

Original Article

Prevalence and Associated Factors of Edentulism among Elderly Muslims in Kota Bharu, Kelantan, Malaysia

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Abstract

Objective: To determine the prevalence of edentulism and its associated factors among elderly Muslims in Kota Bharu, Kelantan, Malaysia.

Study design: A cross-sectional study was conducted with 506 randomly selected community-dwelling elderly patients aged 60 years and older in the district of Badang, Kota Bharu, Kelantan. The participants who consented were interviewed for sociodemographic information and followed by an oral examination to record edentulism.

Results: The prevalence of edentulism was 55.9% (95% CI=51.67, 60.50). Multiple logistic regression analyses showed that older age groups of the elderly, 70-79 years and 80 years and older, were more likely to be edentulous, with an odds ratio (OR) of 1.9 (95% confidence interval [CI] =1.2, 3.1) and OR=4.0 (95% CI=2.0, 8.1) respectively, compared to the younger elderly 60-69 years old. Women are more likely to be edentulous (OR=2.0, 95% CI=1.3, 3.1).

Conclusion: Older women are more likely to be edentulous. More efforts are required to promote retention of teeth among younger women so that this cohort will not be edentulous when its members reach old age.

Keywords: Edentulism, geriatric, Malaysia.

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Introduction

Edentulism, or complete tooth loss, is prevalent worldwide among older people.¹ Earlier studies have shown that edentulism affects the health and the overall quality of life of the elderly.² Complete and partial tooth loss is associated with reduction in physical, psychological and social function, and the ability to chew. It also increases disability.³ The edentulous elderly tend to consume fewer than two-thirds of the recommended nutri-

ents compared to the dentate elderly.⁴ Edentulism is an independent risk factor for significant weight loss⁵ and is associated with systemic and chronic diseases among the elderly, becoming an important public health issue as a large proportion of elderly people are edentulous.²

Tooth loss is mainly attributed to dental caries and gum disease. However, factors that lead to tooth extraction are not always dental in origin. The complex interaction between dental diseases, the tendency to use dental care, dental attitude, and affordability of nonextraction treatment have been related to the incidence of tooth loss.⁷ Sociodemographic factors, lifestyles, and habits influence oral conditions. Women with a low education level, low economic status, and those who did not brush their teeth showed a higher average of missing teeth.⁸ Age, gender, low family income, and rural domicile have been associated with edentulism.⁹ Multivariate analyses have shown that the only predictor of the incidence of tooth loss among a representative sample of Norwegian adults 20 to 79 years old was a borderline significant level of education.¹

With the expected growth of the older population in the coming decades, issues surrounding older adults, especially those living in rural areas, need to be addressed. The magnitude of the problem is important in determining the need for and type of necessary intervention.¹¹ The aim of this study was to determine the prevalence of edentulism and the associated factors among elderly Muslims in Kota Bharu, Kelantan.

Materials and Methods

This cross-sectional study was conducted in the district of Badang, Kota Bharu, Kelantan, Malaysia. Badang is one of the 10 districts in the Kota Bharu administrative area situated in the northeast portion of the state of Kelantan. It has 14 subdistricts, consisting of several villages in each subdistrict. Badang district had about 1887 (33%) elderly residents 60 years and older in 2000 and is one of the areas highly populated with elderly Muslims.¹² The villages were accessible by narrow bituminous roads and had electrical power and public water supply. A majority of the elderly residents did not work.¹³

The source population was Muslim community-dwelling elderly residents 60 years old and older. The inclusion criterium was that the participants be

Malaysian community-dwelling residents age 60 years and older. The sample size was calculated prior to the study using the single proportion formula.¹⁴ The final sample size was 557 subjects. Study subjects were selected using systematic random sampling with a sampling interval of 1:2 from a sampling frame that consisted of the names of the elderly people in Badang district. Consented subjects were interviewed at their homes by a single trained interviewer using the local dialect. The information on sociodemographic profile (age, sex, occupation, level of education), general health status (activities of daily living, presence of chronic diseases), and smoking habits were collated. The level of education was recorded as those with formal education and those with no formal education. The elderly with formal education included those who attended at least a primary level of education. The assessment of activities of daily living was categorized into dependent and independent elderly residents. Those who were independent and elderly were able to dress, eat, and walk by themselves. Smoking habits were grouped into those who never smoked and those who have smoked. Elderly Muslims who smoked included those currently smoking and those who had stopped smoking. An oral examination was carried out by a single examiner soon after the completion of questionnaire, and the edentulous status was recorded. Data obtained were analyzed using SPSS version.¹² Frequency and percentages for categorical variables were calculated. Continuous variables were expressed as mean and standard deviation. Simple logistic regression analysis was carried out to determine the association between sociodemographic profile, general health, and habits with edentulous status as the dependent variable. The significance level was set at $p < 0.05$. The multiple logistic regression analyses were undertaken to determine the significant predictors of edentulism.

Ethical approval was obtained from the local Research and Ethics Committee, Universiti Sains Malaysia on the August 1, 2006. Funds were obtained from the short-term grant (304/PPSG/6131514) of Universiti Sains Malaysia, Kubang Kerian, Kelantan.

Results

A total of 506 Muslim community-dwelling elderly residents age 60 years and older were randomly selected and consented to participate in the study.

Two hundred and eighty-three (55.9%) (95% CI=51.67, 60.50) were edentulous. The mean age was 72.3 years (SD=8.28). About 42.4% were in the 60- to 69-year-old age group, 33.6% were in the 70- to 79-year-old age group, and 24% were in the 80-year-old and older age group (Table 1).

Table 2 showed the statistically significant association between sociodemographic variables and edentulism. Simple logistic analysis showed that age group, sex, education level, occupation, activities of daily living, and smoking status were significantly associated with edentulism. Using multiple logistic analyses, the statistically significant sociodemographic variables were age group and sex (Table 3). Older people (70-79 years old and 80 years and older) have an increased likelihood to be edentulous, OR=1.9 (95% CI=1.2, 3.1) and OR=4.0 (95% CI=1.9, 8.1), respectively. Women 139, were more likely to be edentulous (OR=2.0, 95% CI=1.3, 3.1).

Discussion

The prevalence of edentulism among elderly Muslims in this study was high. Multiple logistic regression analyses showed that age and gender were significantly associated with edentulism. However, this prevalence was comparable to the 57% prevalence reported by the World Health Organization (WHO) Report in 2003.² This prevalence was found to be lower compared to a local study reported by Ismail¹⁵ and Kamariah et al.¹⁶ The prevalence of edentulism was higher when compared to the findings of the Malaysians National Oral Health Survey for Adult (NOHSA)¹⁷ in 2000, which was 36.1%. Similarly, the World Health Report noted variations in the prevalence of edentulism in many countries.¹ Adam et al. reported that the prevalence of edentulism among elderly people 60 years old and older in Western Australia was higher in the rural (34%) and remote (32%) areas compared to occurrence among the elderly living in urban areas (25%).¹⁸ In contrast, both urban and rural elderly Chinese had a low prevalence of edentulism, 4.4% and 3.4% respectively.⁸ Institutionalized older adults were more than twice as likely to be edentulous than independent adults, and Slade et al. suggested that the antecedent sociodemographic factors prior to institutionalization was responsible for the higher probability of oral conditions in the group.¹⁹ The prevalence of edentulism was found to vary due to differences in

Table 1. Characteristics of 283 edentulous elderly residents of the studied Muslim community.

Characteristics	Mean (SD)	n	%
Age (year)	72.3 (8.28)		
Age group (year)			
60-69		120	42.4
70-79		95	33.6
80-plus		68	24.0
Sex			
Male		83	29.3
Female		200	70.7
Education level			
No formal education		203	71.7
Formal education		80	28.3
Occupation			
Unemployed		207	73.1
Employed/pension		76	26.9
Activities of daily living			
Dependent		220	77.7
Independent		63	23.3
Chronic disease			
Yes		129	45.6
No		154	54.4
Smoking status			
Never smoked		196	69.3
Ever smoked		87	30.7
Dental fear			
No		63	22.3
Yes		144	50.9
Dental visit			
No		254	89.8
Yes		29	10.2

geographical, social, economic background, general health, dental care system, and treatment philosophies.⁷⁻⁹ It also reflects that many of the older adults have not benefited fully from the improvements in the prevention and control of oral diseases.²⁰ In this study, univariate analysis showed that age, sex, education level, occupation, activities of daily living, and smoking status were significantly associated with edentulism. This finding is agreeable with earlier authors.^{7,8,9,10} However, multiple logistic analyses showed only age and sex were found to be significantly associated with edentulism. As reported by other studies, age is strongly associated with edentulism.^{9,15-7,21} People tend to lose their teeth as they

Table 2. Characteristics associated with edentulism using simple logistic regression analysis.

Characteristics	Crude OR (95% CI)	p value
Age group (year)		
60-69	1.00	
70-79	2.05 (1.36, 3.09)	0.001
80-plus	3.74 (2.18, 6.40)	<0.001
Sex		
Male	1.00	
Female	2.22 (1.54,3.21)	0.001
Education level		
No formal education	1.00	
Formal education	0.53(0.37, 0.77)	0.001
Occupation		
Unemployed	1.00	
Employed/Pension	0.55 (0.38, 0.81)	0.002
Activities of daily living		
Dependent	1.00	
Independent	2.1 (1.32, 3.53)	0.003
Chronic disease		
Yes	1.00	
No	1.1(0.79, 1.60)	0.524
Smoking status		
Never smoked	1.00	
Ever smoked	1.8 (1.23, 2.55)	0.002
Dental fear		
No	1.00	
Yes	1.4 (0.91, 2.15)	0.122

CI = confidence interval; OR = odds ratio

age due to complex interactions between dental diseases, incident dental signs and symptoms, tendency to use dental care in response to specific dental problems, dental attitudes, and the ability to afford nonextraction treatment alternatives.²² Thus, loss of teeth is a prominent consequence of aging.

We found that women were more likely to be edentulous. Similar findings were obtained from other studies.^{9,15-7,21} Edentulism is closely associated with socioeconomic variables.^{7-10,18} Women who were older, had no formal education, and were unemployed were more likely to be edentulous. Thus, oral health disparities may be due to differences in health literacy and behaviors, attitudes towards oral health, as well as dental care and access and use of dental services and types of treatment available. The future

Table 3. Characteristics associated with edentulism using multiple logistic regression analysis.

Characteristics	Adjusted odds ratio (95% CI)	p value
Age group (year)		
60-69	1.00	
70-79	1.9 (1.2, 3.1)	0.007
80-plus	4.0 (1.9, 8.1)	<0.001
Sex		
Male	1.00	
Female	2.0 (1.3, 3.1)	0.001

CI = confidence interval

The model is reasonably fit with Hosmer and Lemeshow goodness-of-fit: Chi square = 3.621, df=4, p value=0.460, percentage correct classification=64.2%, Area under the curve = 0.671%.

elderly group is more likely to follow the same pattern of social and geographic disadvantage as found in the current cohort of the edentulous elderly and may take a few more years to become evident, because people who had lost their teeth 30 years ago will continue to affect the prevalence of edentulism.²³ Edentulism among elderly women is a worrying outcome. The retention of natural teeth is vital, especially in women as they tend to live longer than men. Retaining teeth will have a positive impact on general health and quality of life of elderly women as they go through their remaining years of life. Efforts to promote retention of teeth include awareness and oral health education, accessibility of oral healthcare services, and improvement in socioeconomic status in general. Although these efforts are already in place, they need to be intensified so that the current cohort of women really understands the significance of maintaining as many natural teeth as possible well into old age. Oral health services must consider women as one of the priority target groups that need oral health attention.

The teachings of Islam strongly encourage Muslims to keep their teeth clean at all times. Muslims in the Middle East used *siwāk* (a twig) as a device to clean their teeth. In the Middle East, it is most commonly obtained from a plant called *Salvadore persica*.²⁴ Among numerous narrations

related to the *siwāk*, it is reported that the Prophet صلی اللہ علیہ وسلم said:

السواك مطهرة للفم مرضاة للرب

The *siwāk* purifies the mouth and pleases the Lord.²⁵

لولا أن أشق على أمتي، أو على الناس لأمرتهم
بالسواك مع كل صلاة

If it had not been too much a burden on the believers, I would have commanded them to use the *siwāk* before each prayer.²⁶

Preserving teeth in good condition is not only restricted to the quality of life of the elderly but is an indicator of general health.²⁻⁴ Edentulism is related to the deterioration in the systemic health of the aged²⁷ and is associated with reduced quality of life.²⁸

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