

The assessment of quality of life measured by General Oral Health Assessment Index (GOHAI) among complete denture patients at a public university

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Abstract

Edentulism remains a public health issue globally, especially in low to middle-income countries. To combat the associated problems with edentulism, complete dentures are prescribed to improve their function, speech, and comfort. The aim of this study is to assess the quality of life using the General Oral Health Assessment Index (GOHAI), focusing on physical function, oro-facial pain and psychosocial impact among complete denture patients in the USIM polyclinic. Patients included in this study consisted of 58% male and 42% female patients with an average age ranging from 60 to 69 years old. 98% of the patients requested new dentures to improve their chewing ability. The highest mean score was 3.34 (± 1.39) for satisfaction with appearance, while the lowest mean score was 0.72 (± 1.10) for limiting themselves from contact with others. In conclusion, edentulousness greatly affects patients' oral function and complete denture treatment had a positive effect on patient's quality of life.

Keywords: complete denture, edentulous, GOHAI, psychometric

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Introduction

The ageing population has been the topic of interest for the past few years in dental fraternities due to the rising number of elderly populations in the world. In Japan, for example, where life expectancy has been steadily increasing, a whopping 38.8 percent of the population will be over the age of 65 by the year of 2050 owing to the improvement in modern healthcare

technology and the reduction in birth rate (Jack, 2016). In recent years, life expectancy is now averaged around 71 years old and is expected to further increase in the future (Dattani *et al.*, 2024). One review found that high-income countries recorded a higher life expectancy relative to the least developed countries, where life expectancy is less than 60 years old. This is related to better health-related variables (i.e., improved sanitation, higher public health expenditure, *etc.*) in a high-income country (Karacan *et al.*, 2020).

In order to cater to the rising number of elderly, improvements to the current health care systems are crucial in order to prepare for the impending demand, and this includes geriatric patients' dental treatment.

Edentulism can be described as the total absence of teeth. Tyrovolas *et al.* (2016) stated that the current prevalence of edentulism for the global population is at 7.6% with an overall reduction in the prevalence of edentulism worldwide. Khazaei *et al.* (2012) took a deeper look revealed a regional distribution based on economic and social variations and found that the prevalence of edentulism is on a decline in the developed countries, while the opposite is seen in developing countries. The treatment for edentulism can be divided into two options, either a fixed or a removable prosthesis. The McGill consensus in 2002 posed evidence that the first line of treatment for edentulous mandibles is the 2-implant overdenture (Feine, 2003). In a developing country like Malaysia, however, this treatment option is not feasible for all patients because it will incur a high cost of implant surgery and the subsequent implant placement and prosthesis fabrication (Juhari *et al.*, 2024; Ting *et al.*, 2021).

Edentulism negatively affects patients' quality of life (QoL) in terms of psychosocial, function and comfort (Rajaraman *et al.*, 2018). World Health Organisation (WHO) defined quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. There are numerous studies that conclude oral health is part of a factor that makes up for a patient's quality of life (Sischo & Broder, 2011). The fundamental of good oral health constitutes the ability to function properly including mastication and speech, the absence of pain and being psychosocially able to mingle well without diminished self-confidence. The disruption of any of these factors may lead to malnutrition and reduced self-confidence. A complete denture is prescribed to improve these concerns and improve oral function. However, it remains a question whether the dentures delivered by

the students to their patients are satisfactory. This is necessary not only for the students to be fully equipped to become a dentist, but also a measure of complete denture teaching in general.

In order to assess the quality of life, the Geriatric/General Oral Health Assessment Index GOHAI was developed. It consists of a 12-item questionnaire to measure the oral health-related QoL. GOHAI was developed by Atchinson and Dolan (Atchison & Dolan, 1990) and has been translated into several languages, including the Malay language (Othman *et al.*, 2006). The questions evolve around three key oral health-related domains, namely physical, psychosocial and pain and discomfort. The physical domain assessed the functional aspects, such as mastication and speech, while the psychosocial domain assessed the social aspects, such as wariness, social contacts and self-consciousness. The last domain, which touched on the aspect of pain and discomfort, was used to assess patients, general wellbeing and concern (Othman *et al.*, 2006). GOHAI measures patient QoL without an intraoral examination, therefore, it is not suitable to be used as a total measure for correlation of disease-quality of life.

In this study, our interest lies in the quality of patients' lives after the introduction of new complete dentures made in USIM polyclinic. There is little evidence regarding pedagogy, particularly in complete denture management in Malaysian undergraduate dentistry programs where most of the study focuses on partial dentures and fixed prosthodontics (Ab Ghani *et al.*, 2022; Daood *et al.*, 2022). The assessment regarding outcome of the teaching is important to ensure the regulatory body requirement are followed and graduates provide high treatment quality according to the needs of their patient. The objective of the study was to assess the quality of life of the elderly population among the geriatric patients who received complete dentures from the undergraduate dental students of the Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM), Kuala Lumpur.

Materials and Methods

Prior to the study, ethical approval was obtained from USIM Board of Ethics (Project approval code: USIM/JKEP/2022-195). All participants who enrolled in this study were selected using simple random sampling from the complete case list from the undergraduate students polyclinics. The number of participants required was calculated using G-Power software (Germany) with effect size 0.5, alpha 0.05 and power 0.95, a sample size of 34 participants was obtained. However, a total of 50 patients were recruited for the study. All patients that were treated with the same conventional technique by undergraduate students in USIM polyclinic were invited to the study after a three-month review. All patients must fulfill the inclusion criteria; 1) at least three months of complete denture wear, 2) fluent in Malay language and 3) no underlying systemic diseases that might affect denture wear or clinical attendance. Patients who do not wear their denture and do not understand basic Malay are excluded from the study.

Consent was obtained from the participants before the questionnaire was distributed. Participants were interviewed by a single interviewer using the Malay version of GOHAI. The questionnaire was organized into two parts, where the first part of the questionnaire relates to sociodemographic questions, among which include gender, age, education level, occupation and history of denture wearing and reasons for denture wearing. In the second part, the questionnaires go into itemized questions under the domain of physical, psychosocial and discomfort. The rating on the questionnaires utilizes a six-point Likert scale from 'always' (5), 'very often' (4), 'often' (3), 'sometimes' (2), 'seldom' (1) or 'never' (0) (Othman *et al.*, 2006). The score is determined by the total sum of the whole questionnaire, with a total range of 0-60 range. The higher the scores, the better oral health is perceived by the patient. In this study, item 7 was removed because all participants in this study were edentulous hence, they do not experience sensitivity to

the sweet, hot and cold. The score was recalculated to a maximum of 55 and the score for high, medium and low were changed accordingly. Items three, five and nine have a positive question-rating score and the reverse for the rest of the questions so that the end score will reflect a positive score. The scores were then analyzed using an independent t-test to compare means across the variables in GOHAI scores with the significance levels set at $p < 0.05$. The data were analyzed using SPSS Statistics version 22.

Results

Table 1 shows the characteristics of all the participants in the study. From the table, the average mean score for each patient was 41.72 (SD 8.3) ranging from score 31 to 57.

The mean age was 63.88 ± 5.6 , where 58% of the participants were male, while 42% of participants were female. Most of the participants received an education up to secondary education level at 64% and only 30% of them were working. Only 7% of participants never had any dentures prior to the treatment and the rest of the participants had a history of previous dentures. 98% of the respondents stated their reason to request new denture is to improve their chewing ability, followed by improved speech and aesthetic appearance, while only 20% of the participants stated a health reason.

Table 2 shows the response for GOHAI questionnaires. Item 7, related to sensitivity to hot, cold and sweet food, was eliminated because all participants are edentulous. The percentage of participants' positive response that comprises of 'sometimes', 'often', 'very often' or 'always' to the GOHAI items. The percentage of subjects responding positively to each item ranged from 6% to 70%. For items three, five and nine, which were positive rating items, two out of three items scored high positive response of more than 50%. The highest positive responses are related to aesthetic, 'pleased with the look of teeth' at 70% and function, 'able to swallow comfortably' at

64%. The lowest percentage for positive responses was feeling '*self-conscious of denture*' and '*uncomfortable eating in front of others*', with the same percentage of 8%. For items with negative ratings, questions that

scored a high positive response were items in the physical function domain, which were '*trouble biting and chewing*' at 38% and '*limit the kinds of food*' at 28%.

Table 1. Sociodemographic profile of participants.

Characteristics of Subjects			
GOHAI score	Mean 41.72		
Range	31-57		
Socioeconomic Profile	N	%	
Gender			
Male	29	58%	
Female	21	42%	
Age			
>55 y/o	8	16%	
55-59 years old	6	12%	
60-69 years old	27	54%	
70-79 years old	6	12%	
>80 years old	3	6%	
Education Level			
No schooling	2	4%	
Primary school	3	6%	
Secondary school	32	64%	
University	13	26%	
Occupation			
Still working	15	30%	
Not working	35	70%	
History of Wearing Denture			
>1 year	8	16%	
1-3 years	14	28%	
3-5 years	9	18%	
>5 years	12	24%	
Never	7	14%	
Reasons of Wearing Denture			
Chewing	49	98%	
Speech	38	76%	
Aesthetic	27	54%	
Health	10	20%	

In the physical function domain, 72% of the respondents stated that they do not limit their food intake by the use of complete denture, however, 38% of them had trouble in biting and chewing especially firm meat and apples. For the GOHAI items that describe the pain and discomfort, most of the respondents (88%) did not use any

medication to relieve the pain and 36% of them were not able to eat anything without discomfort. In the psychosocial function domain, most of the respondents did not have a problem socialising with other people, while only 8% of the participants felt uncomfortable eating in front of others with their complete denture.

Table 2. Percentage of subjects responding '*sometimes*', '*often*', '*very often*' or '*always*' to each GOHAI and the mean of each of the items.

GOHAI Items		Percentage of participant responding to positive response (%)	Mean score (SD)	Never	Seldom	Sometimes	Often	Very often	Always
				Percentage (%)					
Physical Function									
1.	Limit the kinds of food	28	2.02(1.42)	16	20	36	6	18	4
2.	Trouble biting and chewing	38	2.26(1.36)	10	18	34	20	10	8
3.	Able to swallow comfortably	64	2.96(1.41)	10	0	26	26	24	14
4.	Unable to speak clearly	16	1.36(1.35)	30	34	20	6	6	4
Pain and Discomfort									
5.	Able to eat without discomfort	36	2.20(1.48)	14	18	32	16	10	10
6.	Used medication to relief pain	12	0.88(1.35)	60	16	12	0	12	0
7.	Sensitive to hot, cold or sweet foods	-	-	-	-	-	-	-	-
Psychosocial Function									
8.	Limit contact with people	6	0.72(1.10)	58	24	12	2	2	2
9.	Pleased with the look of teeth	70	3.34(1.39)	2	10	18	16	30	24
10.	Worried about denture	14	1.30(1.34)	34	30	22	2	10	2
11.	Self-conscious of denture	8	0.90(1.21)	54	18	20	0	8	0
12.	Uncomfortable eating in front of others	8	0.98(1.25)	48	24	20	0	6	2

Discussion

Measurement of therapeutic outcome is important to assess the long-term effect of a treatment in terms of quality-of-life

improvement. Several assessment tools have been developed previously, specifically to measure the oral health impact on quality of life (OHQoL). Among all, two of most used instruments are Oral Health Impact Profile (OHIP) and GOHAI. OHIP is the tool used to

measure an individual's perception of the social impact of oral health while GOHAI is used to measure the oral health problems for elderly (Slade & Spencer, 1994).

In this study GOHAI (Atchison & Dolan, 1990) was chosen to measure the oral health problems after the delivery of a complete denture. GOHAI is chosen because it is more sensitive to measure the QoL, especially in terms of oral function and psychosocial impacts (Locker *et al.*, 2001). In the education field, this is especially important to assess the quality of treatment provided by undergraduate students.

As previously discussed, GOHAI questionnaire is divided into 2 types of responses, where three items were positive responses, and the rest of the items were negative responses. In terms of positive rating items, a higher percentage of positive responses could be considered as a good outcome while for negative rating items, a high percentage of positive responses could be considered as a failure of the prosthesis given. In this study, the delivered complete dentures treatment has a good aesthetic outcome and patients are able to swallow comfortably.

On the other side of the spectrum, in terms of physical function, there are some reported troubles with mastication and patients had to limit the types of food intake, especially meat and apples. This is a major concern because according to Paturu *et al.* (2011) limitations of food intake and masticatory problems are prevalent in the elderly and can lead to malnutrition. In this study, the questionnaire was given to patients who have at least three months of denture wear. As stated by Eberhard *et al.* (2018) study, the adaptation to new dentures differs significantly after one, three and six months of denture wear and this could be the factor that affects mastication for some of the patients who have worn the dentures for a shorter period. However, in terms of education, six months post treatment questionnaires might be the answer to the findings.

Other than that, the lowest mean recorded was for limiting social contact, which means most patients almost never had to limit themselves from meeting other people. Meanwhile, the highest mean score is related to the aesthetic outcome of the denture. In terms of pain and discomfort, a small number of patients had to deal with pain coming from the denture. It is imperative that a review appointment be given where reported troubles with denture usage can be evaluated and managed. This is not only important for the patient but also as a part of the learning curve for undergraduate students.

Adjustment of percentage was done according to the original GOHAI score was done since the study item 7 was excluded. Taking this into consideration of the original GOHAI score where 57-60 was considered high, 51-56 moderate and less than 50 was low, new calculation was made. In the new calculation a score of less than 47.7 was considered low and this means that the mean GOHAI score of 41.72 indicates that participants in this study are at a low level of quality of life (Aguirre *et al.*, 2020). This means an improvement to the current teaching is needed, especially for complete dentures. There are little study in different university, however a study by a university in Lahore, Pakistan reported mean score of 20.46 pre-treatment to 26.32 post-treatment (Rana *et al.*, 2019). The mean GOHAI can be interpreted as significantly lower than the result in this study, however, the result in Rana *et al.* (2019) study does state that there are improvements in the score before and after treatment.

A few limitations to this study are the relatively small sample size, with participants gathered only in USIM polyclinic. To make further comparisons, further studies with a larger sample size and corroborative efforts with different dental school around Malaysia could be done to assess patients' satisfaction in terms of complete denture treatment from undergraduate students. A bigger research area could only mean that schools are able to compare notes and improve the teaching of undergraduates. In the future, a

measurement for before and after treatment will be used to measure changes in quality-of-life post-treatment.

Conclusions

In conclusion, edentulousness greatly affects patients' oral function and complete denture treatment has a positive effect on their quality of life. Although complete denture helps patients in terms of physical function, psychosocial and comfort, further management, including review post treatment, is needed to help patient adapt to the new denture.

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