

ลักษณะผู้ป่วยสูงอายุที่เข้ารับการรักษาทางทันตกรรมที่คณะทันตแพทยศาสตร์ จุฬาลงกรณ์
มหาวิทยาลัยในช่วงปี พ.ศ. 2550-2552 และการพัฒนาฐานข้อมูลบริการทันตกรรมอิเล็กทรอนิกส์
สำหรับผู้สูงอายุ

นางสาววิภาวรัตน์ ยวดยิ่ง

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรวิทยาศาสตรมหาบัณฑิต
สาขาวิชาทันตกรรมประดิษฐ์ ภาควิชาทันตกรรมประดิษฐ์
คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2554
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)
เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ที่ส่งผ่านทางบัณฑิตวิทยาลัย

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THE CHARACTERISTICS OF ELDERLY PATIENTS SEEKING CARE AT FACULTY OF
DENTISTRY, CHULALONGKORN UNIVERSITY DURING 2007-2009 AND THE
DEVELOPMENT OF DENTAL SERVICE ELECTRONIC DATABASE FOR THE AGED

Miss Wiparat Youdying

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science Program in Prosthodontics

Department of Prosthodontics

Faculty of Dentistry

Chulalongkorn University

Academic Year 2011

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Thesis Title THE CHARACTERISTICS OF ELDERLY PATIENTS SEEKING CARE AT FACULTY OF DENTISTRY, CHULALONGKORN UNIVERSITY DURING 2007-2009 AND THE DEVELOPMENT OF DENTAL SERVICE ELECTRONIC DATABASE FOR THE AGED

By Miss Wiparat Youdying

Field of Study Prosthodontics

Thesis Advisor Assistant Professor Orapin Kaewplung, Ph.D.

Thesis Co-advisor Assistant Professor Tewartit Somkotra, Ph.D.

Accepted by the Faculty of Dentistry, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

..... Dean of the Faculty of Dentistry
(Associate Professor Wacharaporn Tasachan)

THESIS COMMITTEE

..... Chairman
(Assistant Professor Prarom Salimee, Ph.D.)

..... Thesis Advisor
(Assistant Professor Orapin Kaewplung, Ph.D.)

..... Thesis Co-advisor
(Assistant Professor Tewartit Somkotra, Ph.D.)

..... Examiner
(Assistant Professor Patita Bhuridej, Ph.D.)

..... External Examiner
(Dr. Matana (Pruksapong) Kettratad, Ph.D.)

วิทยารัตน์ ยวดยิ่ง : ลักษณะผู้ป่วยสูงอายุที่เข้ารับการรักษาทางทันตกรรมที่คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ในช่วงปี พ.ศ. 2550-2552 และการพัฒนาฐานข้อมูลบริการทันตกรรมอิเล็กทรอนิกส์สำหรับผู้สูงอายุ.

(THE CHARACTERISTICS OF ELDERLY PATIENTS SEEKING CARE AT FACULTY OF DENTISTRY, CHULALONGKORN UNIVERSITY DURING 2007-2009 AND THE DEVELOPMENT OF DENTAL SERVICE ELECTRONIC DATABASE FOR THE AGED) อ. ที่ปรึกษาวิทยานิพนธ์หลัก : ผศ.ทญ.ดร.อรพินท์ แก้วปลั่ง, อ. ที่ปรึกษาวิทยานิพนธ์ร่วม: ผศ.ทพ.ดร.เทวฤทธิ์ สมโคตร, 66 หน้า.

การศึกษานี้มีวัตถุประสงค์เพื่อสำรวจลักษณะและแนวโน้มของผู้ป่วยสูงอายุที่คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย รวบรวมข้อมูลของผู้ป่วยใหม่สูงอายุตั้งแต่ปี พ.ศ. 2550 ถึง 2552จากบันทึกการรักษาทางทันตกรรมจำนวน 1,320 คน โดยวิธีการสุ่มอย่างมีระบบ ในด้านการรักษาทางทันตกรรมประดิษฐ์รวบรวมข้อมูลจากบันทึกการรักษาทางทันตกรรมของผู้ป่วยใหม่สูงอายุที่คลินิกบัณฑิตศึกษา ภาควิชาทันตกรรมประดิษฐ์ จำนวน 634 คน ตัวอย่างจากการสุ่มจากผู้ป่วยใหม่สูงอายุทั้งหมด พบโรคทางระบบที่มากที่สุดคือ ความดันโลหิตสูง เบาหวาน โรคหัวใจและไขมันในเส้นเลือดสูง ตามลำดับ อาการสำคัญที่พบมากที่สุดคือการสูญเสียฟัน ร่วมกับการบดเคี้ยวไม่มีประสิทธิภาพ และหรือ ความต้องการฟันเทียมใหม่ ร้อยละ 38 ของตัวอย่างมีความต้องการการรักษาทางทันตกรรมประดิษฐ์ ขณะที่ ร้อยละ 65 มีความจำเป็นทางวิชาชีพต่อการรักษาทางทันตกรรมประดิษฐ์ การสำรวจนี้พบว่าค่าเฉลี่ยจำนวนคู่สบฟันธรรมชาติเท่ากับ 2.8 คู่ การรักษาทางทันตกรรมประดิษฐ์ที่พบมากที่สุดในผู้ป่วยสูงอายุที่คลินิกบัณฑิตศึกษาภาควิชาทันตกรรมประดิษฐ์คือฟันเทียมชนิดถอดได้ (ร้อยละ 60) ระยะเวลารอรับการรักษาทางทันตกรรมประดิษฐ์เฉลี่ยเท่ากับ 134.1 วันและระยะเวลาการรักษาทางทันตกรรมประดิษฐ์เฉลี่ยเท่ากับ 155.4 วัน ระยะเวลาการรอรักษาและระยะเวลาการรักษาลดลงจากปีพ.ศ. 2550 ถึง 2552

ภาควิชา ..ทันตกรรมประดิษฐ์..... ลายมือชื่อ.....
 สาขาวิชา ..ทันตกรรมประดิษฐ์..... ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก
 ปีการศึกษา ..2554..... ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม

527 61295 32 : MAJOR PROSTHODONTICS

KEYWORDS : CHIEF COMPLAINT / ELDERLY / PROSTHODONTIC TREATMENT

WIPARAT YOUDYING : THE CHARACTERISTICS OF ELDERLY PATIENTS

SEEKING CARE AT FACULTY OF DENTISTRY, CHULALONGKORN UNIVERSITY

DURING 2007-2009 AND THE DEVELOPMENT OF DENTAL SERVICE

ELECTRONIC DATABASE FOR THE AGED. ADVISOR: ASST. PROF. ORAPIN

KAEWPLUNG, Ph.D. CO-ADVISOR: ASST. PROF. TEWARIT SOMKOTRA, Ph.D.,

66 pp.

This study aimed to investigate the characteristics and trend of the elderly patients at Faculty of Dentistry, Chulalongkorn University. The information of new-registered elderly patients from year 2007 to 2009 was collected from 1,320 dental treatment records by systematic random sampling method. For prosthodontic treatment aspect, 634 dental treatment records were selected from the new-registered elderly patient at post graduated prosthodontic clinic. For the subjects sampling from all new-registered elderly patients, the most common systemic conditions were hypertension, diabetes mellitus, heart disease and high cholesterol level, respectively. The most common oral complaint was tooth loss with inefficient chewing and/or needed newly prostheses. There were 38% of subject had perceived prosthodontic treatment need while 65% had normative prosthodontic treatment need. This survey found that the average number of occluding natural pairs of teeth was 2.8 pairs. The highest frequent prosthodontic treatment in elderly patients at post graduated prosthodontic clinic was removable denture (60%). The average waiting period for prosthodontic treatment was 134.1 days and the average prosthodontic treatment period was 155.4 days. There were decreasing in duration of waiting period and treatment period from year 2007 to 2009.

Department : Prosthodontics..... Student's Signature

Field of Study : Prosthodontics..... Advisor's Signature

Academic Year : 2011..... Co-advisor's Signature

ACKNOWLEDGEMENTS

I would like to express my gratitude to all those who gave me the possibility to complete this thesis. I am deeply thankful to my advisor, Assistant Professor Dr. Orapin Kaewplung for her encouragement, guidance and support from the initial to the final level unit I completed this research project.

My sincere respect is expressed to, Assistant Professor Dr. Tewarit Somkotra for his valuable criticism and advice in this thesis. More importantly, I especially appreciate his kindness and patience throughout the years.

I also wish to thank the excellent center for oral and maxillofacial reconstruction project for the financial support of this research project, the Department of Prosthodontics, Chulalongkorn University for giving me a chance to study in this program.

Finally, I owe my deepest gratitude to my parents and my brother for their help, support and encouragement over this Master's Degree course. All of these are expressed from my heart.

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LIST OF ABBREVIATIONS

B.E.	Buddhist Era
SD	standard deviation
IT	information technology
OIDP	Oral Impacts on Daily Performances
PG	postgraduate
UG	undergraduate
Fig	figure

CHAPTER I

INTRODUCTION

Background and signification of the research problem

According to universal demographic transition toward an aging society, nowadays as other developing countries Thailand has been facing with the rapid increase in the proportion of older population. That is, in 2000, people aged 60 years or older was 9.5% of Thai population. By 2025, the number of older people will double to approximately 19.0% of its total population [1]. The growing proportion of the elderly challenges health sectors, in particular with the increase in burden of diseases and its effect on quality of life [2]. Regarding oral health which is considered as integral part of general health and the important component of quality of life, it has been emphasized that oral diseases are age-related and the risk factors for chronic disease are common to most oral diseases [3].

As of the recent National Oral Health Survey in Thailand, that revealed the amount of remaining teeth among the elderly has increased comparing with the past experiences [4]. However, tooth loss is still remained oral health problem among Thai elderly. Furthermore, previous studies indicated that faulty prosthesis was the most frequent oral complaint among elderly [5, 6]. The majority of the elderly resides in the community and is functionally independent. The access to dental care for these individuals may not different from the younger individuals [7]. Although, there is a frail elderly needed assistance in some of their activities of daily living which may impact to their access to dental care. In fact, it is relatively small group of elderly who are functionally dependent and require long-term care [7]. Hence, it is undoubtedly remarked that the increase in proportion of the Thai elderly in the near future challenges whether health care sector, social services delivery, including oral health care [8]. It is also important for dental schools to improve educational program and oral health care service to meet the need of an increasing in number of elderly with either normative or

perceived need. Knowing the characteristic and trend of these elderly patients is necessary for educational development and planning for appropriate oral health care services.

This study is raised from pertinent question pertaining to the important aspect as mention above. That are; “What are the characteristics of elderly patients seeking care at Faculty of Dentistry, Chulalongkorn University?” and “Is there any statistically significant difference in prosthodontic-related chief complaint between age groups and genders among elderly patients?”

This study therefore aimed primarily to investigate the characteristics and trend of the elderly patients utilized dental care at Faculty of Dentistry, Chulalongkorn University during 2007 to 2009. Some elderly patients are medically compromised, together with complicated oral health problems or need special care in dental treatment leading to the secondary objective of this study that aimed to investigate prosthodontic treatment of the elderly patients who had health problems which impacted to prosthodontic treatment and/or complicated prosthodontic treatment. Finally, this study aimed to develop the dental service electronic database for the elderly patients.

Hypothesis

Descriptive hypothesis

1. More than 50% of samples were not working.
2. The prevalence of prosthodontic-related chief complaint higher than other chief complaints among the elderly patients.
3. More than 50% of samples have at least one systemic disease.
4. The average number of functional pair occluding teeth was less than 4 pairs.
5. The prevalence of normative prosthodontic treatment need was higher than perceived prosthodontic treatment need.
6. More than 50% of samples have consistency between chief complaint and the first treatment received.
7. Among the elderly patients at postgraduate prosthodontic clinic, the prevalence of removable denture was the highest among any types of prosthesis

8. The average waiting period in postgraduate prosthodontic clinic was higher than 60 days.
9. The average treatment period in postgraduate prosthodontic clinic was higher than 60 days.
10. More than 50% of new-registered elderly patients at postgraduate prosthodontic clinic need multidisciplinary approach in dental treatment.

Analytic hypothesis

1. H_0 : Prosthodontic-related chief complaint between genders, in the same age group, within the same year was not different.
 H_1 : Prosthodontic-related chief complaint between genders, in the same age group, within the same year was different.
2. H_0 : Prosthodontic-related chief complaint between age groups, in the same gender, within the same year was not different.
 H_1 : Prosthodontic-related chief complaint between age groups, in the same gender, within the same year was different.

Expected benefits

1. Knowing the characteristics and trend of the elderly patient utilized dental care at Faculty of Dentistry, Chulalongkorn University during 2007 to 2009.
2. Knowing the prosthodontic treatment of the elderly patients with complicated general health or complicated prosthodontic treatment.
3. This study will be data base for the development of educational program and the improvement of the oral health service delivery for the elderly patients.

CHAPTER II

LITERATURE REVIEW

1. Definition of aging and aging society

Definition of ageing has been defined in various ways by different disciplines [9]. The Act on Older Person, B.E. 2546 stated that elderly person means persons who have attained the age of at least sixty years [10]. Previous study reported definition of aging in four major categories; 1) chronologic aging, 2) biologic aging, 3) sociologic aging and 4) psychologic or behavioral aging [9]. Chronologic aging represents the passage of time and the changes that have occurred in the individual. Older people are people who lived certain number of years [11]. Biologic aging has been defined as the progressive loss of physiologic capabilities and function in the organism [12]. Aging may also be defined in relation to changes that affect the socioeconomic status of the person when getting into retirement [9]. The term of psychological aging could be described as a subjectively experienced age based on a person's behavior or how old they feel [13]. In addition, considered with psychosocial function older people could be classified into three categories which are the functionally independent elderly, the frail elderly and the functionally dependent elderly [14]. Individuals in the first group are those who reside in the community and receive little or no assistance in their necessary activities of daily living, such as feeding themselves, dressing or toileting [7]. The frail older adults have chronic, debilitating physical, medical and emotional problems and are able to maintain some independence in the community only with assistance from others [7]. The functionally dependent elderly are impaired by any combination of chronic, debilitating physical, medical and emotional problems that they are unable to maintain their independence including those who require special care at home or in institutions [7, 14]. There is variability in physical, medical and mental health status among the older people, it is not appropriate to use a chronologic age to define geriatric patients. It is more appropriate to concern the health needs of older persons according to their health and

functional status rather than by their age [7]. Elderly could be defined as a population with health care conditions and needs which differ significantly from those people of younger age group, which are often complicated by the physical, behavioral and social changes associated with aging. This would include all individuals aged over 60 years and also include some younger people who are subjected to similar physical and/or mental conditions [7].

The world population is aging as a consequence of longer life expectancy and a decline in fertility, particularly in developed countries, during the latter half of the past century [15]. The world is experiencing an unprecedented demographic transformation and that by 2050 the number of persons aged 60 years and over will increase from 600 million to almost 2 billion and that the proportion of persons aged 60 years and over is expected to double from 10 to 21 per cent. Increasing of older population will be the greatest in developing countries where the older population is expected to quadruple during the next 50 years [16]. Nowadays as other developing countries, Thailand has been facing with the rapid increase in the proportion of older population. That is, in 2000, people aged 60 years or older was 9.5% of Thai total population. By 2025, the number of older people will double to approximately 19.0% of its total population [1].

2. General health, oral health and quality of life in elderly

The growing proportion of the elderly challenges health sectors, particularly with regard to the growing burden of diseases and its effect on quality of life among the older persons. It has been emphasized that oral diseases are age related, that the risk factors for chronic diseases are common to most oral diseases, and that oral health is an integral part of general health and important component of quality of life [17].

Many physiological changes take place as part of aging which some would have negative effect on the oral health for example; dementia and visual impairments may affect the individual's ability to maintain oral health [3]. In addition, older persons affected by xerostomia are at risk to have oral symptoms such as sensory changes [3]. Moreover, diet and nutrition are also related to oral cancer and dental disease in the older persons [3].

Previous studies reported the impact of oral disease on general health described as follow. First, there is an association between poor oral hygiene and respiratory infection [18]. Others studies reported a relationship between aspiration pneumonia and periodontal disease [19, 20]. Furthermore, combination of inadequate oral care and difficulty in swallowing were significant predictors of radiologically confirmed pneumonia [21]. Another study found that periodontal disease and fewer teeth may be associated with coronary heart disease and ischemic stroke [22]. Several studies established the association between diabetes mellitus and periodontitis [23-28]. Some studies proposed the evidence of a two-way relationship between periodontal disease and diabetes mellitus [29, 30]. Older people have the greatest risk for the development of premalignant lesions and oral cancer which had higher rates of morbidity and mortality when compared with other types of cancers [3]. Furthermore, several chronic diseases and oral diseases relate to common risk factors such as the use of tobacco, excessive consumption of alcohol, poor diet and nutritional status, and poor oral hygiene, all of which are significantly affected by socioeconomic and environmental factors [3, 8]. Considering the recognition of the value of an individual's health with the broader psychological and social aspect of life, it emphasizes that healthcare providers must shift from a disease-oriented focus to a broader psychosocial approach[8]. Quality of life is particularly affected by dentate status, including the use of partial and complete dentures. This can be viewed in recent evidence that demonstrated the impact of oral and general health on the quality of life in older populations [3]. For instance, pain, discomfort, mucosal infections, and xerostomic conditions related to multi-medication use, as well as tooth loss, could impair self esteem, daily life, well-being, and cause a deterioration to the quality of life [3, 8, 31].

Evidence from examination of links between oral health and general health [3]

General health	Oral health
Mental disease including dementia and Parkinson disease	<ul style="list-style-type: none"> - High level of caries experience - Tooth loss - Periodontal disease/ impaired or neglected oral hygiene - Experience of pain - Chewing difficulties - Poor function of dentures
Visual impairment	<ul style="list-style-type: none"> - Dental caries - Gingival bleeding - Reduce ability to maintain oral health
Xerostomia related to systemic disease, head and neck radiations or multiple/regular use of medications	<ul style="list-style-type: none"> - Dental caries/root caries - Candidosis - Impaired mastication, swallowing and speech
Inadequate nutrition (impaired immune response)	<ul style="list-style-type: none"> - Periodontal disease - Tooth loss - Poor oral hygiene - Masticating function and swallowing - Taste perception - Oral dryness - Oral pain - Oral cancer
Weight loss	<ul style="list-style-type: none"> - Edentulousness
Respiratory disease <ul style="list-style-type: none"> - Chronic obstructive pulmonary disease - Aspiration pneumonia 	<ul style="list-style-type: none"> - Poor oral hygiene - Periodontal disease - Difficulty swallowing
Cardiovascular disease <ul style="list-style-type: none"> - Coronary heart disease - Stroke 	<ul style="list-style-type: none"> - Tooth loss - Severe periodontal disease (bone loss, deep pockets)
Diabetes mellitus (type 1, type 2)	<ul style="list-style-type: none"> - Severe periodontal disease
Oral cancer	<ul style="list-style-type: none"> - Poor oral hygiene and health conditions
Quality of life	

3. Oral health problems in the elderly

An understanding of oral disease faced by older adult is important for a number of reasons. First, this knowledge will suggest preventive approaches and allow educational system to offer appropriate information. Second, the dental professions will pay more attention and change the attitude towards their elderly patients, and thereby have a positive impact on the health and well-being of the older people. Third, there are many evidences demonstrated the relationship between oral health and general health. Fourth, this information will provide background for discussion of approaches to address the need for oral health care services in aging population [2].

3.1 Tooth loss

Tooth loss and edentulism are a consequence of severe dental caries and periodontal disease. Further, tooth loss can be a result from variety of other reasons including trauma, elective extraction for prosthodontic or orthodontic treatment, lack of restorative dental services, personal choice and lack of resources to pay for dental care [2, 32]. Edentulousness can be found in older people around the world with the prevalence between 6-78 percent [17]. The prevalence of edentulism is associated with socio-economic status and level of education. Previous studies reported that persons with low income and little or no education are more likely to be edentulous than persons with high income and high level of education [32]. In most western countries there has been a positive trend towards decline in the percent of older population that is edentulous for example; a study in Sweden indicated that older persons who were edentulous decreased from 51% to 7% between 1971 and 2001, similar declines have been reported from the United States that between 1971-1974 and 1988-1994, the percent of elderly persons who were edentulous declined from 45.6% to 28.6% [2, 33]. On the other hand, percentage of edentulism among older population in Thailand was increased from 8.2% to 10.5% between 2000-2001 and 2006-2007 [4, 34]. Edentulism has an impact on daily activities such as eating and social interaction. In addition, tooth loss implies the loss of orofacial structures such as bony tissues, nerves, receptors and muscles [35].

3.2 Dental caries

The prevalence of coronal dental caries and root surface caries is high among older populations all over the world. Previous study demonstrated that older adults are at greater risk for developing root caries due to the exposed root surface resulted from gingival recession and periodontal disease [7]. The important risk factors for coronal caries and root caries including increased intake of fermentable carbohydrates, increased plaque accumulation due to the presence of dental restorations and prostheses, reduced dexterity, poor oral hygiene and reduce salivary flow that is a side effect of several medications [2]. Furthermore, low socioeconomic status have been associated with increasing in caries and are also associated with reduce access to care, reduce oral health aspiration, low self-efficacy and health behaviors that may enhance caries risk [2, 36, 37].

3.3 Periodontal disease

Conclusions of periodontal disease affecting older adults were described as follows. First, evidence of moderate periodontitis is commonly found in elderly adults. While approximately 70% of older adults demonstrate evidence of advanced periodontitis but the number of affecting sites is small. Second, when monitored over a few years, approximately 75% of older adults will demonstrate additional loss of attachment. This progression is not widespread through the mouth. Third, newly affected sites of periodontal disease tend to oppose to continued loss at previously affected sites. Fourth, the most important risk factors for periodontal disease include smoking and presence of specific periodontal pathogens [38]. Recent studies reported that older age, male, poorer oral hygiene, higher level of dental plaque, smoking, alcohol consumption and diabetes were positively associated with periodontitis while higher education and higher income were inversely associated with periodontal disease severity [28, 32]. In addition, low education, no dental check-ups, few teeth present and regular smoking are considered as risk factors for progression of periodontal disease in older adults [32, 39].

3.4 Xerostomia

Dry mouth is a common complaint in older adults and the condition is leading to severe oral problems including high level of dental caries and difficulties in chewing, eating and communicating [32]. Xerostomia is usually associated with decreased salivary flow rate and some psychological factors. Salivary gland hypofunction can be due to the effect of systemic disease such as diabetes, Sjögren's syndrome, AIDS or their treatment [3]. There are many medications causing xerostomia, the most common are tricyclic antidepressant, antipsychotics, anticholinergics, beta blockers and antihistamine. In addition, smoking is another risk factor of dry mouth [32]. Therefore, management of patients affected by xerostomia can be difficult [3].

3.5 Oral mucosal lesion, oral premalignant lesion and oral cancer

Oral mucosal lesion is another significant problem found in older adults. The prevalence of oral mucosal disease was found to be associated with age. However, age alone was not the only correlating factor, other finding including trauma, medication and oral and denture hygiene may also influence the development of oral mucosal conditions [40]. The three most common oral mucosal lesions were varices, fissure tongue and traumatic ulcer. Denture wearers exhibited higher prevalence of oral mucosal condition compared with non-denture wearers [40]. The major denture-related lesions included denture stomatitis, traumatic ulcer, angular cheilitis, candidiasis and denture hyperplasia [2, 32, 40]. The risk factors for denture stomatitis are denture hygiene or the amount of denture plaque, usage of denture at night, neglect of denture soaking at night and use of improper dentures [32]. Oral premalignant lesion included leukoplakia, which is more frequent among men and lichen planus, which is associated with female gender [32, 40]. Oral and pharyngeal cancers comprise a variety of malignant disorders affecting cells and tissues in this anatomical region [2]. Nevertheless, the most common carcinoma of this region is squamous cell carcinoma. The major risk factors for oral cancer included smoking, chewing tobacco, betel nut chewing and alcohol consumption [2, 32]. Although the most common oral mucosal conditions among older populations were benign, there were several older persons with premalignant and malignant lesions. Thus, a regular oral

examination for the detection of precancerous and cancerous lesions is important in older populations [40].

4. Dental chief complaint and dental treatment need in elderly

Oral health problems in elderly lead to dental treatment need in this population. Number of people who had normative need was always higher than perceived need because the normative assessment was a measure of “disease” while perceived assessment was a combination of biologic factor, psychologic factor and social factor. If their oral disease or oral health problem did not impact daily performance, they may feel that they do not require any treatment [41]. Another consideration is propensity to seek oral health care which addressed the need of people within the context of their physical and cognitive abilities and their overall desire for treatment and potential for benefit [42]. Previous study stated that as the number of frail elderly increase, propensity to seek treatment decline [43]. Related studies indicated major chief complaint categories in the elderly including tooth loss or prosthodontic treatment need, pain and/or swelling, broken teeth or restoration and teeth sensitivity [5-7, 44-46]. The problem that brought the patient to the dentist is obviously a treatment priority and dental profession should be directed to meet the demands and needs of the elderly and provide proper dental care for this group of patients [46].

5. Accessibility and availability of dental service for elderly

Access to care could defined as the ability of an individual to obtain any services and the capacity of the system to match the patient's needs and preference with the appropriate level of services [7]. While many people can access to dental health care, several population especially elderly group have poor access to services, unmet needs and consequently poor oral health status[7]. The special considerations of oral health care needs among elderly patients are listed as follows. First, the elderly may have unique problems in access to the health care delivery system. Second, older population may experience different patterns and prevalence rates of oral disease when compared with the younger population. Third, the elderly may have characteristics that affect the

amount and types of dental treatment and the method by which it is performed [47]. The ability of the elderly to access dental health care service is an important component of maintaining optimal dental health [7]. Concerning with problems or barriers in access to dental health care, the common reasons for not seeking dental care could be defined as active barrier which categorized into 5 reasons including, cost of dental treatment, fear of dental treatment, problem in accessibility of dental services, availability of dental services and characteristics of dentist. In addition passive barrier to dental health care is demonstrated by a lack of perceived need for dental services, particularly among elderly people wearing complete dentures [48].

5.1 Problems in accessibility of dental services

Transportation difficulties seem to be significant barrier for older people using both private and public transport. Most of the elderly do not drive and are dependent on others for transportation [7]. Older people often had difficulty walking which also impact to access to dental services [48]. In addition, the need of physical assistance to get to the dentist in homebound elders is also considered as a barrier in access to dental care [7].

To solve problems associated with travelling to the dentist, a mobile dental team should visit the elderly in the community center and take them to the dental hospital if further treatments were needed. Home visits were also a good option for those with more severe mobility problems [48].

5.2 Availability of dental services

Availability or the lack of dental services was identified as one of the barrier to the utilization of dental services. The major cause is the moving of dentist from the public to the private sector [48]. This problem is also found in Thailand where the distribution of number of public health care workers including dentists is improper. For example, number of dentists in Bangkok is 4.4 times higher than in the Northeast area of Thailand [49].

6. Profile of patients in dental schools

The characteristics of patients seeking care at dental school and the reason for their choosing dental school can assist the school to develop the service plan for the patient [50]. Previous study in patients from six dental schools in the United States indicated that patient utilized dental care at these schools tended to be low income [50]. Low cost of dental treatment and up-to-date care were the main reason for seeking care at dental school [50]. A study at the University of West Indies showed that 42% of dental patients had medical problems which hypertension and diabetes were the two leading problems [51]. The prevalence of angina, defective eyesight, arthritis and diabetes increase significantly with age [51]. One study of dental school patient population reported a significant increase in the percentage of medically compromised dental patients in 1986 compared with 1976 [52]. The growing in the number of dental patients who had medical conditions increases the risk of medical emergency during dental treatment. The common medical emergency events at one dental school in New York involved suspected cardiovascular events, syncope, complication related to local anesthesia and hypoglycemia [53]. The suggestions to reduce the incidence of medical emergencies and increase dentists' ability to manage those events were described as followed. First, there should have an evaluation and updating of patients' medical history, monitoring vital sign before treatment and consultation with the physician when indicated. Second, adequate emphasis on the management of acute events related to dental treatment including syncope, anesthesia complications allergic reactions and swallowed or aspirated objects [53].

7. The educational program in geriatric dentistry

Improving the oral health status of older population has become a major role of academic dental institutions and needs to be included in both medical and public health education [54]. Geriatric dental educational programs have been developed as a result of the demographic change in public health, social and behavioral science and medical health profession, including dentistry as well as the increasing of older persons who maintain their teeth, increasing in the number of medically compromised elderly patients

and the need for greater understanding of the skills required to provide effective dental care for older persons [55]. Geriatric dentistry differs from general dentistry for other age groups in several ways described as follow; 1) majority of elderly people have at least one chronic disorder 2) many of elderly patients suffer from physical disabilities such as hearing loss, poor vision and taste disorder which impact on their ability to comply with dentist's instructions 3) Many older persons use multiple medications leading to oral side effect such as dry mouth 4) some of the elderly suffer from cognitive dysfunction such as dementia which may impact the compliance with oral health care and 5) the combination of physical, psychological and mental disorders challenges the dentist in making proper treatment plan to these group of patients [54]. Education and continuous training geriatric program included the following recommendations. The first is increasing the number of faculty prepared to develop a gerontology and geriatrics and also establish clinical sites served as mentors and role models. Second, develop and evaluate educational program for all practicing dental personnel. Continuing education is a key to bring practitioners up to date. Third, it is necessary to train dental care team to provide dental services in the rapidly expanding home health sector. Fourth, there should be an emphasizing of oral health promotion and disease prevention and incorporate these concepts into all levels of health professional education. Finally, making an effort to train health profession team to solve the cultural and linguistic miscommunication problem that seem to impede effective treatment for some elders [7]. Education and continuous training must ensure that oral health care providers have skills in taking care of elderly patients. Moreover, dental care providers have to understand both biomedical and psychosocial aspect of care for older people [32].

Concerning with the research aspect, research on interrelationship between oral health and general health can provide a better understanding of disease mechanism in old age. For epidemiological research of oral health status aspect, there is a suggestion that the information should be complemented by the data on feeling of well-being, oral functioning and quality of life [32].

CHAPTER III

MATERIAL AND METHODS

Part I The Characteristics of elderly patients seeking care at Faculty of Dentistry, Chulalongkorn University during 2007-2009

Every patients seeking care at Faculty of dentistry, Chulalongkorn University should be registered and screened by oral diagnosis clinic. The patients were sent to receive treatment at academic related clinic or special clinic according to their decision. Dental care and treatment at the academic related clinic were provided by undergraduate or post graduate students under advice of the academic staffs. For special clinic which was higher expense than the academic related clinic, dental care and treatment were provided by the academic staffs. There were 7 departments in the academic related clinic including; prosthodontics, operative dentistry, periodontology, oral and maxillofacial surgery, occlusion, oral medicine and pediatric dentistry.

The population in this study was new-registered elderly patients (aged 60 years and over) utilized dental care at Faculty of Dentistry, Chulalongkorn University during 2007 to 2009. The minimal sample size was obtained by using the formula calculation under 5% of acceptable errors and 95% of the confidence level [56]. The final sample size was adjusted to minimize errors (Table I).

Minimal sample size calculation [56]

$$n_i = \frac{N_i}{1 + (N_i e^2)}$$

n_i = minimal sample size in each year

N_i = population size in each year

$i = 1, 2, 3$ (1= year 2007, 2= year 2008, 3= year 2009)

e = acceptable errors ($e = 0.05$)

Table I. Number of population, minimal sample size and final sample size

Year	Population (N)	Minimal sample size(n)	Final sample size
2007	1961	332	447
2008	1898	330	437
2009	2459	344	436
Total	6318	1006	1320

The data to perform analyses were taken from retrospective dental chart review. The survey design was two-stage stratified random sampling which the first stage was stratified by gender (male and female) and the second stage was stratified by age-group (60-70 year-old and more than 70 year-old).

One thousand three hundred and twenty dental treatment records were selected to this study. To achieve the primary objective of the study in investigating the characteristics and trend of elderly dental patients, the information of gender, age, working status, chief complaint, systemic diseases, number of functional pair occluding teeth, perceived prosthodontic treatment need, normative prosthodontic treatment need, clinic obtained prosthodontic treatment and consistency between their chief complaints and its first treatment were obtained from the selected dental treatment records.

Furthermore, patients with the conditions of difficult or complicated prosthodontic treatment needed dental care from dentists training in prosthodontic program, health problem which impacted to prosthodontic treatment (for example; severe limited mouth opening, severe Parkinson disease) and according to prosthodontic academic staff opinion were referred to postgraduate prosthodontic clinic. As mention above, to achieve the secondary objective in investigating prosthodontic treatment of elderly patients who had health problem which impacted to prosthodontic treatment and/or complicated prosthodontic treatment, data of all new-registered elderly patients who received prosthodontic treatment at postgraduated prosthodontic clinic during 2007 to 2009 were used. Six hundred and thirty-four dental treatment records were selected and the information of gender, age, type of prosthesis, duration of waiting time, duration of

treatment time and necessity of multidisciplinary approach in dental treatment were gathered.

Any samples which missing more than 1 variable were excluded from the study. The data collection was performed by one of the authors (YW). The research team met frequently during the study to solve problems or disputes in the data collection. Missing data would be coded as not report and not include in the analysis of the average number of functional pair occluding teeth, the average waiting period and the average treatment period. The protocol of this study was approved by the ethics committee of Chulalongkorn University. Descriptive analyses were performed with the Statistics Package for the Social Sciences (SPSS) version 17.0 (SPSS (Thailand) Co., Ltd., Bangkok, Thailand). Differences in prosthodontic-related chief complaint between genders in the same age group within the same year and differences in prosthodontic-related chief complaint between age groups in the same gender within the same year were tested by Pearson chi-square test. P-value lower than .05 were considered statistically significant. Figure 1 showed selection of study samples and data collection. Table II showed defined variables of this study.

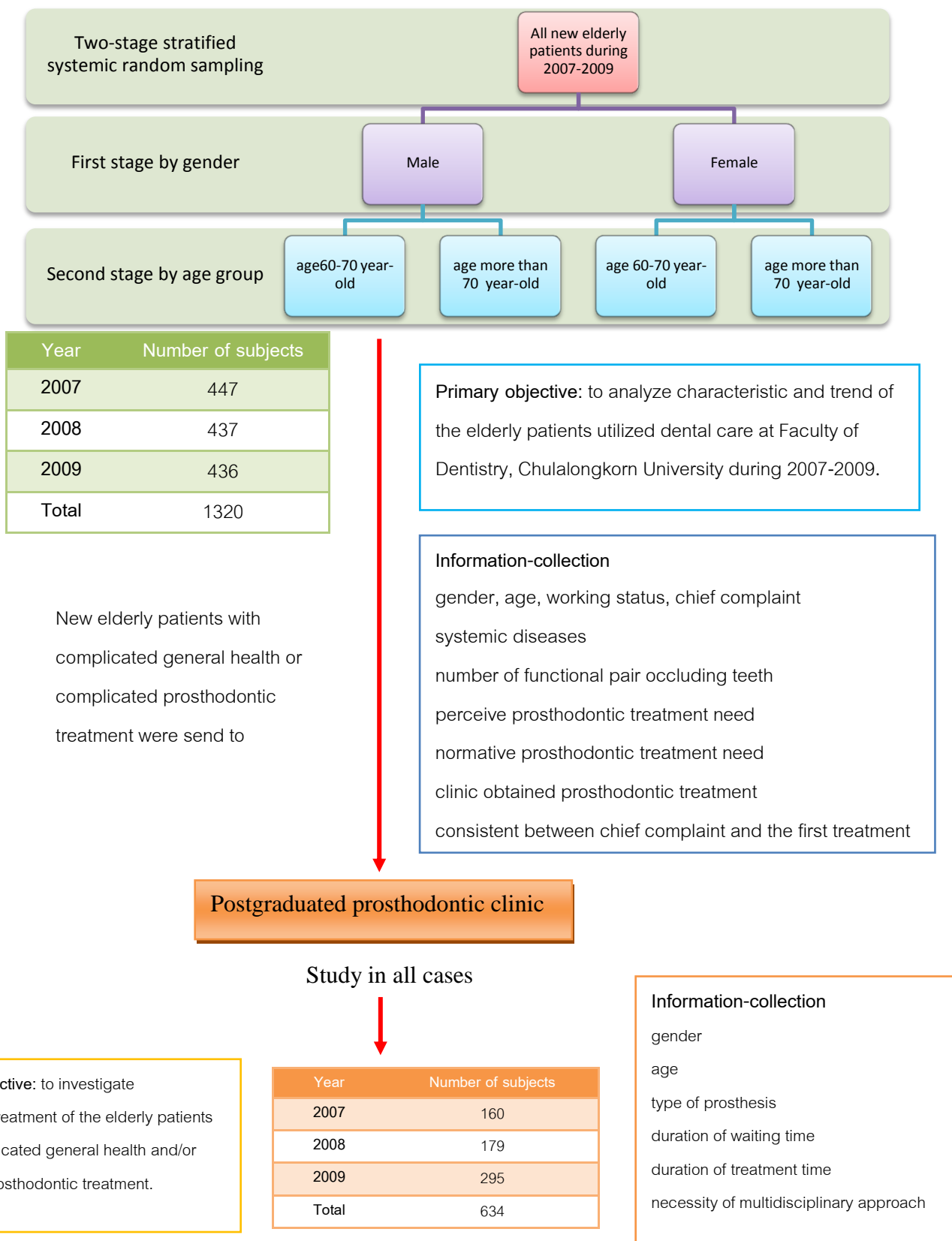


Fig 1. Diagram of selection of study samples and data collection.

Table II. Details and definition of variables in this study

Variables	Details and definition of variables
Gender (a)	Male/Female
Age (a)	Age at the day registered to Faculty of Dentistry, Chulalongkorn University
Working status (a)	Working/ Not working
Chief complaint (b)	Series1(c) : tooth loss/inefficient chewing/needed newly prosthesis, pain/swelling, broken teeth/restoration, check up, sensitive teeth, tooth decay, other Series2: prosthodontic-related chief complaint, non prosthodontic-related chief complaint
Systemic diseases (a)	Heart trouble, hypertension, diabetes, blood disease, liver disease, sexual transmitted disease, tuberculosis, others
Number of functional pair occluding teeth	Score the pair occluding teeth (#14/44, 15/45, 16/46, 17/47, 24/34, 25/35, 26/36, 27/37)
Perceived prosthodontic treatment need	Yes/No (Yes: if sample reported chief complaint of tooth loss or inefficient chewing or needed newly prosthesis)

Table II. (continue)

Variables	Details and definition of variables
Normative prosthodontic treatment need	Yes/No (Yes: if sample had record of referring for prosthodontic treatment)
Clinic obtained prosthodontic treatment	Special clinic/Post graduate clinic/ Undergraduate clinic/Others
Consistency between chief complaint and the first treatment	Yes/No
Type of prosthesis (b)	Removable denture, fixed denture, combination of removable and fixed denture, full mouth rehabilitation, others
Duration of waiting time	Period from the day accepted in PG prosthodontic clinic till the first appointment
Duration treatment time	Period from the first appointment till denture delivery appointment
Necessity of multidisciplinary approach in dental treatment	Yes/No (Yes: when sample had not only referred to postgraduated prosthodontic clinic but also other departments)

Note: (a) Details of variables were selected from a list of choices present in the dental chart

(b) The details of variables were record with handwritten in the dental chart

(c) Categorization of chief complaints (series1) was adapted from previous study in Faculty

of Dentistry, Chulalongkorn University [6]

Part II The development of dental service electronic database for elderly patients

According to the third objective of this study which aimed to develop the dental service electronic database for elderly patients, the integration of the knowledge from literature review and result from part I of this study was used for the development. The electronic program was aimed to improve dental service by completion of history taking, proper dental treatment planning and oral health related quality of life evaluation in elderly patients. Microsoft Visual Basic 6.0 and Microsoft Access 2003 were used to perform the electronic program.

CHAPTER IV

RESULTS

Part I The Characteristics of elderly patients seeking care at Faculty of Dentistry, Chulalongkorn University during 2007-2009

Percentage of new-registered elderly patients utilized dental care at Faculty of Dentistry, Chulalongkorn University were 9.6, 9.1 and 11.8 from year 2007 to 2009, respectively. Of those elderly patients comprised of 578 (44%) male and 742 (56%) female, with the average age of 67.5 ± 6.3 (mean \pm sd) years. The most common chief complaint was tooth loss with inefficient chewing and/or needed newly prostheses (36%) followed by pain or swelling (11%), broken teeth or filling (9%), check up (8%), sensitive teeth (5%), caries or cavity (4%), and others (19%), respectively. Chief complaints as mentioned were classified into 2 groups including prosthodontic-related chief complaint and non prosthodontic-related chief complaint. Comparing between genders (male and female), among subjects in the same age group (60-70 year-old or more than 70 year-old) in each year, there were no statistically significant in prosthodontic-related chief complaint. Comparing between age-groups (60-70 year-old and more than 70 year-old), among male in each year there were statistically significant higher prosthodontic-related chief complaint among subjects aged over than 70 year-old meanwhile among female only in the year 2008 with p-value $< .05$ (Table III). Regarding their working status, 43 percent among them were economically inactive. From all of subjects, 720 subjects (55%) reported themselves having at least one systemic disease. The most common systemic diseases were hypertension (37%), diabetes mellitus (15%), heart trouble (8%) and high cholesterol level (7%), respectively (Figure 2). From all of the subjects 1,030 subjects had information of functional pair occluding teeth, average number of functional pair occluding teeth was 2.8 ± 3.2 pairs. Among all subjects from 3 years there were 477 subjects (36%) had perceived prosthodontic treatment need while 853 subjects (65%)

had normative prosthodontic treatment need. Among the subject who received prosthodontic treatment (853 subjects) when concerning with the clinic in faculty of Dentistry, Chulalongkorn University most of the subjects (45%) received prosthodontic treatment at special clinic follow with postgraduated clinic (28%), and undergraduated clinic (20%) respectively. This study found most of the subjects (59%) had the first treatment consistent with their chief complaint (Table IV).

With respect to the secondary objective, among all new-registered elderly patients receiving prosthodontic treatment at postgraduated prosthodontic clinic, Faculty of Dentistry, Chulalongkorn University during 2007 to 2009, there were 309(49%) male and 325 (51%) female with the average age of 67.4 ± 6.2 (mean \pm sd) years. The highest frequent prostheses treatment type was removable denture (either partial or complete denture) (60%) follow with combination of removable and fixed denture (18%), full mouth rehabilitation (11%) and fixed denture (9%), respectively. From all of the subjects among 3 years there were 400 subjects had the information about waiting period and 270 subjects finished their prosthodontic treatment. The average waiting period until receive the first prosthodontic treatment was 134.1 days and the average treatment period was 155.4 days. From all of the subjects in 3 years most of them (82%) need multidisciplinary approach for their dental treatment (Table V).

Table III. Distribution of chief complaint among selected samples at Faculty of Dentistry, Chulalongkorn University during 2007-2009

Chief complaint	Year/ Gender/ Age-group (n, (%))											
	2007				2008				2009			
	Male		Female		Male		Female		Male		Female	
	Aged 60-70 years	Aged more than 70 years	Aged 60-70 years	Aged more than 70 years	Aged 60-70 years	Aged more than 70 years	Aged 60-70 years	Aged more than 70 years	Aged 60-70 years	Aged more than 70 years	Aged 60-70 years	Aged more than 70 years
- Prosthodontic-related chief complaint (a)	38(29)	25(47)	71(39)	38(49)	31(23)	22(42)	44(24)	26(38)	47(32)	38(62)	64(40)	34(49)
- Non prosthodontic-related chief complaint	95(71)	28(53)	113(61)	39(51)	102(77)	31(59)	139(76)	42(62)	98(68)	23(38)	96(60)	36(51)
- Pain/swelling	22(17)	1(2)	14(8)	4(5)	15(11)	8(15)	26(14)	6(9)	21(15)	1(2)	15(9)	8(11)
- Broken teeth/restoration	10(8)	3(6)	20(11)	7(9)	17(13)	3(6)	16(9)	6(9)	20(14)	2(3)	10(6)	7(10)
- Check up	15(11)	2(4)	21(11)	5(7)	11(8)	5(9)	15(8)	7(10)	11(8)	3(5)	8(5)	4(6)
- Sensitive teeth	6(5)	3(6)	9(5)	0(0)	8(6)	1(2)	17(9)	1(2)	4(3)	0(0)	10(6)	2(3)
- Tooth decay	8(6)	3(6)	9(5)	1(1)	9(7)	1(2)	10(5)	2(3)	2(1)	1(2)	4(3)	3(4)
- Others (b)	34(26)	16(30)	40(22)	22(29)	42(32)	13(25)	55(30)	20(30)	40(28)	16(26)	49(31)	12(17)
Total (n)	133	53	184	77	133	53	183	68	145	61	160	70
p-value	.016*		.108		.013*		.026*		.000*		.226	

* Statistically significance in chief complaint among samples with the same gender, different age-group within the same year.

Note; (a) Prosthodontic-related chief complaint include tooth loss, inefficient chewing and needed newly prosthesis

(b) Others include tooth mobility, ulcer, gum problem, TMJ disorder, orofacial pain, food impaction, bad breath, dental deposit, hyperplastic tissue, exostosis and others

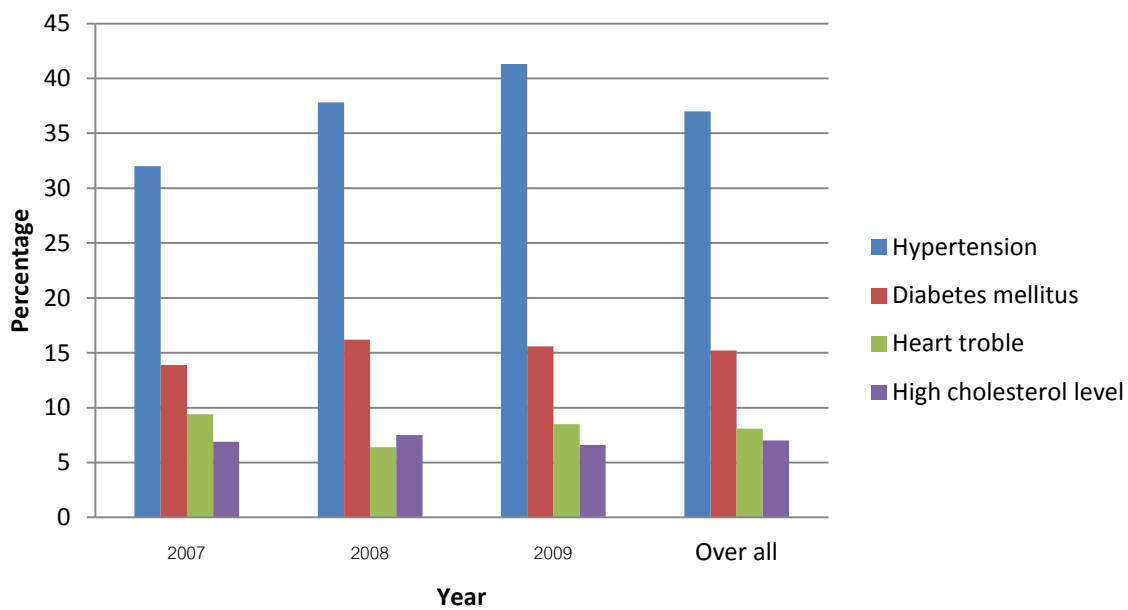


Fig 2. Distribution of systemic disease in new-registered elderly patient utilized dental care at Faculty of Dentistry, Chulalongkorn University during 2007-2009.

Table IV. Descriptive characteristic of individual samples among new-registered elderly patients at Faculty of Dentistry, Chulalongkorn University during 2007-2009

Characteristics		Year (n, (%))			
		2007	2008	2009	Over all
Work-status	Not report	168(38)	151(35)	175(40)	494(37)
	Working	90(20)	82(19)	84(19)	256(19)
	Not working	189(42)	204(47)	177(41)	570(43)
Reported systemic disease	Not report	73(16)	61(14)	66(15)	200(15)
	Absence	137(31)	140(32)	123(28)	400(30)
	Presence	237(53)	236(54)	247(57)	720(55)
Referral to Prosthodontic treatment	Absence	153(34)	154(35)	160(37)	467(35)
Presence	-Special clinic	135(46)	151(53)	99(36)	385(45)
	-PG clinic (a)	78(27)	75(27)	82(30)	235(28)
	-UG clinic (b)	54(18)	40(14)	72(26)	166(20)
	-Other clinics	27(9)	17(6)	23(8)	67(8)
	Consistency between chief complaint and the first treatment	Not report	31(7)	26(6)	37(9)
Consistent	Consistent	251(56)	262(60)	269(62)	782(59)
	Not consistent	165(37)	149(34)	130(30)	444(34)

Note; (a) PG clinic postgraduated prosthodontic clinic

(b) UG clinic means undergraduated clinic

Table V. Descriptive analysis of new-registered elderly patients at postgraduated prosthodontic clinic, Faculty of Dentistry, Chulalongkorn University during 2007-2009

Information	Year			
	2007	2008	2009	Over all
Prostheses treatment type (n, (%))				
-Removable denture (a)	87(54)	97(54)	198(67)	382(60)
-Fixed denture	13(8)	23(13)	20(7)	56(9)
-combination of removable and fixed denture	36(23)	39(22)	39(13)	114(18)
-Full mouth rehabilitation	22(14)	17(9)	32(11)	71(11)
Average waiting period (days)	288.6	134.0	68.4	134.1
Number of subject who reported waiting period (n, (%))	86(54)	112(63)	202(69)	400(63)
Average treatment period (days)	183.6	158.1	139.9	155.4
Number of subject who reported treatment period (n, (%))	63(39)	79(44)	128(43)	270(43)
Number of subject needed multidisciplinary approach in dental treatment (b) (n, (%))	138(86)	152(85)	231(78)	521(82)

Note; (a) Removable denture included partial and complete denture

(b) Multidisciplinary approach in dental treatment in this study mean subject had referred to not only postgraduated prosthodontic clinic but also other dental department.

Part II The development of dental service electronic database for elderly patients

The information contained in the electronic program was listed below.

1. **Personal information:** Name, Hospital number (HN), Birth date
2. **Date:** Date of the first appointment and date of the appointment for denture delivery
3. **Past medical history:**

3.1 Systemic disease: Hypertension, Heart disease, DM, High cholesterol level, Thyroid disease, Kidney disease, Liver disease and other

3.2 Drug allergy

4. **Chief complaint**

4.1 Perceive dental treatment need

- Prosthodontic and restorative dentistry
- Other dental treatment

4.2 Oral health problem

- Pain
- Discomfort
- Functional limitation
- Dissatisfaction with appearance

4.3 Check up

5. **Other condition which may impact the dental treatment:**

Xerostomia, Gag reflex, Parkinson disease or tremor, Alzheimer disease, Arthritis,

Limitation in mouth opening, Others

6. Basic Activities Daily Living

- Independent
- Semi-dependent
- Dependent

7. Diagram of teeth and their condition

The circle shape which represented the teeth would change the color according to their condition for example; sound tooth=white, missing or extracted tooth=black and carious tooth=red.

8. Prosthodontic treatment type:

Complete denture, Acrylic Removable Partial Denture, Metal base Removable Partial Denture, Post and Core, Coping, Crown, Bridge, Full Mouth Rehabilitation, Implant

9. Oral health related quality of life

The Oral Impacts on Daily Performances (OIDP) was used for evaluation of Oral health related quality of life before and after prosthodontic treatment. After recorded all answers of the index, the electronic program would calculate the OIDP score automatically. The summarized review of the OIDP index was described in the appendix.

Figure 3-5 showed the dental service electronic database for elderly patients

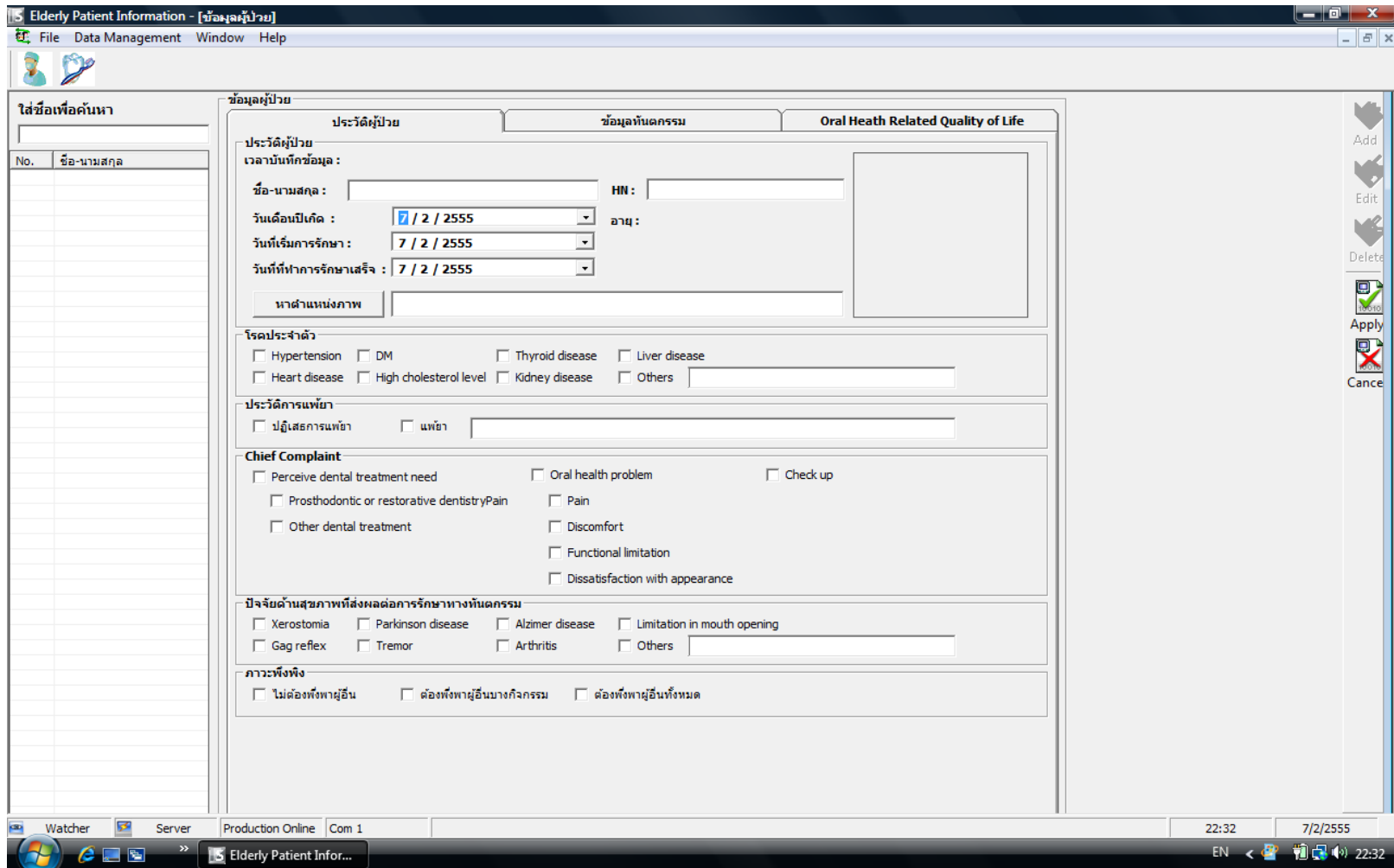


Fig 3. The first page of dental service electronic database for elderly patients.

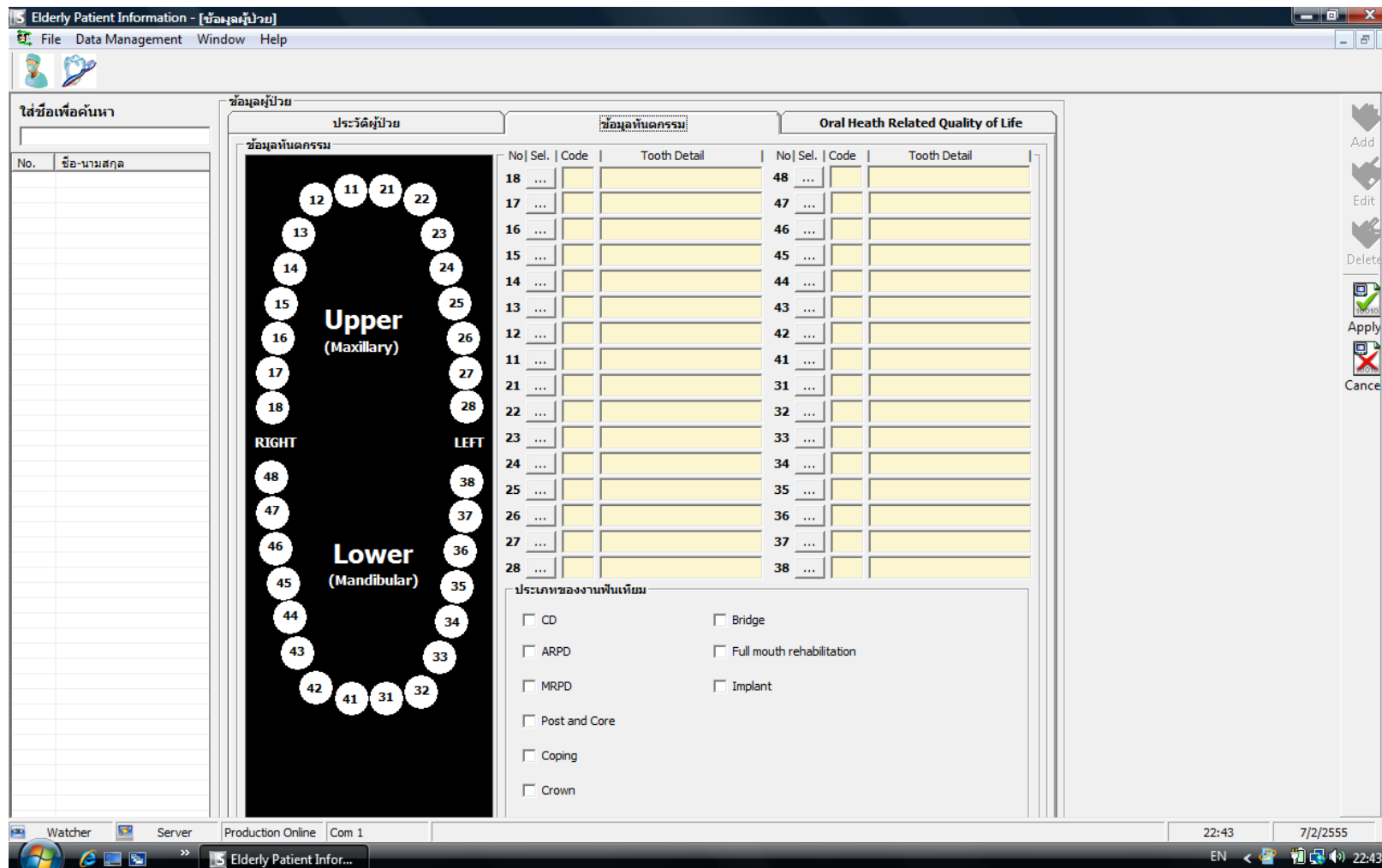


Fig 4. The second page of dental service electronic database for elderly patients.

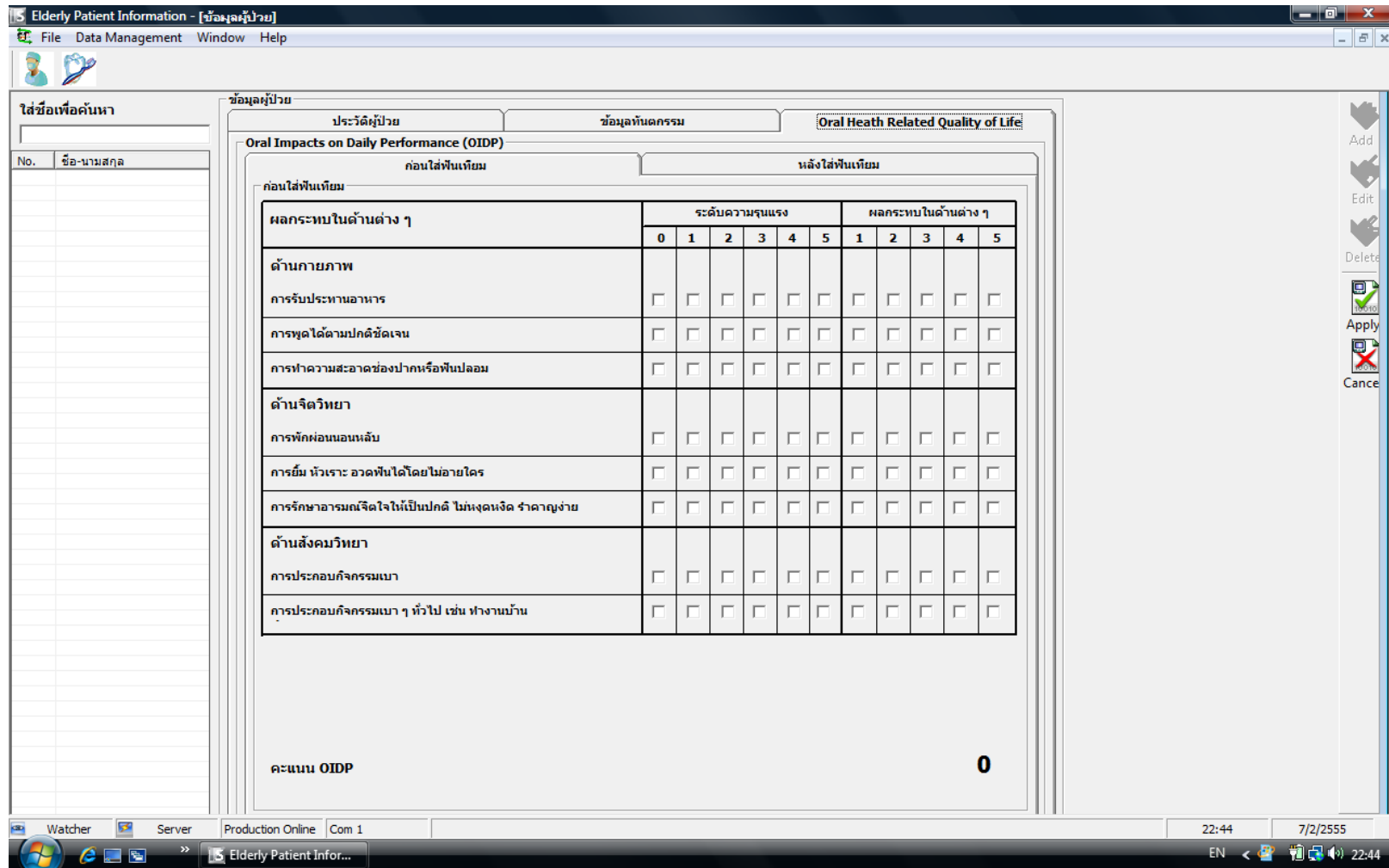


Fig 5. The third page of dental service electronic database for elderly patients.

CHAPTER V

DISCUSSION

As aforementioned, among new-registered elderly patients at Faculty of Dentistry, Chulalongkorn University, the proportion of elderly patients tends to increase simultaneously (approximately 10% each year). This trend challenges dental school in particular with the dental educational program for patients in this age group. There are some profound implications regarding the analysis from this study, described as follows. First, medical or general health is the important information among this age group and the most common systemic disease included hypertension which are related to dental treatment. This is consistent to other previous studies that found the incidence of hypertension in patients receiving dental treatment, range from 6.3-30.9% [57-64]. Other systemic disease such as diabetes is also related to oral health and shared common risk factors with hypertension which could be the aspect for health prevention and promotion [65-68]. This indicates that dental provider should recognize sign and symptoms and evaluate medical condition as well as consultation with the physician when indicated for proper treatment plan and dental treatment [52]. Evaluation of medical condition could also encourage patients to concern their health status.

With respect to chief complaint among elderly patients, the trend reveals consistent finding that prosthodontic-related chief complaint is the most common and this was consistent with previous studies [5, 6, 46, 69]. This study found significant higher prosthodontic-related chief complaint among elderly aged over than 70 year-old. This could imply that tooth loss and prosthodontic treatment need increasing with age. In this study, those elderly patients have an average number of functional pair occluding teeth as 2.8 pairs. Although subjects in this study were patients who need or seek dental care which could be the reason for having less number of functional pair occluding teeth when compared with general Thai elderly (approximately 3.3 pairs) [4].

As aforementioned, tooth loss is a major dental problem among elderly leading to need of dental substitution. Also, this was consistent with high prevalence of elderly patients who need removable, either partial or complete denture at postgraduated prosthodontic clinic in this study. The same trend of high prevalence of complete and removable denture was found in a study in geriatric home in India [70] and geriatric hospital in Switzerland [45]. This study suggested prosthodontic educational program to well prepare the knowledge of dentist from fixed partial denture to removable denture so that we can take good care in every oral health stages. In addition, tooth loss could lead to chewing and swallowing problem. Encouraging older people to maintain the number of tooth as much as possible, improving oral health status and proper denture could bring patient to better quality of life.

Furthermore, concerning with prosthodontic treatment need, this study found number of normative need (65%) was double when compared with perceived need (36%). Number of people who had normative need was always higher than perceived need because the normative assessment was a measure of "disease" while perceived assessment was a combination of biologic factor, psychological factor and social factor of individual. If there oral disease or oral health problem did not impact daily performance, they may feel that they have good oral hygiene and do not require any treatment [41].

With respect to the clinic in the Faculty of Dentistry, Chulalongkorn University, there are academic-related clinics which undergraduate or post graduate students provide dental treatment for patients under control of academic staffs. Another special channel for obtaining dental care is special clinic which academic staffs provide dental treatment with the expense similar to private clinic. For the aspect that deserves particular attention among elderly patients who had prosthodontic treatment, most of them (45%) received prosthodontic treatment at special clinic which is higher expense than the student clinic whereas their revenue were decreased. The elderly may need family financial support or their saving money to support their dental treatment need because most of them were not working. For author opinion, the high number of elderly patient at special clinic could be from various factors such as, less waiting time and less

number of appointment, etc. Resolving this problem are developing educational course for prosthodontic and geriatric training and improving service of student clinic to support the increasing of elderly patients by using Information Technology (IT) in improving updating patient data base, patient referring process and recording treatment plan. The student clinic should be the alternative for elderly patient to receive efficient dental treatment with lower expense.

Among the elderly patients who were referred to postgraduate prosthodontic clinic, defined as complicated case in this study, the waiting time for obtaining care tends to be decline from 2007 to 2009 (table V). Although it might not reflect the actual waiting period and treatment period because of high number of subject who had no information of waiting period and treatment period due to many reasons for example; rejection of dental treatment, rejection to continue dental treatment, or decided to change dental clinic, etc. This situation could be from several barriers impeding access to dental care including physical disability, financial hardship, culture, linguistic miscommunication and health care provider attitude [54]. Active barriers to dental care such as cost of dental treatment, fear of dental treatment, accessibility of dental services, availability of dental services and characteristics of the dentist were reported as well as passive barriers demonstrated by lack or absence of perceived need [48]. Although the average waiting period showed in this study reveal problem in service delivery and educational program to serve dental treatment need of increasing elderly people. Therefore, this study suggested that information technology (IT) would be useful to improve service delivery for this age group. The information of general health, oral health and quality of life of elderly patients would be benefit for appropriate treatment plan. Dental treatment plan for elderly should adapt to a realistic not an ideal treatment plan which suit to individual need of elderly patients.

There are limitations of this study regarding interpretation of the analysis. First, the data to perform analyses were taken from dental treatment record which missing some information in some subjects such as; medical problem, chief complaint, etc. From the aspect of this study result, we noted that sometimes information of elderly patients

was neglected by the dental profession. General health and oral health can be changed at anytime so the availability of updated information on general health status, oral health status and use of oral health service by older people would help justify their specific needs and facilitate the formulation of service delivery and development of program for oral health and quality of life.

Second, the investigation of prosthodontic treatment type this study could not represent trend of prosthodontic treatment in elderly receiving prosthodontic treatment at Chulalongkorn University because data to perform analysis was obtained only from elderly patients receiving prosthodontic treatment at postgraduate prosthodontic clinic. These subjects were patients who had complicated general health and/or complicated prosthodontic treatment. This study suggested further study to investigate trend of prosthodontic treatment in elderly patients receiving prosthodontic treatment at Chulalongkorn University and compare the trend with national survey.

Concerning with the dental service electronic database, there were several implementation described as followed;

1. The information of the date of the first appointment and denture delivery could use in the survey of waiting time and treatment time and use for improving service in prosthodontic clinic.
2. Medical problems included in the electronic program were listed according to medical problems present in dental chart of Faculty of Dentistry, Chulalongkorn University together with high prevalence medical problems found in this study. It was necessary for dental providers to update patient's medical history. This information was important to manage medically compromised patients with optimal and less invasive ways and monitor patient's health status to ensure proper management [52].
3. The information of chief complaint in the electronic program including; check up, dental treatment need which could classified patients into having prosthodontic treatment need or other dental treatment need and oral health problem which adapted from theoretical framework of the OIDP index. In addition, chief

complaint was a treatment priority and dentist should be directed to meet the need of patients [46].

4. The information of other health condition which may impact the dental treatment would be useful for dental profession to prepare instruments and proper management before start dental treatment.
5. Most of the patients seeking care at Faculty of Dentistry, Chulalongkorn University seem to be independent or semi-dependent. However, as people aged, they become more dependent on others for assistance with daily activities [43]. The information of dependent status would remind dentists to understand and assist elderly patients when indicated. Furthermore, dental care and education should be emphasized on both patients and their care givers.
6. The diagram of teeth and their conditions could represent the oral status of the patients in quick search. In addition, this information would also show the number of remaining teeth which would be useful in the survey research.
7. The information of prosthodontic treatment types would be useful in the survey research or the study of prosthodontic treatment trend in the future.
8. The OIDP index in the electronic program aimed to evaluate patient's oral health relate quality of life before and after prosthodontic treatment. Furthermore, the OIDP score could use to evaluate the improvement of quality of life in elderly patients. This information would be useful in the further study of oral health relate quality of life in elderly population. OIDP may offer advantages because it is concise, reduce over scoring of the same impact and is easier to validate because it measures behavioral rather than feeling-stage impacts [71]. In addition, OIDP-Thai version was approved the reliability in Thai population. Finally, this index can adapt to use in evaluation of dental treatment need, dental health care services and dental health promotion [72].

Finally, there should be an emphasis on preventive dentistry and oral health promotion prior to become an elderly which could reduce complicated dental treatment. Dental education training course must ensure that oral health care providers have skills in and understanding of the biomedical and psychosocial aspects of care for older people [32]. Over the past evaluation of oral health related quality of life was mainly in the form of research and mostly of dental treatment not included quality of life assessment. This study suggested there should be an assessing of oral health related quality of life together with an assessing of performance of prosthesis in elderly patients to reach the need of elderly patient. Health care service for elderly need knowledge integration and team work for good treatment result and sustain their oral health.

CHAPTER VI

CONCLUSION

The elderly usually have systemic disease and the most common is hypertension so it is dentist's responsibility to integrate the information of systemic disease in the elderly patient to their dental treatment plan. The high frequency of chief complaint about tooth loss with inefficient chewing and/or needed newly prostheses together with low average number of functional pair occluding teeth inferred high prosthodontic treatment need in elderly patients. The highest frequency prostheses treatment type in postgraduated prosthodontic clinic was removable denture. Most of elderly patients need multidisciplinary approach for their dental treatment. This study suggested there should be an assessing of oral health related quality of life together with an assessing of performance of prosthesis in elderly patients to reach the need and benefit of the elderly patient.

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APPENDIX

APPENDIX

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Statistical analysis for differences in prosthodontic-related chief complaint between genders, in the same age group, each year

I. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged 60-70 year-old within the year 2007

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	317	100.0%	0	.0%	317	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count		genderageyear		Total
		male 60-70 year 2007	female 60-70 year 2007	
chiefcomplaint	prosthodontic-related chief complaint	38	71	109
	non prosthodontic-related chief complaint	95	113	208
Total		133	184	317

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	3.432 ^a	1	.064		
Continuity Correction ^b	3.003	1	.083		
Likelihood Ratio	3.468	1	.063		
Fisher's Exact Test				.073	.041
Linear-by-Linear Association	3.421	1	.064		
N of Valid Cases	317				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 45.73.

b. Computed only for a 2x2 table

II. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged more than 70 year-old within the year 2007

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	130	100.0%	0	.0%	130	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count

		genderageyear		Total
		male more than 70 year 2007	female more than 70 year 2007	
chiefcomplaint	prosthodontic-related chiefcomplaint	25	38	63
	non prosthodontic-related chiefcomplaint	28	39	67
Total		53	77	130

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	.060 ^a	1	.807		
Continuity Correction ^b	.004	1	.947		
Likelihood Ratio	.060	1	.807		
Fisher's Exact Test				.859	.474
Linear-by-Linear Association	.059	1	.808		
N of Valid Cases	130				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.68.

b. Computed only for a 2x2 table

III. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged 60-70 year-old within the year 2008

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	316	100.0%	0	.0%	316	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count		genderageyear		
		male 60-70 year 2008	female 60-70 year 2008	Total
chiefcomplaint	prosthodontic-related chiefcomplaint	31	44	75
	non prosthodontic-related chiefcomplaint	102	139	241
Total		133	183	316

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	.023 ^a	1	.879		
Continuity Correction ^b	.000	1	.986		
Likelihood Ratio	.023	1	.879		
Fisher's Exact Test				.894	.494
Linear-by-Linear Association	.023	1	.880		
N of Valid Cases	316				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.57.

b. Computed only for a 2x2 table

IV. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged more than 70 year-old within the year 2008

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	121	100.0%	0	.0%	121	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count		genderageyear		Total
		male more than 70 year 2008	female more than 70 year 2008	
chiefcomplaint	prosthodontic-related chiefcomplaint	22	26	48
	non prosthodontic-related chiefcomplaint	31	42	73
Total		53	68	121

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	.133 ^a	1	.715		
Continuity Correction ^b	.032	1	.859		
Likelihood Ratio	.133	1	.715		
Fisher's Exact Test				.852	.429
Linear-by-Linear Association	.132	1	.716		
N of Valid Cases	121				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.02.

b. Computed only for a 2x2 table

V. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged 60-70 year-old within the year 2009

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	305	100.0%	0	.0%	305	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count

		genderageyear		Total
		male 60-70 year 2009	female 60-70 year 2009	
chiefcomplaint	prosthodontic-related chiefcomplaint	47	64	111
	non prosthodontic-related chiefcomplaint	98	96	194
Total		145	160	305

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	1.891 ^a	1	.169		
Continuity Correction ^b	1.578	1	.209		
Likelihood Ratio	1.896	1	.168		
Fisher's Exact Test				.191	.104
Linear-by-Linear Association	1.885	1	.170		
N of Valid Cases	305				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 52.77.

b. Computed only for a 2x2 table

VI. Statistical analysis for differences in prosthodontic-related chief complaint between genders among samples aged more than 70 year-old within the year 2009

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * genderageyear	131	100.0%	0	.0%	131	100.0%

chiefcomplaint * genderageyear Crosstabulation

Count		genderageyear		Total
		male more than 70 year 2009	female more than 70 year 2009	
chiefcomplaint	prosthodontic-related chiefcomplaint	38	34	72
	non prosthodontic-related chiefcomplaint	23	36	59
Total		61	70	131

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	2.480 ^a	1	.115	.159	.081
Continuity Correction ^b	1.957	1	.162		
Likelihood Ratio	2.492	1	.114		
Fisher's Exact Test					
Linear-by-Linear Association	2.461	1	.117		
N of Valid Cases	131				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 27.47.

b. Computed only for a 2x2 table

Statistical analysis for differences in prosthodontic-related chief complaint between age groups, in the same gender, each year

I. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the male gender within the year 2007

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	186	100.0%	0	.0%	186	100.0%

chiefcomplaint * agegroup Crosstabulation

Count		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	38	25	63
	non prosthodontic-related chief complaint	95	28	123
Total		133	53	186

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.853 ^a	1	.016		
Continuity Correction ^b	5.052	1	.025		
Likelihood Ratio	5.702	1	.017		
Fisher's Exact Test				.025	.013
Linear-by-Linear Association	5.821	1	.016		
N of Valid Cases	186				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.95.

b. Computed only for a 2x2 table

II. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the female gender within the year 2007

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	261	100.0%	0	.0%	261	100.0%

chiefcomplaint * agegroup Crosstabulation

Count		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	71	38	109
	non prosthodontic-related chief complaint	113	39	152
Total		184	77	261

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.586 ^a	1	.108		
Continuity Correction ^b	2.162	1	.141		
Likelihood Ratio	2.568	1	.109		
Fisher's Exact Test				.130	.071
Linear-by-Linear Association	2.576	1	.109		
N of Valid Cases	261				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 32.16.

b. Computed only for a 2x2 table

III. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the male gender within the year 2008

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	186	100.0%	0	.0%	186	100.0%

chiefcomplaint * agegroup Crosstabulation

Count		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	31	22	53
	non prosthodontic-related chief complaint	102	31	133
Total		133	53	186

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.162 ^a	1	.013		
Continuity Correction ^b	5.301	1	.021		
Likelihood Ratio	5.925	1	.015		
Fisher's Exact Test				.019	.012
Linear-by-Linear Association	6.129	1	.013		
N of Valid Cases	186				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.10.

b. Computed only for a 2x2 table

IV. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the female gender within the year 2008

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	251	100.0%	0	.0%	251	100.0%

chiefcomplaint * agegroup Crosstabulation

Count

		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	44	26	70
	non prosthodontic-related chief complaint	139	42	181
Total		183	68	251

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.965 ^a	1	.026		
Continuity Correction ^b	4.284	1	.038		
Likelihood Ratio	4.785	1	.029		
Fisher's Exact Test				.039	.021
Linear-by-Linear Association	4.945	1	.026		
N of Valid Cases	251				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.96.

b. Computed only for a 2x2 table

V. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the male gender within the year 2009

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	206	100.0%	0	.0%	206	100.0%

chiefcomplaint * agegroup Crosstabulation

Count		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	47	38	85
	non prosthodontic-related chief complaint	98	23	121
Total		145	61	206

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.818 ^a	1	.000		
Continuity Correction ^b	14.609	1	.000		
Likelihood Ratio	15.730	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.741	1	.000		
N of Valid Cases	206				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.17.

b. Computed only for a 2x2 table

VI. Statistical analysis for differences in prosthodontic-related chief complaint between age groups among the female gender within the year 2009

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
chiefcomplaint * agegroup	230	100.0%	0	.0%	230	100.0%

chiefcomplaint * agegroup Crosstabulation

Count		agegroup		Total
		60-70 years old	more than 70 years old	
chiefcomplaint	prosthodontic-related chief complaint	64	34	98
	non prosthodontic-related chief complaint	96	36	132
Total		160	70	230

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.463 ^a	1	.226		
Continuity Correction ^b	1.134	1	.287		
Likelihood Ratio	1.456	1	.228		
Fisher's Exact Test				.248	.144
Linear-by-Linear Association	1.457	1	.227		
N of Valid Cases	230				

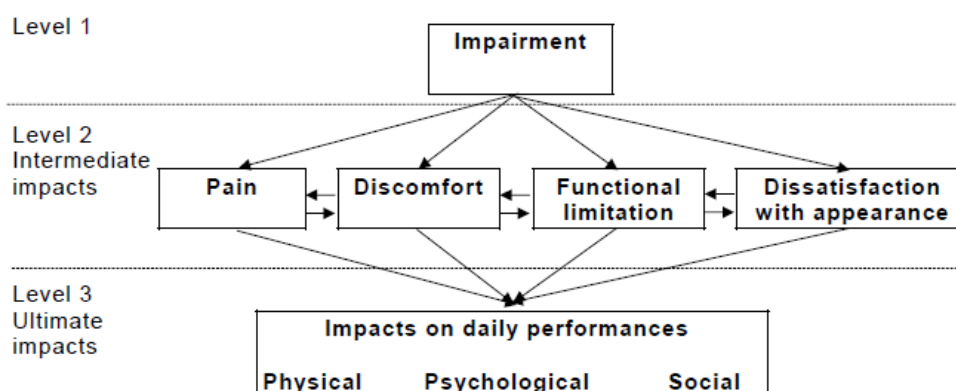
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 29.83.

b. Computed only for a 2x2 table

The summarized review of the Oral Impacts on Daily Performances Index (OIDP)

OIDP was developed by Adulyanon S. and Sheiham A. in 1997 [73]. The theoretical framework of OIDP was modified from Locker's framework [74]. The main modification was that different levels of consequence oral health outcome were established. The first level refers to the oral status, including oral impairments, which most clinical indices attempt to measure. The second level or the intermediate impacts including, the possible earliest negative impacts caused by oral health status: pain, discomfort, functional limitation and dissatisfaction with appearance. The third level or the ultimate impacts represents impacts on ability to perform daily activities which consists of physical, psychological and social performance [72, 73].

The theoretical framework of consequences of oral impacts [73]



OIDP consists of eight daily performances which reflex physical, psychological and social performances. This index assesses both frequency and severity of each performance. There are 2 patterns of frequency score, including regular pattern and spell pattern. The difference between regular and spell pattern is that the spell pattern is used for the case if less frequency of impact than once a month. The severity score was derived by asking respondents to rate the score ranging from 0 to 5, as an indication of how much trouble it caused to their daily living. Five represents "very severe" and 0 represents "none". The time frame for the OIDP was set at the past 6-month period. The score representing the total impact on each performance was calculated by multiplying

the frequency with the severity score. The total score was the sum of all the performance scores for an individual. Then the sum was divided by the maximum possible score (200) and multiply by 100 to give a percentage score. The higher score mean higher problem [72, 73].

Record form of Oral Impacts on Daily Performances (OIDP) [72, 73]

Daily performance		Frequency	Severity	Main oral impairments causing oral impacts
Physical performance	Eating and enjoying food Speaking and pronouncing clearly Cleaning teeth or denture			
Psychological performance	Sleeping and relaxing Smiling, laughing and showing teeth without embarrassment Maintaining usual emotional state without being irritable			
Social performance	Carrying out major work or social role Enjoying contact with people			
Total score				

Criteria of frequency score of affected performances over past six months [73]

Frequency (for people affected on a regular or periodic basis)	Duration (for people affected for a period/spell)	Score
Never affected in past 6 months	0 days	0
Less than once a month	Up to 5 days in total	1
Once or twice a month	Up to 15 days in total	2
Once or twice a week	Up to 30 days in total	3
3-4 times a week	Up to 3 months in total	4
Every or nearly every day	Over 3 months in total	5

