

Oral Health Status and Oral Health-Related Quality of Life in Indonesian Elderly (Analysis using the Indonesian Version of the Oral Health Assessment Tool and the Geriatric Oral Health Assessment Index)

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Abstract

Alterations of oral tissue due to aging may affect one's oral health-related quality of life (OHRQoL). In Indonesia, many remote areas are inaccessible by dentists; therefore an assessment tool that can be used by health care professionals other than dentists and caregivers is required. The objective of this study was to analyze the validity and reliability of the Oral Health Assessment Tool (OHAT) and the Geriatric Oral Health Assessment Index (GOHAI) translated into the Indonesian language, analyze the association between the oral health status and OHRQoL of the elderly, and explore the important factors that contribute to OHRQoL. This was a cross-sectional study with 114 subjects between 60-70 years old. Socio demographic data were obtained and intraoral examinations and interviews for the OHRQoL questionnaire were conducted. A Kappa test result of OHAT showed substantial agreement and the Indonesian version of the GOHAI assessment tool was valid and reliable. Chi-square test results indicated that there was no significant relationship between oral health status and OHRQoL. However, a significant relationship was found between oral health status and sex ($p = 0.026$) and education ($p = 0.015$). A significant relationship was also found between OHRQoL and economic status ($p = 0.01$).

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Introduction

The growth in the aging population has recently gained much attention in developing countries due to increased life expectancy. The aging population continues to increase globally, including Indonesia. In Indonesia currently, 17 million people (8%) are over 60 years old. This age group is estimated to grow to 13.5% of the population by 2025.¹ In 2020, the elderly population is expected to reach 29.1 million and 36 million in 2025. Indonesia is welcoming the era of an aging structured population.²

Aging entails decreases in organ functionality as well as various physical changes, including changes in oral condition, such as keratin loss, dehydrated tissue, scarce epithelium, and fiber degradation in periodontal ligaments. These disruptions commonly found in the elderly may temper their quality of life. The World Health Organization (WHO) defines quality of life as individuals' perceptions 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.²

The optimum quality of life can be achieved not only by noticing one's general health condition, but also by paying attention to oral health. Oral health is essential to general health; it is a determining factor for quality of life. Many studies have shown that proper oral health

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care reduced morbidity and mortality.³ Oral health influences mastication, food selection, weight, speech, taste, hydration, appearance, and psychosocial behavior and is therefore an essential part of general health with an impact on a person's quality of life during his or her entire lifespan. Several worldwide reports have shown that the oral health of elderly people, in particular that of frail and disabled elderly people, is rather poor. Associations have been reported between oral health and general health, for instance, with respect to diabetes mellitus, respiratory diseases, and cardiovascular diseases.⁴

Regular checkups of oral health are needed for the elderly to gain optimum oral health-related quality of life. In Indonesia, many remote areas are still inaccessible by dentists; therefore an assessment tool that can be used by health care professionals other than dentists and caregivers is required to provide regular oral health examinations. Several assessment tools are available for use by health care professionals, but few have been validated and tested for their reliability. The Oral Health Assessment Tool (OHAT) is a simple screening tool used to assess oral health.⁵

Several assessment tools have been developed to assess oral health status pertaining to quality of life, for instance, the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile-14 (OHIP-14). Analyses using both indices present the repercussion of oral disorders in the elderly based on subjective assessment.^{6,7} The difference between the OHIP-14 and the GOHAI indices lies in the number of questions; the first consists of 14 questions while the latter has 12.^{7,8}

A study conducted by Rodakowska (2014) that compared the two indices reported that there was a strong correlation between the GOHAI and the OHIP-14. Both instruments demonstrated good discriminant properties and helped capture the respondents' oral health problems. The questionnaires should be randomly distributed to avoid the influence of "fatigue effect" on the results of a comparison of different measures.⁹

GOHAI was developed for the assessment of oral health-related quality of life (OHRQoL) measures exclusively in the elderly. Later on, it was adopted for the general population and renamed the General Oral Health Assessment Index. It measures a person's or

patient's OHRQoL on the basis of the three dimensions of QoL: first is the impact on physical function, such as speech and mastication; second is the psychological dimension, which includes concerns or dissatisfaction regarding the appearance of teeth, social handicaps, and a lack of self-confidence due to oral problems; and the third dimension emphasizes the function aspect, which includes pain and discomfort caused by oral conditions. GOHAI has been found to be more suitable for assessing OHRQoL where functional aspects of oral health are of greater concern.^{6,10,11}

Various studies around the world have shown that GOHAI has been more successful than OHIP-14 in detecting elderly people's oral health problems. Immediate outcomes from poor oral health such as pain, discomfort, and functional limitations are given more importance by the GOHAI scale when compared to OHIP-14, which dwells on assessing psychological and behavioral outcomes. Overall, GOHAI has been more successful than OHIP-14 at detecting the impacts of oral disorders in a study population, with fewer participants having zero scores. GOHAI also appears to be somewhat better at detecting the impacts in each of the four health domains represented by the measures. GOHAI has better discriminating power when compared to OHIP-14.¹⁰

In Indonesia, several previous studies regarding the relationship between oral health status and quality of life have been done. In this study, the analysis was carried out by using OHAT and GOHAI as assessment tools. This study was different from that of Kusdhany (2011), which studied the relationship between tooth loss, wearing dentures, and the quality of life of pre-elderly and elderly women.³ In this study, oral health was assessed generally and was not merely based on tooth loss and wearing dentures. The subjects of this study were diverse and were not limited to geriatric patients with health issues. The assessment tools used in this study, OHAT and GOHAI, had never been applied before in any study in Indonesia, and hence were translated and validated beforehand to obtain assessment tools that can be employed by dentists, non-dentists, and caregivers in Indonesia.

The objective of this study was to test the validity and reliability of the Indonesian versions of OHAT and GOHAI and to also analyze the

relationship of oral health status and quality of life. This study also aimed to determine the dominant factor related to the oral health quality of life in Indonesian elderly.

Materials and methods

This was an analytic, cross-sectional study. The subjects of this study were from the elderly community in Depok, Cicantayan Sukabumi, and the Annisa Ummul Khairat Nursing Home in Batam. The inclusion criteria were age 60 and over, excellent general health with less than four systemic disorders, and no dementia.

The subjects were briefly interviewed and given an explanation of this study prior to obtaining their consent. Subsequently, their general health was documented and their oral health status was assessed using OHAT. Each subject was assessed by two examiners; the first examiner was a dentist and the second was a non-dentist and both were blinded from each other's assessment score. An evaluation of the consistency of the assessments conducted by the two examiners was carried out using a Kappa test. Afterwards, the subjects were interviewed using the GOHAI to assess their quality of life. A back-translation method was applied to translate OHAT and GOHAI into Indonesian. The data obtained in this study were then compiled and analyzed using SPSS software.

Results

This study received ethical approval from the Ethical Committee of the Faculty of Dentistry, Universitas Indonesia. A total of 141 subjects fulfilled the inclusion criteria; they came from elderly home care in Cicantayan, Sukabumi, and the elderly community in Sukmajaya, Depok, and the Annisa Ummul Khairat Nursing home in Batam.

Oral examinations for OHAT analysis were carried out upon 58 subjects residing in the Annisa Ummul Khairat Nursing Home in Batam and the elderly community in Sukmajaya, Depok. Most of the subjects were women between 60-70 years old.

To analyze the validity and reliability of GOHAI and the relationship between oral health status and quality of life, assessments were conducted of 114 elderly subjects.

Each subject was assessed by two examiners using OHAT; the first examiner was a dentist and the second was a trained carer. Oral Hygiene Index simplified (OHI-S) measurement and the interview was carried out afterwards by the dentist. A back-translation method was applied to translate OHAT and GOHAI into Indonesian. Three categories in OHAT and several words in GOHAI were back-translated differently but this was deemed insignificant, hence it was decided that the OHAT and GOHAI formats proposed in Indonesian were acceptable.

A consistency analysis of OHAT was done with 58 subjects. The distribution was 49 subjects (84.5%) between 60-70 years old and 50 subjects (86.2%) were women. The evaluation of the consistency of OHAT conducted by the two examiners was carried out using a Kappa test. The Kappa test reported that the dentist and the career adopted similar perceptions; strong consistencies were reported across the examinations of the tongue, gums and surrounding tissue, teeth, dentures, and oral hygiene, and moderate consistencies were reported for the rest of the items.

This result implied that OHAT was a competent tool for oral health status assessment (Table 1).

Table 1. Inter-rater agreement test (Kappa test) of the Indonesian version of OHAT

Category	Kappa Measure of Agreement	Significance
Lips	0.386	0.001
Tongue	0.610*	0.000
Gums and surrounding tissue	0.862*	0.000
Saliva	0.200	0.046
Teeth	0.606*	0.000
Denture	0.612*	0.000
Oral hygiene	0.870*	0.000
Tooth pain	0.351	0.000

Table 2. Distribution variables for the validity and reliability test of the Indonesian version of GOHAI

Variable	Total (n = 114)	%
Age		
a. 60-70 years old	76	66.7
b. > 70 years old	38	33.3
Gender		
a. Female	84	73.7
b. Male	30	26.3
Education		
a. Low	56	
b. High	58	
Income		
a. IDR 0-1,290,000	67	58.8
b. > IDR 1,290,000	47	41.2

To analyze the validity and reliability of GOHAI and the relationship between oral health status and quality of life, assessments were conducted of 114 subjects. Table 2 shows the distribution of the variables.

Table 2

The Pearson test conducted to evaluate the validity of GOHAI reported moderate correlation ($r = 0.26-0.50$) and strong correlation ($r = 0.51-0.75$) for questions 1 to 11. Weak correlation ($r = 0.00-0.25$) was reported for question 12 regarding pain or discomfort. However, GOHAI was to be analyzed in a general sense, so question 12 was not removed from the questionnaire. Chronbach's alpha for GOHAI was 0.728, indicating excellent internal consistency (Table 3).

Table 3. Summary of the validity and reliability test of the Indonesian version of GOHAI

Component	Sub-Component	Item	Inter-Item Correlation	Item Correlation to Total	Cronbach's Alpha Coefficient
Geriatric oral health assessment index (GOHAI)	Physical function	Questions 1, 2, 3, 4	-0.030–0.389	0.288-0.349	0.719
	Psychosocial function	Questions 6, 7, 9, 10, 11	0.06–0.727	0.236-0.625	0.730
	Pain or discomfort	Questions 5, 8, 12	-0.036–0.151	0.240-0.425	0.728

Table 4. Relationship between oral health status, quality of life, and socio demographic factors

Variable	OHAT score Good	%	OHAT score Bad	%	P
Age					
a. 60-70 years old	40	35.1	36	31.6	0.11+
b. > 70 years old	14	12.3	24	21.1	
Gender					
a. Female	45	39.5	39	34.2	0.026*+
b. Male	9	7.9	21	18.4	
Education					
a. Low	21	23.9	37	53.3	0.015*+
b. High	33	37.6	23	26.2	
Financial status					
a. IDR 0-1,290,000	27	23.7	39	34.2	0.105+
b. > IDR 1,290,000	27	23.7	21	18.4	
Quality of Life					
a. Low	39	34.2	37	32.5	0.439
b. Moderate	10	8.7	17	14.9	
c. High	5	4.4	6	5.3	

Note: Using chi-square test, *significant ($p < 0.05$), +included in multivariate model ($p < 0.250$).

The chi-square test indicated that there were no significant relationships between oral health status and quality of life ($p = 0.439$). The sociodemographic factors that displayed significant relationships with oral health status were gender ($p = 0.026$) and education ($p = 0.015$) (Table 4).

A multivariate regression logistic test was carried out. The test reported that education showed a significant relationship with oral health status after controlling other variables, with $p = 0.054$, OR 2.155 (Table 5).

Table 5. Final multivariate analysis model for oral health status of the elderly.

Variable	Coefficient	OR	P	CI
Gender	0.781	2.185	0.097	0.867-5.503
Education	0.768	2.155	0.054	0.212-1.014
Constant	-0.476	0,621	0.092	

The chi-square test that analyzed the relationships between quality of life and socio demographic factors reported that before

controlling other variables, financial status showed a relationship with quality of life ($p = 0.02$) (Table 6).

Table 6. Relationship between quality of life and age, gender, education, and financial status of the elderly.

Variable	Quality of life low	%	Quality of life moderate	%	Quality of life high	%	P
Age							
a. 60-70 years old	51	44.7	17	14.9	8	7,01	0.65
b. > 70 years old	25	21.9	10	8.7	3	2,6	
Gender							
a. Female	60	52.6	18	15.8	6	52.7	0.14 ⁺
b. Male	16	14	9	78,9	5	43.8	
Education							
Low	35	39.9	17	19.4	6	6.8	0.31
b. High	41	46.7	10	11,4	5	5.7	
Financial status							0.01 ^{**}
a. IDR 0-1,290,000	46	40.3	19	1.7	1	0.8	
b. > IDR 1,290,000	30	26.31	18	1.6	10	8.7	

Note: Using chi-square test *significant ($p < 0.05$), +included in multivariate model ($p < 0.250$).

The logistic regression analysis showed that after controlling other variables, gender showed a significant relationship with quality of life ($p = 0.074$), with OR 2.187.

Discussion

A long distance to the nearest dentist or health center facilities and/or a lack of dentists and health centers in remote areas of Indonesia

most likely hinder the delivery of oral health care to the elderly. In that case, non-dentists or caregivers are significantly essential to help dentists in assessing the oral health of the elderly, since they have more access to those patients. Trained by dentists, caregivers are expected to be able to carry out the basic assessment of oral health in the elderly, preventing the deterioration of their oral health and eventually their quality of life. After assessing the oral health status of the

elderly, the caregivers are supposed to inform the elderly about the importance of proper oral health care and regular visits to dentists, hence increasing their overall health status and particularly, oral health status. Therefore, it was imperative to validate an oral health status assessment tool that could be used by a caregiver.

The translation of OHAT was accomplished by an educated professional translator in dentistry; the questions were translated from English to Indonesian. In this study, the educated translator was also a dentist. The translated Indonesian questions were then back-translated by two native professional translators who did not have any knowledge about the questions. This back-translation method was done to confirm the relevance of the Indonesian translation to the original English questions. Several inconsistencies were found but were insignificant and did not alter the general explication of the questions.

GOHAI by Atchison (1990) was employed to assess the quality of life of the elderly. The GOHAI questionnaire consists of three dimensions with a total of 12 questions. Filling out the questionnaire was assisted by the interviewer, and hence subjectivity was a factor in this study. However, this was anticipated by calibrating the interviewers earlier, subsequently minimizing subjectivity and gaining objective results.⁶

This study has reported that GOHAI was proven to be more successful in detecting the effect of oral health disorders compared to OHIP-14. This is supported by a previous study by Ikebe (2012) that reported that GOHAI was an objective oral health function assessment tool with higher sensitivity than OHIP-14. GOHAI also showed a significant relationship with occlusal force and mastication ability score. GOHAI was better in detecting the effect of temporary dysfunction and pain, while OHIP-14 was better in detecting the psychosocial effect. Improved mastication ability is one of the main goals in prosthodontic restoration, and thus GOHAI was deemed more useful in clinical settings and longitudinal studies compared to OHIP-14.¹²

The majority of the subjects in this study (66.7 %) had a low quality of life based on their GOHAI scores. This result contradicted Kusdhany's (2011) study, in which 86.4% of the subjects had good OHRQoL.³ Both studies were

done in Indonesia with elderly subjects. The differences in the results may be due to differences in the type of questionnaire used to measure OHRQoL. This study found that there were no significant relationships between oral health status and quality of life. This may be due to the fact that not every assessed intraoral status affects the quality of life, for example, ailing lips and tongue would not disrupt one's ingestion.

This study found no significant relationship between oral health status and age and financial status. However, significant relationships were found between oral health status and gender ($p = 0.026$) and education level ($p = 0.015$). This result implies that a higher education level is a foundation for a well-informed attitude, that is, the realization of the importance of oral health care.

In general, the idea accepted by the elderly was that as long as they had good general health, oral health care was not necessarily needed. Another study in the UK found a strong association of OHRQoL with self-reported general health. Poor self-reported general health also had a significantly higher impact on people's OHRQoL, highlighting the role of oral health as an integral part of general health that is essential to well-being and the close link between general and dental health.¹³ Studies on OHRQoL in Indonesia have shown similar trends, although they have not been statistically significant.³

This study has reported that there were no significant relationships between age, gender, education level, and quality of life. The lack of a significant relationship between age and quality of life reported in this study may be due to the homogeneity of the age of the subjects. This result is in accordance with a previous study in Brazil that found that the adult age group showed a stronger correlation to quality of life compared to the elderly group. This might have been caused by the high level of tolerance of deteriorating oral health status shown by the elderly group. The results of this study are contrary to a previous study by Ulinski in Brazil, which found that female subjects 60-64 years old with low financial status showed a negative effect of financial status on quality of life. This might have been caused by the fact that women tend to be more self-conscious about their looks and hence more sensitive to their oral health status,

particularly in terms of pain and mastication incompetence.¹⁴

This study reported no significant relationship between education level and quality of life. This result might have been caused by the homogeneity of the subjects' level of education. This might also be due to other factors showing more impact on quality of life, for example, the socioeconomic factor. This is supported by the previous study in Brazil, which found that the lower the income, the less the access to oral health care and subsequently the worse the oral health status. The accumulation of oral disorders imposed a negative effect on the quality of life.¹⁴

Low income was a risk factor for low quality of life ($p = 0.01$); this finding is the same as the result of a study in Mexico with 150 elderly subjects (OR2.7 with $p = 0.01$). These findings suggest that individuals with low incomes and low educational levels must first satisfy their basic needs, such as food, clothing, and transportation, before addressing oral health; thus, oral health may be a relatively low priority among low-income people.¹⁵

Conclusion

The results of this research imply that OHAT and GOHAI are competent tools and could be used in Indonesia. No significant relationship between oral health status and quality of life was found. Education was a contributing factor for oral health status and gender was a contributing factor for quality of life.

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