



Oral health status of Thai older adults with Mild Cognitive Impairment (MCI)

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Abstract

Mild Cognitive Impairment (MCI) is a transitional stage between normal cognitive decline and dementia. Cognitively impaired elders tend to have a higher risk of oral health problems with poorer oral hygiene than elders with normal cognition. The better we know about oral health status and bio-psycho-social factors in this preventable stage, the more we can early prevent and prepare for dependency in late life. This study aims to assess oral health status among Thai older adults with MCI through a cross-sectional study that was conducted on Thai older adults at the Faculty of Dentistry, Chulalongkorn University. Dementia or depression individuals were excluded. Cognitive function was assessed by the Montreal Cognitive Assessment Thai version (MoCA-T). Any participants with the MoCA score of below 25 were referred to a psychiatrist for final diagnosis. Bio-psycho-social data of 60 MCI participants were obtained by a self-reported interview. Oral examination was evaluated by a dentist. The average age of participants was 72.18 years, with 76.7% female. From a total of 60 MCI participants, 60.0% had periodontal disease, while 40.0% had active caries. The mean number of natural teeth (NT) was 16.80 ± 9.1 , by which 43.3% had at least 20 NT. The mean number of posterior opposing pairs (POPs) was 2.78 ± 3.0 , by which 33.3% had at least 4 POPs. Only 33.3% had at least 20 NT with 4 POPs. Oral health status of Thai older adults with MCI in this study was poorer than general Thai elders in the national data but considerably better than dementia Thais.

Keywords: Oral health status, Mild Cognitive Impairment (MCI), Elders, Thai, Older adults, Geriatric

1. Introduction

Oral health problems among the elderly can lead to a negative impact on their quality of life (Somsak & Kaewplung, 2016). Several factors from physical changes such as systemic diseases and medications, sensory and motor deficits, physical and mental impairments, and disability have drawbacks to oral health (Srisilapanan & Jai-Ua, 2013). Particularly in cognitively impaired elders, the higher risk of root caries, more carious teeth, more often edentulous without using dentures, and poorer denture hygiene have found than elders with normal cognition (Avlund, Holm-Pedersen, Morse, Viitanen, & Winblad, 2004; Syrjala, Ylostalo, Sulkava, & Knuuttila, 2007).

Diversely, recent studies showed associations between oral health problems and cognitive impairment, especially dementia that is periodontal disease (Kamer, Pirraglia, et al., 2015; Noble et al., 2009), tooth loss and poor mastication (Chen, Iinuma, Onozuka, & Kubo, 2015; Elsig et al., 2015; Stein, Desrosiers, Donegan, Yepes, & Kryscio, 2007). Some studies suggested a causal relationship and the positive effects of mastication on cognition (Ono, Yamamoto, Kubo, & Onozuka, 2010; Weijenberg, Scherder, & Lobbezoo, 2011). Further, periodontal disease has been proclaimed as one of the modifiable risk factors for cognitive decline and dementia (Kamer, Janal, & de Leon, 2015)

Mild Cognitive Impairment (MCI) has known as a transition between normal cognitive decline and untreatable dementia (Roberts & Knopman, 2013). Individuals with MCI have a higher risk of progression to dementia as well as dependency. As many MCI cases do not progress in cognitive deficits, and some cases can revert to normal cognition (Bischkopf, Busse, & Angermeyer, 2002; Busse, Angermeyer, & Riedel-Heller, 2006; Wilson, Leurgans, Boyle, & Bennett, 2011).

Thus, it is beneficial to know better about oral health status with bio-psycho-social factors of Thai older adults on this preventable stage. To fill the gap mentioned above, this study aims to investigate the



descriptive data which might be useful for dental and non-dental further studies among the Thai senior population.

2. Objectives

This study aims to assess oral health status among Thai older adults with MCI.

3. Materials and Methods

3.1 Attendees aged 60 years and above were voluntarily recruited from the outpatient department of Faculty of Dentistry, Chulalongkorn University, from July 2018 to June 2019. Any individuals with a history of dementia, depression, psychiatric disorders, cerebrovascular diseases, cancer, major head trauma, or any brain diseases were excluded. Thai Mental State Examination (TMSE) (Committee, 1993) and Thai Geriatric Depression Scale (TGDS) (Wongpakaran, Wongpakaran, & Van Reekum, 2013) were performed to exclude any individuals with suspected current symptoms of dementia or depression. Potential participants all given their consent in written consent form after thoroughly informed about the study protocol. This study protocol was approved by the Ethical Committee of Faculty of Dentistry, Chulalongkorn University (HREC-DCU 2017-088), and Institutional Review Board of Faculty of Medicine, Chulalongkorn University (IRB no. 612/62). Montreal Cognitive Assessment-Thai version (MoCA-T) (Tangwongchai S, 2009) or Montreal Cognitive Assessment-Basic (MoCA-B) (Julayanont et al., 2015) for illiterates, were used as cognitive function screening instruments. Any individuals with MoCA score below 25 were referred to a psychiatrist for clinical evaluation and final diagnosis. Individuals with suspected dementia, depression, or MCI were referred to King Chulalongkorn Memorial hospital as an ethical protocol written.

3.2 All 60 MCI confirmed by a psychiatrist were included in this study. Demographic and individual data were collected by a self-reported questionnaire including age, gender, marital status, current living condition, education, occupation defined as the longest job in a lifetime, monthly income (Baht). The Lawton Instrumental Activities in Daily Living (IADL) (Graf, 2009) was used as a functional assessment. Body Mass Index (BMI), nutritional status by Mini Nutritional Assessment (MNA) (Vellas et al., 1999), current medical problems, history of hypertension over ten years, and history of obesity ($BMI \geq 30$) according to maximum weight in a lifetime except during pregnant period were also recorded. Regarding other factors, this study also included family history of dementia, continuous sleeping hours, smoking status, alcohol, and drug use, physical exercise defined by the frequency of more-than-30-minute exercise (Yaffe, Barnes, Nevitt, Lui, & Covinsky, 2001), social media usage, and social meeting.

3.3 Oral examinations were conducted by only one certified dentist under the dental unit's light-collecting five oral health topics as follows;

- Dentition was evaluated by current dentition on the day of participation. Dentition classified into seven dentition types.
- Periodontal disease was defined after the presence of at least two proximal sites of non-adjacent teeth having clinical attachment loss ≥ 3 mm (Kamer, Pirraglia, et al., 2015).
- Active dental caries were determined by cavitation. Any signs of pulp exposure were recorded according to clinical signs.
- The number of natural teeth (NT) was counted according to the number of functional NT. The functional teeth must not be unrestorable, retained root, moderate to severe mobility, which needs to be extracted, and implant or pontic of any dental prostheses (Somsak & Kaewplung, 2016).
- The number of posterior occluding pairs (POPs) determined as pairs of natural opposing premolars and molars, which functionally met in centric occlusion of the participants. This study considered either occluding premolars or molars as one occluding pair (Somsak & Kaewplung, 2016).

3.4 Mean with standard deviation (SD), or frequency and percentage were presented as descriptive statistics.



4. Results

Table 1 showed the bio-socio-economic characteristics of a total of 60 MCI participants.

Table 1 Bio-socio-economic characteristics of Thai older adults with MCI

Characteristics	n	%
Age (years)		
60-70	27	45
>70	33	55
Mean \pm SD		72.18 \pm 7.4
Min - Max		60 - 92
Gender		
Male	14	23.3
Female	46	76.7
Marital status		
Single	11	18.3
Married	26	43.3
Divorced	4	6.7
Widowed	19	31.7
Living condition		
Alone	6	10.0
With spouse	7	11.7
With family	46	76.7
Institutionalized	1	1.7
Education		
Illiterate	15	25.0
Primary school	5	8.3
Secondary school	21	35.0
Bachelor's degree	12	20.0
Master/PhD degree	7	11.7
Occupation		
Civil servant	13	21.7
Private employee	15	25.0
Self-employed	22	36.7
Unemployed / Housewife	10	16.7
Income per month (THB)		
<10,000	29	48.3
10,000-20,000	14	23.3
20,000-50,000	11	18.3
\geq 50,000	6	10.0
Lawton IADL score		
Mean \pm SD		7.88 \pm 0.5
Nutritional status		
Normal	45	75.0
Risk to malnutrition	15	25.0
Body Mass Index (kg/m ²)		
<18.5 Underweight	6	10.0
18.5-29.99 Normal	47	78.3
\geq 30 Obesity	7	11.7
Mean \pm SD		23.93 \pm 5.2
Waist circumference		
Normal	27	45.0
Over 80/90 cm.	33	55.0

Table 1 showed that the average age of participants was 72.18 \pm 7.4 years, with 76.7% of females. The majority (43.3%) of participants were married, 76.7% were living with family, 75.0% were educated in primary school or higher, 83.3% had a job, and 51.7% had monthly income 10,000 Baht and above. The mean



of the IADL score was 7.88 ± 0.5 from 8. Regarding nutritional status, 75% were in the normal range in MNA, 78.3% were within normal BMI range, but 55% had over waist circumference (80 cm in females and 90 cm in males).

Table 2 showed the medical and behavioral characteristics of participants. Regarding the total sample, 55.0% of participants had hypertension, 56.7% had dyslipidemia, and 23.3% had diabetes mellitus. History of illness showed 10.0% had a history of cancer, 18.3% used to have BMI ≥ 30 kg/m² in their lifetime, 43.3% had a history of chronic hypertension for ten years and more, 6.7% had a history of heart disease, 8.3% had a history of brain disease or seizure, 3.3% had a history of cerebrovascular disease, and 1.7% had a history of depression. Only 18.3% showed a family history of dementia. For behavioral characteristics, 55.0% of participants had at least 5 hours of continuous sleeping, 80.0% had never smoked, 90.0% never had alcohol consumption, 51.7% had physical exercise more than once a week, 65.0% could use social media, and 93.3% had social meeting more than once a week.

Table 2 Medical and behavioral characteristics of Thai older adults with MCI

Characteristics	n	%
Current medical problem		
- Hypertension	33	55.0
- Dyslipidemia	34	56.7
- Diabetes Mellitus	14	23.3
No medical problem	7	11.7
Past medical history		
- History of cancer	6	10.0
- History of obesity (BMI ≥ 30)	11	18.3
- History of hypertension (≥ 10 years)	26	43.3
- History of heart disease	4	6.7
- History of brain disease/seizure	5	8.3
- History of cerebrovascular disease	2	3.3
- History of depression	1	1.7
Family history of dementia	11	18.3
Continuous sleeping hours		
<5 hours	27	45.0
≥ 5 hours	33	55.0
Smoking status		
Ex-smoker	12	20.0
Never	48	80.0
Alcohol consumption		
Social drinker	6	10.0
Never	54	90.0
Exercise		
More than once a week	31	51.7
Once a week	3	5
Never	26	43.3
Social media using		
More than once a week	35	58.3
Once a week	4	6.7
Never	21	35.0
Social meeting		
More than once a week	45	75.0
Once a week	10	16.7
Never	5	8.3

Table 3 showed the oral health characteristic of participants. From a total of 60 dentitions, only 6.7% had all-natural teeth, 13.3% had fixed prostheses, 5.0% had fixed and removable prostheses, 55.0% had removable prostheses, 8.3% had complete dentures, and 11.7% had partial edentulous area without prosthesis. This study showed that 60.0% had periodontal disease, and 40.0% had active caries. Mean active dental caries



was 1.08 ± 1.8 . Mean NT was 16.80 ± 9.1 , with 43.3% of total having at least 20 NT. The mean number of POPs was 2.78 ± 3.0 , with 33.3% of total having at least 4 POPs. Only 33.3% had 20 NT with 4 POPs.

Table 3 Oral health characteristics of Thai older adults with MCI

Characteristics	n		%
Dentition			
Natural teeth	4		6.7
Fixed prostheses	8		13.3
Fixed and removable prostheses	3		5.0
Removable prostheses	33		55.0
Complete denture	5		8.3
Partial edentulous area without prosthesis	7		11.7
Periodontal disease			
Active dental caries	24		40.0
Mean \pm SD		1.08 ± 1.8	
Min - Max		0 - 8	
Natural teeth (NT)			
<20	34		56.7
≥ 20	26		43.3
Mean \pm SD		16.80 ± 9.1	
Min - Max		0 - 30	
Posterior Opposing Pairs (POPs)			
<4	40		66.7
≥ 4	20		33.3
Mean \pm SD		2.78 ± 3.0	
Min - Max		0 - 8	
20 NT with 4 POPs	20		33.3

5. Discussion

Regards to IADL score and nutritional status, MCI participants in this study were considerably physically independent. Most participants were in the middle class by socioeconomic status. Only 11.7% had no medical problems. Non-communicable diseases were the most common medical problems. Almost half of the participants struggled in sleeping. The social meeting was more common than social media usage in this population.

Approximately 8.3% of complete edentulism in this study was lower in percentage than the study among Thai dementia patients (Srisilapanan & Jai-Ua, 2013) that show 11.6%. Also, the percentage of having a partially edentulous area without a prosthesis (11.7%) was lower than among the dementias (40.6%). These findings were in accordance with previous studies that cognitively impaired individuals have a higher risk for tooth loss and edentulism (Avlund et al., 2004; Stein et al., 2007), and have found more often being edentulous without using dentures (Syrjala et al., 2007) than cognitively normal persons, which might be a result of the loss of autonomy to recognize any physical problems, also able to communicate for help before the problems getting obvious and seen by others, along with the decline of cognition. Another possible reason was lesser self-adaptation to unfamiliar things, including dental prostheses.

This study showed that 60.0% had periodontal disease, and 40.0% had active caries. These two factors were incomparable to other studies because of different criteria, methodology, and definition. The discrepancy of data had shown 36.3% for periodontal disease and 56.2% for dental caries in the 8th national survey among the general Thai population (Ministry of public health, 2013). Periodontal disease and dental caries among dementias were 54.5% and 49.2%, respectively (Srisilapanan & Jai-Ua, 2013). The comparable data was NT and POPs, as shown in Figure 1-2.

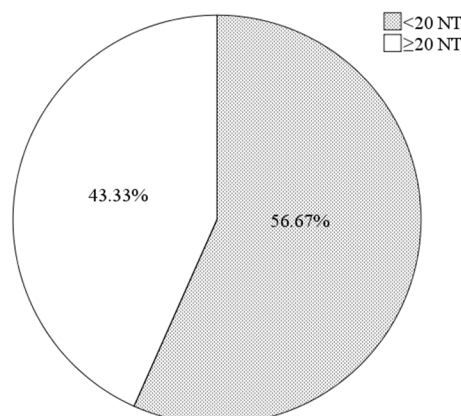


Figure 1 Percentage of MCI participants having at least 20 Natural Teeth (NT) and over

This study showed that mean NT was 16.80 ± 9.1 . By 43.3% of the total had at least 20 NT, as shown in Figure 1. The national survey revealed that mean NT was 18.6, with 56.1% of the total had at least 20 NT (Ministry of public health, 2013). The number of NT and percentage of participants having at least 20 NT among MCIs was lower than general Thai older adults.

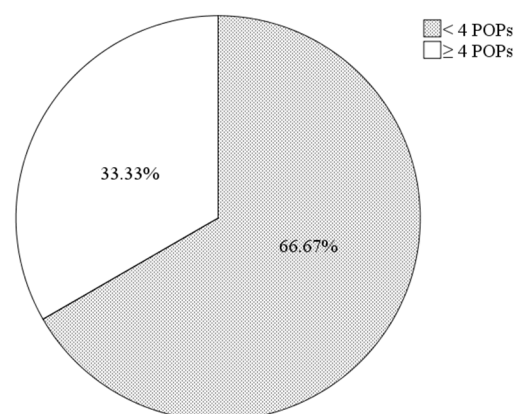


Figure 2 Percentage of MCI participants having at least four posterior occluding pairs (POPs) and over

The mean number of POPs was 2.78 ± 3.0 . Only 33.3% had at least 4 POPs, as shown in Figure 2. The national survey revealed that mean of POPs was 3.0, with 40.2% of the total had at least 4 POPs (Ministry of public health, 2013). Besides, the percentage of MCI participants having at least 20 NT with 4 POPs was 33.3%, while the national survey was 39.4%. Number of POPs, percentage of participants having at least 4 POPs, and percentage of participants having at least 20 NT with 4 POPs among MCIs were all lower than the general Thais.

6. Conclusion

Oral health status of Thai older adults with MCI in this study was poorer than general Thai elders in the national data in terms of a lower number of NT and POPs, a lower percentage of having at least 20 NT and 4 POPs, and a lower percentage of having at least 20 NT with 4 POPs. However, oral health status among the MCIs was considerably better than the dementias in an earlier study by a lower percentage of edentulism. Not only physical and mental health but also oral health demonstrated the progressive decline through a



lifetime by several factors. The early prevention and functional maintenance before dependency in late-life must be prioritized in treatment planning. The further study focused on prevention strategies in the preventable stage as MCI was recommended.

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