

Dental Prosthesis Status in Patients with Mild to Moderate Dementia in King Chulalongkorn Memorial Hospital: A Pilot Study

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Abstract

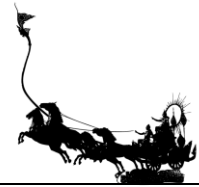
Thailand's ageing population raised concerns about cognitive impairment and oral health, particularly among patients with dementia. Despite research on oral health in dementia, studies specifically addressing denture-related issues were limited. This study investigated denture status and complications among patients with dementia at King Chulalongkorn Memorial Hospital. The study aims to assess the status of removable dental prostheses in patients diagnosed with mild and moderate dementia at King Chulalongkorn Memorial Hospital. A cross-sectional study was conducted from October 2023 to January 2024. Patients with a dementia diagnosis were assessed with the Functional Assessment Staging Test (FAST) for severity. Only FAST scores 4 and 5, mild and moderate dementia, were included in the study. Oral examinations, ADL assessments and denture status evaluations using the Oral Health Assessment Tool (OHAT) were performed. Out of 70 patients, 39 individuals were denture users. The utilization of dentures among participants in the study was lower compared to the population within the same age range, as indicated by national data. It was found that 84.6% of patients with dementia used dentures, but issues with denture cleanliness were observed in 33.3% of individuals. Addressing these issues could mitigate the risk of pneumonia, a leading cause of mortality in patients with dementia. An individual oral care plan provided by the healthcare center is suggested. Closer caregiver supervision and assistance in oral care routines can reduce the risk of aspiration pneumonia. Future research should explore factors influencing dental care utilization among patients with dementia.

Keywords: Caregiver, Denture, Dementia, Neurodegenerative Disease, Oral Health

1. Introduction

Thailand is currently experiencing a demographic shift towards an ageing society, with approximately 12 million individuals aged 60 years or older as of 2022, constituting 18.3% of the population. Projections indicate that Thailand is on track to transition into a super-aged society by 2031 (Prasartkul et al., 2023). As life expectancy continues to rise, cognitive impairment emerges as a prominent concern among the older people population, heightening the risk of dementia development (Niccoli & Partridge, 2012). Individuals with dementia are particularly susceptible to oral health issues, with studies (Aarabi et al., 2019; Chen et al., 2015; Fang et al., 2018). Delwel et al., (2017) revealed a prevalence of gum diseases and infections attributed to diminished salivary rates in patients with dementia.

Older individuals commonly experience tooth loss, necessitating the use of dental prostheses to restore chewing function. While dentures offer a solution to occlusal restoration, improper fitting or worn-out dentures can exacerbate health problems (Cerutti-Kopplin et al., 2015). Suboptimal denture condition may lead to bone resorption or flabby ridge formation in the maxillary arch, culminating in complications like combination syndrome (Tolstunov, 2007). Additionally, ill-fitting or unclean dentures serve as a breeding site for bacteria and fungi, increasing the risk of conditions such as denture stomatitis and oral candidiasis



(Akpan & Morgan, 2002; Gendreau & Loewy, 2011). Moreover, advanced symptoms, such as dysphagia or aspiration during meals, pose a significant risk of pneumonia, a leading cause of mortality in patients with dementia (Bosch et al., 2012; Brunnstrom, & Englund, 2009; Sumi, Miura, Michiwaki, Nagaosa, & Nagaya, 2007).

Much research examined oral health in patients with dementia and investigated denture-related issues among this demographic remains scarce. Srisilapanan and Jai-Ua (2013) discovered that over 50% of patients with dementia in Chiang Mai had 20 functional teeth, while 54.7% of them experienced periodontal concerns. Nevertheless, in comparison with Thai national data, it was observed that patients with dementia had superior oral health outcomes. Notably, while Srisilapanan and Jai-Ua (2013) studied in Chiang Mai explored oral health status in patients with dementia, no studies specifically addressing denture status or associated problems have been conducted. Therefore, this study endeavored to fill this gap by investigating denture status and associated complications among patients with dementia at King Chulalongkorn Memorial Hospital.

2. Objectives

To assess the status of removable dental prostheses in patients with mild to moderate dementia at the Department of Psychiatry, King Chulalongkorn Memorial Hospital.

3. Materials and Methods

The cross-sectional study was conducted at the Department of Psychiatry, King Chulalongkorn Memorial Hospital from October 2023 to January 2024. Patients diagnosed with dementia were approached for potential participation in the study. Detailed information regarding the research was provided upon expressing interest, and informed consent was obtained from a legitimate representative prior to data collection. The cognitive severity of patients was assessed using the Functional Assessment Staging Test (FAST) score, determined through interviews assessing the patient's functional abilities (Reisberg, 1988). Patients with FAST scores of 4 and 5, indicative of mild to moderate dementia, were included in the study, while those with scores of 6 or above were excluded. Scored 4 in FAST, mild dementia, patients in this stage had difficulties in carrying out complex tasks in daily life such as paying bills, planning, and cooking. Challenges in selecting suitable clothing and relying on the assistance of the caregiver to assist in choosing appropriate attire were common in participants who scored 5 in FAST, indicating moderate dementia (Sclan & Reisberg, 1992). Every patient diagnosed with dementia, with consent from their legitimate caregiver, scoring 4 or 5 on the FAST score, would be included in this study regardless of any other medical issues. Caregivers providing information about the patients were required to have been actively caring for the patient for a minimum of 6 months, providing care for at least 8 hours per day, and spanning at least 3 days per week (Hughes, 2008). Caregivers who were not literate in Thai were excluded from participation.

Demographic data collection and oral examinations were subsequently conducted. The patient's activities of daily living (ADL) were assessed using the ADL score, with patients scoring less than 5, total dependence patients, being excluded from the research (Edemekong et al., 2024). Oral health and denture assessments were performed using a variety of tools including a mouth mirror, explorer, forceps, gauze, and headlight. The Oral Health Assessment Tool (OHAT) was utilized to gather comprehensive information regarding the patient's oral health status (Chalmers et al., 2005). The use of the Thai version of OHAT was authorized by the graduate school of Naresuan University, the licensee of OHAT-Thai.

The aggregation of information regarding denture age was hindered by an inability to obtain data from all participants or their caregivers. This challenge was primarily attributed to the cognitive decline experienced by patients with dementia, leading to difficulties in recalling details, including denture age.



Moreover, many caregivers expressed uncertainty regarding the denture age, further complicating the specific data aggregation process.

Furthermore, information regarding the type of dementia and date of diagnosis was extracted from hospital medical records. All patient information remains confidential and is expressed in coded form only. Patient names are securely stored on a computer and protected by a passcode. This study received ethical approval from Ethics Committees, the Faculty of Medicine, Chulalongkorn University, Thailand with IRB No. 0810/65. Descriptive statistics will be used to present the collected data, including means, standard deviations, and percentages.

4. Results and Discussion

From October 2023 to January 2024, there were 39 out of 70 patients who had had a denture before. In the study group, 69.2% of the participants were female. The mean age was 78.4 ± 8.1 , with the majority of participants aged more than 80 years old, 43.6%. In the group of people using dentures, the same number of patients, 17 people, were diagnosed with vascular dementia and Alzheimer's disease. Most from the study group scored 4 in FAST, mild in severity, and 16 people in moderate severity. Population characteristics are shown in Table 1.

Table 1 Population characteristics

Variables	N	%
Sex		
Male	12	30.8%
Female	27	69.2%
Age		
60-69	6	15.4%
70-79	16	41%
80 and above	17	43.6%
Mean \pm SD	78.4 ± 8.1	
Min-Max	62 - 95	
ADL (Mean\pmSD)	16.4 ± 3.9	
Severity		
Mild (FAST = 4)	23	59%
Moderate (FAST =5)	16	41%
Type of dementia		
Alzheimer's disease	17	43.6%
Vascular dementia	17	43.6%
Unspecified dementia	5	12.8%
Level of education		
No formal education	2	5.1%
Primary school	15	38.5%
Secondary school	5	12.8%
High school or diploma	6	15.4%
Post-secondary education	8	20.5%
Not applicable	3	7.7%
Caregiver-to-patient ratio		
.1	25	64.1%
.2	8	20.5%
.3	6	15.4%
Relationship with caregivers		
.Family members/Relatives	27	69.2%
.Paid caregiver	11	28.2%

[112]



Family member and Paid caregiver

1

2.6%

Table 2 Overview of Denture Use, Denture Maintenance and Dental Visits

	Total (N=39)	Mild (N=24)	Moderate (N=15)
Denture Use			
.Active Denture wearer	33	21	12
.Non-compliance	5	2	3
.Non-compliance with new denture	1	1	0
Last Dental visit			
≤ 6 month	14	9	5
.6 - 12 month	1	1	0
.1 - 3 year	5	3	2
> 3 years	0	0	0
Not applicable	19	10	9
Denture care frequency per day			
.None	2	1	1
.Once	7	5	2
.Twice	19	10	9
.≥ 3 times	6	4	2
Oral care provider			
.Self	26	18	8
.Self + Caregiver's help	7	3	4
.Caregiver	2	0	2
.No oral hygiene practice	4	2	2
Denture hygiene only, no intra-oral cleaning	3	1	2
Sleep with dentures worn	7	4	3
Denture issues			
.Cleanliness	8	3	5
.Ill-fitting	3	2	1
.Discomfort	6	3	3
.Lost denture	4	2	2
.Flabby ridge	3	0	3
OHAT (Mean±SD)	6.0±2.5	5.8±2.6	6.2±2.5
ADL (Mean±SD)	16.4±3.9	18.1±1.5	13.9±4.9

The majority of patients did oral care all by themselves. Seven people did oral care by themselves but got help from CG, such as reminding or redoing the cleaning again after self-cleaning. There were only 2 people who had their CG fully help with oral care. Three patients didn't do oral care anymore and the other 3 people only cleaned their dentures but abandoned their actual oral cavity care (Table 2).

There were five people in this group who no longer used their dentures. Three patients lost their dentures and did not want to fabricate a new pair of prostheses. A patient was undergoing treatment for tongue cancer and had a low saliva flowing rate, causing pain upon denture wearing. Another patient's denture was an anterior teeth denture. The patient had no problem chewing, which prompted the carer to abandon the denture. The other person only used the lower metal removable denture that had been used for more than ten



years. The patient denied using the upper denture which was fabricated a month before the examination with a complaint of discomfort and mood swings adapting to the new denture. With 33 people actively using their dentures, most of them have been using the same set of prostheses for more than five years (13 people) while nine caregivers didn't know when their patients' dentures were fabricated.

Among 33 active wearers, one person only wore the denture before eating due to pain upon wearing. Since the patient only ate at home, the denture was not brought on the day of data collection. The other two people forgot their dentures at home. These people's dental prostheses could not be assessed. One person only wore complete dentures when going out for sociability and confidence.

Most of dental prostheses used were acrylic removable partial dentures (RPD) (15/33). Seven people used metal RPD, while the other seven people wore acrylic on one arch and metal RPD on another arch. Only one person used a Valplast removable denture.

The biggest problem found in denture wearers was cleanliness. Eight people wore unclean dentures with heavy plaque deposition. Six people encountered discomfort with denture use. The other three patients complained about denture looseness and needed adhesives for their dentures to stay in place.

Flabby ridge, characterized by the atrophic resorption of the alveolar bone at the anterior surface of the maxillary arch, was observed in three patients. Prolonged denture usage was associated with alterations in occlusion owing to the wear of artificial teeth and resorption of the alveolar ridge (Utz, 1997). Inadequate maintenance practices may further exacerbate these changes in occlusion and precipitate undesirable resorption of the alveolar ridge. Consequently, these alterations may manifest as loose dentures and discomfort (Lynch & Allen, 2006). The finding highlighted the importance of regular professional evaluation to avoid such sequelae.

Patients utilizing removable partial dentures (RPDs) fabricated from metal and Valplast materials exhibited distinct characteristics regarding denture comfort and maintenance habits. Valplast RPD and removable bridge, known for their slim profile compared to traditional acrylic dentures, were often perceived as more comfortable, leading wearers to keep them in place for extended periods without removal for cleaning. Two individuals with Valplast dentures and removable bridges brushed them while inside the mouth, foregoing the customary removal for cleaning. Similarly, cases were reported where patients wearing metal RPDs unintentionally neglected routine removal and cleaning, resulting in adverse outcomes such as plaque accumulation beneath the denture and the development of dental caries at abutment teeth due to compromised oral hygiene. White plaques, removable by gentle rubbing and accompanied by underlying redness, suggestive of oral candidiasis, were identified in one case. (The patient was advised to adhere to regular denture removal practices and referred to a dental clinic for further diagnostic evaluation and appropriate treatment.)

Another patient, diagnosed with mild dementia and utilizing a metal removable partial denture, refused to engage in denture-cleaning activities (Figure 2). The individual expressed a strong dissatisfaction upon being reminded to do so. The patient habitually slept with the denture in place. Despite the absence of overt oral health issues, the patient's ability to chew effectively was compromised, necessitating reliance on a soft diet such as milk and banana bread. Observable physical manifestations included redness, swelling, and asymmetry of the upper lip, along with a shallow vestibule and redness localized to the area surrounding the maxillary right canine, accompanied by pain upon palpation (Figure 1). The image depicted in Figure 1 was obtained with the patient's consent. These clinical findings underscored the importance of regular dental assessments for patients with dementia.



Figure 1 Observational findings: extra- and intra-oral asymmetry, redness, and swelling



Figure 2 Patient's denture: despite the refusal to remove, the denture is worn during sleep

These observations highlighted the need for more comprehensive education and proactive dental care strategies for caretakers to address potential complications associated with inadequate denture hygiene practices.

Patients diagnosed with dementia might experience challenges in maintaining personal hygiene compared to when they were in good health (Lauritano et al., 2019; Lopez-Jornet et al., 2021). Caregivers played a crucial role in ensuring the overall well-being of these patients, including attending to their daily living activities and hygiene needs. In some cases, caregivers might need to supervise the patients' self-care routines and intervene if necessary (Lewis et al., 2015). From this study, a majority of caregivers allowed patients to attend to their oral hygiene, with only nine caregivers providing assistance and supervision in this regard. Given that patients with dementia are at a heightened risk of aspiration pneumonia, which is a leading cause of mortality in this population (Bosch et al., 2012), diligent oral care practices are paramount for mitigating such risks. Encouraging regular oral care routines and dental visits for patients with dementia is imperative. Additionally, raising awareness about the importance of oral hygiene among caregivers is recommended for enhancing overall patient care and well-being.

Among patients with mild to moderate dementia who possessed a denture, 38.5% reported having had a dental visit within the past year, a proportion comparable to the national average of 38.6%. However, the percentage of entirely edentulous individuals within the 80-85 age group, constituting 22.2% of the sample, was found to be lower than the national figure of 31%.

The majority of participants, constituting 84.6%, persisted in utilizing their dentures. In contrast, a study by Srisilapanan and Jai-Ua (2013) reported that only 40.6% of patients with dementia continued to use their dentures. Notably, the aforementioned study included cases of severe dementia, a demographic excluded from the present investigation. This discrepancy suggested a potential trend wherein, as the disease advances, patients might discontinue the use of their prostheses, or it could signify regional variances warranting further investigation.



When examining the data from the study group in comparison to national statistics, it was noted that the percentage of patients with dementia at the Department of Psychiatry, King Chulalongkorn Memorial Hospital, utilizing various types of dentures was lower than the national average obtained from the oral health survey, as depicted in Table 3. Furthermore, a significant portion of participants demonstrated effective chewing ability without reliance on their dentures. This finding aligns with the conclusions drawn by Srisilapanan and Jai-Ua (2013), who similarly reported that patients with dementia within the study exhibited superior oral health outcomes compared to national averages.

Table 3 Comparison of type of dental prosthesis between study group and national data in percentage

Age		Partial denture (PD)			Complete denture (CD)			U-PD L-CD	U-CD L-PD
		U arch only	L arch only	U/L arch	U arch only	L arch only	U/L arch		
60-74	Study data	0	4.3	1.4	1.4	0	2.9	0	1.4
	National data	10.9	5.1	12	3.4	2.5	6.9	2.3	2.3
80-85	Study data	1.4	0	1.4	0	0	2.9	2.9	0
	National data	6.7	8.2	15.8	10.6	2.9	15.4	2.9	4.3

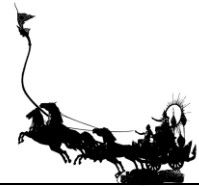
Considering the typical strain and distress endured by caregivers of patients with dementia, it is crucial for hospitals and healthcare centres to establish effective oral care plans specifically designed for caregivers (Sorensen & Conwell, 2011). These measures aim to facilitate caregiving responsibilities, ultimately alleviating the burdens faced by caregivers. It is important to note that this study represents a preliminary investigation conducted solely within the confines of King Chulalongkorn Memorial Hospital. Future research endeavors should aim to gather additional data, including insights into caregivers' attitudes and the accessibility of dental treatment, to provide a more comprehensive evaluation of the factors influencing dental care utilization among patients with dementia.

5. Conclusion

The majority of patients with mild to moderate dementia at the Department of Psychiatry, King Chulalongkorn Memorial Hospital, continued to use their removable dentures. A major problem identified in this cross-sectional study of denture status was denture cleanliness, followed by denture discomfort as the second major concern.

6. Acknowledgements

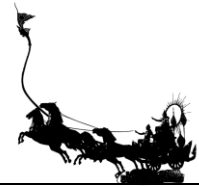
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