JGG 2019;67:109-113

ORIGINAL INVESTIGATION

Prevalence of oral health problems and dental hygiene practices in older medical patients in RIPAS Hospital, Brunei

C.S.Tan[1], S.P. Teo[2], M. Kula[2], N. Halim[2], H.A. Rahman[1], J.S. Dhaliwal[1]

[1] PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, [2] RIPAS Hospital, Brunei Darussalam

Background. Oral hygiene is a critical part of an individual's health. Older individuals are more prone to oral pathology, particularly females. This study assessed the prevalence of oral health problems of older people admitted to hospital and their dental hygiene practices.
Methods. The study was done on patients aged 65 years or older admitted to medical wards in a tertiary hospital. A questionnaire regarding dental hygiene habits as well as the Oral Health Assessment Tool (OHAT) were administered.
Results. For the 100 patients interviewed and assessed, most participants brushed their teeth at least once daily with toothpaste. Almost three quarters did not visit a dentist regularly, while 43% were not aware of the importance of visiting a dentist routinely. The main problems identified in the oral cavity were tongue and natural teeth.
Conclusions. The prevalence of oral health problems in older medical inpatients was low. However, the dental hygiene habits and perceptions of importance of dental hygiene should be improved to maintain the low prevalence of dental problems in older people.

Key words: Oral hygiene, Dental health, Older people

INTRODUCTION

Oral health is "a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal disease, tooth decay, tooth loss and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial well-being" [1]. Poor oral hygiene may lead to chronic gingivitis and eventually chronic periodontitis, which is associated with systemic diseases including cardiovascular disease and periodontitis-associated pneumonia [2]. Maintenance of oral health in older people is challenging due to changes in dental tissues [3]. Older people have increased rates of oral pathology such as dental caries and periodontal disease [4], which may affect their quality of life [5].

Older people who only understood basics of oral hygiene but not oral pathology such as periodontitis were found to have poor oral hygiene [6 7]. Educational interventions which provided an understanding of how oral health affects quality of life appeared effective in improving oral health [8]. A study of older people which identified a high prevalence of dental caries and missing teeth in older people suggested lack of dental insurance may be contributory [9]. Both awareness and access to services should be aligned to ensure good oral health.
The distribution of oral disease may be affected by gender. Although females take better care of their oral health through more frequent dental visits and attention to daily tooth-brushing [10 11], females have a higher caries rate and loss of teeth [12], which may be oestrogen related [13].
Older people are under-represented in surveys of oral

Received: May 21, 2018 - Accepted: February 26, 2019
Corrispondence: Shyh Poh Teo, RIPAS Hospital, Jalan Putera Al-Muhtadee Billah, Bandar Seri Begawan BA1712, Brunei Darussalam. E-mail: shyhpoh.teo@moh.gov.bn

health. A local survey on oral health subgrouped all older people in the category over 55 years old [14]. In Brunei, there were approximately 22.600 people aged 65 years and over in 2017, making up 5.4% of the population. The local population life expectancy in 2017 was 77.3 years (76.3 years and 78.3 years for males and females respectively) [15]. Data specific to older people is required to identify the extent of this problem to facilitate service planning and proactively treat dental issues in this population.

METHODS

100 consecutive patients age 65 years and older admitted to the medical wards in a tertiary hospital were interviewed and assessed. If patients were unable to communicate and provide informed consent, a family member who has knowledge of the dental habits of the patient may consent on their behalf and was interviewed. Patients with infectious diseases, in isolation or for palliation were excluded from the study.

The study used two instruments: firstly, a questionnaire was used to enquire about dental hygiene habits, such as duration and techniques of brushing teeth. For edentulous patients, the questions were amended to cleaning other oral structures. The second instrument was the Oral Health Assessment Tool (OHAT). Eight categories of oral health were assessed: lips, tongue, gums and tissues, saliva, natural teeth, dentures, oral cleanliness and dental pain. Each category was scored between 0 to 2 (where a score of 0 represents a healthy oral condition, a score of 1 representing any changes seen from the normal state of oral health, and a score of 2 representing an unhealthy state of oral health).

Consent forms, participation information sheet and questionnaires were administered in Malay, English or Chinese depending on the participant's language of preference. Both instruments were administered separately so that data collection does not fatigue patients or interrupt clinical management of patients, such as ward rounds, investigations or therapy.

Training on the use of OHAT was provided by one of the authors (JSD), who is a specialist Periodontist. Oral health assessments were performed by two geriatrics nurses (MK and NH). This was piloted on 10 older inpatients with supervision to ensure consistency and accuracy in scoring of the OHAT.

Statistical analyses were performed using IBM SPSS Statistics Version 22. In addition to descriptive statistics, chi-square test of independence was performed to determine if there was an association between gender and the prevalence of oral health problems.

Ethical approval was obtained from the medical health research and ethics committee (MHREC) of the hospital and local university.

RESULTS

150 patients initially consented to participate in the study before achieving 100 participants with fully completed instruments. Of the 50 patients omitted from the study, 14 declined to participate in either the questionnaire or OHAT assessment, while 36 patients were discharged before the completion of OHAT.

Table I summarises patient demographics and dental care characteristics. Mean age was 75.7 ± 6.76 years, ranging from 65 to 94 years old. 52% had natural teeth. 39% of the edentulous participants had dentures, while 9% of the participants did not have natural teeth use dentures. When participants were asked about items used for basic oral hygiene, most participants used a toothbrush (93%) and toothpaste (79.0%).

In terms of dental visits, 72% of the participants had not visited the dentist or forgotten when their last visit was. The most common self-perceived oral problem

Table I. Description of brief participant demography, methods and frequency of teeth cleaning.

N = 100	N	(%)
Gender		
Male	51	(51.0)
Female	49	(49.0)
Having teeth/no teeth/dentures		
Teeth	52	(52.0)
Dentures	39	(39.0)
No teeth	9	(9.0)
Objects used to clean teeth		
Toothbrush	93	(93.0)
Toothpaste	79	(79.0)
Dental floss	8	(8.0)
Inter-dental toothbrush	0	(0.0)
Last visit to a dentist? (years)		
1 or 2 years ago	22	(22.0)
3 or 4 years ago	2	(2.0)
5 years or more	4	(4.0)
Does not visit dentist/Don't remember	72	(72.0)
Self-perceived oral problems		
No problem	5	(5.0)
Dry mouth	29	(29.0)
Tooth pain	86	(86.0)
Bad breath	26	(26.0)
Bleeding gums	30	(30.0)
Dental plaque	37	(37.0)

Table II. Description of brushing frequency and techniques.

N = 100	N	(%)
Frequency of brushing teeth (includes brushing oral structures if edentulous)		
0 times per day	7	(7.0)
1 time per day	8	(8.0)
2 times per day	48	(48.0)
3 times per day	36	(36.0)
4 times per day	1	(1.0)
Frequency of flossing		
Does not floss	92	(92.0)
1 time per day	7	(7.0)
2 times per day	1	(1.0)
Does not brush at all	6	(5.0)
Duration of brushing teeth (n = 52)		
About 30 seconds	1	(1.9)
About 1 minute	10	(19.2)
About 2 minutes	32	(61.5)
Don't know	9	(17.3)
Brushing techniques to clean teeth (n = 52)		
Brush horizontally	45	(86.5)
Brush vertically	6	(11.5)
Not aware of brushing technique used	1	(1.9)
Cleaning other structures and areas of the mouth (n = 48)		
Brushing behind gums (alveolar ridges)	28	(58.3)
Brushing roof of mouth (hard palate)	27	(56.3)
Brush cheeks of mouth	25	(52.1)
Does not clean at all	17	(35.4)
Tongue brushing after cleaning teeth		
Yes	81	(81.0)
No	18	(18.0)
Don't know	1	(1.0)
Mouthwash use after cleaning teeth		
Yes	10	(10.0)
No	90	(90.0)
If mouthwash is used, is it used daily?		
Yes	5	(50.0)
No	5	(50.0)
If not daily, frequency of using mouthwash?		
Once a week	3	(75.0)
Twice a week	2	(25.0)

experienced was tooth pain (40.4%) followed by dental plaque (17.4%) and bleeding gums (14.1%).

Table II shows the dental care techniques used by participants. For those with natural teeth, 48% brushed their teeth twice daily, while 36% brush thrice daily. Only 61.5% took at least 2 minutes to brush their teeth. Majority (86.5%) cleaned the front surface of their teeth with horizontal brushing. The tongue was brushed by 81.0% of the participants. The most brushed structure among edentulous patients (regardless of wearing dentures or not) after the tongue, were alveolar ridges (58.3%) followed by the hard palate (56.3%) and cheeks (52.1%). 17 (35.4%) of the edentulous patients reported they did not brush any of the structures in the oral cavity (35.4%).

Most (87%) were aware that dietary habits can cause adverse effects to teeth and gums. More than half (55%) thought visiting the dentist for regular checkups was important, while 43% did not. In terms of frequency of dentist visits, 89% did not visit the dentist routinely unless there were oral-related problems. Almost all participants (90%) did not use mouthwash. For those who did, only half used mouthwash daily.

Table III represents data from the OHAT assessment. The two categories which had a high prevalence of oral pathology were the tongue and natural teeth category. For the tongue category, 47.0% of the participants scored 1 (change from normal health), while for the natural teeth category, 46.2% of the patients scored 1 and 42.3% of the patients scored 2 (unhealthy). Most of the remaining assessed categories were scored 0 (healthy). When gender was compared with categories of oral health in OHAT, the only significant association was health of saliva ($p = 0.008$), where more male participants were deemed unhealthy (25.5%) compared to females (6.1%). There were no other significant associations between gender and other OHAT categories.

DISCUSSION

The results from the OHAT showed that the prevalence of oral health problems is notable only for tongue and natural teeth categories. Most patients maintained good basic oral hygiene by brushing twice or thrice daily for two minutes. A review stated that careful tooth brushing at least once daily reduces risk of caries and periodontal diseases [16]. However, dentists still recommend brushing twice daily at home for better plaque control, as infrequent brushing is associated with severe forms of periodontal disease [17]. In addition, brushing the teeth for two minutes is shown to maintain oral health and helps clearing out dental plaque [18].

Although most participants practiced basic oral care at home, a large proportion of participants thought regular dental visits were of little importance. Only a few participants used dental floss or mouthwash. The highest self-perceived oral problem by the participants was toothache, followed by tartar and gingival bleeding. This may be due to the incomplete oral maintenance prevalent among participants. Other than adequate brushing, factors such as dental visits and use of oral

Table III. Oral health assessment for long-term care.

N = 100	N	(%)
Lips		
Healthy (score = 0)	63	(63.0)
Dry, chapped or red at corners (score = 1)	37	(37.0)
Tongue		
Healthy (score = 0)	53	(53.0)
Patchy, fissured, red, coated (score = 1)	47	(47.0)
Gums and tissues		
Healthy (score = 0)	94	(94.0)
Dry, shiny, rough, red, swollen 1-6 teeth, one ulcer or sore spot under denture (score = 1)	6	(6.0)
Saliva		
Healthy (score = 0)	84	(84.0)
Dry, sticky tissues, little saliva present, resident thinks they have dry mouth (score = 1)	16	(16.0)
Natural teeth (n = 52)		
Healthy (score = 0)	6	(11.5)
1 to 3 decayed or broken teeth/roots (score =1)	24	(46.2)
4 or more decayed or broken teeth/roots, or very worn down teeth, or less than 4 teeth with no denture (score = 2)	22	(42.3)
Dentures (n = 39)		
Healthy (score = 0)	36	(92.3)
1 broken area/tooth, or dentures only worn 1 to 2 hours daily, or no name on denture(s) (score = 1)	2	(5.1)
More than 1 broken area/tooth, denture missing or not worn due to poor fit, or worn only with denture adhesive (score = 2)	1	(2.6)
Oral cleanliness		
Healthy (score = 0)	83	(83.0)
Food particles/ tartar/ debris in 1 or 2 areas of the mouth or on small area of dentures; occasionally bad breath (score = 1)	16	(16.0)
Food particles, tartar, debris in most areas of the moth or on most areas of denture(s), or severe halitosis (bad breath) (score = 2)	1	(1.0)
Dental pain		
Healthy (score = 0)	97	(97.0)
Verbal and/or behavioural signs of pain such as pulling of face, chewing lips, not eating, aggression (score = 1)	3	(3.0)

hygiene adjuncts such as dental floss and mouthwash are paramount to oral health maintenance [19 20].

Statistical comparison between gender and OHAT categories only showed significant results for the OHAT category of saliva, which contradicts other studies [10 13]. In addition, a multi-country study in India, Nepal, Bangladesh and Sri Lanka showed adult females had a higher rate of dental cares compared to males [21].

In this study, health of saliva was poorer in males. This was initially thought to be likely due to medications. However, studies looking at the association between medications and dry mouth in older people found this more prevalent in females [22]. Unfortunately, this study did not collect medication data on the patients, so this could not be explored further.

The main limitation of this study was the small sample size, resulting in a limited ability to compare age of participants and oral health. This is important as there are physiological changes to the oral mucosa with age. Changes include reduced turnover rate of epithelial cells that provides a natural cleansing mechanism, thinning of oral mucous membranes and gingival tissues, reduced salivary production due to atrophy of acinar tissues in the salivary glands and increased susceptibility of oral pathologies [23]. The main oral problems of dry mouth and caries are associated with reduced salivary flow among older people [23]. Future studies would involve recruitment a larger sample to correlate age and oral health, allowing more effective planning of oral health promotion and resourcing locally.

CONCLUSIONS

The prevalence of oral health problems in older medical inpatients was low. However, the dental hygiene habits and perceptions of importance of dental hygiene should be improved to maintain the low prevalence

of dental problems in older people. Future initiatives should include improving knowledge of oral health to ensure people perform oral hygiene correctly [24 25] and have a good attitude in preserving their oral health [26].

Funding

No external funds were obtained for this study

Conflict of interest

The Authors have no conflict of interest.

References

1 World Health Organization. *Oral health* (http://www.who.int/oral_health/publications/factsheet/en/).

2 Arigbede A, Babatope B, Bamidele M. *Periodontitis and systemic diseases: a literature review*. J Indian Soc Periodontol 2012;16:487.

3 Razak PA, Richard KM, Thankachan RP, et al. *Geriatric oral health: a review article*. J Int Oral Health 2014;6:110-6.

4 Gil-Montoya JA, de Mello AL, Barrios R, et al. *Oral health in the elderly patient and its impact on general well-being: a nonsystematic review.* Clin Interv Aging 2015;10:461-7.

5 Gluzman R, Meeker H, Agarwal P, et al. *Oral health status and needs of homebound elderly in an urban home-based primary care service.* Spec Care Dent 2013;33:218-26.

6 Skorupka W, Zurek K, Kokot T, et al. *Assessment of oral hygiene in adults.* Cent Eur J Public Health 2012;20:233-6.

7 McQuistan MR, Qasim A, Shao C, et al. *Oral health knowledge among elderly patients*. J Am Dent Assoc 2015;146:17-26.

8 McGrath C, Bedi R. *The importance of oral health to older people's quality of life*. Gerodontology 1999;59-63.

9 Liu L, Zhang Y, Wu W, et al. *Prevalence and correlates of dental caries in an elderly population in Northeast China.* PLoS One 2013;8:e78723.

10 Azodo CC, Unamatokpa B. *Gender difference in oral health perception and practices among Medical House Officers.* Rus OMJ 2012;1:0208.

11 Fukai K, Takaesu Y, Maki Y. *Gender differences in oral health behavior and general health habits in an adult population.* Bull Tokyo Dent Coll 1999;40:187-93.

12 Gleissner C. *Welchen Einfluss hat das Geschlecht auf die Mundgesundheit? How does gender influence oral health?* In: Seidel S, Ed. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz*. 2014;1099-106.

13 Branch-Elliman D. *A gender-based approach to oral health changes across the lifespan. University of Pennsylvania.* 2012 (https://repository.upenn.edu/anthro_seniortheses/131).

14 Ministry of Health. *Oral Health Information Booklet 2013*. Research and Development Division, Department of Dental Services, Brunei Darussalam, p. 68.

15 Ministry of Health Brunei Darussalam. *Health Information Booklet 2017*. Department of Policy and Planning, Ministry of Health, Brunei Darussalam, p. 74.

16 Attin T, Hornecker E. *Tooth brushing and oral health: how frequently and when should tooth brushing be performed?* Oral Health Prev Dent 2005;3:135-40.

17 Zimmermann H, Zimmermann N, Hagenfeld D, et al. *Is frequency of tooth brushing a risk factor for periodontitis? A systematic review and meta-analysis*. Community Dent Oral Epidemiol 2015;43:116-27.

18 Creeth JE, Gallagher A, Sowinski J, et al. *The effect of brushing time and dentifrice on dental plaque removal in vivo*. J Dent Hyg 2009;83:111-6.

19 Bashiru BO, Anthony IN. *Oral self-care practices among university students in Port Harcourt, Rivers State.* Niger Med J 2014;55:486-9.

20 Madan C, Arora K, Chadha VS, et al. *A knowledge, attitude, and practices study regarding dental floss among dentists in India.* J Indian Soc Periodontol 2014;18:361-8.

21 Lukacs JR. *Gender differences in oral health in South Asia: Metadata imply multifactorial biological and cultural causes*. Am J Hum Biol 2011;23:398-411.

22 Thomson WM, Chalmers JM, Spencer AJ, et al. *Medication and dry mouth: findings from a cohort study of older people.* J Public Health Dent 2000,60:12-20.

23 Razak PA, Jose KM, Thankachan PR, et al. *Geriatric oral health: a review article*. J Int Oral Health 2014;6:110-6.

24 Al-Darwish M. *Oral health knowledge, behaviour and practices among school children in Qatar.* Dent Res J 2016;13:342.

25 Bhoopathi PH, Reddy PRP, Kotha A, et al. *Oral health related knowledge, attitude and practices among the primary health care workers of a district in India*. J Int Soc Prev Community Dent 2014;4(Suppl 1):S11-7.

26 Levin L, Shenkman A. *The relationship between dental caries status and oral health attitudes and behavior in young Israeli adults.* J Dent Educ 2004;68:1185-91.

How to cite this article: Tan CS, Teo SP, Kula M, et al. *Prevalence of oral health problems and dental hygiene practices in older medical patients in RIPAS Hospital, Brunei*. Journal of Gerontology and Geriatrics 2019;67:109-13.