Oral Health-related Quality of life and related factors in the elderly patients who received dental treatment

Mr. Teerawut Tatiyapongpaiboon

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Geriatric Dentistry and Special Patients Care
Common Course
FACULTY OF DENTISTRY
Chulalongkorn University
Academic Year 2019

คุณภาพชีวิตในมิติสุขภาพช่องปากและปัจจัยที่เกี่ยวข้องในผู้ป่วยสูงอายุที่ได้รับการรักษาทางทันตกรรม

นายธีรวุฒิ ตติยพงศ์ไพบูลย์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
สาขาวิชาทันตกรรมผู้สูงอายุและการดูแลผู้ป่วยพิเศษ ไม่สังกัดภาควิชา/เทียบเท่า
คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2562

Thesis Title	Oral Health-related Quality of life and related factors in the elderly patients who received dental treatment
By	Mr. Teerawut Tatiyapongpaiboon
Field of Study	Geriatric Dentistry and Special Patients Care
Thesis Advisor	Assistant Professor ORAPIN KOMIN, D.D.S., Ph.D.
Thesis Co Advisor	NAREUDEE LIMPUANGTHIP, D.D.S., Ph.D.

Accepted by the FACULTY OF DENTISTRY, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Science

..... Dean of the FACULTY OF DENTISTRY

(Assistant Professor SUCHIT POOLTHONG, D.D.S., Ph.D.)

THESIS COMMITTEE

..... Chairman

(Associate Professor NIYOM THAMRONGANANSKUL, D.D.S., M.Sc., Ph.D.)

..... Thesis Advisor

(Assistant Professor ORAPIN KOMIN, D.D.S., Ph.D.)

..... Thesis Co-Advisor

(NAREUDEE LIMPUANGTHIP, D.D.S., Ph.D.)

..... External Examiner

(Assistant Professor Jutharat Chimruang, D.D.S., Ph.D.)

ธีรวุฒิ ตติยพงศ์ไพบูลย์ : คุณภาพชีวิตในมิติสุขภาพช่องปากและปัจจัยที่เกี่ยวข้องในผู้ป่วยสูงอายุที่ได้รับการรักษาทางทันตกรรม. (Oral Health-related Quality of life and related factors in the elderly patients who received dental treatment) อ.ที่ปรึกษาหลัก : ผศ. ทญ. ดร.อรพินท์ โคมิน, อ.ที่ปรึกษาร่วม : อ.ทญ. ดร.ณฤดี ลิ้มปวงทิพย์

วิทยานิพนธ์ฉบับนี้เป็นการศึกษาแบบตัดขวางซึ่งศึกษาลักษณะของผู้ป่วยสูงอายุและศึกษาปัจจัยที่เกี่ยวข้องที่ทำให้คุณภาพชีวิตในมิติสุขภาพช่องปากแย่ลงและวิเคราะห์ลักษณะของผู้ป่วยสูงอายุที่คลินิกทันตกรรมผู้สูงอายุและคลินิกผู้ป่วยพิเศษคณะทันตแพทยศาสตร์จุฬาลงกรณ์มหาวิทยาลัยที่ได้รับการรักษาทางทันตกรรม มีผู้ป่วย 46 รายซึ่งเสร็จสิ้นการรักษาทางทันตกรรมมากกว่า 6 เดือนในช่วงเดือนพฤษภาคม 2559 ถึงธันวาคม 2561 เข้าร่วมตรวจและสัมภาษณ์ที่คลินิกเก็บข้อมูลที่เป็นปัจจัยสำคัญโดยการสัมภาษณ์, การทบทวนประวัติผู้ป่วยและได้รับการประเมินตนเองและสัมภาษณ์ผลกระทบจากสภาวะช่องปากต่อการใช้ชีวิตประจำวัน โดยใช้สถิติเชิงพรรณนาอธิบายลักษณะของผู้ป่วย และใช้การความสัมพันธ์ของสเปียร์แมนและการทดสอบของครัสคาล-วัลลิสที่ระดับนัยสำคัญ 0.05 พบว่าคะแนนผลกระทบจากสภาวะช่องปากของผู้เข้าร่วมส่วนใหญ่ไม่มีความรุนแรงและไม่เกิน 2 กิจกรรมผลกระทบ กิจกรรมหลักที่ได้รับผลกระทบคือกิจกรรมการกินและการพูดเนื่องจากฟันปลอมที่ไม่เหมาะสมแต่ผลกระทบน้อยลงในการกิจกรรมทางจิตวิทยาและสังคม มีความพึงพอใจของฟันปลอมที่ไม่ดีทำให้คุณภาพชีวิตในมิติสุขภาพช่องปากลดลงอย่างไรก็ตามมีความแตกต่างระหว่างการประเมินช่องปากของผู้ป่วยและทันตแพทย์ ผู้เขียนแนะนำว่าการรักษาทางทันตกรรมควรมุ่งเน้นไปที่ระบบการนัดติดตาม, ความถี่ในการมาตรวจสุขภาพช่องปาก, วิธีการในการสอนสุขอนามัยช่องปากที่ประสบความสำเร็จและทักษะในการจัดการกับปัญหาฟันปลอม

สาขาวิชา	ทันตกรรมผู้สูงอายุและการดูแลผู้ป่วยพิเศษ	ลายมือชื่อนิสิต .....
ปีการศึกษา	2562	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....
		ลายมือชื่อ อ.ที่ปรึกษาร่วม .....

6075816932 : MAJOR GERIATRIC DENTISTRY AND SPECIAL PATIENTS CARE
KEYWORD: Elderly patients Oral Health-related Quality of Life (OHRQoL) Dental treatment OIDP

Teerawut Tatiyapongpaiboon : Oral Health-related Quality of life and related factors in the elderly patients who received dental treatment. Advisor: Asst. Prof. ORAPIN KOMIN, D.D.S., Ph.D. Co-advisor: NAREUDEE LIMPUANGTHIP, D.D.S., Ph.D.

This thesis is a cross-sectional study which explores underlying determinants of elderly patients. The study examines related factor that impaired Oral Health-related Quality of life (OHRQoL) and analyzes the characteristics of elderly patients at our clinic. 46 participants are patients who completed dental treatment more than 6 months during May 2016 to December 2018. Underlying determinants information were recorded by interview, patient chart review and oral examination. There were collected self-evaluation and Oral Impacts on Daily Performances (OIDP). Descriptive statistics was used to describe the characteristics of patients. Spearman correlation and Kruskal-Wallis test at P-value < 0.05 were performed. From the results, the participant's OIDP scores showed the majority in no severity and no more than 2 impacts activities. The major activities that were impacted were eating activity and speaking activity due to ill-fitting dentures but less impacts in psychological and social performance. There was poor denture satisfaction that impaired participant's OHRQoL. However, there were differences between dentist and patient evaluation. The authors suggest that the dental treatment should focus on the recall system, the frequency of dental recall visits, procedures to successful oral hygiene instruction and skills to handle the denture problems.

Field of Study:	Geriatric Dentistry and Special Patients Care	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....
		Co-advisor's Signature .....

ACKNOWLEDGEMENTS

I would like to give the special thanks to the staffs and team members of Geriatric Dentistry and Special Patients Care Clinic, Faculty of Dentistry, Chulalongkorn University for providing the location in my research project.

Teerawut Tatiyapongpaiboon

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF ABBREVIATIONS

CFS	Clinical Frailty Scale
GOHAI	Geriatric Oral Health Assessment Index
MMSE	Mini-Mental State Examination
MNA	Mini Nutrition Assessment
OHAT	Oral Health Assessment Tool
OHIP	Oral Health Impact Profile
OHRQoL	Oral Health-Related Quality of Life
OIDP	Oral Impacts on Daily Performances

CHAPTER I INTRODUCTION

Background and Rationale

The world elderly population aged 60 years and above is 962 million people or 13.2% of population in 2017. The number of elderly people is expected to be nearly 2.1 billion people or 21.4% of the world population in 2050. In 2017, an elderly population in Thailand is 11,691 thousand or 16.8% of a total population. In 2050, the elderly population of Thailand is expected to be increased to 22,954 thousand or 32.2% of population (1, 2). Major causes of disability and mortality are often from non-communicable diseases, so the rapidly changing burden of chronic disease in ageing population is the great challenge of health and social policy makers. Moreover, chronic disease and most oral diseases have common risk factors (3).

A major oral disease in Thai elderly are tooth loss, commonly caused by periodontal disease and dental caries (4). From previous study (5), there is overwhelming evidence confirming that a maintenance of a healthy natural dentition in elderly people is advantageous from “a structural, functional, and psycho-social point of view”. Moreover, Clinical, anthropometric, socio-economic, and lifestyle characteristics variables also were significantly associated with remaining teeth (6).

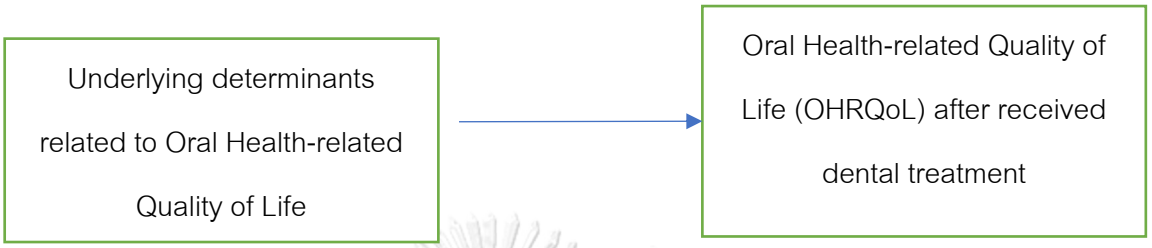
Furthermore, several studies present that oral health has a strong association and correlations with sociodemographic (7-11); physical performance (12-14); psychosocial and cognitive (12, 15-17); lifestyle (18-24); social participation (25-29), and social support (30-32). In Thailand, there are a rarity of OHRQoL studies at adult population-based level in which the Oral Impacts on Daily Performance (OIDP) are regularly used (33, 34); Oral Impacts were related to some social and clinical variables (34-37).

This study aims to determine related factors that impaired Oral Health-related Quality of life in the elderly patients who received dental treatment.

Keywords

Elderly patients, Oral Health-related Quality of Life (OHRQoL), Dental treatment, OIDP

Conceptual framework



Objectives

1. To determine oral health-related factor that impaired quality of life in the elderly patients who received dental treatment at Geriatric Dentistry and Special Patients Care clinic, Faculty of Dentistry, Chulalongkorn University.
2. To analyze the characteristics of elderly patients at Geriatric Dentistry and Special Patients Care clinic, Faculty of Dentistry, Chulalongkorn University, received dental treatment during 2016-2018.

Expected benefits and applications

1. To know the characteristics of elderly patients using as a database for improving educational programs and oral health service for elderly patients.
2. To know the oral health-related factors that affect the quality of life for improving the recall and waiting system of dental treatment in elderly patients.
3. To further develop a registration criteria and priority for dental treatment in the elderly patients.

CHAPTER II LITERATURE REVIEW

World population aging and situation in Thailand

The world population aged 60 years and over is 13.2% of population or 962 million in 2017, more than a doubling to that in 1980. The number of elderly people is expected to double again, in other words, nearly reaching 2.1 billion people or 21.4% of population in 2050 (1).

In Thailand, the ageing population is 11,691 thousand of persons or 16.8% of population in 2017. While in 2050, the elderly population will be increasing to 22, 954 thousand of persons or 32.2% of population (1, 2). Thailand is currently the "aged society" as the ratio of the population who is more than 60 years are beyond 14% of the total population.

Household living arrangements of ageing society will be changing to small families or living alone (1). it is a correlation between the proportion of living alone and the proportion of other forms of living arrangements of the elderly persons. Increasing proportion of elderly people living alone in many countries in all regions of the world is a greater risk of social isolation. It was about the need to come up when a serious disease or disability found in the elderly who were alone (38). In developed countries, those living alone confront a higher risk of entry into long-term institutional care, especially for those who have never married and lack spouse; spouse and children are the main support informally (39). The situation of household living arrangements of Thai older persons are shown in the table 1 (1).

Table 1 the percentage of household living arrangements of Thai older persons from the UN Database of the Living Arrangements of Older Persons, 2017.

Alone		With spouse only		Independently (alone or with spouse only)		With child(ren)	
Females	Males	Females	Males	Females	Males	Females	Males
7.0	4.8	9.9	16.4	16.8	21.3	69.4	67.3

In conclusion, globally, there are rapidly increased of proportion of older people, especially in developing countries. Major causes of disability and mortality are often from non-communicable diseases, so the rapidly changing burden of chronic disease in ageing population is the great challenge of health and social policy makers. Moreover, chronic disease and most oral diseases have common risk factors. The key challenge is to translate the "knowledge" into "how to practice" programs for oral health of the elderly which mean more compliance (3).

Oral health status in elderly people and its burden

In every region of the world, oral diseases are main public health problems. They effect to Individuals and communities because of the pain and suffering, impairment of function and reduced quality of life. The burden of oral disease is still high and underprivileged especially to the poor (3). The global burden of oral diseases in the elderly people is tooth loss; denture-related conditions; periodontal disease; coronal dental caries and root surface caries; xerostomia, oral precancer, and oral cancer lesions (40).

In Thailand, from the 7th national dental survey in 2012, the major oral diseases of the Thai elderly are tooth loss that caused by periodontal disease and dental caries. The average of tooth loss per person in age 60-74 years and age 80-89 years are 13.2 and 23.1 respectively; The average posterior occluding pairs of the elderly is 3.2 pairs. Elderly population that has at least 4 posterior occluding pairs is less than half (43.3%) (4). In the United Kingdom and in Australia, people with 25 or more natural teeth have an average OHIP-14 score lower than all other groups. The highest OHIP-14 scores was found in the persons who had less than 17 natural teeth in the United Kingdom and less than 21 teeth in Australia (41).

Although, in the elderly people, the maintenance of a healthy natural dentition is advantageous from "a structural, functional, and psycho-social point of view", the presence of natural teeth is correlated with higher life expectancy. Frail elders who aspirated of biofilm from natural teeth can cause pneumonia and lead to death (5). The clinical, anthropometric, socio-economic, and lifestyle characteristics variables were significantly associated with remaining teeth. Difficulty in chewing was

associated with type of dentition: edentulous persons not wearing any dental prosthesis, edentulous persons wearing both upper and lower dentures, persons with 0 to 19 teeth with or without dentures, and persons with most of their natural teeth (≥20) with or without dentures (6).

Oral health and index used in elderly people

Currently, a new definition of oral health was approved by the FDI. Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort, or disease of the craniofacial complex (42). Accordingly, oral health has been measured through the impact of oral health on the person's ability. "Oral health related quality of life (OHRQoL)" is a multi-dimensional concept that measures oral health perception and the effects of oral health on individual and population levels (43). OHRQoL measures have been used in both epidemiological and clinical studies. These measures were initially designated as socio-dental indicators or subjective oral health indicators.

<u>OHRQoL measures developed to date (44):</u>

Pre- 1997

- Social Impacts of Dental Disease
- General (Geriatric) Oral Health Assessment Index (GOHAI)
- Dental Impact Profile (DIP)
- Oral Health Impact Profile (OHIP)
- Oral Impacts on Daily Performances (OIDP)
- Subjective Oral Health Status Indicators (SOHSI)
- Oral Health-Related Quality of Life Measure
- Dental Impact on Daily Living (DIDLS)
- Oral Health Quality of Life Inventory
- Rand Dental Questions

Post-1997

- OHQoL-UK
- Child Oral Health Quality of Life Questionnaire (COHQoL)
- Child OIDP
- OHRQOL for Dental Hygiene
- Orthognathic QOL Questionnaire
- Surgical Orthodontic Outcome Questionnaire (SOOQ)

However, instruments that were established for use mainly with older adults, were Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile (OHIP) (45). To assess OHRQoL in the elders in Thailand, there are a rarity of OHRQoL studies at adults population-based level (33) in which the Oral Impacts on Daily Performance (OIDP) are regularly used (34)

Oral Impacts on Daily Performance (OIDP) is a well-known oral health-related quality of life instrument that assesses a person's difficulty in performing 8 activities within 3 performances; 1) Physical (eating, speaking, cleaning teeth or denture), 2) Psychological (maintaining emotion, smiling/laughing without embarrassment by teeth appearance, sleeping well), and 3) Social (Contact with people, Working). Data was collected on these impacts (frequency score and severity score), the OIDP score was calculated by multiplying the frequency score by the severity score (5 frequency score ×5 severity score = OIDP score) (46). Moreover, the OIDP instrument can be used to detect change of oral health status that occurred over the time after treatment or follow up (47).

The Thai version of the OIDP has been validated among the Thai adult population (34). The impacts directly related to function of the teeth and related to wider range of physical and social activities of the day. Moreover, one social performance, carry out major work or role changed to physical performance because "it was not relevant to the social role of the older people" (34). The OIDP of Thai

older people were relatively common impacts but not severe impacts. Oral Impacts were related to some social and clinical variables (34-37), for example, gender, income, and number of attendances to the dentist (37). The effect of common and severe impacts in edentulous subjects are more than dentate subjects (34). Thai older participants with at least 20 natural teeth or at least 4 posterior occluding pairs had better OHRQoL than others; 5 teeth may be a significant clinical threshold for Thai elderly dental patients' quality of life (35). The high frequency of oral hygienic obstruction with OIDP too still high magnitude level. Therefore, there are need to be improved and fulfilled in community oral health education and dental skill training programs (48).

Underlying determinants related to Oral Health-related Quality of Life (OHRQoL) of elderly people

Due to a burden of oral health status in elderly people, several studies have been investigated. The underlying determinants related to oral health of elderly people, including individual and social determinants as listed below. These factors may not only directly associate with oral health status, but also indirectly through oral health service utilization (7, 34-36).

Factors related to Oral Health-related Quality of Life (OHRQoL) were sociodemographic and economic factors, clinical oral health status factors, health status factors, psychological factors and social factors.

1) Sociodemographic and economic factors

Sociodemographic factors include age, sex, education level, income level, marital status, occupation, religion, average size of a family, and socioeconomic condition. Some outstanding oral diseases in the elderly were related with socio-demographic factors (8). However, previous studies have shown some variables of sociodemographic factors can effect on OHRQoL, including those;

1.1 Household income: a reduced amount of using of health services among the elderly because of a lower income; on the other hand, It led to less favorable health conditions and physical function (7). Income less than 3,000 Baht per month related to poor OHRQoL (33).

1.2 Age: In the Norway study, their found a strong inter-relationship among age and OHRQoL (10) similar to Thailand study that found the prevalence of OIDP in the older people (aged 60-74) was lower than in a younger people (aged 35-44) (34).However, the Germany study was found little effect on OHRQoL (11).

1.3 Gender: In the Brazil study, there was found variables that had a statistically significant association: gender / gingival disease (9).

1.4 Care giver: In the Brazil study, there was found variables that had a statistically significant association: the presence of a caregiver / gingival disease, need for dental prosthesis (9). Moreover, while using the OHAT assessment for evaluating oral health, the previous study (49) found that only half caregivers had similar OHAT scores with dental professionals.

1.5 Education: perceived chewing ability and OHRQoL were not significantly influenced by age and number of teeth, except by gender, years of schooling, treatment demand and denture status. The correlation between perceived chewing ability and OHRQoL revealing that greater chewing ability was correlated with lower the Oral Health Impact Profile-J14 (OHIP-J14) summary scores, which indicate better OHRQoL (17).

1.6 Residential area: In the Brazil study, there was found variables that had a statistically significant association: residence area / need for dental prosthesis (9).

2) Clinical oral health status factors

2.1 Tooth loss

In the Norway study, their found a strong inter-relationship among number of missing teeth and OHRQoL. While one of the most important predictors of the OIDP is the number of missing teeth significantly influenced the OHRQoL (10). However, the extent and severity of tooth loss seems to be dependent that not only number,

but also occluding pairs, location and distribution of missing teeth affect the severity of OHRQoL impairment (50).

2.2 Dry mouth and oral care

The clinical status that impacted their daily performances were irritation in oral cavity, xerostomia, loosening teeth, frequency of cleaning teeth. Multivariate logistic regression model evaluating the relationship between the OIDP and selected variables after controlling for age: perceived their irritation in oral cavity (adjusted OR 2.11, 95% CI: 1.62-4.31), xerostomia (AOR 1.89, 95%CI: 1.02-3.13), frequency of cleaning teeth (AOR 1.96, 95% CI: 1.09-3.03), restricted their sugar consumption (AOR 2.38, 95%CI: 1.22-3.80), visited a dentist during the past three years or more (AOR 2.89, 95%CI: 1.20-4.15) (48)

2.3 Non – denture user

Edentulous elders are more likely to have more oral impact on their daily performances than those using dentures on eating OR = 6.5 (3.9–10.9), speaking clearly OR = 43.7 (12.7–15.07), emotional stability OR = 16.5 (6.0–45.6), and social contacts OR = 4.6 (2.2–9.5) ($p < 0.001$) (51).

2.4 Dental visit: While one of the most important predictors of the OIDP is dental visiting habits significantly influenced the OHRQoL (10, 48)

2.5 Self – rated oral health and perceived need of dental treatment

In Southern Brazilian elderly study, oral health impact profile-14 scores varied significantly according to perceived need for dental treatment ($p < 0.001$), self-rated oral health as good/fair or poor/very poor ($p < 0.001$), number of teeth ($p = 0.007$) and use of any type of prosthesis ($p = 0.002$) (22). In community-dwelling elderly persons with disabilities study, they found that poor OHRQOL was significantly associated with perceived need for dental treatment (odds ratio (OR)= 2.61) (52).

3) Health status factors

3.1 Frailty: Clinical Frailty scale, Activities of daily living

Older people commonly present with frailty and multi-morbidity, often requiring support with the activities of daily living and a shift in life priorities. The prevalence of chronic disease and functional handicap increases with age. A dry mouth, possibly

caused by polypharmacy, raises the risk of root caries, and renders the oral tissues more sensitive. Muscle coordination is likely to get worsened especially around head and neck area, then the swallowing disorders become more common. Additionally, complicated procedures will often be beyond consideration, which should be predicted when planning the treatment for the elderly patients before they become frail (12). Oral health and physical performance were correlated. Frail and multi-morbid elderly persons or dependent persons display with physical limitations and higher risk of oral health decline (13). Frailty is described by raising vulnerability to peripheral stressors. The Clinical Frailty Scale (CFS) is a practical and efficient instrument for evaluating frailty. The CFS is a simple to use instrument which can find older adults at considerable risk of complicated course and longer stay (14). The details for the clinical frailty scale are as follows.

Clinical Frailty Scale (CFS) (Canadian study on health and aging revised 2008) (53)

1. Very Fit – robust, active, energetic and motivated people, commonly exercise regularly.
2. Well – no active disease symptoms but are less fit than Very Fit group, exercise occasionally
3. Managing Well –well controlled medical problems people, no exercise.
4. Vulnerable – no need daily help, limit activities, slowed up and being tired during the day.
5. Mildly Frail – more slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications)
6. Moderately Frail – need help with all outside activities and with keeping house, have problems with stairs, need help with bathing and dressing.
7. Severely Frail – completely dependent people (physical or cognitive), stable and not at high risk of dying (within ~ 6 months).
8. Very Severely Frail – completely dependent people, approaching the end of life. Typically, they could not recover even from a minor illness.
9. Terminally Ill - approaching the end of life (life expectancy <6 months)

3.2 Cognition

The prevalence of a low standardized Mini-Mental State Examination (MMSE) score or poor cognition was more significant in association with fewer teeth remaining. No significant relationship existed between denture presence and cognitive function. Likewise, a lower number of remaining teeth and impaired chewing ability were significantly correlated with poor cognitive ability (16).

In Thailand, there is the Mini-Mental State Examination Thai 2002 (MMSE-T), a reliable screening tool for cognitive function in primary care settings. It is recommended for using as a standard cognitive screening test for the aging population in the Thai community (54).

3.3 Self – rated general health

Poor OHRQOL (poor OHIP14 scores) was associated with poor self-rated health status (OR = 2.29; P=.03).(52). Poor self-rated health was likely to have poor and moderate GOHAI scores (55). Moreover, OIDP was related to perceived general health, oral health, oral health in relation to general health, poor self-rated oral health or general health were more likely to have a higher OIDP score (56).

4) Psychological factor

In old age, it seems everything is not perfect, some recommend the aging display a more realistic expectations and more accepting attitude, along with lower stress tolerance levels, which tends to render elders more fulfilled with their condition (12). Overall, the elderly has less patience and energy to cope with the changes.

4.1 Depression

The prevalence of depression and social isolation raise as partners or friends pass away, or when relocating to other accommodation that decreases usual social contacts and familiar environment. Oral health will not be the first priority in depression and social isolation patients so oral pathologies and functional

impairment are not perceived. Edentulism is related with physical and psychological incapacity. Psychological preparation of aging patients is very important (12).

The measure of depressive symptoms was obtained using the Thai version of the 15-item Geriatric Depression Scale (TGDS-15). Based on the criteria of the International Classification of Diseases (ICD-10), individuals with more than five points were considered to exhibit depressive symptoms (57).

4.2 Mental health

Oral health-related quality of life (OHRQoL) showed several associations with all the emotions (anxiety, depression, aggression, activity, fatigue, and confusion). The different level of impact from oral health on OHRQoL appeared differences in mood states such as normal, moderately altered, or psychopathological. The consideration about the role of emotions in oral health involves both psychologists and dentists, who must assure the psychosocial, physical, and emotional well-being of dental patients. Additionally, the teeth have a representative value in the emotional life (15).

In 1950, there were the development of "Person classification system" by Dr M. M. House based on how patients' psychological responses and adapting to dentures. This system classified patients into 4 types: philosophical mind, exacting mind, hysterical mind, and indifferent mind) (58):

1. Philosophical mind: Philosophical mind patients are prepared to rely on the dentist's advice for diagnosis and treatment and will follow the dentist's advice

2.Exacting mind: Exacting mind patients need a great deal of treatment and have doubt in the dentist's ability for satisfy their esthetic and functional needs.

3.Hysterical mind: Hysterical mind patients are careless of their oral health, dental phobia, and unwilling to try to adapt to wearing dentures.

4.Indifferent mind: Indifferent patients tend to neglect about their self-image and are not motivated to enjoy eating. No need to wearing dentures.

In community-dwelling elderly persons with disabilities study, poor OHRQoL was associated with poor (the lowest quartile) (OR = 2.00; P =.039) and fair (the second lowest quartile) (OR = 1.73; P =.089) mental health as measured according to the Medical Outcomes Study 36-item Short Form Survey (SF- 36) : Mental Component Summary (MCS) scores(SF-36 MCS score) (52).In Thailand, The Thai SF-36 was found reliable and valid for use in a general non-clinical population (59).

5) Social factor

5.1 Lifestyle

The encouragement of a healthy lifestyle is a topic of public health importance in the surroundings of ageing populations and increasing prevalence of chronic non-communicable diseases (18). Healthy lifestyles include patterns of behavior to protect, maintain or promote health and oral health (19). For example, smoking, alcohol consumption, dietary habits, and physical activity. In addition, the efficient primary and secondary preventive health and oral health programs used documents about modifications in healthy lifestyle patterns across the time as well as the economical, socio-cultural, and cognitive factors for motivating changing (20). Using oral hygiene measures, controlled sugar, stop smoking, and reduced alcohol consumption were the primary prevention of oral diseases as well as other chronic degenerative illnesses, alcohol consumptions and smoking are considered the most important lifestyle factors for health and oral health (21). Proper use of oral hygiene measures is important in the prevention and control of caries and periodontal disease and may provide to protect from myocardial infarction, cerebrovascular disease, and pneumonia (22, 23). In the cohort study, participants aged 50 at baseline showed both positive and negative trends in oral health behaviors over a 20-year period. While participants who lose teeth were more likely to increase the use of fluoride toothpaste and increase to stop smoking than those who had never lost

teeth. The outcomes discovered that oral health promoting lifestyle of the elderly changed according to the experience of tooth loss. (18).

Furthermore, the relationships between oral health status and food's choice show that the elderly people who have small number of natural teeth will select the diet menu that give chewing comfort. The salivary flow and the chewing function may also play an important role that impact the chewing and swallowing ability. Food choices in elderly people tends to low in fruits and vegetable intakes resulting in a reduction of both non-starch polysaccharide and micronutrient intakes. These lead to reduce dietary intake overall (24).

5.2 Social participation, social support

Earlier studies have examined the relationships between various health outcomes and social participation. Social participation decreased the risk of mortality that may equal with smoking cessation (25). The definitions of social participation frequently focused on questions of who, how, what, with whom, and where in meta-analysis (26). Lower levels of social participation were related to a higher risk for periodontitis (27) or edentulism (28). The main impact of social participation comes from social relationship. Normative dental health behaviors were influenced by a social network. For example, "smoking cessation" in one person, it was shown that the smoking habits of other people who are nearby in that person's social network were highly correlated. (29). Social network relationships also provide several sources of data that could change behaviors related to oral health. In addition, a source of social support in social networks provides psychological resources and tools intended to gain an individual's ability to deal with stress. In Japan, "social participation was significantly and positively associated with better dental health status among older Japanese adults". Moreover, their results show the possibility that neighborhood community associations, participation in sports groups, or hobby clubs might be a strong forecaster for preserving more teeth and better dental health beyond individual differences in sociodemographic variables (30).

In Britain, social support is associated with oral health behavior and oral health status of older people, e.g., self-reported oral health status and use of dental services. Social support appeared as an important sign of reason for last dental visit, treatments that they receive, and denture status, having determined for other factors in the model (age, gender, social class, and educational achievement). Undoubtedly, the interrelationship of social support on the oral health of older people should not be underestimated (31). Furthermore, a positive correlation exists between oral health behaviors and self-esteem; oral health behaviors and significant others' support; and oral health behaviors and friends' support (32).

Dental care in the elderly requires holistic care and relates to other cares. When Faculty of Dentistry, Chulalongkorn University developed the master course in Geriatric Dentistry and Special Patients Care Clinic, the students have more chance to learn more knowledge and to develop their skill in treatment plan and management. It is interesting to collect information on various aspects of the elderly who seeking for dental care and to analyze the characteristics of those elderly patients. Together with this, it is also nice to evaluate the related factors that impaired Oral Health-related Quality of life in the elderly patients who received dental treatment.

CHAPTER III RESEARCH METHODOLOGY

1. Population

- Target population

  Elderly patients who received a comprehensive dental treatment at Geriatric Dentistry and Special Patients Care Clinic, Faculty of Dentistry, Chulalongkorn University.

- Sample population

  127 Elderly patients who received a comprehensive dental treatment that completed more than 6 months at Geriatric Dentistry and Special Patients Care Clinic, Faculty of Dentistry, Chulalongkorn University during May 2016 – December 2018.

- Participants

  Participants are patients who were willing to participate for a maintenance recall at Geriatric Dentistry and Special Patient Care clinic and pass the eligible criteria.

- Inclusion Criteria

  1.Willing to give a personal information, either by themselves, offspring, or caregiver.

  2. Ability to understand and communicate Thai.

- Exclusion Criteria

  1.Unable to attend interview, test and oral examination at Geriatric Dentistry and Special Patients Care clinic, Faculty of Dentistry.

  2. Having depression and cognitive impairment that were evaluated by Mini-Mental State Examination Thai 2002 (MMSE Thai 2002) (54) and Thai version of the 15-item Geriatric Depression Scale (TGDS-15) (57).

  No depression in TGDS-15 was scores lower than 6 and no cognitive impairment in MMSE Thai 2002 was scores more than cut points. Their points

were more than 14,17,22 points for none, up to primary, and above primary education. If the patients had depression and cognitive impairment, researcher had to inform patients' relatives information and advise them to visit and consult a doctor.

After invitation via a telephone call, 104 (81.9%) subjects were selected by inclusion criteria. Then, 43 (33.8%) subjects were excluded by exclusion criteria so there were 61 (48.1%) subjects that attended to Geriatric Dentistry and Special Patients Care Clinic for interviews and oral examinations. The reason for being unable to participate the study is presented in table 2.

Table 2 the reasons for being unable to participate the study (from total N=127).

Criteria	N (%)
Inclusion criteria	
Including: giving a consent and communicate Thai.	104 (81.9)
Not including: unable to contact	10 (7.9)
unable to communicate Thai.	2 (1.6)
Dead	11 (8.6)
Exclusion criteria	
Exclusion: rejection for attending	38 (29.9)
severe illness	5 (3.9)

2. Study design

A cross-sectional study: the data were collected by interview, self-reported and oral examination.

3. Outcome: Oral Impacts on Daily Performances and self-evaluations.

The outcome of OHRQoL was determined by using the Oral Impacts on Daily Performances (OIDP) index. It assessed whether a person has difficulty in performing 8 activities within 3 performances; 1) Physical (eating, speaking, cleaning teeth or denture, carry out major work or role), 2) Psychological (maintaining emotion,

smiling/laughing without embarrassment by teeth appearance, sleeping well), and 3) Social (Contact with people). Data was collected on the frequency, severity, main reason, and main oral impairment of these impacts. The OIDP score or intensity (max scores = 25) was calculated by multiplying the frequency score by the severity score (34). Frequency and severity score of OIDP were shown in the table 3 (46). The total OIDP score (max scores = 200) or the overall impact intensity score were the sum OIDP score of every activity, OIDP (%) (max scores = 100) was the total OIDP score that divided by two. OIDP (prevalence) was the percentage of only subject that had oral Impact. Severity (1-5) and intensity ((1-2), (3-5), (6-12), (15-16), (20-25)) were divided to 5 level: very little, little, moderate, severe, very severe (60) and were shown in percentage for each impacted activity. The overall impact of severity and intensity was then estimated as the most severe impact on any of the 8 performances (60).

Table 3 frequency score and severity score of OIDP.

Score	Frequency score		Severity score
	Frequency of the problem occurrence (Regular pattern)	Duration of the problem occurrence (Spell pattern)	
0	Never affected in past 6 months	0 day	None
1	Less than once a month	1-5 days	Very little
2	Once or twice a month	6-15 days	Little
3	Once or twice a week	16-30 days	Moderate
4	3-4 times a week	1-3 months	Severe
5	Every or nearly every day	Over 3 months	Very severe

Self-evaluations

1. Self- Rated health (49) (1-5): very good, good, fair, bad, and very bad.
2. Self-rated oral health (1-5): very good, good, fair, bad, and very bad.
3. Self-rated oral hygiene (1-3): good, fair, poor.

4. Variables:

Underlying determinants information were recorded by interview in Thai language, patient chart review and oral examination, including sociodemographic and economic factors, clinical oral health status factors, health status factors, psychological factors, and social factors.

- Sociodemographic and economic factors

1. Age (year)
2. Sex: male and female
3. Marital status: single, married, separated, divorced, and widowed
4. Educational level and year of education:

1. Uneducated	..... years
2. Primary school or lower	
3. Secondary school or technical equivalent	
4. Post high school diploma / certificate	
5. Bachelor or higher university degree	

5. Living condition

1. Address
2. How many people in your home including yourself_____ peoples
3. Living with (multi-choice)

husband/ wife, son, daughter, brother, sister, grandson, granddaughter, Nursing home (please specify starting date ___ / ___ / ___), and friends or other relatives.

4. Caregiver*:* Yes/ No
5. Who is the caregiver?

6. Income and work

1.Occupation _____

1) Not working 2) State enterprise employees 3) Employees or employee of a private company / university. 4) Farmers 5) Private business 6) Housework / hire 7) Priest / priest 8) Others .....

2. Monthly income _____Baht / month

3.Monthly household income _____Baht / month

4.Main sources of income for living:

1) work 2) descendants / relatives 3) savings / interest 4) allowances for senior citizens 5) government pension 6) donations 7) other ....

5. Are you satisfied with your financial situation or your living expenses: satisfied/ unsatisfied

6.Occupation or job defined as the longest job in life_____

7. Health insurance utilization for the recent dental treatment

1 Social Security Scheme

2 Government or State Enterprise Officer: officer, family officer, pension officials

3 Universal Coverage Scheme: Disabled, elderly

4 Out-of-pocket payment

5 Private health insurances

6. Right to be an employee of a private company

7 Other _____

- Health status factors

1. Body mass index (BMI): Weight (kg) / Height $(m)^2$
2. Underlying Disease: Current medical problem:
    1. Diabetes mellitus
    2. Cardiovascular disease
    3. Chronic kidney disease
    4. Pulmonary disease
    5. Gastritis
    6. Rheumatoid arthritis or chronic knee pain
    7. Cancer
    8. Dementia
    9. Hypertension
    10. Dyslipidemia
    11. Osteoporosis or Bone disorders
    12. Parkinson's disease
    13. Other_____

3. Frailty or CFS (14) were modified to dependency status. It was divided into three levels: independent (very fit, well, and managing well), semi-dependent (vulnerable and mildly frail), dependent (moderately frail, severely frail and very severely frail).

- Psychological factors

1. Personality types (patient type) (58): 1. Philosophical mind, 2.Exacting mind, 3.Hysterical mind, 4.Indifferent mind.
2. Happiness: I am happy; strongly agree, agree, neither agree nor disagree, disagree, strongly disagree

- Social factors

I. Lifestyle

1. Smoking: Non-smokers, Smoker, Ex-smoker

2. Alcohol consumption (61) (quantity and frequency of alcohol consumption (drinks/day)): Non-Alcohol consumption, Moderate Alcohol consumption (up to 1 drink per day for women and up to 2 drinks per day for men), Heavy Alcohol consumption (8 or more drinks a week for women and 15 or more drinks a week for men)

3. Physical exercise: frequency of exercise

4. Concern for health care knowledge: yes, no

5. Dietary habits: Mini Nutrition Assessment (MNA) (62)

II. Social participation: What are your activities and frequency with others?

; everyday, nearly/ every week, 1-2 times /month, very few, never

; family, neighbors, other friends, people at recreational clubs or voluntary or service organization, Participate in political parties, trade unions, environmental groups

III. Social support: living factor, financial factor, and health and care factor

- Clinical oral health status factors

1. Number of natural teeth

2. Number of posterior occluding pairs (natural teeth + artificial teeth)

3. Location of tooth loss: anterior, posterior, both/right, left

4. Current denture status

Denture type: Complete Dentures, Partial Dentures (ARPD/MRPD), Others____

Denture condition: Broken denture, Poor hygiene denture, Others_____

Interfere occlusion: no, yes

Retention and Stability: ill-fitting denture, acceptable denture

5. Denture satisfaction: Good, Fair, Poor

6. Oral cleaning: type of oral cleaning and person who do oral care

MMSE Thai 2002 (54), TGDS-15 (57), MNA (62) and questionnaires were calibrated by dentists and physician. There are 60-90 minutes of all tests and questionnaires interviews by single interviewer.

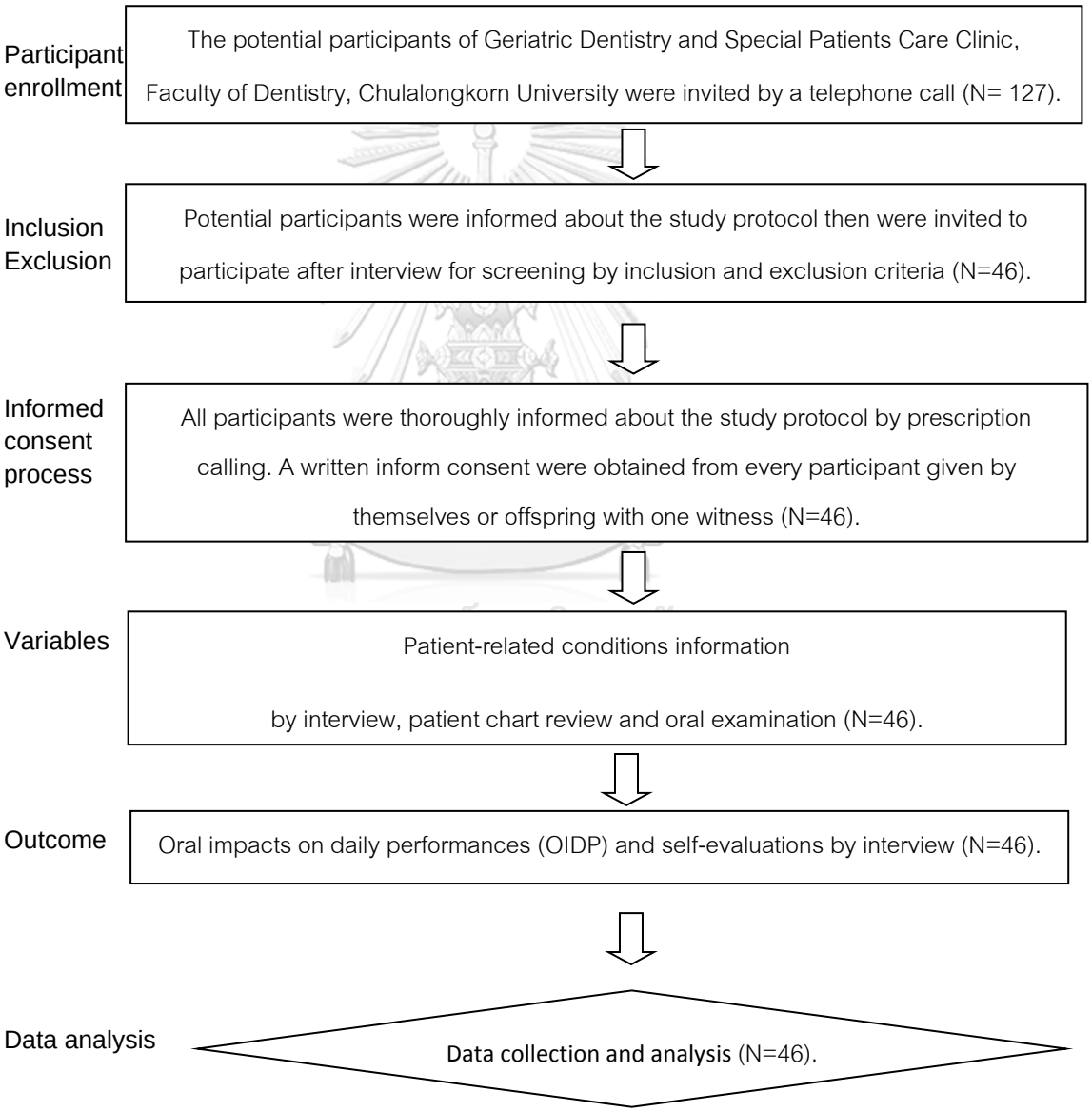
5. Data analysis

Data analyses were conducted by using the IBM Statistics Package for the Social Sciences (SPSS) version 22.0 at a significance level of 0.05. Descriptive statistics were used to describe the characteristics of the participants. For interval scale data, means and standard deviations (SD) or median and interquartile range (Q1 and Q3) were presented, while for the categorical data were described in frequency and percentage. The associations among outcome (OIDP (prevalence) and related variables were assessed through a Spearman correlation. Kruskal-Wallis test was used to determine if there are statistically significant differences between two or more groups of related variables on an outcome variable (OIDP (prevalence)). Using Mann–Whitney test to compare differences of OIDP (prevalence) between two independent groups.

6. Ethical consideration

Study protocol of the present study was submitted for an approval by the International Review Board (IRB) committee of the Faculty of Dentistry, Chulalongkorn University (Study code: No HREC-DCU 2018-112).

Figure 1 flow-chart of study protocol



CHAPTER IV RESULTS

The characteristics of all participants

The characteristics of all participants are shown in table 4, including socio-demographic characteristics, oral status and treatment, and general health status. Most patients were 70-79 years old (45.6%), having a primary to secondary education (65.2%), not currently working (76.1%), living with a financial support from offspring (60.9%) and living in Bangkok (82.6%). The main health insurance was universal coverage scheme. About oral health status and treatment and general health, the main dental treatments were prostheses (95.7%), scaling and root planing (80.4%), and filling (67.4%). The most patients had the number of remaining teeth < 20 teeth (87.0%) and the number of occluding pairs < 4 pairs (89.1%). There were Independent in dependency status (82.6%) and were high blood pressure (52.2%), high cholesterol (52.2%) and heart disease (37.0%).

Table 4 characteristics of all participants (N= 46).

Determinants		N (%)
Socio-demographic characteristics		
Age:	60 – 69	8 (17.4)
	70 – 79	21 (45.6)
	≥ 80	17 (37.0)
Gender:	Male	25 (54.4)
	Female	21 (45.6)
Education:	None	3 (6.5)
	Up to primary	15 (32.6)
	Up to secondary	15 (32.6)
	At least tertiary	13 (28.3)
Work status:	Not working	35 (76.1)
	Working	11 (23.9)
Main source of living expense:	Themselves	11 (23.9)
	Offspring	28 (60.9)
	Both	7 (15.2)
Resident area:	Bangkok	38 (82.6)
	Not Bangkok	8 (17.4)

Determinants	N (%)
Health insurance: Social Security Scheme	4 (8.7)
Government Officer	6 (13.0)
Universal Coverage Scheme	36 (78.3)
Oral status and treatment	
Type of dental treatment:	
Filling	31 (67.4)
Scaling and root planing	37 (80.4)
Prostheses	44 (95.7)
Endodontic treatment	4 (8.7)
Extraction	12 (26.1)
Other surgical procedures (Implant, torus removal)	1 (2.2)
Number of remaining teeth: <20	40 (87.0)
≥20	6 (13.0)
Number of occluding pairs: <4 pairs	41 (89.1)
≥4 pairs	5 (10.9)
General health status	
Dependency status: Independent	38 (82.6)
Semi-dependent	5 (10.9)
Dependent	3 (6.5)
Diagnosed underlying diseases:	
High BP	24 (52.2)
DM	15 (32.6)
High cholesterol	24 (52.2)
Heart disease	17 (37.0)
Kidney disease	3 (6.5)
Lung disease	1 (2.2)
Osteoporosis	9 (19.6)
Cancer	3 (6.5)
Parkinson's disease	2 (4.4)

Determinants	Mean	SD
Age (years)	77.07	6.63
Education (years)	9.08	5.95
Monthly income (Baht)	19,457	22,025
Monthly household income (Baht)	67,277	89,425

Outcome: Oral Impacts on Daily Performances (OIDP)

The results of OIDP were presented in table 5. There were no oral impacts in most participants. There were no more than 2 impacted activities in participants that had oral impacts. The prevalence of impacted activities was eating activity (20,43.5%), speaking activity (4,8.7%), cleaning activity (2,4.4%) and emotional stability activity (1,2.2%). In 2 items group, the main impacted activity was eating and speaking activity. The impact on physical performance was higher than psychological performance and social performance.

Table 5 oral Impacts on Daily Performances (OIDP).

OIDP score	Mean±SD	%Prevalence, range	Main reason (%), Main oral impairment (%)
Overall	4.5 ± 8.5	47.8, 0-45	Denture problems (63.6), ill-fitting denture (50.0)
Physical			
Eating	3.0 ± 4.9	43.5, 0-20	Denture problems (70.0), ill-fitting denture (55.0)
Speaking	0.9 ± 4.2	8.7, 0-25	Unclear speech (100.0), ill-fitting denture (50.0)
Cleaning mouth	0.3 ± 1.6	4.4, 0-10	Sensitive teeth (100.0), tooth wear (100.0)
Doing light activities	0.0 ± 0.0	0.0, 0	
Psychological			
Emotional stability	0.2 ± 1.5	2.2, 0-10	burning gums (100.0), Discomfort (100.0)
Smiling	0.0 ± 0.0	0.0, 0	
Sleeping	0.0 ± 0.0	0.0, 0	
Social			
Social contact	0.0 ± 0.0	0.0, 0	
Item: 0	0.0 ± 0.0	52.2, 0	
1	5.7 ± 4.2	37.0, 1-15	Eating (88.24)
2	22.0 ± 13.6	10.8, 10-45	Eating and speaking (60.00)

Activities	Severity (%)					Intensity (%)				
	Very little	Little	Moderate	Severe	Very severe	Very little	Little	Moderate	Severe	Very severe
Eating	23.9	6.5	10.9	2.2	0.0	6.5	21.8	6.5	6.5	2.2
Speaking	4.3	0.0	2.2	0.0	2.2	4.3	0.0	0.0	2.2	2.2
Cleaning	2.2	2.2	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0
Emotion	0.0	2.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0
Overall	23.8	8.7	10.9	2.2	2.2	6.5	21.7	8.7	8.7	2.2

The main severity in impacted activity was very little in eating activity and speaking activity, very little to little in cleaning activity, and little in emotional stability activity. The main intensity in impacted activity was very little in speaking activity, little in eating activity, little to moderate in cleaning activity, and moderate in emotional stability activity. However, the main severity and main intensity of overall impact was very little and little, respectively.

For evaluating between OIDP in clinic field and oral examination, comparison between dentist and patient evaluation are presented in Table 6. In group of OIDP = 0 had 24 cases however there are only 10 cases that no treatment needs (dentist's opinion) after oral examination. There are 14 cases that had the need for treatment as root caries, tooth wear, grade III mobile teeth and denture problems. For denture problems cases, they can be classified as ill-fitting denture, loose denture or broken denture, the causes of these cases are inappropriate recall visits and poor oral care. And root caries cases, these are usually found in teeth with crown or bridge and no symptoms.

Table 6 comparison between dentist and patient evaluation (n = 46)

Oral exam by dentist that need treatment	Having oral impact that reported by OIDP		
	Yes (%)	No (%)	Total (%)
Yes: Mobile teeth	0 (0.0)	2 (4.3)	2 (4.3)
Root caries	2 (4.3)	5 (10.9)	7 (15.2)
Tooth wear	3 (6.6)	5 (10.9)	8 (17.5)
Denture problems	14 (30.4)	2 (4.3)	16 (34.7)
Burning gums	2 (4.3)	0 (0.0)	2 (4.3)
Pulpitis	1 (2.2)	0 (0.0)	1 (2.2)
Total	22 (47.8)	14 (30.4)	36 (78.2)
No:	0 (0.0)	10 (21.8)	10 (21.8)

22 Having oral impact: 2 not wearing the new denture and 2 no need to wear the denture obtained from. (2 not wearing the new denture but no oral impact)

Outcome: self-evaluations

Table 7 self-evaluations

Self-evaluations	N (%)
• Self- rated health	
Very good	1 (2.2)
Good	21 (45.6)
Fair	23 (50.0)
Poor	1 (2.2)
• Self-rated oral health	
Very good	6 (13.0)
Good	18 (39.1)
Fair	16 (34.8)
Poor	5 (10.9)
Very poor	1 (2.2)
• Self-rated oral hygiene	
Good	29 (63.0)
Fair	15 (32.6)
Poor	2 (4.4)

Self-evaluations that were shown in table 7, were self- rated health, self-rated oral health and self-rated oral hygiene. Most participants were good to fair in self-rated health, self-rated oral health and self-rated oral hygiene. However, there still have poor self- rated health, poor self-rated oral health and poor self-rated oral hygiene.

Moreover, the correlation between self-rated oral health and other factors were presented in table 8. The results were found that self-rated oral health was positively correlated to self-rated health, self-rated oral hygiene, OIDP (prevalence), and denture satisfaction. All that values were more poor evaluations when higher scores. From correlation coefficient = 0.394 - 0.470, It may be implied that self-rated and OIDP had same direction tendency. However, it has only moderate correlation.

Table 8 correlation between self-rated oral health and other factors.

Factors	Self-rated Oral health	
	Correlation Coefficient	P-value
Self-rated health	.394	0.007
Self-rated Oral hygiene	.470	0.001
OIDP (prevalence)	.424	0.003
Denture satisfaction	.447	0.004

Using Spearman correlation, P-value <0.05.

Then, OIDP (eating) was associated with self-rated oral health (ρ = .466, P = 0.001), dependency status (ρ = .413, P = 0.004). There were higher OIDP scores in eating activity when poorer self-rated oral health and more dependent in dependency status.

Underlying determinants and OIDP

Underlying determinants and OIDP were presented in table 9. There were sociodemographic and economic factors, health status factors, psychological factors, social factors and clinical oral health status factors. The characters of most participants were aged between 70-79 years, married, the education level was between primary to secondary, living with offspring (1-4 people) in Bangkok, no caregiver, not working, supported by offspring in main sources of income for living, satisfied in financial status, and using universal coverage scheme of health insurance utilization for the recent dental treatment.

Concerning about, health status factors, the major of participants had body mass index (BMI) in normal range (18.5-24.9) and a few participant were underweight or obese. Hypertension and dyslipidemia were the dominant underlying disease.

Psychological factors, main personality type was philosophical mind, and major answer happiness question was agree.

Social factors, in part of lifestyle, there were no smoker and no severe alcohol consumption. Major frequency of exercises was 5-7 days/week, it related to most participants that interest in health care knowledge. There were 13.04% patients

that were at risk of malnutrition. In part of major social participation, the dominant groups were “family group” or “family and friends group”. In part of social and family support, the most participants need financial and living support by offsprings but no need in health and care support.

Clinical oral health status factors, talking about teeth, the main characters were number of natural teeth < 20 teeth, number of posterior occluding pairs < 4 pairs and self oral cleaning. About denture, there were 25 patients that wear acrylic removable partial denture, 2 patients had no need to wear denture, 1 complete denture patient was wearing old denture, also 2 ARPD patients and 1 MRPD patient were not wearing new denture. There were only 40 patients in denture evaluation: 1 poor denture hygiene (2.50%), 3 ill-fitting denture cases (7.50%), and 3 poor denture satisfaction (7.50%).

From the results, the OIDP(%) were correlated to denture satisfaction (P = 0.008): poor denture satisfaction group had scores higher than good and fair groups (P = 0.002, 0.018), financial family support (P = 0.028): financial support (Together with offspring) had scores higher than no financial support group (P = 0.009), chronic kidney disease (P = 0.041) and self-rated oral health (P = 0.042): poor self-rated oral health group had scores higher than good self-rated oral health group (P = 0.048).

Lastly, age was not associated with amount of problems in each activity. On the other hand, the percentages of patients that have problems in eating activity and cleaning activity increased gradually with number of teeth. Therefore, the problem may be due to ineffective teeth cleaning when there are still many teeth.

Table 9 underlying determinants and OIDP (%).

9.1 sociodemographic and economic factors.

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
1. Age					
60-69 years	8 (17.4)	2.3	0.8	4.3	
70-79 years	21 (46.6)	0.0	0.0	2.0	0.173
≥ 80 years	17 (37.0)	0.5	0.0	2.5	
2. Gender					
Male	21 (45.6)	0.0	0.0	2.5	
Female	25 (54.4)	0.0	0.0	3.0	0.839
3. Marital status					
Single	7 (15.2)	2.5	0.8	5.0	
Married	24 (52.8)	0.0	0.0	2.3	0.240
Divorced	4 (8.7)	0.0	0.0	1.3	
Widowed	11 (23.9)	0.5	0.0	2.8	
4. Education					
-Uneducated	3 (6.5)	0.0	0.0	0.3	
-Primary school or lower	15 (32.6)	0.0	0.0	2.3	0.706
-Secondary school or technical equivalent	15 (32.6)	1.5	0.0	4.0	
-Post high school diploma / certificate	5 (10.9)	0.0	0.0	1.0	
-Bachelor or higher university degree	8 (17.4)	1.3	0.0	2.5	
5. Living condition					
• Address					
Bangkok	38 (82.6)	0.5	0.0	2.5	
Not Bangkok	8 (17.4)	0.0	0.0	1.3	0.266
• Number of peoples in their home					
Alone	3 (6.5)	0.0	0.0	1.3	
2-5 people	34 (73.9)	0.5	0.0	3.0	0.462
More than 5 people	9 (19.6)	0.0	0.0	1.0	

9.1 sociodemographic and economic factors (continued).

Underlying determinants	N (%)	OIDP (%)			P value
		Median	*Q1*	Q3	
• Living status					
Alone	3 (6.5)	0.0	0.0	1.3	
Spouse only	4 (8.7)	0.0	0.0	11.3	0.804
Offspring with/without spouse	31 (67.4)	0.5	0.0	2.5	
Other relatives	7 (15.2)	2.5	0.0	3.8	
Paid helper	1 (2.2)	0.0	-	-	
• Caregiver					
Self	37 (80.4)	0.0	0.0	2.5	
Family	8 (17.4)	2.8	0.0	5.8	0.341
Paid helper	1 (2.2)	0.0	-	-	
6. Income and work					
• Occupation					
Not working	35 (76.1)	0.5	0.0	4.0	
Private business	4 (8.7)	0.0	0.0	1.3	0.571
Housework / hire	4 (8.7)	0.0	0.0	1.3	
Others	3 (6.5)	2.0	1.0	2.3	
• Main sources of income for living					
Work	8 (17.4)	1.0	0.0	2.5	
Offsping	22 (47.8)	0.5	0.0	5.0	0.712
Savings	4 (8.7)	3.0	0.0	6.3	
Pension	5 (10.9)	0.0	0.0	0.0	
Investment	7 (15.2)	0.0	0.0	1.8	
• Financial satisfaction : Yes	37 (80.4)	0.0	0.0	2.5	
No	9 (19.6)	0.0	0.0	6.0	0.846
• The longest job in life					
Government official	5 (10.9)	0.0	0.0	0.0	
State enterprise employees	4 (8.7)	0.5	0.0	1.8	0.596
Employees of a private company	13 (28.3)	2.0	0.0	6.0	
Private business	20 (43.5)	0.0	0.0	2.3	
Housework / hire	3 (6.5)	0.0	0.0	2.5	
Others	1 (2.2)	2.5	-	-	

9.1 sociodemographic and economic factors (continued).

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
7. Health insurance utilization for the recent dental treatment					
Social Security Scheme	4 (8.7)	0.0	0.0	3.3	
Government Officer	6 (13.0)	0.0	0.0	0.0	0.572
Universal Coverage Scheme	32 (69.6)	0.5	0.0	2.8	
Out-of-pocket payment	2 (4.35)	1.3	0.0	2.5	
Others	2 (4.35)	0.5	0.0	1.0	

9.2 health status factors.

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
1. Body mass index (BMI)					
<18.50	2 (4.35)	0.0	-	-	
18.5-24.99	33 (71.7)	0.5	0.0	2.5	0.428
25-29.99	9 (19.6)	0.0	0.0	2.0	
≥ 30.00	2 (4.35)	0.8	0.5	1.0	
2. Underlying Disease					
Diabetes mellitus	15 (32.6)	0.5	0.0	6.3	0.299
Cardiovascular disease	17 (37.0)	0.5	0.0	2.5	0.873
Chronic kidney disease	3 (6.5)	5.0	3.0	13.8	**0.041**
Pulmonary disease	1 (2.2)	0.0	-	-	0.371
Gastritis	2 (4.4)	2.5	0.0	5.0	0.793
Rheumatoid arthritis or chronic knee pain	1 (2.2)	2.5	-	-	0.393
Cancer	3 (6.5)	0.0	0.0	3.0	0.829
Hypertension	24 (52.2)	0.0	0.0	2.5	0.794
Dyslipidemia	24 (52.2)	0.0	0.0	2.5	0.831
Osteoporosis or Bone disorders	9 (19.6)	0.0	0.0	1.0	0.361
Parkinson's disease	2 (4.4)	3.5	2.0	5.0	0.190
Others	20 (43.5)	0.3	0.0	2.5	0.933
3. Dependency status:					
Independent	38 (82.6)	0.0	0.0	2.5	
Semi-dependent	5 (10.9)	2.0	1.0	5.0	0.065
Dependent	3 (6.5)	5.0	2.8	5.8	

9.3 psychological factors.

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
1. Personality types (patient type)					
Philosophical mind	39 (84.8)	0.0	0.0	2.3	
Exacting mind	3 (6.5)	2.5	2.5	12.3	0.106
Hysterical mind	4 (8.7)	1.3	0.0	3.8	
2. Happiness					
Strongly agree	7 (15.2)	0.0	0.0	1.3	
Agree	31 (67.4)	0.0	0.0	2.5	0.838
Neither agree nor disagree	8 (17.4)	0.8	0.0	3.8	

9.4 social factors.

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
1. Lifestyle					
• Smoking					
Non-smoker	23 (50.0)	0.0	0.0	4.0	
Ex-smoker	23 (50.0)	0.0	0.0	2.0	0.545
• Alcohol consumption					
Non-alcohol consumption	40 (87.0)	0.0	0.0	2.5	
Moderate alcohol consumption	6 (13.0)	2.0	0.0	2.5	0.388
• Frequency of exercises					
No	3 (6.5)	0.0	0.0	2.5	
1-2 days/week	3 (6.5)	0.0	0.0	7.5	
3-4 days/week	11 (23.9)	0.5	0.0	2.0	0.990
5-7 days/week	29 (63.0)	0.0	0.0	2.5	
• Concern for health care knowledge					
Yes	29 (63.0)	0.5	0.0	2.5	0.483
No	17 (37.0)	0.0	0.0	2.0	
• Dietary habits: Mini Nutrition Assessment					
Normal nutritional status	40 (87.0)	0.0	0.0	2.5	0.428
At risk of malnutrition	6 (13.0)	2.5	0.0	6.5	

9.4 social factors (continued).

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
2. Major social participation					
Family	17 (37.0)	0.5	0.0	5.0	
Friends	5 (10.9)	0.0	0.0	0.0	
Family& friends	18 (39.1)	0.3	0.0	2.5	0.806
Family& community	2 (4.3)	2.5	0.0	5.0	
Friends& community	1 (2.2)	0.5	-	-	
Family&friends& community	3 (6.5)	0.0	0.0	1.5	
3. Social and family support					
• Financial support					
Offspring	28 (60.9)	0.3	0.0	4.0	
Self	11 (23.9)	0.0	0.0	0.0	**0.028**
Together with offspring	7 (15.2)	2.5	1.5	4.3	
• Living support					
No living support	7 (15.2)	0.0	0.0	1.3	
Living support by offspring	39 (84.8)	0.5	0.0	2.5	0.467
• Health and care support					
Independent	38 (82.6)	0.0	0.0	2.5	
Semi-dependent	5 (10.9)	2.0	1.0	5.0	0.065
Dependent	3 (6.5)	5.0	2.8	5.8	

9.5 clinical oral health status factors

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
1. Teeth					
• Natural teeth					
0-19	40 (87.0)	0.0	0.0	2.5	
20-32	6 (13.0)	2.5	0.0	3.0	0.324
• Natural posterior occluding pairs					
< 4 pairs	41 (89.1)	0.0	0.0	2.5	
≥ 4 pairs	5 (10.9)	2.5	0.0	3.0	0.505

9.5 clinical oral health status factors (continued).

Underlying determinants	N (%)	OIDP (%)			P value
		Median	Q1	Q3	
• Location of tooth loss					
No	2 (4.3)	3.8	2.5	5.0	
Only posterior	8 (17.4)	0.0	1.5	4.5	0.178
Both (Anterior and posterior)	36 (78.3)	0.0	0.0	2.3	
• Oral cleaning					
Type of oral cleaning					
-Only toothbrushes	25 (54.4)	0.0	0.0	2.5	
-Toothbrush and others	21 (45.6)	0.5	0.0	2.5	0.775
Person who do oral care					
-Self	45 (97.8)	0.0	0.0	2.5	
-Family	1 (2.2)	5.0	-	-	0.207
2. Denture (N=44)					
• Denture type					
Complete denture	8 (18.2)	0.3	0.0	3.8	
Single Complete denture	2 (4.5)	1.3	0.0	2.5	0.503
ARPD	25 (56.8)	0.5	0.0	2.5	
MRPD	9 (20.5)	0.0	0.0	0.0	
• Denture hygiene(N=40)					
Good	26 (65.0)	0.0	0.0	2.5	
Fair	13 (32.5)	0.5	0.0	2.5	0.692
Poor	1 (2.5)	0.0	-	-	
• Retention and Stability (N=40)					
Acceptable denture	38 (95.0)	0.0	0.0	2.5	
ill-fitting denture	2 (5.0)	7.5	0.0	15.0	0.518
• Denture satisfaction (N=40)					
Good	30 (75.0)	0.0	0.0	1.5	
Fair	7 (17.5)	0.0	0.0	2.3	**0.008**
Poor	3 (7.5)	15.0	11.3	18.8	

Using Kruskal-Wallis test, P-value <0.05.

CHAPTER V DISCUSSION

The characteristics of elderly patients

There are 17.4% of dental elderly patients that need family support in daily activity. From the results (table4), it can be predicted that the dental patients tend to be gradually dependent in the near future due to many underlying diseases and need of financial support. Therefore, a protocol should be established regarding precaution based on the vital sign and dependency rate. For example, methods for transfer patients to dental chairs, types of dental chairs for each dependency status, or the monitoring systems that related to the dental procedure such as oxygen saturation, blood pressure, pulse, and respiratory rate. Some of the dental elderly patients need to receive the treatment that are quite simple, such as applied fluoride, cleaning or adjust the previous denture, at home or in place like in the nursing home or long-term care facilities. Therefore, home dental visit may be considered. There was a short period that this clinic opened (only 3 – 4 years), it should have more proactive dental care for long term care of dental elderly patients. For the support of dental care in these patient group, it should have oral health care education that related to each their education level and dependency status.

OIDP

From our study, the OIDP (table 5) showed the majority participants were no oral impacts or no more than 2 impacted activities. The prevalence of impacted activities was eating activity, speaking activity, cleaning activity and emotional stability activity. OIDP (prevalence) was 47.8, comparing previous studies (35, 51), there were 57.9, 36.6, respectively. The major prevalence of impact activity was eating activity that was 43.5. There was similar to previous studies that were 49.6 in elderly dental patients who were being treated in the Graduate Prosthodontic clinic at the Faculty of Dentistry, Chulalongkorn University (35), 52.2 in elderly who residing in

northeastern region of Thailand (48) , 20.0 and 21.7 in complete denture group and removable partial denture group of elderly dental patients who had undergone treatment for complete dentures or acrylic partial dentures under the Royal Denture Project of five cities that purposively selected to represent different parts of Thailand (51), and 42.1 in removable complete denture wearers treated in the Department Prosthodontic at the Faculty of Dentistry, Chulalongkorn University (63). However, there were less prevalence of impacts in psychological and social performance while comparing previous studies (35, 48, 51, 63) and less severity and intensity of impacts in all performance while comparing previous studies (48, 51). For total OIDP score (4.5 (± 8.5)), there was less than previous study (35) (9.38 and 16.89 in <20 teeth group and ≥20 teeth group), but there was more than another previous study (51) (1.6 (±4.5) and 1.9 (±5.0) in complete denture group and removable partial denture group). It might be a difference of prevalence, severity and intensity of impacts due to different type of samples, such as different duration after completed treatment prior to the study, after or during dental treatment and study sites. This study uses participants that complete treatment at least 6 months prior to the study but the previous studies (35, 51, 63) were during dental treatment, after dental treatment at least one year and at least 2 years, respectively.

However, there were the limitations of OIDP for evaluated OHRQoL in geriatric clinic. There were differences between dentist and patient evaluation in table 6, participants often underestimated of oral health problem. It was consistent with previous study (64) that found that in the elderly in short-term care, there was poor agreement between the self-perceived oral health and professional clinical evaluation of oral health. OIDP, self-evaluation or self-rated can represent the positive attitudes of health and oral health, however not sensitively of problems that asymptomatic. For example, tooth wear as abrasion or abfraction and root caries as the symptoms are often absent or almost negligible, if present. The elderly patient may be not observed until caries exposed pulp and that tooth may be treated with

a root canal treatment or tooth extraction. Moreover, in denture problems cases as ill-fitting denture, loose denture or broken denture and root caries cases, there may be caused by changes of condition in alveolar ridge and saliva due to underlying disease and medicines. The author suggested that dental recall for oral examination is needed, however, there were accessible problems, home visits may be required. Then, there were the analysis of each factor (table 9).

Sociodemographic and economic factors

About age, there were small different in age, so it was no effect on OHRQoL. From the study, there were no significant difference OHRQoL among aged group (60-69 years, 70-79 years, ≥ 80 years). There were not similar to previous study (10, 11). In contrast to previous study (9, 17), gender and care giver were not effect on OHRQoL. This is due to the fact that the elderly may still take good care of themselves and may have good health concerns. Education level or years of schooling was associated with OHRQoL in previous study (17). However, in this study, it was not effect on OHRQoL. Living status of participants are similar to majority of Thai elderly in the ageing society (1) but there were no association with OHRQoL because their living status were. In this study, the participants were not in low income group (less than 3000 baths/month) therefore monthly household income and monthly income were not related to OHRQoL, which were different from the previous study (7)((33). We can analyze the results and suggest that this was the characteristic of patients who come to receive dental care at the faculty, which may reflect the aging society in large cities.

Health status factors

Although, dependent persons display with physical limitations and higher risk of oral health decline (13), the results were found that only chronic kidney disease (CKD) was associated with OHRQoL but no significant relationship existed between other health status factors and OHRQoL. This result may be due to the fact that chronic kidney disease may be more difficult in oral care than other diseases. In previous study (65), they found that poor oral hygiene, gingival and periodontal

status in chronic kidney disease patients. When the stage of CKD increased, oral hygiene, gingival and periodontal status worsened.

For frailty or CFS (14), it was divided into three levels dependency status. There was no significant difference between dependency status and OHRQoL, while OIDP (eating) was associated with dependency status.

Looking with the self – rated health, our findings do not support previous study that found poor self-rated general health were more likely to have a higher OIDP score (56).

In summary, most patients may tend to dependent due to underlying diseases that were a non-communicable disease (NCD) and to more OIDP scores in eating activity. Moreover, dental treatment need that was evaluated by dentist and dependency status had no significant correlation. This result may be implied that it may not change the need for dental care as patients become more dependent, while oral problems of each dependency status may be different.

Psychological factors

Base on the result, no different OIDP in each patients' psychological response (58), moreover in each happiness group, this findings differ from the previous study which claimed that the differences in mood states may induced the different level of impact of oral health on OHRQoL (15). However, in the study, there were no indifferent mind of personality types, "exacting" mind group may have higher OIDP score than "philosophical" and "hysterical" mind group. This is because the "exacting" mind patient group had more concerned than other groups. Also, there were a little different level of happiness in each participant.

However, more than one quarter of patients in this clinic had cognitive impairment or depression so OIDP and self-rated could not be assessed. As we age, more depression and cognitive impairment tend to occur. Therefore, OIDP and self-rated may not be appropriate for elderly.

Moreover, psychological problems may affect the management of dental treatment, so proper environment of the treatment field and equipment should be prepared.

Social factors

In part of lifestyle, previous study (21) found that smoking and alcohol consumption are considered the most important lifestyle determinants for health and oral health. In this study, there were no smoker and heavy alcohol consumption among participants, these brought the results to show no difference OHRQoL in these group. Moreover, there were no difference OHRQoL in other lifestyle factors.

In part of major social participation and social & family support, social participation of participants was home-bound (40 cases) than social-bound (6 cases). There were not significantly associated with OHRQoL. This finding differs from previous study (30) that found the positively relationship between social participation and dental health status especially neighborhood community associations, participation in sports groups or hobby clubs.

Then, there were only significant difference OHRQoL between financial support (together with offspring) group and no financial support group. However, there were a small number of participants in each group. If there were more participants, there may be more significant difference. There should be more participants and more information obtained about reasons for last dental visit for comparing with previous study (31) which claimed that social support appeared as an important cue of reasons for last dental visit, including the received treatment, and denture status. Moreover, participants in no living support group were independent and no major social participation in community part. Certainly, the relationship between social support and oral health should not be underestimated.

Clinical oral health status factors

According to the results, almost all participants that had tooth loss have received dental rehabilitation treatment (prostheses) therefore the number, location, distribution, severity of tooth loss and occluding pairs in the study were not significantly influenced the OHRQoL. Conversely, previous study (10)(35) has found a strong inter-relationship among number of missing teeth and OHRQoL. Also, another previous study (50) has discovered that occluding pairs, location and distribution of missing teeth may modified the severity of OHRQoL impairment. However, the participants in those studies may be not received dental rehabilitation treatment.

There was only one case that their family performed oral care for participant. Moreover, there are not a caregiver that do their oral care. Oral care by caregiver or their family was not related to dependency status. This may imply that their family and caregiver had some misunderstanding of oral care and do not want to take the oral care for other members. The authors suggest that those semi-dependent or dependent elderly should have care giver to help in their normal activities including oral care, also the caregivers should be trained or inform some health literacies.

For denture factors, OHRQoL was associated with denture satisfaction. Self-rated about current denture would be the key of assessment of oral health because of the denture impact in eating activity and speaking activity. Moreover, self-rated oral health were associated with OHRQoL similarly to previous study (22). Furthermore, denture status and denture hygiene or oral hygiene should also be considered because the most of patients that use removable denture may have difficulty to clean oral cavity. Oral care behaviors and equipment need to be reviewed and educated individually or in groups about oral health care in patients and caregivers.

Summarizations

In this study, OHRQoL was related to denture status higher than demographic variables, there was consistent with previous study (11). However, the result of another previous study (66) found that there were significant influenced of sociodemographic factors such as age, education and residence place size on perception of oral health and OHRQoL among complete denture wearers but the length of denture wearing period also was related.

Finally, these results that were different could be because the elderly patients had already received comprehensive dental treatment and oral hygiene instructions. It means that all patients were performed the oral problems at least 6 months before they participate the study. Therefore, there may be a small impact of oral health in only 6 months to 2 years. However, there are a difference of characteristic of patients in different field as a private or government hospital or an academic clinic due to health insurance and limited budget so it should study in other fields too. The limitation of this study, there were sensitive and subjective techniques for interview in OIDP index and recall bias that OIDP used recall memories in last 6 months.

For further study, the author suggested that it should be considered about duration after treatment and frequency of recall visits for comparing OHRQoL among different period of recall visits to determine factors that impaired OHRQoL in long-term. Moreover, the patients know their own problems however to evaluate the problems from patients self-reported only may not reliable as they have fewer problems than what the dentist has detected, there was a same direction tendency between OIDP and self-evaluations. It should use self-evaluation with oral examination for evaluated OHRQoL after dental treatment.

CHAPTER VI CONCLUSION

In this study, the results indicated that the elderly patients still have oral health problems but low severity and intensity. It is indicated that the major factors impairing the quality of life are denture factors, therefore, the dental treatment should focus on the recall system, the frequency of dental recall visits, procedures to successful oral hygiene instruction and skills to handle the denture problems. Though, the character of the elderly patients in this clinic were mostly independent, nevertheless, they also have underlying disease (with fewer natural teeth) which tend to be more depend on surrounding persons in the near future. A protocol should be established regarding caution based on the vital sign and dependency rate.

REFERENCES

1. United Nations. World Population Ageing 2017 - Highlights. In: Department of Economic and Social Affairs PD, editor. 2017.

2. World Population Prospects - Population Division [Internet]. 2017 [cited 23 april 2018]. Available from: https://esa.un.org/unpd/wpp/Download/Standard/Population/.

3. Petersen PE, Yamamoto T. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. Community dentistry and oral epidemiology. 2005;33(2):81-92.

4. health. Mop. The 7th National oral health survey in Thailand 2012. In: Health DoP, editor. Bangkok: The Veteran Organization publishing; 2013.

5. Muller F, Shimazaki Y, Kahabuka F, Schimmel M. Oral health for an ageing population: the importance of a natural dentition in older adults. International dental journal. 2017;67 Suppl 2:7-13.

6. Musacchio E, Perissinotto E, Binotto P, Sartori L, Silva-Netto F, Zambon S, et al. Tooth loss in the elderly and its association with nutritional status, socio-economic and lifestyle factors. Acta Odontologica Scandinavica. 2007;65(2):78-86.

7. Cesar JA, Oliveira-Filho JA, Bess G, Cegielka R, Machado J, Gonçalves TS, et al. Profile of the elderly population in two poor municipalities in North and Northeast Brazil: the results of a cross-sectional population-based survey. Cadernos de saude publica. 2008;24(8):1835-45.

8. Mendes DC, Poswar Fde O, de Oliveira MV, Haikal DS, da Silveira MF, Martins AM, et al. Analysis of socio-demographic and systemic health factors and the normative conditions of oral health care in a population of the Brazilian elderly. Gerodontology. 2012;29(2):e206-14.

9. de Oliveira TC, da Silva DA, Leite de Freitas YN, da Silva RL, Pegado CP, de Lima KC. Socio-demographic factors and oral health conditions in the elderly: a population-based study. Archives of gerontology and geriatrics. 2013;57(3):389-97.

10. Åstrøm A, Haugejorden O, Skaret E, Trovik T, Klock K. Oral Impacts on Daily Performance in Norwegian adults: the influence of age, number of missing teeth, and socio-demographic factors. European journal of oral sciences. 2006;114(2):115-21.

11. John MT, Koepsell TD, Hujoel P, Miglioretti DL, LeResche L, Micheelis W. Demographic factors, denture status and oral health-related quality of life. Community dentistry and oral epidemiology. 2004;32(2):125-32.

12. Emami E, Feine J. Mandibular Implant Prostheses: Guidelines for Edentulous Geriatric Populations: Springer; 2018.

13. Rapp L, Sourdet S, Vellas B, Lacoste-Ferre MH. Oral Health and the Frail Elderly. The Journal of frailty & aging. 2017;6(3):154-60.

14. Juma S, Taabazuing M-M, Montero-Odasso M. Clinical Frailty Scale in an Acute Medicine Unit: a Simple Tool That Predicts Length of Stay. Canadian Geriatrics Journal. 2016;19(2):34-9.

15. Settineri S, Rizzo A, Liotta M, Mento C. Clinical Psychology of Oral Health: The Link Between Teeth and Emotions. SAGE Open. 2017;7(3):2158244017728319.

16. Seraj Z, Al-Najjar D, Akl M, Aladle N, Altijani Y, Zaki A, et al. The Effect of Number of Teeth and Chewing Ability on Cognitive Function of Elderly in UAE: A Pilot Study. International journal of dentistry. 2017;2017.

17. Inukai M, John MT, Igarashi Y, Baba K. Association between perceived chewing ability and oral health-related quality of life in partially dentate patients. Health and quality of life outcomes. 2010;8(1):118.

18. Åstrøm A, Gülcan F, Ekbäck G, Ordell S. Long-term healthy lifestyle patterns and tooth loss studied in a Swedish cohort of middle-aged and older people. International journal of dental hygiene. 2015;13(4):292-300.

19. Abel T. Measuring health lifestyles in a comparative analysis: Theoretical issues and empirical findings. Social Science & Medicine. 1991;32(8):899-908.

20. Newsom JT, McFarland BH, Kaplan MS, Huguet N, Zani B. The health consciousness myth: implications of the near independence of major health behaviors in the North American population. Social Science & Medicine. 2005;60(2):433-7.

21. Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. Community dentistry and oral epidemiology. 2000;28(6):399-406.

22. Saffi MAL, Furtado MV, Polanczyk CA, Montenegro MM, Ribeiro IWJ, Kampits C, et al. Relationship between vascular endothelium and periodontal disease in atherosclerotic lesions. World journal of cardiology. 2015;7(1):26.

23. Müller F. Oral hygiene reduces the mortality from aspiration pneumonia in frail elders. Journal of dental research. 2015;94(3_suppl):14S-6S.

24. Walls A, Steele J. The relationship between oral health and nutrition in older people. Mechanisms of ageing and development. 2004;125(12):853-7.

25. Holt-Lunstad J, Smith TB, Layton JB. Social relationships and mortality risk: a meta-analytic review. PLoS medicine. 2010;7(7):e1000316.

26. Levasseur M, Richard L, Gauvin L, Raymond É. Inventory and analysis of definitions of social participation found in the aging literature: Proposed taxonomy of social activities. Social science & medicine. 2010;71(12):2141-9.

27. Merchant AT, PITIPHAT W, AHMED B, KAWACHI I, JOSHIPURA K. A prospective study of social support, anger expression and risk of periodontitis in men. The Journal of the American Dental Association. 2003;134(12):1591-6.

28. Rodrigues SM, Oliveira AC, Vargas AMD, Moreira AN. Implications of edentulism on quality of life among elderly. International journal of environmental research and public health. 2012;9(1):100-9.

29. Christakis NA, Fowler JH. The collective dynamics of smoking in a large social network. New England journal of medicine. 2008;358(21):2249-58.

30. Takeuchi K, Aida J, Kondo K, Osaka K. Social participation and dental health status among older Japanese adults: a population-based cross-sectional study. PloS one. 2013;8(4):e61741.

31. McGrath C, Bedi R. Influences of social support on the oral health of older people in Britain. Journal of oral rehabilitation. 2002;29(10):918-22.

32. Shin Y, Hong J, Kim Y, Chang K-W. Effect of social support and self-esteem on the oral health behaviors of Korean elderly people. Journal of Korean Academy of Oral Health. 2017;41(4):282-9.

33. Yiengprugsawan V, Somkotra T, Seubsman S-a, Sleigh AC. Oral Health-Related Quality of Life among a large national cohort of 87,134 Thai adults. Health and Quality of life Outcomes. 2011;9(1):42.

34. Srisilapanan P, Sheiham A. The prevalence of dental impacts on daily performances in older people in Northern Thailand. Gerodontology. 2001;18(2):102-3.
35. Somsak K, Kaewplung O. The effects of the number of natural teeth and posterior occluding pairs on the oral health-related quality of life in elderly dental patients. Gerodontology. 2016;33(1):52-60.
36. Youdying W. 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. Bangkok: Chulalongkorn University; 2009.
37. Burci LM, Miguel YD, Miguel OG, Souza AW, Dias JdFG, Miguel MD. Prevalence of oral impacts on daily performances (OIDP) of elderly people in Curitiba–PR. Brazilian Dental Science. 2016;19(4):63-71.
38. Knodel J. Living Arrangements of Older Persons around the World. JSTOR; 2006.
39. Grundy E. Living arrangements and the health of older persons in developed countries: Population Division, Department of Economic and Social Affairs, United Nations Secretariat New York; 2000.
40. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bulletin of the World Health Organization. 2005;83(9):661-9.
41. Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, et al. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. Community dentistry and oral epidemiology. 2004;32(2):107-14.
42. Glick M, Williams DM, Kleinman DV, Vujicic M, Watt RG, Weyant RJ. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. British dental journal. 2016;221(12):792.
43. Naorungroj S, Naorungroj T. Oral health-related quality of life in the elderly: a review and future challenges in Thailand. Siriraj Medical Journal. 2016;67(5):248-53.
44. Locker D, Allen F. What do measures of 'oral health-related quality of life' measure? Community Dent Oral Epidemiol. 2007;35(6):401-11.

45. Hebling E, Pereira AC. Oral health-related quality of life: a critical appraisalof assessment tools used in elderly people. Gerodontology. 2007;24(3):151-61.

46. Adulyanon S, Vourapukjaru J, Sheiham A. Oral impacts affecting daily performance in a low dental disease Thai population. Community Dentistry and Oral Epidemiology. 1996;24(6):385-9.

47. Gulcan F, Nasir E, Ekbäck G, Ordell S, Åstrøm AN. Change in Oral Impacts on Daily Performances (OIDP) with increasing age: testing the evaluative properties of the OIDP frequency inventory using prospective data from Norway and Sweden (vol 14, 59, 2014). BMC Oral Health. 2015;15.

48. Sombateyotha K, Mahaweerawat U. Oral Health Status and Oral Impact on Daily Performance in Elderly in Northeastern Region Thailand. European Journal of Sustainable Development. 2017;6(2):240.

49. Komin O, Weerapol P. Oral Health Status of Patients with Dementia and their Caregivers' Ability in Oral Health and Dysphagia Assessment: A Pilot Study. Journal of the Dental Association of Thailand 2020;70(1):1-10.

50. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. Health and quality of life outcomes. 2010;8(1):126.

51. Srisilapanan P, Korwanich N, Jienmaneechotchai S, Dalodom S, Veerachai N, Vejvitee W, et al. Estimate of impact on the oral health-related quality of life of older Thai people by the provision of dentures through the royal project. International journal of dentistry. 2016;2016.

52. Jensen PM, Saunders RL, Thierer T, Friedman B. Factors Associated with Oral Health–Related Quality of Life in Community-Dwelling Elderly Persons with Disabilities. Journal of the American Geriatrics Society. 2008;56(4):711-7.

53. Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, et al. A global clinical measure of fitness and frailty in elderly people. Canadian Medical Association Journal. 2005;173(5):489.

54. Medicine IoG. Mini-Mental State Examination-Thai Version (MMSE-Thai 2002). Bangkok: Department of Medical, Ministry of Public Health; 1999.

55. de Andrade FB, Lebrao ML, Santos JLF, da Cruz Teixeira DS, de Oliveira Duarte YA. Relationship between oral health–related quality of life, oral health, socioeconomic, and general health factors in elderly Brazilians. Journal of the American Geriatrics Society. 2012;60(9):1755-60.

56. Dorri M, Sheiham A, Tsakos G. Validation of a Persian version of the OIDP index. BMC oral health. 2007;7(1):2.

57. Wongpakaran N, Wongpakaran T, Van Reekum R. The use of GDS-15 in detecting MDD: a comparison between residents in a Thai long-term care home and geriatric outpatients. Journal of clinical medicine research. 2013;5(2):101.

58. Gamer S, Tuch R, Garcia LT. MM House mental classification revisited: Intersection of particular patient types and particular dentist's needs. Journal of Prosthetic Dentistry. 2003;89(3):297-302.

59. Lim LL, Seubsman S-a, Sleigh A. Thai SF-36 health survey: tests of data quality, scaling assumptions, reliability and validity in healthy men and women. Health and quality of life outcomes. 2008;6(1):52.

60. Gherunpong S, Tsakos G, Sheiham A. The prevalence and severity of oral impacts on daily performances in Thai primary school children. Health and quality of life outcomes. 2004;2(1):57.

61. alcoholism nioaaa. Drinking Levels Defined [Available from: https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking.

62. Guigoz Y. The Mini Nutritional Assessment (MNA®) review of the literature - What does it tell us? Journal of Nutrition, Health and Aging. 2006;10(6):466-85.

63. Limpuangthip N, Somkotra T, Arksornnukit M. Impacts of Denture Retention and Stability on Oral Health-Related Quality of Life, General Health, and Happiness in Elderly Thais. Current Gerontology and Geriatrics Research. 2019;2019.

64. Koistinen S, Olai L, Ståhlnacke K, Fält A, Ehrenberg A. Oral health and oral care in short‐term care: prevalence, related factors and coherence between older peoples' and professionals' assessments. Scandinavian journal of caring sciences. 2019;33(3):712-22.

65. Tadakamadla J, Kumar S, Mamatha G. Comparative evaluation of oral health status of chronic kidney disease (CKD) patients in various stages and healthy controls. Special Care in Dentistry. 2014;34(3):122-6.

66. Kranjčić J, Mikuš A, Peršić S, Vojvodić D. Factors affecting oral health–related quality of life among elderly Croatian patients. Acta Stomatologica Croatica. 2014;48(3):174-82.

APPENDICES

Appendix A ethic document

No. 004/2019

Study Protocol and Consent Form Approval

The Human Research Ethics Committee of the Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand has approved the following study to be carried out according to the protocol and patient/participant information sheet dated and/or amended as follows in compliance with the **ICH/GCP**

Study Title	: Oral Health-related Quality of life and related factors in the elderly patients who received dental treatment
Study Code	: HREC-DCU **2018-112**
Study Center	: Chulalongkorn University
Principle Investigator	: Mr. Teerawut Tatiyapongpaiboon
Protocol Date	: December 12, 2018
Date of Approval	: January 11, 2019
Date of Expiration	: January 10, 2021

K. Bhalang

.....

(Assistant Professor Dr. Kanokporn Bhalang)
Chairman of Ethics Committee
Associate Dean for Research

***A list of the Ethics Committee members (names and positions) present at the Ethics Committee meeting on the date of approval of this study has been attached (upon requested). This Study Protocol Approval Form will be forwarded to the Principal Investigator.**

Approval is granted subject to the following conditions: (see back of the approval)

เอกสารยินยอมเข้าร่วมการวิจัย
(Consent Form)

การวิจัยเรื่อง คุณภาพชีวิตในมิติสุขภาพช่องปากและปัจจัยที่เกี่ยวข้องในผู้ป่วยสูงอายุที่ได้รับการรักษาทางทันตกรรม ข้าพเจ้า(นาย/ นาง/ นางสาว).....
อยู่บ้านเลขที่.....ถนน.....ตำบล/แขวง.....
อำเภอ/เขต.....จังหวัด.....รหัสไปรษณีย์.....
ก่อนที่จะลงนามในใบยินยอมให้ทำการวิจัยนี้

1. ข้าพเจ้าได้รับทราบรายละเอียดข้อมูลคำอธิบายสำหรับอาสาสมัครที่เข้าร่วมในการวิจัย รวมทั้งได้รับการอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการวิจัย วิธีการทำวิจัย อันตรายหรืออาการที่อาจเกิดขึ้นจากการทำวิจัยหรือจากยาที่ใช้รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียดและมีความเข้าใจดีแล้ว
2. ผู้วิจัยได้ตอบคำถามต่างๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจไม่ปิดบังซ่อนเร้นจนข้าพเจ้าพอใจ
3. ผู้วิจัยรับรองว่าจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุป ผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆ ที่เกี่ยวข้องกระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น และผู้วิจัยรับรองว่าหากเกิดอันตรายใดๆ จากการวิจัยดังกล่าว ข้าพเจ้าจะได้รับการรักษาพยาบาลโดยไม่คิดมูลค่า
4. ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมในโครงการวิจัยนี้เมื่อใดก็ได้และการบอกเลิกการเข้าร่วมการวิจัยนี้จะไม่มีผลต่อการรักษาโรคที่ข้าพเจ้าจะพึงได้รับต่อไป

ข้าพเจ้าจึงสมัครใจเข้าร่วมโครงการวิจัยนี้ตามที่ระบุในเอกสารข้อมูลคำอธิบายสำหรับอาสาสมัครและได้ลง นามในใบยินยอมนี้ด้วยความเต็มใจ และได้รับสำเนาเอกสารใบยินยอมที่ข้าพเจ้าลงนามและลงวันที่ และเอกสารยกเลิกการเข้าร่วมวิจัย อย่างละ 1ฉบับ เป็นที่เรียบร้อยแล้ว ในกรณีที่อาสาสมัครไม่สามารถตัดสินใจได้ จะต้องได้รับการยินยอมจากญาติและผู้ดูแลด้วย

ลงนาม.....(อาสาสมัคร) (.....) วันที่...../...../.....	ลงนาม.....(ญาติอาสาสมัคร) (.....) วันที่...../...../.....
ลงนาม.....(ผู้วิจัยหลัก) (ทพ.ธีรวุฒิ ตติยพงศ์ไพบูลย์) วันที่...../...../.....	ลงนาม.....(พยาน) (.....) วันที่...../...../.....

ข้าพเจ้าไม่สามารถอ่านหนังสือได้ แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้แก่ข้าพเจ้าฟังจนเข้าใจดีแล้วข้าพเจ้าจึงลงนาม หรือประทับลายนิ้วหัวแม่มือขวาของข้าพเจ้าในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม.....(อาสาสมัคร) (.....) วันที่...../...../.....	ลงนาม.....(ญาติอาสาสมัคร) (.....) วันที่...../...../.....
ลงนาม.....(ผู้วิจัยหลัก) (ทพ.ธีรวุฒิ ตติยพงศ์ไพบูลย์) วันที่...../...../.....	ลงนาม.....(พยาน) (.....) วันที่...../...../.....

Appendix B questionnaires and test

QUESTIONNAIRE AND INTERVIEW

Participant [ ] yourself [ ] others: relationship with participant _____

If it is Caregiver Take care of the participant for __ month __ year

A. Sociodemographic

1. Sex: male, female

2. Age: _ _ _ years: **Date of Birth** _ _/_ _/_ _ _ _

3. Marital status

1 single 2 married

3 separated 4 divorced

5 widowed

6. Education

a. Year of education _ _

b. Highest level of education

1 uneducated 2 primary school or lower

3 secondary school or technical equivalent 4 post high school diploma / certificate

5 bachelor or higher university degree

7. Living condition

a. Address_____

b. How many people in total live in your home including yourself _ _

c. Living with (multichoice)

1 My husband/ wife 2 My son

3 My daughter 4 Brother

5 Sister 6 My grandson

7 My granddaughter 8 nursing home (please specify starting date _ / _ / _)

9 Friends or other relatives 10 Other _____

d. Caregiver: Yes No

e. Who is the caregiver _____

8. Income and work

a. Occupation _____

1) Not working 2) State enterprise employees 3) Employees or employee of a private company / university. 4) Farmers 5) Private business 6) Housework / hire 7) Priest / priest 8) Others .....

b. Monthly income _____Baht / month

c. Monthly household income _____Baht / month

d. Main sources of income for living:

1) work 2) descendants / relatives 3) savings / interest 4) allowances for senior citizens 5) government pension 6) donations 7) other ....

e. Are you satisfied with your financial situation or your living expenses?

Satisfied, Dissatisfied

f. Occupation or *job* defined as the longest job in life_____

9. insurance of health

1 Social Security Scheme

2 Government or State Enterprise Officer: officer, family officer, pension officials

3 Universal Coverage Scheme: Disabled, elderly

4 Self – payment

5 Private health insurances

6. Right to be an employee of a private company

7 Other _____

B. Physical factors

a. Underlying Disease: Current medical problem

1. Diabetes mellitus

2. Cardiovascular disease

3. Chronic kidney disease

4. Pulmonary disease

5. Gastritis

6. Rheumatoid arthritis or chronic knee pain

7. Cancer

8. Dementia

9. Hypertension

10. Dyslipidemia

11. Osteoporosis or Bone disorders

12. Parkinson's disease

13. Other_____

b. Self- Rated health (past 1 year):

very good, good, fair, bad, and very bad

C. Psychological factors

a. Happiness: I am happy.

strongly agree, agree, neither agree nor disagree, disagree, strongly disagree

D. Lifestyle

a. Smoking (Packyears _ _)

• Non-smokers

• smoker

• Ex-smoker

b. Alcohol consumption(quantity and frequency _ drinks/ __)

• Non-Alcohol consumption

• Moderate Alcohol consumption (up to 1 drink per day for women and up to 2 drinks per day for men)

• Heavy Alcohol consumption (8 or more drinks a week for women and 15 or more drinks a week for men)

c. Physical exercise: frequency (time/week)

d. Concern for health care knowledge: yes/no

e. social interaction and social participation

- What are your activities and frequency with others?

	everyday	Nearly/ every week	1-2 times /month	Very few	never	Activity
1.family						
2.neighbors						
3.other friends						
4.people at recreational clubs or voluntary or service organization						
5.Participate in political parties, trade unions, environmental groups						

E. Oral Condition

a. Self-rated oral health: very good, good, fair, bad, and very bad

b. Self-rated Oral hygiene Good, Fair, Poor

c. Oral Cleaning

	Oral care equipment
Self	
Others_____	

d. Current denture with patient's satisfaction Good, Fair, Poor

Record form

A. Clinical Frailty Scale (CFS)

1 very fit 2 well 3 managing well 4 vulnerable

5 mildly frail 6 moderately frail 7 Severely frail 8.Very Severely frail

9. Terminally Ill

B. weight _ _ _ Kg

C. height _ _ _ Cm

D. Personality types (patient type)

- Philosophical mind - Exacting mind

- Hysterical mind - Indifferent mind

E. Number of natural teeth _ _

F. Number of posterior occluding pair (natural teeth + artificial teeth)

Teeth	Left side	Right side
1 Premolar		
2 Premolars		
1 molar		
2 molars		

G. Current denture status

Denture type: Complete Dentures, Partial Dentures (ARPD/MRPD), Others_____

Denture condition: Broken denture , Poor hygiene denture, Others_____

Interfere occlusion: no , yes

Retention and Stability : ill-fitting denture, acceptable denture

H. Oral Impacts on Daily Performances: OIDP (46).

Oral Impacts on Daily Performances

Activities	Frequency score	Severity score	Major symptoms and Oral impairments
1. Eating			
2. Speaking			
3. Cleaning teeth or denture			
4. Maintaining emotion			
5. Smiling/laughing without embarrassment by teeth appearance			
6. Sleeping well			
7. Contact with people			
8. Working			

I. Thai version of the 15-item Geriatric Depression Scale (TGDS-15) (57).

ชื่อ_____สกุล_____

Date ☐☐ / ☐☐ / 25☐☐

แบบวัดความเศร้าในผู้สูงอายุไทย 15 ข้อ (TGDS-15)*

เลือกคำตอบที่ตรงกับความรู้สึกของคุณในช่วง **1 สัปดาห์ที่ผ่านมา**

หัวข้อ	คำตอบ	
1.โดยทั่วไปแล้วคุณพึงพอใจกับชีวิตตัวเองหรือไม่	☐ใช่	☐ไม่ใช่
2.คุณลดกิจกรรมหรือความสนใจในสิ่งต่างๆลงหรือไม่	☐ใช่	☐ไม่ใช่
3.คุณรู้สึกว่าชีวิตคุณว่างเปล่าหรือไม่	☐ใช่	☐ไม่ใช่
4.คุณรู้สึกเบื่อๆ อยู่บ่อยครั้งหรือไม่	☐ใช่	☐ไม่ใช่
5.คุณอารมณ์ดีเป็นส่วนใหญ่หรือไม่	☐ใช่	☐ไม่ใช่
6.คุณกลัวว่าอะไรร้ายๆ จะเกิดขึ้นกับคุณหรือไม่	☐ใช่	☐ไม่ใช่
7.คุณรู้สึกมีความสุขเป็นส่วนใหญ่หรือไม่	☐ใช่	☐ไม่ใช่
8.คุณรู้สึกหมดหนทางอยู่บ่อยครั้งหรือไม่	☐ใช่	☐ไม่ใช่
9.คุณชอบอยู่กับบ้านมากกว่าออกไปหาอะไรทำนอกบ้านหรือไม่	☐ใช่	☐ไม่ใช่
10.คุณรู้สึกว่าคุณมีปัญหาความจำมากกว่าใครๆหรือไม่	☐ใช่	☐ไม่ใช่
11.คุณคิดว่าการที่มีชีวิตอยู่มาได้จนถึงทุกวันนี้มันช่างแสนวิเศษไปหรือไม่	☐ใช่	☐ไม่ใช่
12.คุณรู้สึกหรือไม่ว่าชีวิตที่กำลังเป็นอยู่ตอนนี้ช่างไร้ค่าเหลือเกิน	☐ใช่	☐ไม่ใช่
13.คุณรู้สึกมีกำลังเต็มที่หรือไม่	☐ใช่	☐ไม่ใช่
14.คุณรู้สึกหมดหวังกับสิ่งที่คุณกำลังเผชิญอยู่หรือไม่	☐ใช่	☐ไม่ใช่
15.คุณคิดว่าคนอื่นๆ ดีกว่าคุณหรือไม่	☐ใช่	☐ไม่ใช่

คะแนนรวม _ _/15

0-1-2-3-4-5 N 6-7-8-9-10 S 11-12-13-14-15 D

การคิดคะแนน

ให้คะแนน 1 คะแนนในข้อต่อไปนี้

ตอบ ใช่ 2-4, 6, 8-10,, 12, 14-15

ตอบ ไม่ใช่ 1, 5, 7, 11, 13

6 คะแนนขึ้นไปบ่งบอกว่ามีภาวะซึมเศร้า ควรติดตามหรือส่งพบแพทย์ประเมินอาการทางคลินิก

11 คะแนนขึ้นไปมีภาวะซึมเศร้าแน่นอน ควรพบจิตแพทย์

J. Mini-Mental State Examination Thai 2002 (54).

แบบทดสอบ MMSE – Thai 2002

Mini – Mental State Examination: Thai version (MMSE – Thai 2002)

1. Orientation for time (5 คะแนน) (ตอบถูกข้อละ 1 คะแนน)	บันทึกคำตอบไว้ทุกครั้ง (ทั้งคำตอบที่ถูกและผิด)	คะแนน
1.1 วันนี้วันที่เท่าไร	.....	☐
1.2 วันนี้วันอะไร	.....	☐
1.3 เดือนนี้เดือนอะไร	.....	☐
1.4 ปีนี้ปีอะไร	.....	☐
1.5 ฤดูนี้ฤดูอะไร	.....	☐
2. Orientation for place (5 คะแนน) (ให้เลือกข้อใดข้อหนึ่ง) (ตอบถูกข้อละ 1 คะแนน)		
2.1 กรณีอยู่ที่สถานพยาบาล		
2.1.1 สถานที่ตรงนี้เรียกว่า อะไร และ.....ชื่อว่าอะไร	.....	☐
2.1.2 ขณะนี้ท่านอยู่ที่ชั้นที่เท่าไรของตัวอาคาร	.....	☐
2.1.3 ที่อยู่ในอำเภอ - เขตอะไร	.....	☐
2.1.4 ที่นี่จังหวัดอะไร	.....	☐
2.1.5 ที่นี่ภาคอะไร	.....	☐
2.2 กรณีที่อยู่ที่บ้านของผู้ถูกทดสอบ		
2.2.1 สถานที่ตรงนี้เรียกว่าอะไร และบ้านเลขที่อะไร	.....	☐
2.2.2 ที่นี่หมู่บ้าน หรือละแวก/คุ้ม/ย่าน/ถนนอะไร	.....	☐
2.2.3 ที่นี่อำเภอเขต / อะไร	.....	☐
2.2.4 ที่นี่จังหวัดอะไร	.....	☐
2.2.5 ที่นี่ภาคอะไร	.....	☐

3. Registraion (3 คะแนน)

ต่อไปนี้เป็นการทดสอบความจำ ดิฉันจะบอกชื่อของ 3 อย่าง คุณ (ตา, ยาย....) ตั้งใจฟังให้ดีนะ เพราะจะบอกเพียงครั้งเดียว ไม่มีการบอกซ้ำอีก เมื่อ ผม (ดิฉัน) พูดจบ ให้ คุณ (ตา, ยาย....) **พูดทบทวนตามที่ได้ยิน ให้ครบทั้ง 3 ชื่อ** แล้วพยายามจำไว้ให้ดี เดี๋ยวดิฉันจะถามซ้ำ

✳ การบอกชื่อแต่ละคำให้ห่างกันประมาณหนึ่งวินาที ต้องไม่ช้าหรือเร็วเกินไป

(ตอบถูก 1 คำได้ 1 คะแนน)

○ ดอกไม้ ○ แม่น้ำ ○ รถไฟ	.....	☐

ในกรณีที่ทำแบบทดสอบซ้ำภายใน 2 เดือน ให้ใช้คำว่า

○ ต้นไม้ ○ ทะเล ○ รถยนต์	.....	☐

แบบทางเวชปฏิบัตินี้ เป็นเครื่องมือส่งเสริมคุณภาพในการบริการด้านสุขภาพที่เหมาะสมกับทรัพยากรและเงื่อนไขในสังคมไทย โดยหวังผลในการสร้างเสริมและแก้ไขปัญหาสุขภาพของคนไทยอย่างมีประสิทธิภาพและคุ้มค่า ข้อเสนอแนะต่างๆในแนวทางเวชปฏิบัตินี้ ไม่ใช่ข้อบังคับของการปฏิบัติ ผู้ใช้สามารถปฏิบัติแตกต่างไปจากข้อแนะนำได้ ในกรณีที่สถานการณ์แตกต่างออกไปหรือมีเหตุผลที่สมควรโดยใช้วิจารณญาณที่เป็นที่ยอมรับในสังคม

4. Attention/Calculation (5 คะแนน) (ให้เลือกข้อใดข้อหนึ่ง)

ข้อนี้เป็นการคิดเลขในใจเพื่อทดสอบสมาธิ คุณ (ตา, ยาย....) คิดเลขในใจเป็นไหม ?

ถ้าตอบคิดเป็นทำข้อ 4.1 ถ้าตอบคิดไม่เป็นหรือไม่ตอบให้ทำข้อ 4.2

4.1 "ข้อนี้คิดในใจเอา 100 ตั้ง ลบออกที่ละ 7

ไปเรื่อยๆ ได้ผลเท่าไรบอกมา .... ☐

บันทึกคำตอบตัวเลขไว้ทุกครั้ง (ทั้งคำตอบที่ถูกและผิด) ทำทั้งหมด 5 ครั้ง

ถ้าลบได้ 1, 2, หรือ3 แล้วตอบไม่ได้ ก็คิดคะแนนเท่าที่ทำได้ ไม่ต้องย้ายไปทำข้อ 4.2

4.2 "ผม (ดิฉัน) จะสะกดคำว่า มะนาว ให้คุณ (ตา, ยาย....) ฟังแล้วให้คุณ (ตา, ยาย....) สะกดถอยหลังจากพยัญชนะตัวหลังไปตัวแรก คำว่ามะนาวสะกดว่า มอม้า-สระอะ-นอหนู-สระอา-วอแหวน

ไหนคุณ (ตา, ยาย..) สะกดถอยหลัง ให้ฟังซิ ....

ว า น ะ ม

5. Recall (3 คะแนน)

เมื่อสักครู่ที่ให้จำของ 3 อย่างจำได้ไหมมีอะไรบ้าง" (ตอบถูก 1 คำได้ 1 คะแนน)

○ ดอกไม้ ○ แม่น้ำ ○ รถไฟ ..... ☐

ในกรณีที่ทำแบบทดสอบซ้ำภายใน 2 เดือน ให้ใช้คำว่า

○ ต้นไม้ ○ ทะเล ○ รถยนต์ ..... ☐

6. Naming (2 คะแนน)

6.1 ยื่นดินสอให้ผู้ถูกทดสอบดูแล้วถามว่า

"ของสิ่งนี้เรียกว่าอะไร" ..... ☐

6.2 ชี้นาฬิกาข้อมือให้ผู้ถูกทดสอบดูแล้วถามว่า

"ของสิ่งนี้เรียกว่าอะไร" ..... ☐

7. Repetition (1 คะแนน)

(พูดตามได้ถูกต้องได้ 1 คะแนน)

ตั้งใจฟังผม (ดิฉัน) เมื่อผม (ดิฉัน) พูดข้อความนี้

แล้วให้คุณ (ตา, ยาย) พูดตาม ผม (ดิฉัน) จะบอกเพียงครั้งเดียว

"ใครใคร่ขายไก่ไข่" ..... ☐

8. Verbal command (3 คะแนน)

ข้อนี้ฟังคำสั่ง "ฟังดีๆ นะเดี๋ยวผม (ดิฉัน) จะส่งกระดาษให้คุณ แล้วให้คุณ (ตา, ยาย....)

รับด้วยมือขวา พับครึ่งกระดาษ แล้ววางไว้ที่....." (พื้น, โต๊ะ, เตียง)

ผู้ทดสอบแสดงกระดาษเปล่าขนาดประมาณ เอ-4

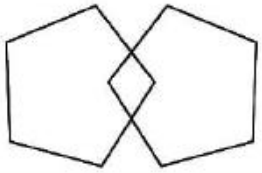
ไม่มีรอยผับ ให้ผู้ถูกทดสอบ

○ รับด้วยมือขวา ○ พับครึ่ง ○ วางไว้ที่" (พื้น, โต๊ะ, เตียง) ..... ☐

9. Written command (1 คะแนน)
ต่อไปเป็นคำสั่งที่เขียนเป็นตัวหนังสือ ต้องการให้คุณ (ตา, ยาย....) อ่าน
แล้วทำตาม (ตา, ยาย....) จะอ่านออกเสียงหรืออ่านในใจก็ได้
ผู้ทดสอบแสดงกระดาษที่เขียนว่า "หลับตาได้" ○ หลับตาได้ ..... ☐

10. Writing (1 คะแนน)
ข้อนี้จะเป็นคำสั่งให้ "คุณ (ตา, ยาย....) เขียนข้อความอะไรก็ได้ที่อ่านแล้วรู้เรื่อง
หรือมีความหมายมา 1 ประโยค" .....
○ ประโยคมีความหมาย ..... ☐

11. Visuoconstruction (1 คะแนน)
ข้อนี้เป็นคำสั่ง "จงวาดภาพให้เหมือนภาพตัวอย่าง"
(ในช่องว่างด้านขวาของภาพตัวอย่าง) ..... ☐



	คะแนนเต็ม	**30**

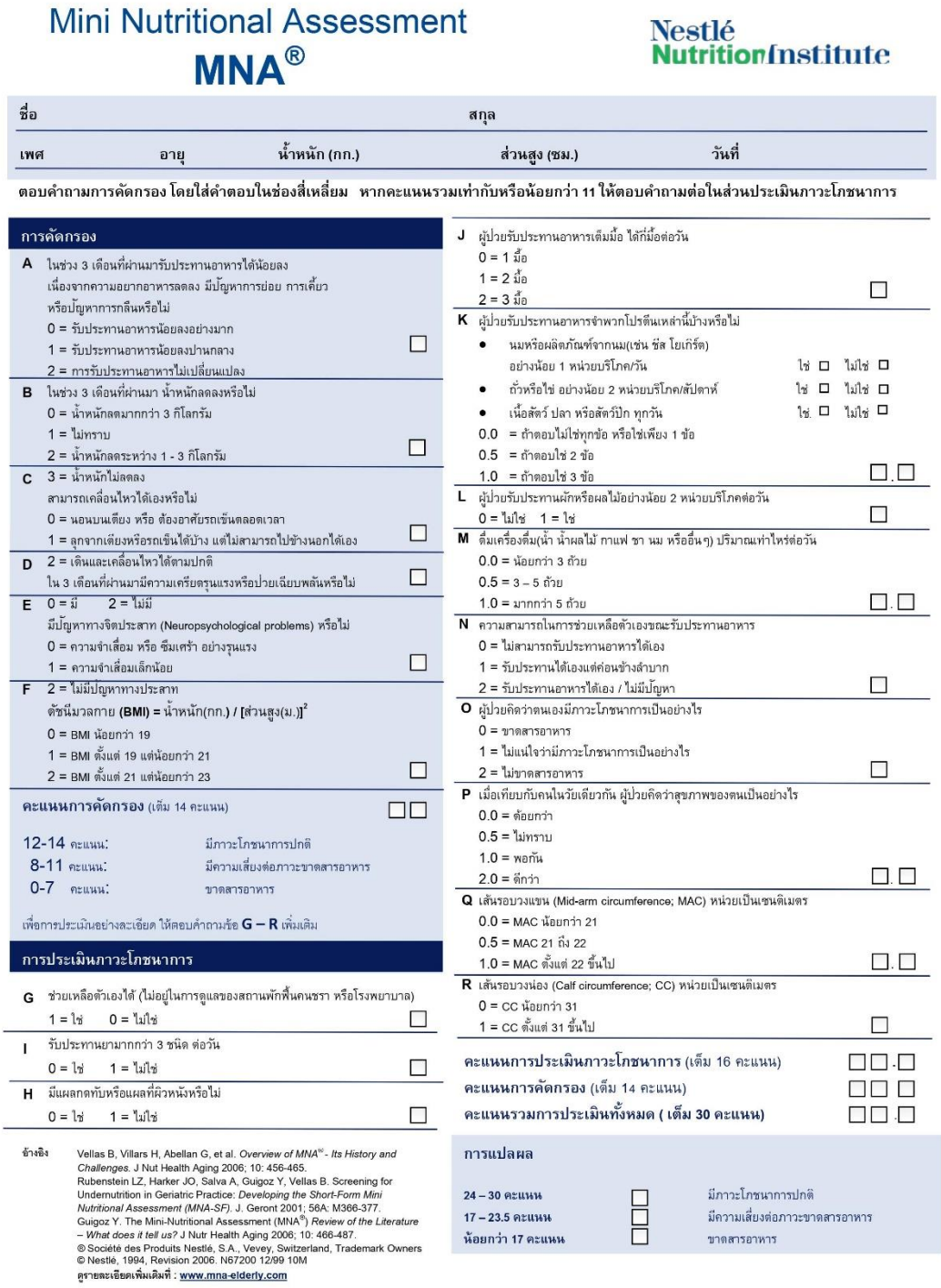
การแปลผล MMSE-THAI 2002

ระดับการศึกษา	คะแนน		Sensitivity	Specificity	Positive Predictive value	Negative Predictive value	Efficiency
	จุดตัด	เต็ม					
ไม่ได้เรียนหนังสือ (อ่านหนังไม่ออก)	≤ 14	23*	35.4	76.8	64.5	50.0	54.3
จบ ประถมศึกษา	≤ 17	30	56.6	93.8	88.9	71.0	76.3
สูงกว่า ประถม	≤ 22	30	92.0	92.6	91.2	93.3	92.4

* ตัดข้อ 4, 9 และ 10

ที่มา: สถาบันเวชศาสตร์ผู้สูงอายุ กรมการแพทย์ กระทรวงสาธารณสุขแบบทดสอบสภาพสมองเสื่อมเบื้องต้นฉบับภาษาไทย MIMSE-THAI 2002

K. Dietary habits: Mini Nutrition Assessment (Thai version) (62).



Mini Nutritional Assessment
MNA®

Nestlé Nutrition Institute

ชื่อ สกุล

เพศ อายุ น้ำหนัก (กก.) ส่วนสูง (ซม.) วันที่

ตอบคำถามการคัดกรอง โดยใส่คำตอบในช่องสี่เหลี่ยม หากคะแนนรวมเท่ากับหรือน้อยกว่า 11 ให้ตอบคำถามต่อในส่วนประเมินภาวะโภชนาการ

การคัดกรอง

A ในช่วง 3 เดือนที่ผ่านมารับประทานอาหารได้น้อยลง เนื่องจากความอยากอาหารลดลง มีปัญหาการย่อย การเคี้ยว หรือปัญหาการกลืนหรือไม่
0 = รับประทานอาหารน้อยลงอย่างมาก
1 = รับประทานอาหารน้อยลงปานกลาง
2 = การรับประทานอาหารไม่เปลี่ยนแปลง ☐

B ในช่วง 3 เดือนที่ผ่านมา น้ำหนักลดลงหรือไม่
0 = น้ำหนักลดมากกว่า 3 กิโลกรัม
1 = ไม่ทราบ
2 = น้ำหนักลดระหว่าง 1 - 3 กิโลกรัม ☐

C 3 = น้ำหนักไม่ลดลง
สามารถเคลื่อนไหวได้เองหรือไม่
0 = นอนบนเตียง หรือ ต้องอาศัยรถเข็นตลอดเวลา
1 = ลุกจากเตียงหรือรถเข็นได้บ้าง แต่ไม่สามารถไปข้างนอกได้เอง ☐

D 2 = เดินและเคลื่อนไหวได้ตามปกติ
ใน 3 เดือนที่ผ่านมามีความเครียดรุนแรงหรือป่วยเฉียบพลันหรือไม่ ☐

E 0 = มี 2 = ไม่มี
มีปัญหาทางจิตประสาท (Neuropsychological problems) หรือไม่
0 = ความจำเสื่อม หรือ ซึมเศร้า อย่างรุนแรง
1 = ความจำเสื่อมเล็กน้อย ☐

F 2 = ไม่มีปัญหาทางประสาท
ดัชนีมวลกาย (BMI) = น้ำหนัก(กก.) / [ส่วนสูง(ม.)]²
0 = BMI น้อยกว่า 19
1 = BMI ตั้งแต่ 19 แต่น้อยกว่า 21
2 = BMI ตั้งแต่ 21 แต่น้อยกว่า 23 ☐

คะแนนการคัดกรอง (เต็ม 14 คะแนน) ☐☐

12-14 คะแนน: มีภาวะโภชนาการปกติ
8-11 คะแนน: มีความเสี่ยงต่อภาวะขาดสารอาหาร
0-7 คะแนน: ขาดสารอาหาร

เพื่อการประเมินอย่างละเอียด ให้ตอบคำถามข้อ G – R เพิ่มเติม

การประเมินภาวะโภชนาการ

G ช่วยเหลือตัวเองได้ (ไม่อยู่ในการดูแลของสถานพักฟื้นคนชรา หรือโรงพยาบาล)
1 = ใช่ 0 = ไม่ใช่ ☐

I รับประทานยามากกว่า 3 ชนิด ต่อวัน
0 = ใช่ 1 = ไม่ใช่ ☐

H มีแผลกดทับหรือแผลที่ผิวหนังหรือไม่
0 = ใช่ 1 = ไม่ใช่ ☐

J ผู้ป่วยรับประทานอาหารเต็มมื้อ ได้กี่มื้อต่อวัน
0 = 1 มื้อ
1 = 2 มื้อ
2 = 3 มื้อ ☐

K ผู้ป่วยรับประทานอาหารจำพวกโปรตีนเหล่านี้บ้างหรือไม่
- นมหรือผลิตภัณฑ์จากนม(เช่น ชีส โยเกิร์ต) อย่างน้อย 1 หน่วยบริโภค/วัน ใช่ ☐ ไม่ใช่ ☐
- ถั่วหรือไข่ อย่างน้อย 2 หน่วยบริโภค/สัปดาห์ ใช่ ☐ ไม่ใช่ ☐
- เนื้อสัตว์ ปลา หรือสัตว์ปีก ทุกวัน ใช่ ☐ ไม่ใช่ ☐

0.0 = ถ้าตอบไม่ใช่ทุกข้อ หรือใช่เพียง 1 ข้อ
0.5 = ถ้าตอบใช่ 2 ข้อ
1.0 = ถ้าตอบใช่ 3 ข้อ ☐.☐

L ผู้ป่วยรับประทานผักหรือผลไม้อย่างน้อย 2 หน่วยบริโภคต่อวัน
0 = ไม่ใช่ 1 = ใช่ ☐

M ดื่มเครื่องดื่ม(น้ำ น้ำผลไม้ กาแฟ ชา นม หรืออื่นๆ) ปริมาณเท่าไหร่ต่อวัน
0.0 = น้อยกว่า 3 ถ้วย
0.5 = 3 – 5 ถ้วย
1.0 = มากกว่า 5 ถ้วย ☐.☐

N ความสามารถในการช่วยเหลือตัวเองขณะรับประทานอาหาร
0 = ไม่สามารถรับประทานอาหารได้เอง
1 = รับประทานได้เองแต่ค่อนข้างลำบาก
2 = รับประทานอาหารได้เอง / ไม่มีปัญหา ☐

O ผู้ป่วยคิดว่าตนเองมีภาวะโภชนาการเป็นอย่างไร
0 = ขาดสารอาหาร
1 = ไม่แน่ใจว่ามีภาวะโภชนาการเป็นอย่างไร
2 = ไม่ขาดสารอาหาร ☐

P เมื่อเทียบกับคนในวัยเดียวกัน ผู้ป่วยคิดว่าสุขภาพของตนเป็นอย่างไร
0.0 = ด้อยกว่า
0.5 = ไม่ทราบ
1.0 = พอกัน
2.0 = ดีกว่า ☐.☐

Q เส้นรอบวงแขน (Mid-arm circumference; MAC) หน่วยเป็นเซนติเมตร
0.0 = MAC น้อยกว่า 21
0.5 = MAC 21 ถึง 22
1.0 = MAC ตั้งแต่ 22 ขึ้นไป ☐.☐

R เส้นรอบวงน่อง (Calf circumference; CC) หน่วยเป็นเซนติเมตร
0 = CC น้อยกว่า 31
1 = CC ตั้งแต่ 31 ขึ้นไป ☐

คะแนนการประเมินภาวะโภชนาการ (เต็ม 16 คะแนน) ☐☐.☐
คะแนนการคัดกรอง (เต็ม 14 คะแนน) ☐☐.☐
คะแนนรวมการประเมินทั้งหมด (เต็ม 30 คะแนน) ☐☐.☐

การแปลผล

24 – 30 คะแนน	☐	มีภาวะโภชนาการปกติ
17 – 23.5 คะแนน	☐	มีความเสี่ยงต่อภาวะขาดสารอาหาร
น้อยกว่า 17 คะแนน	☐	ขาดสารอาหาร

ข้างอิง Vellas B, Villars H, Abellan G, et al. *Overview of MNA® - Its History and Challenges.* J Nut Health Aging 2006; 10: 456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: *Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001; 56A: M366-377.
Guigoz Y. The Mini-Nutritional Assessment (MNA®) *Review of the Literature – What does it tell us?* J Nutr Health Aging 2006; 10: 466-487.

ดูรายละเอียดเพิ่มเติมที่ : www.mna-elderly.com

VITA

NAME	Teerawut Tatiyapongpaiboon
DATE OF BIRTH	26 April 1991
PLACE OF BIRTH	Bangkok
INSTITUTIONS ATTENDED	2015 Doctor of Dental Surgery (D.D.S.) from Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand.
PUBLICATION	1. The analysis of the dental patients attending Geriatric Dentistry and Special Patients Care clinic, Faculty of Dentistry, Chulalongkorn University during 2016 to 2018 By Teerawut, Tatiyapongpaiboon; Nareudee Limpuangthip and Orapin Komin Conference: RSU International Research Conference 2020 / Rangsit University