Oral Health Status of Dementia Patients in Chiang Mai Neurological Hospital

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Objective: *Investigate the oral health of patients with dementia and examine the association between the type and severity level of dementia on their dental caries status.*
Material and Method: *Cross-sectional study conducted on outpatients referred to the memory clinic. Clinical examinations were based on WHO criteria. Socio-demographic data, functional ability, and dementia level were obtained from hospital medical records. The Thai version of the Mini Mental State Examination (MMSE-Thai 2002) was used as a cognitive testing instrument. The ability to perform oral care derived from an interview.*
Results: *Sixty-nine subjects were included in the present study. The mean age was 75.5 (±7.0) years. Patients with Alzheimer's disease (AD) constituted the largest dementia group. More than half (60.9%), had dementia for less than two years and were functionally independent (66.7%). The majority (56.5%) had moderately severe dementia. More than half (52.5%) had at least 20 functional teeth. The mean number of teeth was 19.5 (±8.4). Mean decayed, missing, and filled teeth (DMFT) were 14.9 (±9.2). More than half (54.7%) had periodontal disease (pocket depth ≥4 mm). Dementia severity was the only characteristic which showed a significant difference in dental caries experience (p = 0.009).*
Conclusion: *Dementia patients who attended the memory clinic had considerably better oral status compared to the national data. Dementia severity was the only characteristic that showed a significant difference in dental caries experience*

Keywords: *Oral health status, Dental caries, Dementia, Periodontal disease*

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Dementia, a progressive neurodegenerative disease, is a condition more commonly found in older people. Dementia is becoming a public health problem[1]. Alzheimer's disease (AD) is the most common form of dementia. The worldwide prevalence of AD is estimated at more than 35 million cases. With aging populations, this number is predicted to increase to 65.7 million in 2030 and 115.4 million in 2050[2]. A national survey of dementia in Thai elders was carried out in Thailand by Jitapunkul and colleagues, using the Chula Mental Test (CMT) without clinical assessment. They found that 3.3% of elderly Thais had dementia[3]. The prevalence of dementia in Thailand ranges from 1.8 to 27.3% in the age group 55 years and above. The reported prevalence of dementia in Thailand varies due to differences in study design, the sample size, the age group of the subjects, and geographic location of the studies[3-10]. AD is the most common type of dementia diagnosed in Chiang Mai province, Thailand. The prevalence is 2.35%, which is close to national findings[10].

Oral health and oral hygiene are essential in maintaining the health of patients with dementia. Many studies have shown that patients with dementia were more likely to have poorer oral health than were healthy patients[11-15]. They found a higher prevalence of coronal and root caries, a higher score with regard to dental plaque, and fewer retained teeth. Chalmers et al conducted a longitudinal study and found that patients with dementia had a higher incidence of coronal and root caries than those without dementia[16]. A study in a large population in South Australia found a greater prevalence of denture-related oral mucosal lesions, greater plaque accumulation, a greater prevalence of coronal and root caries, and more decay in persons with dementia than in those without dementia[17]. A study in a memory clinic in Copenhagen found a significantly higher prevalence of coronal and

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root caries in older adults who had dementia than those without dementia[18].

The oral health status of patients with dementia has rarely been studied in Thailand. Data on oral health status and other related factors of those attending this type of clinic will enable public health dentists to understand the current situation of oral health status of dementia patients. The present study was designed to investigate the oral health status of memory clinic based patients with dementia and to examine the association between age, type, duration and severity level of dementia on dental caries status.

Material and Method

This was a cross-sectional study based on an oral health assessment and interview. The population was all patients who attended the Memory Clinic at Chiang Mai Neurological Hospital and were referred to the dental clinic during a two-year period between February 2009 and December 2010. The dental clinic has developed a clinical practice guideline for all patients who attend the memory clinic. At every visit to the memory clinic, patients are referred to the dental clinic where they undergo an oral examination. Dental treatment and oral hygiene instruction will be provided if needed.

The cognitive evaluation of dementia patients was assessed by the nursing staff of the memory clinic. The Thai version of the Mini Mental State Examination (MMSE-Thai 2002) was used as a cognitive testing instrument[10,19,20]. A score of 24 or greater was a cut-off point for normal cognitive range. A score of 20 to 23 represents mild dementia. Whilst 10 to 19 represents moderate dementia and less than 10 indicates severe dementia. Those with a score less than 24 were diagnosed for dementia by a neurologist as reported elsewhere[10].

Sociodemographic data and functional ability were obtained from the hospital medical records. Functional ability was assessed using the Sirindhron National Medical Rehabilitation Center-Functional Assessment (SNMRC-Functional Assessment). This functional assessment was a modified version of the Barthel Activities of Daily Living (ADL) developed by the Sirindhron National Medical Rehabilitation Center[21]. SNMRC- Functional Assessment assessed levels of dependence of activities of daily living. There are five levels: Completely independent, Independent with assistance, Independent with minimal assistance, Independent with moderate assistance and Dependent. The assessment of an ability to perform oral care was done by an interview of patients using a modification from the assessment of activities for daily living. The ability to perform oral care was divided into three categories: Completely independent (patient could clean his/her own mouth), Independent with assistance (patient could clean his/her own mouth with assistance), Dependent (patient could not clean his/her own mouth but depended completely on help).

Clinical examinations were conducted by the same dentist (CJ) at the dental clinic in a neurological hospital. The examiner calibrated the clinical criteria for assessment of the dental caries and periodontal status through comprehensive discussions with experts.

Data recoded from the clinical examinations included number of functional teeth, dental caries status, periodontal condition and denture status. The evaluation of dental caries was done using the Decayed, Missing and Filled Teeth index (DMFT) based on WHO criteria[22]. Periodontal status was measured by using the Community Periodontal Index (CPI)[23,24]. In measuring CPI, the mouth is divided into six sextants. Only the highest CPI score in index teeth in each sextant was assessed. Subjects who did not have teeth and subjects who did not have index teeth in all sextants were excluded from the CPI assessment. Fifty-three subjects underwent CPI assessment. Denture status was assessed only in subjects who had at least one missing tooth. Denture status was evaluated as worn, had denture(s) but did not wear, never had denture(s). Functional teeth were defined as natural teeth that could be used for biting and chewing. The judgment was based primarily on the clinical examiner with additional information from direct interview.

The protocol for the present study was approved by the Committee for Research Ethics in Public Health, the Graduate School, Chiang Mai University, Thailand.

Statistical analysis

Demographic data, functional ability and oral health status were analyzed with descriptive statistics and reported by mean, SD, and percentage. A Chi-square test and Fisher's exact test was performed to check the association of age, oral care performance, type, duration and severity level of dementia with dental caries experiences. A p-value of less than 0.05 was considered statistically significant.

Results

Sixty-nine subjects were recruited in this present study. Table 1 shows the distribution of the

Table 1. Demographic and dementia status of the 69 subjects

Characteristic	Number	%
Sex		
Male	26	37.7
Female	43	62.3
Age (years)		
60-69	15	21.7
70-79	31	45.0
80 and above	23	23.3
Mean age ± SD	75.5±7.0	
Range	61-89	
Type of dementia		
Alzheimer dementia (AD)	33	47.8
Vascular dementia (VaD)	28	40.6
Alcohol dementia	6	8.7
Others	2	2.9
Duration of dementia		
≤2 years	42	60.9
More than 2 years	27	39.1
Severity of dementia		
Mild (score 20 and above)	10	14.5
Moderate (score10-19)	39	56.5
Severe (score 0-9)	20	29.0

demographic characteristics of the subjects with dementia, including age, sex, dementia type, duration of dementia and its severity. The mean age of the subjects was 75.5±7.0 years. The ages ranged from 61 to 89 years. The majority (62.3%) were female. The group with the highest prevalence of dementia was 70 to 79 years old. When dementia was classified by type, Alzheimer dementia (AD) was the largest group, followed by vascular dementia (VaD), and alcohol dementia. More than half had dementia for less than two years. Most of the patients (56.5%) had moderately severe dementia.

The assessment of functional ability showed that more than half (66.7%) were independent with minimal assistance (Table 2). Almost half (49.3%) were able to perform oral care by themselves. A very high proportion (89.9%) had normal hand and arm function.

Table 3 presents dental caries, dentition status and edentulous status, the mean number of teeth, mean decayed, missing and filled teeth, and periodontal status. Most of the patients with dementia had at least some natural teeth. More than half (52.5%) had at least twenty functional teeth. Almost one half (49.2%) had at least one decayed tooth. Most of them (91.8%) experienced having lost at least one tooth.

The proportion of dementia patients who wore dentures was equal to those reported that they had never worn dentures (40.6%). Almost 20% reported that they had dentures but never wore them. Approximately one-third had calculus (34.0%). About one third (30.2%) had a pocket depth of 4 to 5 mm.

Table 2. Functional ability of subjects with dementia (n = 69)

Studied characteristics	n	%
Activities of daily living		
Completely independent	1	1.4
Independent with assistance	46	66.7
Independent with minimal assistance	19	27.5
Independent with moderate assistance	3	4.4
Dependent	0	0
Ability to perform oral care		
Completely independent	34	49.3
Independent with assistance	30	43.5
Dependent	5	7.2
Hand function		
Normal use of both hands and arms	62	89.9
Able to use only one hand and arm	7	10.1

Table 3. Prevalence of oral conditions of patients with dementia (n = 69)

Oral health condition	n	%
Dentition status		
Edentulous	8	11.6
At least 20 functional teeth	32	52.5
At least one decayed tooth	30	49.2
At least one missing tooth	56	91.8
Periodontal condition (highest CPI score) (n = 53)		
0 = normal	5	9.4
1 = bleeding	1	1.9
2 = calculus	18	34.0
3 = pocket depth 4-5 mm	16	30.2
4 = pocket depth ≥6 mm	13	24.5
Denture condition (n = 64) (in those with at least one missing tooth)		
Wore dentures	26	40.6
Had dentures but did not wear them	12	18.8
Never had dentures	26	40.6
Dental caries status		
Mean functional teeth ± SD	19.5±8.4	
Mean decayed teeth ± SD	1.5±2.3	
Mean missing teeth ± SD	12.6±8.4	
Mean filled teeth ± SD	0.8±1.9	
Mean DMFT ± SD	14.9±9.2	

Table 4. Characteristics of patients with dementia who experienced dental caries (n = 69)

	Dental caries (had at least one decayed tooth)				p-value*
	No		Yes		
	n	%	n	%	
Age group					
60-74	16	41.0	14	46.7	0.639
75+	23	59.0	16	53.3	
Type of dementia					
AD	20	51.3	13	43.3	0.512
Non AD	19	48.7	17	56.7	
Dementia severity					
Mild	5	12.8	5	16.7	0.009**
Moderate	17	43.6	22	73.3	
Severe	17	43.6	3	10.0	
Duration of dementia					
Less than 2 years	23	59.0	14	46.7	0.309
More than 2 years	16	41.0	16	53.3	

* Chi-square test
** Fisher's exact test

The proportion of patients with dementia who had dental caries experience with different characteristics is shown in Table 4. Dementia severity was the only characteristic which showed a significant difference in dental caries experience (p = 0.009).

Discussion

This is a first report on oral health status of dementia patients who attended the Memory Clinic in Thailand. This present study had the limitation of not being able to represent all dementia patients. However, it gives some interesting information on the oral health status of those who had good access to oral care. The age of dementia patients in the present study considered to be a 'young-old' group. The average age of patients with dementia in the present study was lower than in other studies in Western countries, which ranged from 76.1 to 84 years[14,16,18,25]. In a study by Wangthongkum et al in Chiang Mai, they reported a lower mean age of dementia patients (67.9±8.9 years) than the present study[10]. The younger age of these subjects could have a positive effect on their ability to be mobile to the memory clinic as well as to be able to perform several activities related to their daily living needs. The main type of dementia found in the present study was Alzheimer's, a finding similar to other studies[26-28].

The average number of functional teeth (19.5±8.4) was higher than the numbers reported from other countries, which ranged from 11 to 17 teeth per person[14,16,17]. Our dementia patients were younger and most of them had dementia for less than two years. As reported in Table 2, almost 90% had good hand and arm function and were able to perform oral hygiene by themselves. Therefore, this might be the reason why they could maintain a high number of natural teeth. In other studies where the mean age of the AD subjects were higher, they might experience middle stage AD. The impaired cognition could lead to an inability to perform oral hygiene[28]. Philip et al[29] found that dementia patients who needed assistance with oral hygiene care had poorer oral health. In their study, they found higher plaque scores and more amounts of gingival inflammation.

The comparison of the oral status in the present study with the data from the most recent national survey in 2007 showed that this group of patients had more functional teeth, less caries experience, and less periodontal disease[31]. More than half had at least twenty functional teeth, which exceeds the oral health goal proposed by the Ministry of Public Health[31,32]. Mean decayed, filled, and missing teeth (mean DMFT) of this study (14.9±9.2) were similar to the national data (15.85). However, the mean filled-teeth rate was double the data from the national survey (0.8±1.9 vs. 0.4). Filled teeth represent good access to care. The care provided by the memory clinic and the dental clinic had a positive effect on the oral health status of dementia patients. The policy of the public health hospital to integrate oral health care with the memory clinic is able to promote good oral health. The eligibility to receive oral care not only reflected good dental caries status but also had an effect on periodontal status. The authors found that the proportion of subjects who had periodontitis (pocket depth ≤4-5 mm) in the present study (54.7%) was much lower than the data from the national survey (84.2%). Therefore, the treatment from the dental clinic compliments the ability to clean their own mouth and has improved the periodontal condition of dementia patients.

The oral health status of the patients with dementia varied depending on the severity of the disease. Table 4 shows that patients with moderate dementia had the highest proportion of dental caries while those with severe dementia had the lowest proportion. In the study by Gordon and McLain, the moderate and severe dementia subjects had a higher proportion of dental caries compared with those who

had mild dementia[11]. In the present study, among those who had dental caries 73% had moderate dementia. However, in this present study, the severe dementia group had the lowest caries experiences. This finding is different from those of other studies[11-13]. Adam and Preston found that the more severe the dementia status, the higher the DMFT scores[14]. Ellefsen et al reported that caries prevalence was related to dementia type and severity[15]. The patients in the present study were those attending the memory clinic. Memory clinics based in Chiang Mai Neurological Hospitals are part of the public health service. The dental clinic at this hospital gave oral examinations and necessary dental treatment to all dementia patients at every hospital visit. Therefore, compared to general Thai elders, dementia patients have better access to oral care. The data from the national survey reported that only 32.3% of Thai elderly visited the dentist in the previous year[31]. The better oral health status of this group of patients with dementia reflected the good oral and health care provided by a neurological hospital. The finding that the patients with the most severe dementia had less dental caries experiences might be due to more care from the family or caregiver, which led to more visits to a memory clinic. This may have enabled patients to have better access to oral health care that resulted in an enhanced oral health status. The effect of the role of the caregivers on the oral health status of these patients needs further study.

Access to care is a very important factor for the elderly[32-34]. In the present study, access to oral care plays an important role in the oral health status of dementia patients. Furthermore, their abilities to perform oral care independently may play an important role in maintaining good oral status. The current situation of a higher proportion of ageing individuals in the population, the increased prevalence of dementia and the importance of oral health to general health and well-being has led to a greater need for oral health care in these patients. Increased access to oral care for dementia patients should be a dental public health priority. Oral health care should be provided to dementia patients at all levels of health care providers in order to achieve a good quality of life.

The results from the present study cannot represent the oral health status of patients with dementia in Thailand due to the small sample size and the single study site. Further study on a large scale of the oral health status of patients with dementia and the role of their caregivers on oral health status is needed. This information will be useful to develop a long-term oral care plan to maintain the quality of life in these patients.

Conclusion

Dementia patients who attended the memory clinic had considerably better oral status compared to the national data. Dementia severity was the only characteristic that showed a significant difference in dental caries experience.

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Potential conflicts of interest

None.

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สภาวะสุขภาพช่องปากของผู้ป่วยสมองเสื่อมในโรงพยาบาลประสาทเชียงใหม่

พัชราวรรณ ศรีศิลปนันทน์, ชนม์วรินทร์ ใจเอื้อ

วัตถุประสงค์: *เพื่อศึกษาสภาวะสุขภาพช่องปากผู้ป่วยสมองเสื่อมและศึกษาความสัมพันธ์ระหว่างชนิด และระดับความรุนแรงของภาวะสมองเสื่อมกับโรคฟันผุ*

วัสดุและวิธีการ: *เป็นการศึกษาแบบตัดขวางในผู้ป่วยนอกที่มารับการรักษาที่คลินิกความจำ การตรวจในช่องปากทางคลินิกใช้เกณฑ์ขององค์การอนามัยโลก ข้อมูลประชากรศาสตร์ ความสามารถในการเคลื่อนไหวระดับความรุนแรง ภาวะสมองเสื่อม ได้จากเวชระเบียนของโรงพยาบาล ภาวะสมองเสื่อมคัดกรองเบื้องต้น ด้วยแบบทดสอบสมรรถภาพสมองไทย (MMSE-Thai 2002) ประเมินความสามารถการใช้มือทำความสะอาดช่องปากโดยใช้แบบสอบสัมภาษณ์*

ผลการศึกษา: *ประชากรศึกษาทั้งหมด 69 ราย อายุเฉลี่ย 75.5±7.0 ปี ผู้ป่วยส่วนใหญ่อยู่ในกลุ่มสมองเสื่อมชนิดอัลไซเมอร์มากกว่าครึ่งหนึ่ง (60.9%) มีภาวะสมองเสื่อมน้อยกว่าสองปี และสามารถช่วยตัวเองได้ดี (66.7%). ผู้ป่วยส่วนใหญ่ (56.5%) มีความรุนแรงของภาวะสมองเสื่อมในระดับปานกลางมากกว่าครึ่งหนึ่ง (52.5%) มีฟันใช้งานได้อย่างน้อย 20 ซี่ จำนวนฟันในปากเฉลี่ย 19.5±8.4 ซี่ ค่าเฉลี่ยฟันผุ ถอน อุด 14.9±9.2 ซี่ต่อคน ระดับความรุนแรงภาวะสมองเสื่อมเป็นปัจจัยเดียวที่มีความสัมพันธ์กับการมีประสบการณ์การเกิดฟันผุอย่างมีนัยสำคัญทางสถิติ (p = 0.009)*

สรุป: *สภาวะสุขภาพช่องปากผู้ป่วยสมองเสื่อมในคลินิกความจำอยู่ในเกฑณ์ดีเมื่อเทียบกับข้อมูลระดับชาติ สภาวะระดับความรุนแรงภาวะสมองเสื่อมเป็นปัจจัยเดียวที่มีความสัมพันธ์กับการมีประสบการณ์การเกิดฟันผุอย่างมีนัยสำคัญทางสถิติ*