

ORIGINAL ARTICLE

## ORAL STATUS AND ITS ASSOCIATION WITH ORAL HEALTH-RELATED QUALITY OF LIFE IN COMMUNITY-DWELLING OLDER ADULTS

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### ABSTRACT

Poor oral conditions among older adults can cause significant impacts to their overall quality of life. Older adults with reduced number of functional teeth and dental diseases may experience difficulty in daily activities like chewing and eating. The aim of this study is to assess the association between oral health and oral health-related quality of life (OHRQoL) among a group of community-dwelling older adults in Negeri Sembilan, Malaysia. A cross-sectional study was carried out on 436 older adults aged 50 years and above from 20 randomly selected villages in the state. Respondents were interviewed using a structured questionnaire to collect information on their demographic characteristics. Clinical oral examination was carried out to determine the oral health conditions of older people. The validated Malay version of Geriatric Oral Health Assessment Index (GOHAI) was used to measure OHRQoL. Total GOHAI score ranged from 12 to 60 with higher scores indicate better OHRQoL. Majority (77.1%) of the older adults had less than 20 teeth and about 18.3% were edentulous (total tooth loss). All dentate respondents had experienced dental caries. The median GOHAI score was 54.5 (IQR 50-57). About 25.5% of the older adults perceived their oral health as good, while 74.5% had poor perception on oral health. Bivariate analysis showed that less than 20 teeth and high dental caries experience were significantly associated with poor OHRQoL. A significantly higher proportion of older adults with less than 20 teeth limit the kinds of food intake, had trouble biting or chewing, and experienced tooth sensitivity. The physical functioning and well-being of the older people may be disrupted due to oral diseases. Measures of OHRQoL are important as to complement the clinical oral findings in identifying treatment needs of the geriatric patients.

**Keywords:** elderly; GOHAI; oral health; quality of life

### INTRODUCTION

Poor oral health is still prevalent among older population. Despite the improvement of oral health conditions across all age group worldwide, oral health of older persons is far from optimal<sup>1,2</sup>. Dental caries, periodontal disease and tooth loss are very common in this group. In addition, the negative impacts of oral ill health like problems with eating, chewing, smiling and speech, as well as pain and discomfort, are greater in the older population compared to the younger age group<sup>3,4</sup>.

In view to oral health, ageing of the Malaysian population has brought several implications to the provision of oral health care of the country. Major challenge is on the burden of illness of oral diseases and treatment needs for the older group. Dental caries, one of the common oral diseases, remains a major public health problem in older people in several countries worldwide<sup>5</sup>. Malaysia

shares similar caries experience whereby the older age group has much higher prevalence of dental decayed, missing due to caries and filled teeth compared to the younger age group. The percentage of teeth affected by root caries also increased with age, with the highest score experienced by the old-old group<sup>6</sup>.

However, in some industrialized countries, there is a positive trend that certain segment of the older population is keeping more of their natural teeth, for example those from higher socio-economic status<sup>7</sup>. This indicates that the group of older people are at risk to common dental diseases in later life and suffered from more complex conditions. There will be more requirements for complex restorative procedures, severe periodontal treatment as well as management of pre- and cancerous lesions. These conditions can also be a serious challenge to oral healthcare

providers as they may require greater and complex demands.

Therefore, impaired oral health among the aged population has become an important public health issues and a growing burden to many countries worldwide including Malaysia. These conditions are associated with reduction of physical, psychological and social function and will give impact to overall quality of life of older population. Measures of oral health-related quality of life (OHRQoL) are thus important as subjective assessments to complement the clinical findings in identifying treatment needs of the geriatric patients.

The Geriatric Oral Health Assessment Index (GOHAI) is among the most used instrument to measure the impact of oral health conditions on daily life among older population<sup>8,9</sup>. The 12-item GOHAI measures three dimensions of OHRQoL namely physical function, psycho-social function and pain and discomfort. Gil-Montoya et al (2008) reported a high prevalence of mastication-related problems (limit types or amounts of food, difficulties with biting or chewing food, discomfort when swallowing or eating, and feeling uncomfortable eating in front of people) among edentulous elderly when using GOHAI<sup>10</sup>. These unfavourable chewing-related OHRQoL items may increase the possibility of nutritional problems especially in a vulnerable group like the elderly<sup>11</sup>. Thus the aim of this study is to assess the association between oral health and oral health-related quality of life (OHRQoL) among a group of community-dwelling older adults in Negeri Sembilan, Malaysia

## METHODS

This cross-sectional study was conducted in the district of Kuala Pilah, Negeri Sembilan. Twenty villages from two sub-districts, Pilah and Johol, were randomly selected and included for sample selection. Both the sub-districts have similar socio-economic background as well as the number of older adults residing in the areas. Older adults aged 50 years and above, Malaysian, had been living in the selected areas for at least one year and could communicate clearly in Bahasa Malaysia were included in this study. Those who were mentally ill and with other conditions that could affect the history taking and anthropometric measurements were excluded. Through the head villages, all the older adults within the selected villages were invited to participate in the study. Approval to conduct the study was obtained from the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, Universiti Putra

Malaysia (UPM/FPSK/PADS/T7-MJKEtikaPer/F01(IG\_Mei(10)03), and all the respondents provided written informed consent.

Data on socio-demographic characteristics were attained from face-to-face questionnaire interview. The 12-item Malay version of GOHAI was used to measure the oral health-related quality of life of the respondents<sup>12</sup>. It consists of three dimensions: physical function, psycho-social function and, pain and discomfort. A five point Likert scale (always, often, sometimes, seldom and never) was used for measurement of the GOHAI index. The total GOHAI score was determined by summing the final score of each 12 items, ranged from 12 to 60. Higher score indicates better oral health-related quality of life. The scales for three of the positively worded items in the GOHAI (able to swallow comfortably, pleased with appearance of teeth and able to eat any kind of food) were reversed so that a higher score can reflect better self-reported oral health. Older adults with a score  $57 \leq$  were identified as having 'high perception' of oral health, while those who scored between 12 to 56 were identified as having 'low perception'<sup>13</sup>.

Clinical oral examination was carried out to determine the oral health conditions of older people, namely the number of teeth (teeth present and total tooth loss), posterior occluding pairs of teeth, dental caries, periodontal conditions and presence of dentures. The assessment was based on the oral health examination format for National Oral Health Survey of Adults, 2000 and WHO criteria for Oral Health Surveys, 1997. Upon dental screening, older adults who required dental treatment like restorations, scaling and dentures were referred to the nearest government dental clinics. Only one examiner was involved with clinical oral examination throughout the study and demonstrated high intra-examiner consistency (Kappa value of 0.96). Statistical analysis was performed using SPSS version 22.0. Descriptive statistics were determined, such as means and standard deviation (SD) for continuous variables and frequency and percentages for categorical variables. Associations between categorical variables were assessed with the Chi-square test of independence. The significance level was set at  $p < 0.05$ .

## RESULTS

### Socio-demographic characteristics

A total of 436 older adults participated in the study with majority (41.1%) of them were in the age group of 50-59 years. Only 5.0% was in the oldest age group (> 80 years old). The mean age

was 63.2 years (SD 9.6). About 57.8% were female and 42.2% male. In relation to formal educational level, 9.9% had never attended school, 84.6% were with primary and secondary level of education and only a small proportion (5.5%) had tertiary education level. Only a small proportion (8.0%) of

older adults lived alone. In relation to health status, about 57.8% reported that they suffered from at least one chronic disease. Table 1 presents the socio-demographic characteristics of the study population.

**Table 1: Demographic characteristics and body mass index of the study population**

Variables		n	%	mean	SD
Sex	Male	184	42.2		
	Female	252	57.8		
Age Group	50 - 59	179	41.1	63.2	9.6
	60 - 69	130	29.8		
	70 - 79	105	24.1		
	80 & above	22	5.0		
Education level	No formal education	43	9.9		
	Primary & secondary	369	84.6		
	Tertiary education	24	5.5		
Living arrangement	With family members	401	92.0		
	Alone	35	8.0		
Self-reported chronic disease	Yes	252	57.8		
	No	184	42.2		

**Dental status**

Table 2 demonstrates that majority of the older adults were dentate (81.7%) while only 18.3% were edentulous. In relation to number of teeth, only a quarter of the older adults have 20 and more teeth (22.9%) while 86.0% have reduced total occluding pairs of teeth (POPs) that is between 0 to 3 pairs. For dentate older adults, the median number of teeth present was 11.0 (IQR 4-19). About half of the respondents (52.3%) were denture-wearers. Among those who were edentulous, 91.3% were wearing dentures while only 64.6% of those who had less than 20 teeth had dental prostheses.

In relation to dental caries, all the dentate respondents had experienced dental caries, which gave the prevalence of 100%. With regards to caries severity, the studied sample also demonstrated a high median of DMFT (22.0; IQR

16-27) (Table 2). The M component (missing teeth) was the major contributor to caries severity with a mean of 16.6 (SD=8.3). Contrarily, the respondents had the least F component mean score (filled teeth) (1.2; SD=2.7) with only 8.4% of the respondents' teeth were restored due to caries. As for the D component, the mean score was 3.1 (SD=3.0) with 21.4% of teeth present were decayed. In relation to root caries, almost half of the dentate older adults (48.3%) had decayed roots.

As for periodontal health, none of the dentate respondents had healthy gingiva, 2.2% with gingival bleeding, 51.1% had calculus, 36.2% had shallow pockets (4 - 5mm) while 4.2% had deep pocket of 6mm or more (Table 2). This demonstrates that all the respondents were affected by some form of periodontal problems.

**Table 2: Oral health characteristics of the study population**

Oral health characteristics		n	%	median	IQR
Dental status	Dentate	356	81.7		
	Edentate	80	18.3		
Total number of teeth				11.0	4-19
	20 teeth and more	100	22.9		
	Less than 20 teeth	336	77.1		
Total number of posterior occluding pairs of teeth (POPs)	0 - 3 pairs	375	86.0		
	5 - 8 pairs	61	14.0		
Denture presence	Yes	228	52.3		
	No	208	47.7		
Coronal caries	DMFT			22.0	16-27
	Decayed, DT			2.0	1-4
	Missing, MT			16.0	10-23
	Filled, FT			1.0	0-1
Periodontal status	Healthy	0	0		
	Bleeding	8	2.2		
	Calculus	182	51.1		
	Shallow pocket	129	36.2		
	Deep pocket	15	4.2		

**Oral health-related quality of life**

The GOHAI score ranged between 33 and 60, with a median total score of 54.5 (IQR 50-57), thus this finding showed that on average respondents in this study has a poor perception on oral health. About 25.5% of the older adults in this study perceived their oral health as good, while 74.5% had poor perception on oral health. This finding suggests that around three-quarter of the older population’s quality of life was badly affected by their oral conditions.

The highest negative responses for ‘always’ and ‘often’ was trouble biting or chewing (15.7%) followed by limit the kind of foods (14.1%). Psycho-social dimension was the least affected, whereby only 0.4% of the older people reported to limit contacts with other people, felt self-conscious of their teeth, gums and dentures, and uncomfortable eating in front of others. The prevalence of GOHAI items for all responses is presented in Table 3.

**Table 3: Total GOHAI score of the study population**

GOHAI item	GOHAI response category		
	Always, often (%)	Sometimes, seldom (%)	Never (%)
<b>Physical function</b>			
Limit the kinds of food	63 (14.1)	225 (50.4)	158 (35.5)
Trouble biting or chewing	70 (15.7)	229 (51.3)	147 (33.0)
Able to swallow comfortably	426 (95.5)	20 (4.5)	0 (0)
Unable to speak clearly	4 (0.9)	42 (9.4)	400 (89.7)
<b>Psychosocial</b>			
Limit contacts with people	2 (0.4)	42 (9.4)	402 (90.2)
Pleased with appearance of teeth	445 (99.8)	1 (0.2)	0 (0)
Worried about teeth, gums or denture	6 (1.3)	60 (13.5)	380 (85.2)
Self-conscious of teeth, gums or denture	2 (0.4)	55 (12.3)	389 (87.3)
Uncomfortable eating in front of others	2 (0.4)	44 (9.9)	400 (89.7)
<b>Pain / Discomfort</b>			
Able to eat any kind of food	310 (69.5)	133 (29.8)	3 (0.7)
Use of medication to relieve pain	10 (2.2)	73 (16.4)	363 (81.4)
Sensitive to hot, cold or sweet foods	24 (5.4)	112 (25.1)	310 (69.5)

**Association between oral health conditions and oral health-related quality of life**

Table 4 presents the association between oral health characteristics with total GOHAI score among the older adults. Bivariate analysis using

Chi-square test showed that significantly higher percentage of older adults with 20 and more teeth and lower caries experience (lower DMFT score) had good perception on their oral health ( $p < 0.01$ ).

**Table 4: Bivariate analysis for the association between oral health items of respondents with total GOHAI score**

Items	Total GOHAI score		Sig
	Good perception of oral health (GOHAI score $57 \leq$ )	Poor perception of oral health (GOHAI score 12-56)	
Edentate	16 (20.0)	64 (80.0)	0.215
Dentate	95 (26.7)	261 (73.3)	
Total number of teeth			<0.01*
0 - 19 teeth	67 (19.9)	269 (80.1)	
20 - 32 teeth	44 (44.0)	56 (56.0)	
Coronal caries, DMFT			0.003*
High DMFT	94 (23.6)	305 (76.4)	
Low DMFT	17 (45.9)	20 (54.1)	

\*significant at p-level<0.01

Table 5 shows the differences between older adults with less than 20 and 20 and more teeth for the percentage of responses for each of the GOHAI item. Respondents with less than 20 teeth restricted more frequently the types of food they take, had more problems with biting or chewing and experienced sensitivity more towards hot, cold

and sweet foods ( $p < 0.01$ ). Results in Table 5 also shows that respondents with less than 20 teeth were more frequently worried and self-conscious about their teeth, gums and dentures, and unable to eat any kinds of foods. Nevertheless, no significant differences were observed.

**Table 5: Percentage of responses of to each item of GOHAI based on number of teeth**

GOHAI items	20 teeth & more			Less than 20 teeth			p
	1	2	3	1	2	3	
<b>Physical function</b>							
Limit the kinds of food	5.0	40.0	55.0	17.3	53.6	29.1	<0.01*
Trouble biting or chewing	7.0	37.0	56.0	18.2	55.7	26.2	<0.01*
Able to swallow comfortably	94.9	5.1	0	95.7	4.3	0	0.812
Unable to speak clearly	0.6	10.8	88.6	1.1	8.9	90.0	0.733
<b>Psychosocial</b>							
Limit contacts with people	0.6	10.8	88.6	0.4	8.9	90.7	0.733
Pleased with appearance of teeth	100.0	0	0	99.6	0.4	0	0.642
Worried about teeth, gums or denture	0	15.3	84.7	2.1	12.8	85.1	0.149
Self-conscious of teeth, gums or denture	0	13.4	86.6	0.7	12.1	87.2	0.535
Uncomfortable eating in front of others	0.6	11.5	87.9	0.4	9.3	90.3	0.692
<b>Pain / Discomfort</b>							
Able to eat any kind of food	73.2	26.1	0.6	67.3	32.0	0.7	0.426
Use of medication to relieve pain	4.0	19.0	77.0	1.8	16.1	82.1	0.318
Sensitive to hot, cold or sweet foods	10.0	32.0	58.0	4.2	23.2	72.6	0.009*

\*significant at p-level<0.05

**DISCUSSION**

This study demonstrated that older adults with reduced number of teeth and high caries experience had poor perception on their oral health. These findings were consistent with previous studies that concluded significant association between compromised dentition and GOHAI score. The physical functioning like eating, swallowing and speaking of the aged were disrupted due to oral diseases and disorders<sup>13,14</sup>.

Gil-Montoya et al in 2008 reported a high prevalence of mastication-related problems (limit types or amounts of food, difficulties with biting or chewing food, discomfort when swallowing or eating, and feeling uncomfortable eating in front of people) among edentulous elderly. These unfavourable chewing-related OHRQoL items may increase the possibility of nutritional problems especially in a vulnerable group like the elderly<sup>10,11,15</sup>.

Findings from this study also highlighted that the main oral health activity affected among respondents was related to eating, hence suggesting the importance of oral health in dietary practice. One of the possible justifications for this finding is the decreasing number of teeth with age which worsen the masticatory ability. Several studies have concluded similar results<sup>16,17</sup> in which multiple chewing-related problems were detected. Thus, maintaining an optimum number of teeth for chewing is essential for maintenance of healthy nutritional status.

In this study, psycho-social dimension was the least affected, whereby only 0.4% of the older people reported to limit contacts with other people, felt self-conscious of their teeth, gums and dentures, and uncomfortable eating in front of others. This finding indicates that this group of older adults does not view their oral conditions as barriers to social communication. However, higher proportions of elderly who were self-conscious about their teeth, gums and dentures were observed in Romanian and Swedish studies<sup>16</sup>. In relation to oral health, older adults with less than 20 teeth were more affected in the psycho-social dimension. Nevertheless, no significant associations were observed in the present study.

In Malaysia, the National Oral Health Survey of Adults, NOHSA (2010) has reported the impacts of oral conditions on the oral health-related quality of life of the population studied. More than one quarter of the respondents (29.3%) had experienced at least one or more impact and the proportion increased with age<sup>6</sup>. Similar to the earlier NOHSA data in 2000, 54.3% of elderly aged 75 years and above complained of oral functional limitations. Among those with oral functional limitations, majority (19.6%) reported problems with chewing hard foods. Of those who reported problems with chewing, edentulous elderly without dentures had the most impact (85.7%) compared to edentate with dentures and dentate groups<sup>18</sup>. These unfavourable results for chewing-related problems should alert the dental practitioners of

the possibility of nutritional problems especially in the aged populations.

Despite the associations observed, one of the limitation of this study was it could not establish a causal relation between OHRQoL and oral health status as its cross-sectional design. Longitudinal studies may be needed to further explore the relationship. Another limitation was the use of self-reported tools to measure the oral health-related quality of life among the respondents. The GOHAI has potential bias as they rely on respondents' memory and ability to identify the oral health impacts<sup>19</sup>. Furthermore, older people are associated with high prevalence of hearing and memory problems which may lead to additional sources of bias. Nevertheless, highly trained interviewers were used to conduct such procedures to improve reliability of the study. Moreover, it can yield relevant information on the self-perceived oral impacts among older population especially in relation to masticatory ability. To date, local data on self-perception of oral health among the older age group is very scant, so therefore it could add to the limited literature on oral health and OHRQoL at the community level.

## CONCLUSIONS

In conclusion, this study highlighted the significant association between reduced numbers of teeth with negative impacts of quality of life among older adults in the community. It is therefore very important for dental practitioners to advocate on the optimum number of teeth especially at the earlier age as it may help to improve the quality of life of the vulnerable group. The use of oral health-related quality of life instruments also can complement the objective clinical measurements and be utilised as oral health predictors that might lead to problems like impaired nutrition in the older population. Therefore, findings from this study would provide scientific evidence in developing a comprehensive geriatric oral health care within the clinical settings.

## ACKNOWLEDGEMENTS

The authors wish to thank the heads of all villages involved and also to all the residents who participated in the study.

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