Translation and Validation of the Chinese Version of GOHAI

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Abstract

Objective: To translate and validate the Chinese version of General Oral Health Assessment Index (GOHAI) for elderly in Hong Kong and to investigate factors that possibly may influence the GOHAI scores. Methods: The English version of GOHAI was translated into Chinese. Persons aged 60-80 years were interviewed by two trained interviewers and clinically examined by a dentist. Information on subjects' demographic background and oral health conditions was collected. Results: Altogether 1,023 elderly were interviewed and clinically examined. The mean GOHAI score was 48.9 (SD=7.2). Cronbach's alpha of the translated GOHAI was 0.81; item-scale correlation ranged from 0.28-0.61. It was found that the mean GOHAI scores were lower for subjects with poorer perceived oral health (rs=0.57, P<.001). Elderly who had perceived dental treatment need had a lower mean GOHAI score than those who did not (P<.001). It was also found that elderly who lived in elderly homes, those who received social welfare assistance, those who had recent dental visits, and those with higher DMFT scores had higher mean GOHAI scores. Conclusion: The translated Chinese version of GOHAI demonstrated acceptable reliability and validity. It is available for use by researchers in oral health-related quality of life studies on Chinese elderly population. [J Public Health Dent 2002;62(2):78-83]

Key Words: oral health, quality of life, questionnaire, validity, elderly.

Over the past three decades, a variety of quality of life instruments have been introduced for use in the health care industry. In 1996 a conference entitled "Assessing oral health outcomes-measuring health status and quality of life" was held in Chapel Hill and 11 oral-health-related quality-oflife measures were reviewed. All those instruments were either self-completed or interviewer-administered. The number of items included in those instruments ranged from 3 to 73 (1,2). Geriatric Oral Health Assessment Index (GOHAI), which was originally developed for assessing the self-reported oral health status in elderly, was among one of those reviewed measures (3). GOHAI is a 12-item instrument intended to evaluate three different aspects of oral health-related quality of life: (1) physical functioning, including eating, speech, and swallowing; (2) psychosocial functioning, including worry or concern about oral health, dissatisfaction with appearance, self-consciousness about oral health, and avoidance of social contacts because of oral problems; and (3) pain or discomfort, including the use of medication to relieve pain or discomfort from the mouth. A GOHAI score was computed from the subject's responses to the 12 questions, a higher score indicating a better perceived oral health status and quality of life. This instrument demonstrated acceptable reliability and validity in the original study (3).

Since its development, the GOHAI has been adopted in various studies as an epidemiologic tool to measure oral problems or as an outcome measure (4-11). Matthias et al. (4) used GOHAI score as one of the predictors for self-ratings of dental appearance in an eld-erly population in Los Angeles and found that it was a significant predictor. GOHAI has been used in a study to compare the impact of oral disease in two populations of older adults. A significant difference in mean GOHAI

score between the two groups was found, suggesting GOHAI could be used as an indicator of the impact of oral conditions on functioning and well-being in a variety of samples (7). The sensitivity of GOHAI to dental treatment was evaluated in a health promotion project in which subjects completed baseline and 24-month follow-up interviews that included the GOHAI, as well as other self-reported measures of oral health. Findings suggested that the GOHAI was sensitive to the provision of dental care (8). Although the GOHAI was originally developed for use among the elderly, it also has been used in an all-age adult sample of Hispanics and African Americans and the validity of GOHAI was investigated. The study confirmed that GOHAI was valid when used in a younger, ethnically diverse sample (10). With the above results, GOHAI was renamed the General Oral Health Assessment Index (6).

The aim of this study was to translate the original English version of GO-HAI into a Chinese version, to validate the translated instrument for the elderly in Hong Kong, and to investigate the possible factors that may influence the GOHAI score.

Methods

GOHAI is a 12-item instrument intended to evaluate three different aspects of oral health-related quality of life, including physical functioning, pain and discomfort, and psychosocial functioning. Nine and three questions were asked in the negative and positive ways, respectively, to discourage respondent acquiescence. There are five response categories for each question and a score has been assigned for each response category (1=always, 2=often, 3=sometimes, 4=seldom, and 5=never). Scores from the positively worded questions were reversed during data processing so that the direc-

Send correspondence and reprint requests to Ms. Wong, Faculty of Dentistry, University of Hong Kong, 3/F, Prince Philip Dental Hospital, 34 Hospital Road, Hong Kong. E-mail: mcmwong@hkucc.hku.hk. Drs. Liu and Lo are both affiliated with the Faculty of Dentistry, University of Hong Kong. This paper was presented at the 14th Annual Scientific Meeting of the Southeast Asian Division of IADR in September 27–29, 1999, in Singapore. Manuscript received: 1/17/01; returned to authors for revision: 4/18/01; accepted for publication: 6/12/01. tions of all responses were the same. The GOHAI score was computed by adding up the scores of the responses to the 12 questions. Thus, the GOHAI score ranges from 12 to 60, and a higher score indicates a better reported oral health status.

Primary

Tertiary

<1 year

1-2 years

2-5 years

> 5 years

Secondary

Last dental visit

No formal educ.

GOHAI was originally developed in English. To make use of this instrument to measure the oral health-related quality of life of elderly Chinese in Hong Kong, translation of the instrument was necessary. Since about one-third of the elderly in Hong Kong were illiterate (12), the translated GO-HAI needed to be administered by an interviewer in colloquial Chinese. To understand how the elderly expressed their concerns about oral health issues, three focus group discussions were conducted in two elderly homes and one social center for elderly. The information collected was used to translate GOHAI into colloquial Chinese by the authors. The draft Chinese version of the GOHAI was translated back into English by two dentists who were not involved in the study to check whether the questions were translated properly. The translated GOHAI was then pilot tested on a convenient sample of 20 elderly subjects who were either patients attending a dental hospital or residents in an elderly home. Minor modifications were then made according to the comments given by these elderly.

For the validation of the translated GOHAI, elderly persons aged 60-80 years in elderly homes or at social centers were recruited. A total of 15 elderly homes and eight social centers in Hong Kong were selected from the list of institutions applying for an outreach dental service provided by the Faculty of Dentistry of the University of Hong Kong. The elderly subjects completed the translated GOHAI questionnaire in face-to-face interviews conducted by two trained interviewers. Questions concerning each subject's demographic background, time lapsed since the last dental visit, perceived oral health status, and perceived treatment needs also were asked. The subjects then underwent a clinical examination to assess the dental and the periodontal condition following procedures and diagnostic criteria recommended by the World Health Organization (13).

The internal consistency of the translated GOHAI was assessed by

Cronbach's alpha. Item-scale correlation coefficients were used to assess the correlation between the individual items with the GOHAI score. A principal component factor analysis was performed to explore the factor structure of the translated version of GO-HAI, factors with eigenvalues larger than 1 were extracted and Varimax with Kiser normalization rotation method was used. To test the construct validity of the translated GOHAI, the associations between the GOHAI score and a single-item self-rated oral health measure and subject's perceived treatment need were examined. Test-retest correlation coefficients (Spearman's rank correlation coefficients) and weighted kappa were obtained to assess the reliability of the translated GOHAI by re-interviewing 47 elderly persons one week after the first interview by the same interviewer in order to eliminate the interviewer effect on the responses.

To investigate the effects of a set of independent variables on the GOHAI score, analysis of covariance (AN-COVA) was performed. The selected independent variables included sex, age in years, education level, type of residence, receiving social welfare assistance or not, time lapsed since last dental visit, DMFT score, and maxi-

mum CPI score recorded in the six sextants. Variables that did not reach the predetermined statistically significant level were removed and only the significant variables were retained in the final model. The level of significance was set at .05.

45

42

10

4

24

15

20

41

<.001

Results

Altogether, 1,023 elderly persons with a mean age of 72.3 years (SD=5.1 years) were interviewed. Of these, 40 percent (405) lived in elderly homes, 43 percent (447) were living with their family, and 17 percent (171) were living alone. The demographic background of the elderly subjects with different living arrangements is shown in Table 1. Comparing the elderly living in elderly homes with the communitydwelling elderly, there was a higher percentage of males (P<.001), and a higher percentage of government social welfare assistance recipients (P<.001). The education level of the elderly subjects was low, and was similar to that of the general elderly population in Hong Kong (12). Proportionally more of the elderly who were living with their family were found to have a recent dental visit than those who were living in elderly homes or living alone in community (P<.001).

Demographic Background of Elderly Subjects					
	Institutionalized (n=405)	Living with Family (n=447)	Living Alone in Community (n=171)	P-value	
Sex				<.001	
Male	46	25	25		
Female	54	75	75		
Receive social welfare assistance				<.001	
Yes	79	17	54		
No	21	83	46		
Education				.029	

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TABLE 1

Individual Question	1=Always	2=Often	3=Sometimes	4=Seldom	5=Never
Physical functioning					
No trouble biting/chewing*,§	23.9	17.5	11.5	16.3	30.8
Have to limit food intake/choice of food†	5.2	20.6	25.0	27.0	22.2
Able to speak clearly*,§	45.5	29.1	15.5	7.3	2.5
Pain and discomfort					
Discomfort during eating‡	6.2	9.1	24.7	18.4	41.6
Sensitive to hot/cold/sweet/sour foodt	5.7	10.4	22.7	11.3	50.0
Use medication to relieve paint	0.3	0.9	6.3	18.3	74.3
Unable to swallow comfortably‡	0.9	4.3	15.0	17.5	62.4
Psychosocial functioning					
Worried about teeth problemst	1.3	3.3	15.8	14.2	65.4
Limit contacts with peoplet	0.8	0.5	3.1	7.5	88.1
Uncomfortable eating in front of otherst	1.7	2.4	4.8	4.7	86.4
Self-conscious of teeth problemst	0.9	2.5	9.6	11.8	75.2
Pleased with look of teeth ^{LS}	14.0	34.8	27.8	15.0	8.5

 TABLE 2

 Percentage Distribution of Subjects According to Responses to Individual GOHAI Questions (n=1,023)

*Items that were negatively worded in the original version of GOHAI but translated into positively worded in the Chinese version of GOHAI. +Items that were negatively worded in both the original and Chinese versions of GOHAI.

‡Items that were positively worded in the original version of GOHAI but translated into negatively worded in the Chinese version of GOHAI. ¶Items that were positively worded in both the original and Chinese versions of GOHAI.

§Positively worded items-distribution before recoding.

The mean DMFT score of all the examined elderly was 18.8 (SD=9.2) and the major component was missing teeth (mean=16.5, SD=9.6). Twelve percent of the surveyed elderly were edentulous. Twenty-two percent of the elderly did not undergo a periodontal examination either because they were edentulous or they did not have at least two teeth in any of the six sextants. Among those who were examined, according to their highest CPI scores, only 1 percent had healthy periodontal tissue (CPI=0), 2 percent had bleeding on probing only (CPI=1), 32 percent had calculus but no periodontal pockets (CPI=2), 44 percent had shallow pockets only (CPI=3), and 22 percent had deep pockets (CPI=4).

To facilitate the translation of the English version of GOHAI into a Chinese version using colloquial Chinese, three focus group discussions were conducted. The information obtained was very valuable, as it revealed that the elderly subjects did not fully understand the direct translation of some of the questions in the English version. One example was "How often did you limit contacts with people because of the condition of your teeth or dentures?" The elderly subjects did not quite understand the meaning of "limit contacts with people." After discussion with the elderly subjects, the question was reworded to "How often did you try to avoid talking to or meeting with people because of the condition of your teeth or dentures?" Another example was "How often were you able to swallow comfortably?" The elderly found the question easier to answer when the direction of the wordings was changed into negative, that is, "How often were you unable to swallow comfortably?" All these comments from the elderly collected during the focus group discussions were incorporated in the translated Chinese version. The translation of this Chinese version back into English by two independent dentists not involved in the study showed that the questions in the Chinese and English versions were compatible.

In the original version of GOHAI, there were three positively and nine negatively worded questions designed to discourage respondent acquiescence. In the translated Chinese version of GOHAI, there were also three positively and nine negatively worded questions. However, due to a difference in culture and language as mentioned above, two of the positively worded questions in the original version had to be translated into negatively worded questions and two of the negatively worded questions in the original version had to be translated into positively worded questions (Table 2). To have the positively worded questions spread more evenly throughout the questionnaire, the order of the questions in the translated Chinese version was different from that of the English version.

Table 2 shows the percentage distribution of the elderly subjects according to their responses to the individual questions. In general, the elderly reported more problems in the aspect of physical functioning than in the aspects of pain and discomfort, and psychosocial functioning. Further analysis to investigate the relationship between the dentate status of the elderly and their responses to the individual questions were done. The elderly were classified as either dentate or edentulous (over 90% of the edentulous elderly wore dentures). It was found that proportionally more dentate elderly had no trouble in biting or chewing (responded "often" or "always") compared to the edentulous subjects (43% vs 27%; P<.001). Moreover, a higher percentage of the dentate elderly were able to speak clearly (responded "often" or "always") than the edentulous subjects (76% vs 63%; P<.001). On the other hand, proportionally more of

		Test-Retest Correlation		
Individual Question	Irem-scale Correlation	Weighted Kappa	Spearman's Rank Correlation Coefficient	
Physical functioning		<u></u>		
No trouble biting/chewing*	0.50	0.53	0.62	
Have to limit food intake/choice of food	0.59	0.48	0.62	
Able to speak clearly*	0.42	0.26	0.35	
Pain and discomfort				
Discomfort during eating	0.60	0.44	0.58	
Sensitive to hot/cold/sweet/sour food	0.28	0.52	0.74	
Use medication to relieve pain	0.30	0.51	0.44	
Unable to swallow comfortably	0.51	0.42	0.50	
Psychosocial functioning				
Worried about teeth problems	0.61	0.51	0.53	
Limit contacts to others	0.39	0.40	0.43	
Uncomfortable eating in front of others	0.44	0.63	0.56	
Self-conscious of teeth problems	0.53	0.33	0.28	
Pleased with look of teeth*	0.40	0.68	0.76	
GOHAI score		0.87†	0.83	

 TABLE 3

 Item-scale and Test-retest Correlation for Individual Questions

*Positively worded items; scores were reversed before adding up to compute the GOHAI score. †Intraclass correlation coefficient.

the edentulous elderly had discomfort during eating (responded "often" or "always"), and were not sensitive to hot/cold/sweet/sour food (responded "never") than the dentate subjects (27% vs 14% and 81% vs 45%, respectively; P<.001). Table 2 shows that while the distributions of subjects' responses were monotonic or inverted U-shaped in 11 out of the 12 items, the distribution of responses for the item "No trouble biting/chewing" was Ushaped. It was found that the elderly with natural teeth or fixed prosthesis had a monotonic decrease in the percentages for this item (always, 38%; often, 20%; sometimes, 12%; seldom, 16%; never, 14%), while the elderly with no natural teeth or wearing dentures had a monotonic increase in the percentages (always, 13%; often, 16%; sometimes, 11%; seldom, 17%; never, 43%). When the two groups were combined together, a U-shaped distribution was observed. The distribution of GOHAI scores was skewed, more than 80 percent of the elderly had a score above 40. The GOHAI scores of the subjects ranged from 22 to 60, with a mean score of 48.9 and standard deviation of 7.2.

The Cronbach's alpha of the translated GOHAI was 0.81 and the item-

TABLE 4
Factor Loadings of Rotated Factors Resulted from Principal Component Factor
Analysis on 12 Questions in Translated GOHAI

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Individual Question	Factor 1	Factor 2	Factor 3
Physical functioning			
No trouble biting/chewing*	0.86		
Have to limit food intake/choice of food	0.76		
Able to speak clearly*	0.61		
Pain and discomfort			
Discomfort during eating	0.59		0.45
Sensitive to hot/cold/sweet/sour food			0.75
Use medication to relieve pain			0.66
Unable to swallow comfortably	0.46		0.44
Psychosocial functioning			
Worried about teeth problems		0.44	0.55
Limit contacts to others		0.82	
Uncomfortable eating in front of others		0.77	
Self-conscious of teeth problems		0.63	
Pleased with look of teeth*		0.47	

*Positively worded items; scores were reversed before performing the factor analysis.

scale correlation coefficients ranged from 0.28 to 0.61 (Table 3). The test-retest correlation as measured by the Spearman's rank correlation coefficient for the GOHAI score was 0.83 and the intraclass correlation coefficient was 0.87. For individual items, the weighted kappa values ranged from 0.26 to 0.68 and the Spearman's rank correlation coefficients ranged from 0.28 to 0.76. The two questions with the lowest test-retest reliability were "How often did you feel nervous or self-conscious because of the problems with your teeth, gums, or dentures?" and "How often were you able to speak clearly?"

Results of the principal component factor analysis revealed three factors that supported the theoretical construction of the index. Altogether, the three factors could explain 56 percent of the total variance of self-reported oral health as measured by the translated GOHAI scores. Factor loadings, with values bigger than 0.4, for the rotated factors are shown in Table 4. The first factor included questions mainly concerning physical functioning, the second factor included questions mainly concerning psychosocial functioning and the third factor included questions mainly concerning pain and discomfort.

It was further found that the mean GOHAI scores were lower for subjects with poorer perceived oral health (Table 5). The Spearman's rank correlation coefficient between the GOHAI score and the perceived oral health status was 0.57, which was statistically significant (P<.001). This supported the constructed validity of GOHAI that higher GOHAI scores indicated

TABLE 5
Mean GOHAI Scores in Relation to Perceived Oral Health Status and to
Perceived Treatment Need

	n	Mean GOHAI Score	P-value
Perceived health status			<.001
Very healthy	102	55.9	
Healthy	318	51.8	
Average	285	48.7	
Unhealthy	193	45.8	
Very unhealthy	112	40.4	
Perceived treatment need			<.001
Yes	480	46.6	
No	543	50.9	

TABLE 6 Relationship Between GOHAI Scores and Selected Independent Variables Among Elderly Subjects (Results of ANCOVA Analysis)

Independent Variables	Estimate	SE (Estimate)	<i>P</i> -value
Type of residence			<.001
Institutionalized	3.43	0.64	
Living with family	1.40	0.65	
Living alone in community*			
Receiving social welfare assistance			.002
Yes	-1.66	0.52	
No*			
Last dental visit			<.001
<1 year	-2.23	0.57	
1–2 years	-1.12	0.61	
2–5 years	-1.74	0.60	
> 5 years*			
DMFT	0.18	0.02	<.001
Intercept	52.22	0.80	<.001

better reported oral health status. It was also found that elderly who perceived that they needed dental treatment had a lower mean GOHAI score than those who did not (46.5 vs 51.1; P<.001). This also supported the construct validity of GOHAI.

To investigate the possible factors affecting GOHAI scores, eight independent variables were included in ANCOVA; however, only four significant variables remained in the final model (Table 6). It was found that the institutionalized elderly had higher GOHAI scores compared to the elderly who were living with their families or living alone in community. Elderly receiving social welfare assistance from the government had lower GO-HAI scores compared to those who did not. Elderly who had made a more recent dental visit had lower GOHAI scores. Elderly with higher DMFT scores also had lower GOHAI scores.

Discussion

Comparing the percentage distribution of the elderly subjects according to their responses to the individual questions in GOHAI between this study and the study conducted by Atchison and Dolan (3) when they developed the index, it was found that the subjects in this study reported more problems in physical functioning and fewer problems in psychosocial functioning. In addition, the mean GOHAI score of this study sample was lower than that of the original study (48.9 vs 52.5), although the standard deviations were similar (7.2 vs 7.8). One possible reason for the difference is the high prevalence of untreated dental problems among the Chinese elderly in Hong Kong (14), so that they reported more problems in physical functioning, which led to a lower mean GOHAI score that indicated a lower oral health-related quality of life. Nevertheless, the Chinese elderly in Hong Kong might have a higher acceptance of their oral conditions than would respondents from a Western culture such that oral problems would not hinder their social life (15); thus, they reported fewer problems in psychosocial functioning.

The Cronbach's alpha of the translated Chinese version of GOHAI was similar to that of the original English version (0.81 vs 0.79), and similar ranges of item-scale correlation coefficients were obtained in both versions (3). While only one factor emerged from the principal component factor analysis in the original English version, three factors emerged in the translated Chinese version. In fact, these three emerged factors support the theoretical construction of the index. The correlation coefficient between the GOHAI scores and the single-item rating of dental health status in both the English and the Chinese versions were similar (original: 0.47; translated: 0.57). All these suggested that the validity of the translated Chinese version was comparable to that of the original English version. However, it is worth noting that the data collection of the original English version of GOHAI was through self-completion by the subjects themselves, while the data collection of this translated Chinese version of GOHAI was through face-to-face interviews. The reliability and validity of this translated Chinese version when used in studies requiring the subjects to complete the questionnaire by themselves might be different from those reported in this study.

From the results of the ANCOVA, it was interesting to note that elderly subjects who were living in elderly homes had higher mean GOHAI scores (i.e., better reported oral health status) compared to the elderly who were living with their families or living alone in community. The fact that food in the elderly homes was specially prepared, e.g. thoroughly cooked and minced, for easy intake by the elderly and that the elderly had little chance to come into contact with outsiders may partly explain this finding. Further studies on the quality of life of institutionalized elderly are required for a better understanding of this situation. In addition, elderly having more recent dental visits were found to have a lower mean GOHAI score. From an epidemiologic survey of Hong Kong Chinese elderly (16), it was found that their dental visits were mainly symptom driven. Presumably the elderly who had a more recent dental visit were probably those who had more untreated dental problems; thus, they would have lower mean GOHAI scores.

In conclusion, we found that the translated GOHAI demonstrated acceptable reliability and validity, and that it could be used as a valuable instrument for measuring oral health related quality of life for Hong Kong Chinese elderly. For further research, the reliability and validity of the translated Chinese version in studies requiring subjects to complete the questionnaire by themselves should be investigated. The sensitivity of the translated GOHAI to the changes in oral health status should be studied and the use of GOHAI as a tool to evaluate treatment outcomes in the Chinese population should be explored.

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