of supporting person to bring to Health Center no.54, cost of care and availability of dental services were associated with the utilization of dental health services at 95% confident interval.

Reinforcing factors: health insurance was associated with the utilization of dental health services at 95% confident interval.

5.2 Conclusion

This study was descriptive cross-sectional study aim to explore the factors associated with the utilization of dental health services in elderly patients who have oral health problems in diabetes, hypertension, elderly and general clinic, Health center No.54, Bangkok, Thailand. 335 elderly patients were collected from 4 January to 10

February 2012 by face-to-face interviewed using a structure questionnaire at the Health Center no.54. Systematic sampling technique was applied to choose elderly patients from diabetes, hypertension, elderly and general clinic. Inclusion criteria was the patient age over 60 years, both male and female, have oral health problems and have at least 1 natural tooth. Independent variables were divided into 3 sections: predisposing factors, enabling factors and reinforcing factors. Predisposing factors consisted of age, gender, educational attainment, marital status, living arrangements, occupation, presence of systemic disease, dental status, oral health behaviors, self-perceived oral health, attitude toward dental treatment and dental symptoms. Enabling factors consisted of monthly income, presence of supporting person to bring to Health Center no.54, cost of care, convenience of transportation and availability of dental services. Reinforcing factors consisted of health insurance. And dependent variable was the utilization of dental health services. The measurement tools in this study were structure questionnaire and oral health examination which adapted from WHO ORAL HEALTH ASSESSMENT (2004) for dental and periodontal health status. Equipments for oral health examination were plain mouth mirror and WHO periodontal probe. The questionnaire was validated by three experts in public health. The three experts consisted of expert in elderly, research methodology and dental. The Item-Objective Congruence Index (IOC) was 0.75. The pilot study was carried out to test the reliability of questionnaire. The Conbrach's alpha coefficient was 0.81. The interviewers were standardized by train to understand the questionnaire the way for data collection. Only one dentist (researcher) examined elderly patients' oral cavity. The internal reliability of diagnosis dental caries and periodontal disease with statistic Kappa was 0.99. Descriptive statistic was used to determine frequency distribution, mean and standard deviation. Chi-square was used to analyze the association between influence factors. The study was approved from the Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University.

Among 335 elderly patients, Most of the elderly patients were female (255 persons, 76.1%). The average age (SD) was 66.53 (5.87) years old. 41.5 percent had

income less than 1,500 baht per month. Most of the samples received financial aids for elderly (93.4%). 66.3% percent finished primary school. 66.9% percent were living in the area of Health Center no.54. 76.1% percent were married and 95.8% percent lived with family member. 75.8% percent did not work. Systemic disease, 41.5%, 66.3%, 11.6% and 50.7% had diabetes, hypertension, cardiovascular disease and cholesterol, respectively. 65.7 percent had universal coverage of Health Center no.54. 37.3 percent went to Health Center no.54 by hackney and 71.6 percent went to Health Center no.54 by themselves. The average duration of transportation (SD) was 17.48 (11.49) minutes. 97.3 percent felt convenient to go to Health Center no.54. 47.2 percent thought the price of dental services were inexpensive.

48.9 percent of elderly patients had visited a dentist in the past year. 3.9 percent never received dental services. 48.8 percent were received extraction last time. Most of the samples (88.5%) went to the dentist for emergency. 50.3 percent did not use health insurance for dental health services. 48.1 percent were received dental health services at Health Center no.54. 82.9 percent did not had regular dentist and 91.0 percent did not check up regularly.

The prevalence of dental caries and periodontal disease of the samples were 74.3% and 86.9%, respectively. The mean DMFT (SD) was 19.56 (7.80) teeth per person. Mean DT (SD) was 2.87 (3.21). Mean MT (SD) was 14.01 (8.05). Mean FT (SD) was 2.68 (4.21). 60.0 and 70.4 percent did not wear upper and lower denture, respectively.

Monthly income, systemic disease (hypertension and cholesterol), presence of supporting person to bring to Health Center no.54, cost of care, treatment received last time, using health insurance for dental health services, place of receiving dental health services, check up regular, attitude toward dental treatment and dental status (prevalence of dental caries) were the factors associated with the utilization of dental health services in elderly patients who have oral health problems in Health Center no.54, Bangkok

5.3 Recommendation

Most of the samples (88.5%) went to the dentist for emergency and 91.0 percent did not check up regularly. These finding suggest that a high proportion of the elderly are not getting routine diagnostic and dental preventive services. Regular dental visitation is important in maintaining good oral health. It also indicates a compelling need for specific strategies for oral health promotion and disease prevention activities. Oral health programs might be design to make elderly patients realize the important of oral health and routine check-up. It is essential to increase the involvement of other health professionals and caregivers in oral health education and promotion programs for elderly patients to overcome the barriers in dental health service utilization, and improve self-care capacity in oral health. For example, dental personnel should provide education to their patients regarding the importance of dental care and the role of oral health in overall physical health. The role of dental clinic may be both treatment- and education-oriented, as practitioners attempt to both maintain their patient's oral health as well as educate them regarding the importance of good health. The coordination between dental clinic and curative clinic (diabetes, hypertension, elderly and general clinic) is useful to improve the utilization of dental health services in elderly patients for example curative clinic send the patients to dental clinic for oral examination. Oral health program should implement from childhood period to elderly period such as a mobile health team might be organized to provide all health services, physical to oral health, in the school, work place and community.

An unexpected finding was the samples whose presence of supporting person to bring to Health Center no.54 less used dental health services than whose did not have. Contributing factor could be that elderly patients are more reluctant to impose on supporting person for help.

Implications for future research and application

This study provides a first step in identifying the various predictors of dental health service utilization in elderly patients who have oral health problems in Health

Center no.54, Bangkok. This study will be useful for health planning and policy to develop dental health service utilization for the elderly people.

Future research should focus on determining the mechanisms through which these variables act. This might be best accomplished by qualitative methods that focus specifically on motivating factors and barriers responsible for elderly patients visiting or not visiting dentist. More specifically, a longitudinal study that tracks dental visits by elderly patients as they move from independent living to more depending lifestyles would provide valuable information about the factors that help ensure dental visits.

For future research, the study of attitude toward dental treatment in more details and study the methods to adjust the attitude toward dental treatment in elderly patients also suggested.

A study the factors associated with the utilization of dental health services in elderly patients in the community should be conducted.

A study on strategies in encouraging the elderly to have regular dental check up should be conduct to maintain good oral health.

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Appendices

Appendix A

Questionnaire

NO…..

Examiner…… Interviewer……

Date……

Clinic

- ☐ 1. Diabetes clinic
- ☐ 2. Hypertension clinic
- ☐ 3. Elderly clinic
- ☐ 4. General clinic

Part 1 General information

1. Gender
   ☐ 1. Male ☐ 2.Female
2. Age……years
3. Income (monthly) …… baht
4. Receiving extra income from
   ☐ 1. Financial aids for elderly ☐ 2. Pension ☐ 3. Other……..
5. Education
   - ☐ 1. Illiteracy
   - ☐ 2. Primary school
   - ☐ 3. Secondary school
   - ☐ 4. Vocational school
   - ☐ 5. Bachelor degree
   - ☐ 6. Other……
6. Place of living
   - ☐ 1. Area of Health Center no.54
   - ☐ 2. Out of area of Health Center no.54

7. Marital status

☐ 1. Single

☐ 2. Married

☐ 3. Divorce/separate

☐ 4. Windowed

8. Living arrangements

☐ 1. Lives alone

☐ 2. Lives with family member

9. Occupation

☐ 1. Agricultural

☐ 2. Employee

☐ 3. Retired

☐ 4. Merchant

☐ 5. Private business

☐ 6. No occupation

☐ 7. Other……

10. Systemic disease

10.1 Diabetes

☐ 1. Yes

☐ 2. No

10.2 Hypertension

☐ 1. Yes

☐ 2. No

10.3 Cardiovascular disease

☐ 1. Yes

☐ 2. No

10.4 High cholesterol

☐ 1. Yes

☐ 2. No

10.5 Other……

11. Health insurance type

☐ 1. Universal coverage (Health center no.54)

☐ 2. Universal coverage (other……)

☐ 3. Social insurance

☐ 4. Government or State enterprise officer

☐ 5. Do not have any health insurance

☐ 6. Others……..

12. Transportation to Health Center no.54

☐ 1. By bus

☐ 2. By car

☐ 3. By hackney

☐ 4. By motorcycle

☐ 5. By walk

☐ 6. By bicycle

☐ 7. Other…….

13. How do you go to Health Center no.54?

☐ 1. By myself

☐ 2. With family or cousin

☐ 3. Other…….

14. How long do you take to Health Center no.54?

…….minutes

15. Convenient to transportation

☐ 1. Yes

☐ 2. No

16. How do you think about the price of dental services?

- ☐ 1. Inexpensive
- ☐ 2. Reasonable
- ☐ 3. Expensive

Part 2: Oral health behaviors

17. Which method do you clean your oral cavity?

17.1Tooth brushing

- ☐ 1. Yes
- ☐ 2. No

17.2 Antiseptic mouth rinse

- ☐ 1. Yes ……times/day
- ☐ 2. No

17.3 Salt solution mouth rinse

- ☐ 1. Yes ……times/day
- ☐ 2. No

17.4 Dental floss

- ☐ 1. Yes ……times/day
- ☐ 2. No

17.5Tooth pick

- ☐ 1. Yes ……times/day
- ☐ 2. No

17.6 Other……, ……times/day

18. How often do you brush your teeth?

- ☐ 1. Once a day
- ☐ 2. Two times per day
- ☐ 3. Three times per day
- ☐ 4. More than 3 times per day

19. Smoking

☐ 1. Never

☐ 2. Ever, stop smoking…….years

(please answer the question no. 20 and 21)

☐ 3. Yes (please answer the question no. 20 and 21)

20. How many cigarettes did you smoke a day?

…….rolls/day

21. How long do you smoke?

…….years

Part 3: Utilization of dental services

22. How long is it since you last have seen a dentist?

☐ 1. Less than 6 months

☐ 2. 6-12 months

☐ 3. More than 1 year, but less than 2 years

☐ 4. More than 2 years, but less than 5 years

☐ 5. More than 5 years

☐ 6. Never received dental care (go to question no.29)

23. If you ever visit a dentist, what type of dental service did you receive last time?

☐ 1. Extraction

☐ 2. Restoration

☐ 3. Cleaning/Scaling

☐ 4. Denture

☐ 5. Other…….

24. If you ever visit a dentist, usually why did you go to the dentist?

☐ 1. Routine/planned

☐ 2. Emergency

25. If you ever visit a dentist, do you use your health insurance for dental services last time?
    - ☐ 1. Yes
    - ☐ 2. No
26. If you ever visit a dentist, where did you go to visit a dentist last time?
    - ☐ 1. Government hospital
    - ☐ 2. Private hospital
    - ☐ 3. Private dental clinic
    - ☐ 4. Health Center no.54
    - ☐ 5. Other Health Center…….
    - ☐ 6. Other…….
27. If you ever visit a dentist, do you have a regular dentist?
    - ☐ 1. Yes
    - ☐ 2. No
28. If you ever visit a dentist, do you have dental check-up regularly? (at least once a year)
    - ☐ 1. Yes
    - ☐ 2. No

Part 4: Attitude toward dental treatment

29. Which of the following reasons, if any, have kept you from going to the dentist in the past? (only participant who have seen a dentist more than 1 year and never received dental care)

Direction: Please put a tick (✓) in a appropriate box

Which of the following reasons, if any, have kept you from going to the dentist in the past?	**Strongly agree**	**Agree**	**Not sure**	**Disagree**	**Strongly disagree**
29.1 Cost					
29.2 Scared					
29.3 Bad experience					
29.4 No need					
29.5 Go to the dentist is a waste time					
29.6 Embarrassed about the condition of mouth					
29.7 Worried about may need a lot of dental treatment					
29.8 Not enough information about dental procedures					
29.9 Not feeling free to ask questions					
29.10 Smells in the dental clinic					
29.11 Not confident about the sterilization of dental equipment					
29.12 Other……..					

30. How do you rate your overall feeling about visiting a dentist for treatment?

- ☐ 1. Not all afraid
- ☐ 2. Only a little afraid
- ☐ 3. Moderate afraid
- ☐ 4. Very afraid
- ☐ 5. Terrible

30.1 If you are all afraid, of what you are afraid? Pain

- ☐ 1. Yes
- ☐ 2. No

30.2 If you are all afraid, of what you are afraid? Injections

- ☐ 1. Yes
- ☐ 2. No

30.3 If you are all afraid, of what you are afraid? Drilling

- ☐ 1. Yes
- ☐ 2. No

31. How important is receiving dental care to you?

- ☐ 1. It is not all important.
- ☐ 2. It is important only when I am in pain.
- ☐ 3. It is somewhat important.
- ☐ 4. I t is very important.
- ☐ 5. It is essential.

32. Are regular visits to the dentist necessary?

- ☐ 1. It is not all important.
- ☐ 2. It is not important.
- ☐ 3. It is somewhat important.
- ☐ 4. It is essential.
- ☐ 5. It is very important.

Part 5: Self-perceived oral health and dental symptoms

33. How would you describe the state of your oral health?

- ☐ 1. Excellent
- ☐ 2. Good
- ☐ 3. Fair
- ☐ 4. Poor
- ☐ 5. Very poor

34. Do you satisfy your oral health?

- ☐ 1. Satisfied
- ☐ 2. Not satisfied

35. During the past 6 months did your teeth or mouth cause any pain or discomfort?

- ☐ 1. Yes
- ☐ 2. No

36. During the past 6 months did your teeth or mouth have these problems?

36.1 Toothache or discomfort

- ☐ 1. Yes
- ☐ 2. No
- ☐ 3. Not sure

36.2 Tooth mobility

- ☐ 1. Yes
- ☐ 2. No
- ☐ 3. Not sure

36.3 Gingival inflammation or bleeding on brushing

- ☐ 1. Yes
- ☐ 2. No
- ☐ 3. Not sure

36.4 Dental calculus

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.5 Tooth sensitivity

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.6 Dental caries or tooth cavity

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.7 Oral ulcer

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.8 Bad breath

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.9 Pain or ill-fitting denture

☐ 1. Yes

☐ 2. No

☐ 3. Not sure

36.10 Other……

Appendix B

WHO ORAL HEALTH ASSESSMENT FORM (2004)

Dentition status

			55	54	53	52	51	61	62	63	64	65			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
status															
			85	84	83	82	81	71	72	73	74	75			
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
status															

Status

Permanent teeth			Primary teeth
0	=	sound	A
1	=	Decayed	B
2	=	Filled and decayed	C
3	=	Filled, no decay	D
4	=	Missing due caries	E
5	=	Missing any other reason	-
6	=	Sealant, vanish	F
7	=	Bridge abutment or special crown	G
8	=	Unerupted tooth	-
9	=	Excluded tooth	-
T	=	Trauma(Fracture)	T

Denture wearing

Upper Lower 0 = no denture, 1 = partial denture, 2 = full denture

☐ ☐

WHO ORAL HEALTH ASSESSMENT FORM (2004)

Periodontal status (CPI modified)

				55	54	53	52	51	61	62	63	64	65			
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
	status															
Bleeding																
Pocket																

				85	84	83	82	81	71	72	73	74	75			
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	status															
Bleeding																
Pocket																

Status

Gingival bleeding score:

0	=	Absence of condition
1	=	Presence of condition
9	=	Tooth excluded
X	=	Tooth not present

Pocket scores:

0	=	Absence of condition
1	=	Pocket 4-5 mm
2	=	Pocket 6 mm or more
9	=	Tooth excluded
X	=	Tooth not present

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