Reliability of Malayalam version of Geriatric Oral Health Assessment Index among institutionalized elderly in Alleppey, Kerala (India): A pilot study

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Abstract

Background: Oral health has a profound effect on the daily activities of geriatric group. India being a multilingual country, it is essential that instruments used to evaluate the quality of life is in local languages. However, the validation and translational aspect are important before involving a larger cohort of geriatrics. **Aim:** To assess the reliability of Malayalam version of Geriatric Oral Health Assessment Index (GOHAI-m). **Settings and Design:** Institutionalized elderly in Alleppey, Kerala, cross-sectional study. **Materials and Methods:** The 12 items in GOHAI were translated into Malayalam using a back-translation technique. The comprehensibility of the Malayalam version was assessed by a pilot study. Fifty institutionalized elderly answered the questionnaire. Impact based on age and marital status was also assessed. **Statistical Analysis:** Independent sample *t*-test, Cronbach's alpha, test–retest reliability using intraclass correlation coefficient (ICC). **Results:** The mean GOHAI-m scores were higher for elderly participants with slightly more impact on quality of life such as for biting or chewing food, and lower mean GOHAI-m scores indicated a positive impact on quality of life such as their self-conscious of oral health. Cronbach's alpha of 0.677 was reached with 12 items. Item 12 had a negative item-total correlation, –0.016, the deletion of Item-12 increased the item correlation to 0.7. Test–retest reliability of 0.65 for ICC indicated moderate stability. Females had more impact than males ($P < 0.05$). Age and marital status had no impact on their quality of life. **Conclusion:** The primary analysis of GOHAI-m indicated moderate stability. The elimination of negative items depends on the objectives of the study and/or after conducting a larger study keeping in view various parameters of the study.

Keywords: Geriatric assessment, Geriatric Oral Health Assessment Index, psychometrics, quality of life, reproducibility

Introduction

Populations around the world are rapidly aging, with some of the fastest change occurring in low- and middle-income countries. Between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%. The absolute number of people aged 60 years and over is expected to increase from 605 million to 2 billion over the same period.[1] The population of people worldwide is constantly growing older, and their health-related quality of life (HRQoL) is an increasing public health concern.[2] The outcomes of oral health conditions and therapy for those conditions are described by the term "oral health-related quality of life" (OHRQoL).[3,4] The relation between oral health and general health is particularly visible among senior citizens because the large proportion of them does not or even cannot follow the necessary teeth and denture hygiene practices, which has additional negative oral health impacts.[5,6]

In India, with its population of over one billion people, people older than 60 years constitute 7.6% of the total population, which amounts to 76 million.[7] Oral health has a profound effect on the daily activities of the geriatric group, which can affect their functions, cause pain, and have an impact on their psychological and behavioral aspects. Hence, special instruments are required to evaluate the quality of life in this

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How to cite this article: Shekhawat KS, Chauhan A, Koshy AA, Rekha P, Kumar H. Reliability of Malayalam version of Geriatric Oral Health Assessment Index among institutionalized elderly in Alleppey, Kerala (India): A pilot study. Contemp Clin Dent 2016;7:153-7.

group. Geriatric Oral Health Assessment Index (GOHAI) is one such instrument that evaluates the impact on daily lives of the aged. The GOHAI consists of 12 items, which aims at measuring the problems related to physiological, physical, and psychological aspects. It measures the patient reported oral functional problems in a simple to administer manner. GOHAI gives greater weight to functional limitations and pain and discomfort, which are more immediate. Introduced in 1990,[8] its internal consistency has been satisfactorily validated in Malaysia, Germany, France, and Arabic Countries where local versions have shown acceptable reliability and validity.[9,10]

Before introducing an index such as GOHAI, it is essential to carry out a rigorous translation and validation process of the instrument before using it in another population with a different culture. The aim of the study was to assess the reliability of the GOHAI translated in Malayalam (native language spoken in Kerala) (GOHAI-m) in a sample of institutionalized elderly in Kerala and a secondary objective of determining the impact based on age, gender, and marital status.

Materials and Methods

The process of adapting GOHAI index for the elderly in Malayalam version and evaluating its psychometric properties involves three main steps, translation of English version into Malayalam, a pilot study and a main study for reliability and validity testing. This study is only concerned with the first two steps.

Translation
The GOHAI was translated into Malayalam by two dentists' who were fluent in both English and Malayalam. The Malayalam version was then back-translated into English by two other dentist's and then compared with the original version to verify for proper translation.

The OHRQoL was assessed using GOHAI developed by Atchison and Dolan. It consisted of 12 questions, with five Likert scale options, scoring as "often," "always," "seldom," or "sometimes," and "never" reflecting the aspects that are considered to have an impact on the quality of life of the older population. Additive scores for the GOHAI were obtained by summing the response codes for the 12 items.

Study population and setting
This cross-sectional study was conducted to determine the OHRQoL of geriatric patients, living in an old age home in Alleppey district of Kerala with good access to public transport. The study was conducted in the month of April 2015. Prior permission and ethical clearance were obtained from the concerned authorities of Indira Gandhi Institute of Dental Sciences (IGIDS), Pondicherry. A letter seeking permission to carry out the study in Alleppey District was obtained from the principal of IGIDS. The concerned authorities who run and manage the old age home were explained about the study and permission obtained in person. No incentives were given to any subjects to be a part of the study. The individuals living in the old age home are of varied marital status and aged above 60 years. All the individuals were approached, and the nature of the study explained. Confidentiality and anonymity were assured and only those providing informed consent were included in the study. Oral examination was not carried out; however, after the study, oral hygiene instructions were given to all the inmates of the old age home. The GOHAI score was calculated by adding the score of the 12 items ranging from 0 to 60. Other questions referred to age, gender, and marital status.

Data analysis
The data obtained were entered into Microsoft excel sheet and analyzed for frequency distribution. The internal consistency of this version was determined using standardized Cronbach's alpha [alpha if item-deleted and item total correction correlations. To assess the test–retest reliability, the study participants repeated GOHAI 2 weeks after the questionnaire was first administered. Test–retest reliability was measured using intraclass correlation coefficient (ICC). Significant differences with respect to gender, age, and marital status were analyzed using independent sample *t*-test (Statistical Package of Social Sciences (SPSS), version 17.0, SPSS Inc., Chicago, IL, USA). In addition, the GOHAI item responses were combined and calculated using an additive method to report those dimensions which were often and always affecting their quality of life. The responses were combined as, a – never, b – sometimes + seldom, and c – often + always.

Results

Altogether the final sample consisted of fifty participants aged above 60 years. The age ranged from 65 years to 75 years. The mean age was found to be 70.32 years. The findings of this study revealed more number of participants below 70 years with more females than the males. About 58% of them were staying single when compared to those living with their spouses [Table 1].

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Table 2 shows the internal consistency using Cronbach's alpha as 0.677. Correlation between global score and items was tested to assess the internal consistency of the scale. The GOHAI Item 12 was negatively correlated with global score, with coefficient of −0.16 indicating that this item does not provide much information about behavioral impacts among participants. In fact, the column, "Cronbach's alpha if item deleted" shows that eliminating this GOHAI-m item leads to higher Cronbach's alpha coefficient from 0.677 to 0.7.

Table 1: Distribution of participants according to age, gender, and marital status

Variable	*n* (%)
Age (years)	
<70	32 (64)
>70	18 (36)
Gender	
Male	4 (8)
Female	46 (92)
Marital status	
With spouse	21 (42)
Staying single	29 (58)

Table 2: Reliability analysis using Cronbach's alpha of Geriatric Oral Health Assessment Index-Malayalam

GOHAI items (Malayalam)	Corrected item-total correlation	Cronbach's alpha if item deleted
GOHAI item 1	0.413	0.645
GOHAI item 2	0.511	0.617
GOHAI item 3	0.627	0.585
GOHAI item 4	0.157	0.679
GOHAI item 5	0.309	0.660
GOHAI item 6	0.125	0.681
GOHAI item 7	0.234	0.669
GOHAI item 8	0.149	0.677
GOHAI item 9	0.274	0.667
GOHAI item 10	0.493	0.628
GOHAI item 11	0.388	0.653
GOHAI item 12	−0.016	0.696

Standardized Cronbach's alpha - 0.677. GOHAI: Geriatric Oral Health Assessment Index

Table 3 shows the participants response to GOHAI-m items and the values of mean GOHAI-m scores and standard deviation. The scores ranged from 0 to 60 with a mean score of 18.32 ± 10.11. The negative responses or items with highest score (often and always) as observed in the study population are as follows:

- 9 (18%) of the study participants reported limitations for GOHAI-m Item 2: Trouble in biting or chewing food (mean: 1.96, SD: 1.4)
- 7 (14%) of the study participants reported for GOHAI-m, Item 5: Discomfort in eating food (mean: 1.90, SD: 1.3).

Psychological impacts were least affected, with none of the study participants reporting any "nervousness or self-conscious about their oral health and felt uncomfortable when eating in front of others [Table 3, GOHAI-m, Item 10 and Item 11]. The test–retest correlation for the total GOHAI-m score with ICC was found to be 0.65 for the 95% confidence interval.

Mean GOHAI scores were higher for participants aged above 70 years and those staying single with no significant differences between them ($P > 0.05$) [Table 4]. However, significant differences were found in the mean GOHAI-m scores of females and males ($P < 0.05$). GOHAI-m scores and their frequency distribution are shown in Table 3. The mean GOHAI-m scores were calculated to be 18.32 ± 10.11. Majority of the participants never had any problems in any of the dimensions; however, functional limitation (Item 2) and pain and discomfort (Item 5) were the one which often had an impact on their daily life.

Discussion

This study was conducted to measure the GOHAI-m among institutionalized elderly of Kerala, India. This pilot study was conducted to determine the qualitative and quantitative properties of Malayalam version of GOHAI.

Translation
The pilot study provided an opportunity to improve and revise the instrument. Items identifying psychological impact in GOHAI, "uncomfortable eating in front of others," and Item related to Functional limitation," Problems during speaking," were reframed to elicit the impacts in a more meaningful way. Under psychological impacts, "nervous or self-conscious" was modified accordingly. Overall, a few words from each item were modified for proper understanding of the questionnaire.

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The findings of the study showed that a majority of impacts were not acutely perceived or felt by the study subjects. Those impacts felt immediately were for Item 2 and Item 5 (physical function) with underlying Cronbach's coefficient of 0.511 and 0.309, respectively. It was interesting to note that the Cronbach's alpha coefficient for item 3 (uncomfortable to swallow) was higher even though the limitation was reported by less number of study participants. Other items higher than Item 2 and Item 5, but not reported were for items 1 (0.413), 3 (0.627), 10 (0.493), and 11 (0.38), respectively. These items showed sufficient internal consistency to be included in the questionnaire. The remaining items of GOHAI-m (Items 4, 6, 8, and 12) made only small contribution to the global score. One reason could be that in this study setting, the study population did not experience any difficulty in talking or interacting with others and more importantly very few (4%) took medication for any pain.

In this study, we observed that 18% of the study participants reported difficulty in biting or chewing food and 14% reported discomfort in eating food which was far less when compared to a study conducted in 2013 where limitation for these items was found to be 82.5% and 49.2%, respectively.[11]

Table 3: Item responses in numbers and Geriatric Oral Health Assessment Index scores

GOHAI items (Malayalam version)	a	b	c	Mean GOHAI score±SD
Amount of food intake reduced	33 (66)	15 (30)	2 (4)	1.5±0.909
Trouble in biting or chewing food?	29 (58)	12 (24)	9 (18)	1.96±1.498
Uncomfortable to swallow?	30 (60)	19 (28)	1 (2)	1.52±0.789
Difficulty in speech	22 (44)	22 (44)	6 (12)	1.96±1.228
Discomfort when eating food	27 (54)	1 (2)	7 (14)	1.9±1.359
Difficulty interacting with others	38 (76)	11 (22)	1 (2)	1.3±0.614
Unhappy with your appearance	40 (80)	9 (18)	1 (2)	1.26±0.664
Any medications to relieve pain	22 (44)	26 (52)	2 (4)	1.64±0.749
Worried or concerned about your oral hygiene	39 (78)	10 (20)	1 (2)	1.3±0.707
Nervous or self-conscious about oral hygiene	40 (80)	10 (20)	0	1.22±0.465
Feel uncomfortable when eating in front of others	38 (76)	12 (24)	0	1.26±0.487
Sensitive to hot and cold foods	28 (56)	21 (42)	1 (2)	1.5±0.647
Total				18.32±10.116

Usually followed scoring - 1: Never; 2: Seldom; 3: Sometimes; 4: Often; 5: Always; Scoring combined for the present study - a: Never; b: Seldom + sometimes; c: Often + always; GOHAI: Geriatric Oral Health Assessment Index; SD: Standard deviation

Table 4: Geriatric Oral Health Assessment Index scores (in percentages)

Variable	Frequency, *n* (%)	GOHAI score	*t*	Significant (*t*-tailed)
Age (years)				
65-69	32 (64)	17.56	−1.42	0.16
70-74	18 (36)	19.67		
Gender				
Male	4 (8)	14.40	−1.80	0.05*
Female	45 (92)	18.76		
Marital status				
With spouse	21 (42)	17.67	−0.77	0.45
Staying single	29 (48)	18.79		

*P value is significant at *P*=0.05. GOHAI: Geriatric Oral Health Assessment Index

Interestingly, we found that none of the study participants reported any limitation in psychological dimension (GOHAI-m, Item 10) and social integration (GOHAI-m, Item 11) which always affected their quality of life. Only about 20% of them reported the above impact occasionally. The proportion of study population with such limitation was found to be higher for psychological dimension[1,12] and social integration,[9] respectively. Nevertheless, these findings indicate that any form of impairment due to oral disability does not necessarily mean negative impact on quality of life.

Statistical analysis of the scale showed that this form of the questionnaire led to a Cronbach's alpha coefficient of only 0.677, which is low compared with the minimum required of 0.7 for the 12 items to be accepted.[13] This value could be increased by eliminating negative values as observed in Item 12 (sensitive to hot and cold foods [−0.016]). Eliminating Item 12 would increase the coefficient of Cronbach's alpha

to 0.7 when compared to 0.677. However, several aspects need to be thought of before taking a concrete step. This pilot study was conducted on a small number of subjects which are not representative of the entire sample, and Item 12 of the Malayalam version could be relevant had any of the subjects were completely edentulous. Since in this study, any history of pain was not elicited from any study subject nor was the criteria to be included in the study sample, there is a possibility that study subjects might not have thought dental pain as necessary to report. Furthermore, the study subjects may or may not have sufficient natural teeth with little or no risk for sensitivity. Some elderly people feel hesitant to disclose their discomfort assuming such discomforts to be a normal part of aging. The findings from this version of GOHAI-m are similar to a study conducted in 2010 where Romanian version was pilot tested and Cronbach's alpha of 0.635 was obtained, and required the elimination of GOHAI-Ro Item 12 (sensitive to hot and cold) which will increase the internal consistency to 0.713.[14] Studies have been conducted in the past where the 12th item of GOHAI has been ruled out, and advocated using the 12th item according to its relevancy in the study population.[11,15] The final decision regarding inclusion of 12th item depends to a large extent on the interest of the investigator and objectives of the research.

Another objective of this study was to determine the impact of OHRQoL based on age, gender, and marital status. Age and marital status had no significant impact on OHRQoL, but females had more impact than males which was statistically significant (*P* < 0.05). The characteristic "feel good" factor associated with marriage did not have any impact on GOHAI-m scores since the scores obtained had a marginal difference and were statistically not significant. A study conducted in 2013 found more GOHAI scores from married participants than from those who are single and/or widow/er.[11]

The study has several limitations; (1) the obvious next step in the study was to make another statistical analysis without item 12, which was not performed. We feel that had the analysis been done, the results of our study would have been more concrete. (2) other factors such as a number of missing teeth and use of denture (removable and/or fixed) should be considered, and (3) the main study has to be conducted on a larger sample size for reliability and validity.

It can be concluded that GOHAI-m can be used owing to its sufficient coefficient of Cronbach's alpha, considering other factors such as the aim and parameters of the study. Item - 2 (functional limitation) and Item - 5 (pain and discomfort) were the impacts commonly affected. Psychological impacts were least affected.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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