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Original Article

Reliability and validity of the persian version of the General Oral Health Assessment Index (GOHAI)

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Abstract

Introduction: As the oral health related quality of life has been important in many dental patients GOHAI is an acceptable tool, preparing its Persian version can be useful in oral health research among Persian populations. The aim of this study was to evaluate the reliability and validity of the Persian version of General Oral Health Assessment Index (GOHAI).

Methods: Translation was performed using the forward-backward process. The final Persian version was then tested through an interview and test-retest to evaluate its comprehensibility and reliability. A sample of 150 subjects (20-65 years old) was requested to answer the GOHAI items prior to a clinical examination.

Data on the subjects' socio-demographic characteristics and self-rating report of oral health, general health and dental care needs were recorded. Internal consistency was calculated by Cronbach's α. Interview and test-retest reliability was evaluated by weighted kappa. Concurrent validity was assessed by comparing GOHAI scores and self-rated measures of oral health, general health and perceived dental care needs. Discriminant validity was tested by comparing GOHAI scores with clinical oral condition.

Results: The mean GOHAI score was 46.78±7.85. Cronbach's α (0.78) showed a high internal consistency and homogeneity between items. Weighted kappa coefficient for the interview varied from 0.60 to 0.96 and was between 0.33 and 0.64 for test-retest. Bland-Altman plot displayed a good agreement between the two GOHAI scores for both the interview and test-retest. There was no significant relationship between GOHAI scores and self-rating oral health (p=0.090), but there was a relationship between self-rating general health and mean GOHAI scores (p=0.047). Also, the low GOHAI scores were associated with the perceived dental care needs (p=0.001). There was an opposite correlation between GOHAI scores and caries and missing teeth (p<0.0001).

Conclusions: The Persian version of the GOHAI exhibits acceptable reliability and validity, so it can be used widely throughout the Persian communities.

Keywords: GOHAI, Persian, Quality of life, Questionnaire

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پایایی و روایی نسخه فارسی پرسشنامه (GOHAI)

چکیده

مقدمه: امروزه کیفیت زندگی وابسته به سلامت دهان در بیماران دندانپزشکی و پزشکی اهمیت ویژه ای داشته و در این زمینه پرسشنامه GOHAI مورد قبول می باشد. لذا تهیه نسخه فارسی آن می تواند در جوامع فارسی زبان مورد استفاده قرار گیرد. هدف این مطالعه بررسی روایی و پایایی نسخه فارسی پرسشنامه GOHAI است.

مواد و روش ها: با استفاده از روش forward-backward ترجمه پرسشنامه انجام شد. نسخه نهایی جهت بررسی comprehensibility و پایایی توسط مصاحبه و test-retest ارزیابی گردید. ۱۵۰ نفر افراد ۲۰ تا ۶۵ ساله قبل از معاینه دهان پرسشنامه نهایی را تکمیل کردند. اطلاعات مربوط به مشخصات فردی اقتصادی و نظرات افراد از سلامت عمومی و سلامت دهان خود ثبت شد. internal consistency با استفاده از ضریب آلفا کرونباخ محاسبه گردید. پایایی مصاحبه و test-retest با ضریب کاپا (Weighted Kappa) تعیین گردید. روایی Concurrent از طریق مقایسه نمره GOHAI و نظرات افراد از سلامت عمومی و سلامت دهان و نیازهای درمانی دندانپزشکی محاسبه شد. روایی Discriminant از طریق مقایسه نمره GOHAI با وضعیت سلامت دهان (معاینات بالینی) محاسبه شد.

یافته ها: میانگین نمره GOHAI ۴۶/۷۸± ۷/۸۵ بود ضریب آلفای کرونباخ معادل۰/۷۸ نشان دهنده internal consistency و homogeneity بین موارد بود.

ضریب کاپا Weighted برای مصاحبه از ۰/۶ تا ۰/۹۶ و برای test-retest از ۰/۳۳ تا ۰/۶۴ متغیر بود. اما Bland-Altman توافق خوبی بین نمره GOHAI در مصاحبه test-retest نشان داد ارتباط معنی داری بین نمره GOHAI و نظر بیماران از سلامت دهان وجود نداشت($p=0.090$) ولی ارتباط بین نمره GOHAIو نظر بیمار نسبت به سلامت عمومی وجود داشت($p=0.047$) همچنین نمرات کم GOHAI با نیازهای درمان دندانی در ارتباط بود($p=0.001$) ارتباط معکوس بین نمره GOHAI و دندان های کشیده شده و پوسیده وجود داشت($p< 0.0001$)

نتیجه گیری: نسخه فارسی GOHAI تهیه شده روایی و پایایی قابل قبولی داشته و می توان از آن در جمعیت فارسی زبان جهت بررسی های بهداشتی و سلامت دهان استفاده کرد.

واژگان کلیدی: GOHAI، فارسی، کیفیت زندگی، پرسشنامه

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Introduction

Recently, the definition of (oral) health has shifted to address more than the absence of physical disease. The new definition defines health as an individual's perception of his health in the context of physical, psychological and social well-being (1).The disease-based approach is the traditional way to measure oral health. Oral disease has been assessed by objective and quantitative indicators (2).

Oral disease prevalence has been studied in different samples of adults, but less is known about how the disease and symptoms affect adults' daily activities and quality of life (2). Therefore, oral epidemiology uses multidimensional constructs known as socio-dental indicators or oral health–related quality of life measures (OHRQoL), which refer to the extent to which oral disorders disrupt an individual's normal functioning and result in major behavior chang (3, 4).

To date, OHRQoL has become an important tool for assessing the impact of a range of **oral and systemic** conditions on an individual's quality of life and well-being (5- 10). The outcomes of clinical care, such as the efficiency of treatment interventions, are also important (11, 12).

Several measures have been developed that have the potential to be used this way (4). The Geriatric Oral Health Assessment Index (GOHAI) is a questionnaire designed to assess the impact of oral conditions on the quality of life (QoL) of the elderly population. GOHAI has also been referred to as the General Oral Health Assessment Index (13).

The original GOHAI has 12 negatively and positively worded items assessing three dimensions of OHRQoL: 1) physical function, representing the pattern of eating, speech and swallowing; 2) pain or discomfort, representing the use of medications to relieve pain or discomfort in the mouth; 3) psychosocial function, representing the worry or concern about oral health, dissatisfaction with appearance, self-consciousness about oral health and avoidance of social contacts because of oral problems (13).

GOHAI has also been found to be a remarkable predictor of self-rated dental appearance in aged people (14). In comparison with other self-reported measures of oral health, GOHAI has been found to be sensitive to dental treatment needs (15, 16). Although GOHAI has been translated into several languages and tested for its validity and reliability (1, 2, 16-23), a Persian version is not yet available. The purpose of this study was to develop a Persian version of the GOHAI, to make the obligatory cultural and ethnical adaptation and to evaluate its reliability, validity and internal consistency for use among the Persian people.

Methods

English version of the GOHAI: The English GOHAI has 12 items in three hypothetical dimensions: physical function, psychosocial function and pain and/or discomfort. For each of the 12 items, the participants were asked if they have always, often, sometimes, seldom or never experienced any of those problems in the previous 3 months.

The questions were sometimes worded in a positive manner and sometimes in a negative manner to force respondents to consider their answer. The responses were scored on a scale ranging from 1 to 5 (1=never; 2=seldom; 3=sometimes; 4=often; 5=always).

When the data were interred into a database, the responses were recoded, if necessary, so that responses indicating good conditions and no problems carried the highest scores. Thus, the scale score was a sum of values; a low value indicated an oral health problem. A summary score (Add-GOHAI) ranging from 12 to 60 was calculated for each subject, with a higher score indicating better oral health.

The translation process and the pilot study: The proposal of this study was approved by the Research Committee and the Ethics Committee of Babol University of Medical Sciences. The written informed consent was taken from each participant. The GOHAI was translated into Persian.

The process involved translating from English to Persian by two bilingual people whose first language was Persian and then a backward translation from Persian to English by two bilingual people whose first language was English.

Once the translation was complete, comparisons between the original English, the back-translated version and the Persian version were drafted and revised by two professional translators and scrutinized for changes in sense.

The final Persian version was then tested on a sample of adults (n=40). The volunteers first answered the 12 questions from the final Persian version on their own; then, they were asked the same questions in an

interview. The interviewers probed the answers to ascertain the meaning equivalent to the original and recoded the volunteers' comments and any difficulty that they encountered.

The comprehensibility of the translated version was assessed, and only minor changes were made to make the questionnaire more understandable. To evaluate test-retest reliability, the GOHAI was re-administered after one week.

Main study

Sample size: The sample size calculation was based on the test-retest reliability, which was measured by the intraclass correlation (r). To be acceptable, the questionnaire had to have an r=0.8 and an r≥0.7; thus, H0: P0=0.7 and H1: P1=0.8. A two-sided test suggested by Atieh et al, (14) was used. With β=0.2 (80% power) and α=0.05, a sample size of 150 subjects was required.

Data collection: The final Persian version of the GOHAI was administered to 150 Persian adults (20–65 years old) attending Ayatollah Rohani Hospital from September 2009 to February 2010. The data came from a self-administered questionnaire followed by a clinical oral examination performed by a single dentist. In addition to the GOHAI items, the questionnaire included socio-demographic data such as age, gender, educational level and employment. The subjects were also asked about the use of removable prostheses, self-rated oral and general health and dental treatment needs.

All oral examinations were performed the same day the questionnaire was administered, in either a dental or medical examination room using portable lamps and disposable instruments. The oral status examination based on 28 teeth involved recording the number of missing teeth, DMFT, root DFT, pathologic tooth mobility and the Oral Hygiene Index-Simplified (OHI-S).

Data analysis: The analysis of the study was carried out using STATA V 10 and SPSS 17.0 for Windows (SPSS 17.0, SPSS Inc. Chicago, IL, USA). The mean Persian GOHAI scores were calculated for the demographic variables using the independent t-test and ANOVA.The GOHAI was computed by adding the score of the 12 items; the final values ranged from 12 to 60.

The original scores were kept for three items—"able to swallow comfortably", "able to eat without discomfort" and "pleased with look of teeth"—and reversed for the remaining nine items, such that a higher score was associated with a more positive oral health. The test-interview and test-retest reliabilities were assessed by paired t-test, the Spearman correlation coefficient and weighted kappa values. A Bland–Altman plot was also used to describe the agreement between the two GOHAI scores taken from the same participants on two separate occasions.

The internal consistency of the GOHAI was assessed by the standardized Cronbach's alpha (the reliability coefficient), the alpha if the item was deleted and the inter-item and inter-table correlation coefficients.

Concurrent validity was assessed by examining the relation between the GOHAI scores and the global oral health rating questions. It was hypothesized that the subjects reporting functional problems, pain or discomfort or psychosocial impacts would have a low GOHAI score and would be more likely to report dissatisfaction with their oral health, more likely to report their oral health as fair or poor and more likely to report a self-perceived need for dental care. The discriminant validity was tested by comparing the individuals' item responses and GOHAI scores with their objectively evaluated dental condition.

Results

For the test-interview, the mean GOHAI score was 50.37–51.1, (p=0.009), and for the test-retest, the mean GOHAI score was 51.28–51.05 (p=0.776) (table 1). The Bland-Altman plot showed a good agreement between the two GOHAI scores for both the test-interview and test-retest conditions (figure. 1, 2).

In the main study, 150 individuals with a mean age of 31.2 (SD: 8.8, range: 20-65 years) completed the GOHAI questionnaire; the distribution of responses on the individual GOHAI items is displayed in table 2.

Half of the subjects were 30 years of age or older. The majority of the participants were females (68.7%). In terms of education, 43.3% of the subjects reported having completed high school, and 35.5% had a high educational level.

The mean GOHAI score was 46.78 (SD=7.85; range 27–60). In relation to the reliability of the Persian version of GOHAI (table 3), Cronbach's α (0.78) showed a high degree of internal consistency and homogeneity between items.

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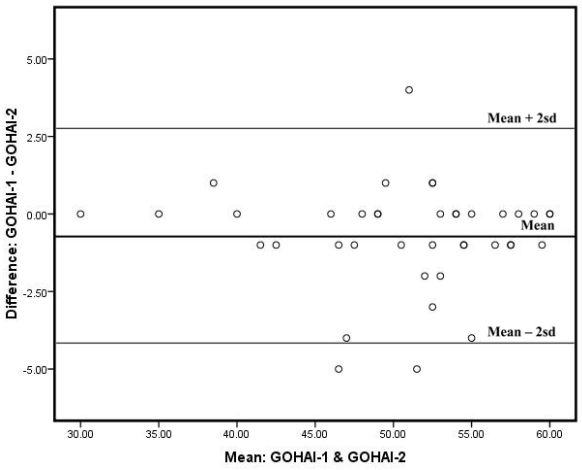

Figure 1. Bland-Altman plot (test-interview)

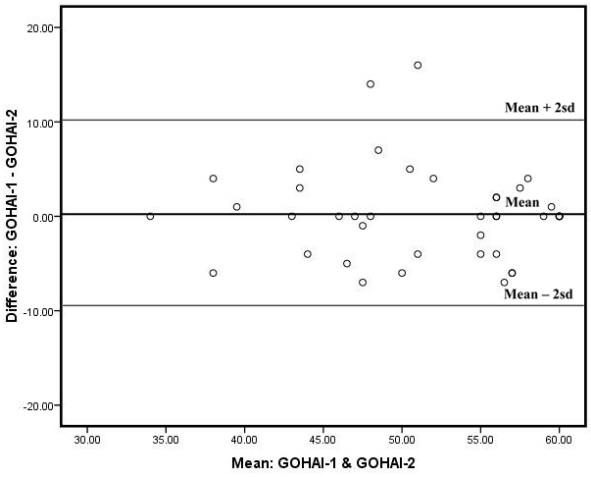

Figure 2. Bland-Altman plot (test-retest)

Table 1. Test-interview & test-retest correlation for the Persian GOHAI items

Item	Weighted kappa	Spearman's rank correlation coefficient	Weighted kappa	Spearman's rank correlation coefficient
Limit the kinds of food	0.783	0.876	0.353	0.445
Trouble biting or chewing	0.829	0.585	0.525	0.709
Able to swallow comfortably	0.868	0.904	0.509	0.571
Unable to speak clearly	0.825	0.866	0.463	0.516
Able to eat without discomfort	0.600	0.620	0.592	0.637
Limit contact with people	0.884	0.954	0.425	0.498
Pleased with look of teeth	0.842	0.827	0.508	0.559
Used medication to relieve pain	0.798	0.872	0.329	0.430
Worried about teeth, gums or dentures	0.888	0.956	0.424	0.519
Self-conscious of teeth, gums or	0.751	0.775	0.638	0.763
Uncomfortable eating in front of others	0.749	0.865	0.590	0.635
Sensitive to hot, cold or sweet foods	0.958	0.980	0.447	0.552
Total	–	0.971	–	0.779

Kappa<0.40 (poor agreement), 0.41–0.60 (moderate agreement), 0.61–0.80 (good agreement),>0.80 (very good agreement)

There was no significant relationship between mean GOHAI score and the subject's age, gender, use of removable partial dentures or Oral Hygiene Index–Simplified (OHI-S), although the subjects with a good OHI-S had a higher GOHAI score than those who had a fair or poor OHI-S. The individuals with a low level of education had lower GOHAI scores compared with the well-educated respondents (table 4). In relation to the concurrent validity (table 4), the subjects with a higher mean GOHAI score were more satisfied with their oral and general health, whereas, low GOHAI scores were associated with self-perceived fair or poor oral health, self-perceived fair or poor general health, a low level of satisfaction with oral health and with the self-perception of dental needs. In relation to the discriminant validity (table 5), the respondents with higher GOHAI scores were associated with a lower number of carious and missing teeth (figure. 3), a better OHI-S score and fewer pathologically mobile teeth.

Table 2. Distribution of responses on individual GOHAI items (%)

GOHAI items	1 never	2 Seldom	3 sometime	4 often	5 always
Limit the kinds of food	57.3	12.0	25.3	4.7	0.7
Trouble biting or chewing	44.0	12.0	27.3	11.3	5.3
Able to swallow comfortably	16.0	2.7	10.0	24.0	47.3
Unable to speak clearly	76.0	9.3	6.0	4.7	4.0
Able to eat without discomfort	10.0	8.7	12.0	32.7	36.7
Limit contact with people	72.0	11.3	10.7	4.7	1.3
Pleased with look of teeth	15.3	22.0	22.0	21.3	19.3
Used medication to relieve pain	66.0	12.0	12.7	7.3	2.0
Worried about teeth, gums or dentures	30.0	14.7	22.0	20.7	12.7
Self-conscious of teeth, gums or	51.3	14.0	22.0	11.3	1.3
Uncomfortable eating in front of others	56.7	17.3	16.0	6.7	3.3
Sensitive to hot, cold or sweet foods	24.0	18.0	32.0	18.7	7.3

Table 3. Reliability analysis using Cronbach's alpha

Item	Corrected item– total correlation	Cronbach's alpha if item deleted
Limit the kinds of food	0.550	0.753
Trouble biting or chewing	0.583	0.746
Able to swallow comfortably	0.041	0.810
Unable to speak clearly	0.372	0.769
Able to eat without discomfort	0.273	0.781
Limit contact with people	0.236	0.780
Pleased with look of teeth	0.388	0.768
Used medication to relieve pain	0.478	0.759
Worried about teeth, gums or entures	0.596	0.743
Self-conscious of teeth, gums or entures	0.546	0.752
Uncomfortable eating in front of others	0.651	0.741
Sensitive to hot, cold or sweet foods	0.455	0.761

Cronbach's alpha= 0.780, Standardized Cronbach's alpha= 0.789

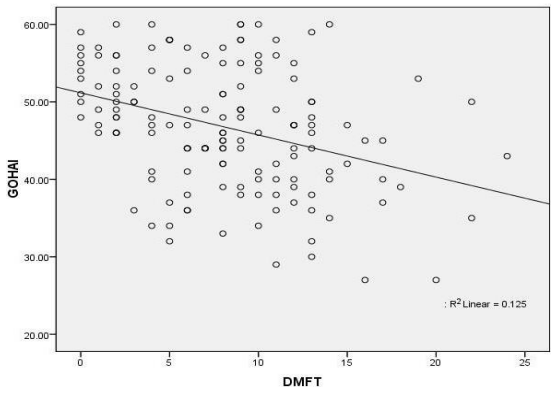

Figure 3. Correlation between GOHAI scores and DMFT

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Table 4. Concurrent validity of GOHAI scores and certain groups of questions

Variable (standard deviation)		GOHAI Mean±SD	Test
Self-rating of oral health			
Good :	n=36	49.11±8.91	ANOVA
Fair:	n=96	46.32±7.51	P value=0.090
Poor:	n=17	44.59±6.85	
Self-rating of general health			
Good :	n=74	48.01±8.48	ANOVA
Fair:	n=74	45.81±6.98	P value=0.047
Poor :	n=21	37.00±2.83	
Perception of dental care needs			
Yes :	n=129	45.97±7.80	T-test
No:	n=20	52.10±6.28	P value=0.001
Age			
18–30 years:	n=85	47.32±7.57	T-test
31–65 years:	n=65	46.08±8.21	P value=0.339
Gender			
Male	n=47	47.55±7.87	T-test
Female	n=103	46.42±7.86	P value=0.417
Educational level			
Primary school	n=32	44.31±8.30	ANOVA
High school	n=65	45.40±7.13	P value=0.002
Associate's degree	n =17	48.41±8.92	
Bachelor's degree	n=36	50.69±6.79	
Wears removable partial denture			
Yes	n=3	44.33±7.09	T-test
No	n=147	46.83±7.88	P value=0.587
Oral Hygiene Index–Simplified (OHI-S)			
Good	n=83	47.57±7.70	ANOVA
Fair	n=49	45.98±7.40	P value=0.498
Poor	n=15	46.27±9.18	

Table 5. Discriminant validity

	Mean	Range	Pearson's correlation coefficient with GOHAI score	P value
Age	31.23	18–57	–0.064	0.439
Missing Teeth	2.80	0–23	–0.318	0.000
DMFT	8.06	0–24	–0.354	0.000
Root DFT	0.04	0–2	–0.01	0.906
Simplified Oral Hygiene Index (OHI-S)	1.373	0–4.8	–0.157	0.057
Teeth with pathologic mobility (>2 mm and/or can be displaced in a vertical direction)	0.04	0–2	–0.066	0.421
GOHAI	46.78	27.00–60.00	–	–

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Discussion

The GOHAI was originally presented and evaluated for assessing oral health–related quality of life in middle-aged and well-educated Americans, but subsequent studies showed that it could also be successfully used in less-educated young people (2). Cultural and language differences, which can even occur in one country, make validity assessment more complicated.

People with different cultural backgrounds may respond differently to GOHAI items. For instance, being edentulous (missing teeth) may have different levels of importance in various cultures. As a result, people's quality of life given the same oral conditions may be evaluated differently.

Therefore, it is important that the GOHAI be tested in diverse populations in terms of culture, language and geography. In this study, the first step consisted of using a standardized translation process. Translation and back-translation were performed to ensure the accuracy and interpretability of the questions, and this led to the creation of a Persian version with pleasing psychometric properties. The assessment of certain social and demographic characteristics, including age and gender, did not indicate significant differences in the mean GOHAI scores for these parameters.

The concurrent validity of the Persian version of the GOHAI was tested and confirmed; there was a meaningful relationship between individuals' self-report of general health and dental care needs with GOHAI scores.

In addition, people with a good self-impression of their oral health received higher mean GOHAI scores compared with those with moderate to poor self-impressions, and all of these cases display high concurrent validity with the Persian version of the GOHAI.

The clinical indicators studied in the discriminant validity assessment had been used in other studies as well (2, 19, 21 and 24).

Because the GOHAI has not been specifically proposed as a predictor of clinical indices, it should be used as a complement to clinical and objective assessments. Some articles have shown reasonable correlation between the GOHAI and clinical observations (2, 19, 24), whereas others have mentioned the weak correlation between them (25). In the present study, the correlation was significant between the clinical indicators such as DMFT and the number of missing teeth.

For loose teeth, a weak relationship with the GOHAI score was observed. However, in the study by Atieh et al, who provided the Arabic version of the GOHAI, the clinical index revealed the strongest relationship with the GOHAI score (21); the cause of this difference could be potentially explained by the mean age group studied, which was 71.20 (age range: 60–90) years in the Arab studies and 31.2 (age range: 18–65) years in our study.

All assessment instruments should possess the quality of repeatability at different times. In this case, the same results at two different time points for a patient would indicate that the patient’s situation had not changed. The findings demonstrated that the questions on the Persian version of the GOHAI have good internal consistency (Cronbach's alpha coefficient=0.78). This value did not become significantly larger by eliminating any of the questions, except question 3 (ability to swallow comfortably), which showed less internal consistency, suggesting poor compatibility with other GOHAI questions. The Cronbach's alpha coefficient would increase if question 3 was deleted.

The question is primarily designed to evaluate the people with dry mouth problems. Dry mouth is much more common in the elderly, and thus, the incidence of swallowing difficulties is more prevalent in middle-aged people than in younger people (2). It would probably be better if the GOHAI scoring did not include this question or if the response was fully reversed.

The result of the test-retest was acceptable in this study, and the weighted kappa values were satisfactory for the GOHAI questions. Only two questions (numbers 1 and 8) did not have desirable weighted kappa values. This was a problem for questions 3 and 5 in the French version and for questions 4 and 10 in the Chinese version of the GOHAI, illustrating that these questions were not easily understood in these languages (2, 17).

A Bland-Altman plot indicated an acceptable result, and the 95% of differences in the questions, both for the test-interview and the test–retest cases, were within the limits of agreement.

As conclusion, the Persian version of the GOHAI exhibited acceptable reliability and validity. This instrument can be applied to evaluate OHRQoL in

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cross-sectional and longitudinal studies of different age groups.

This version may be better tested for different oral and systemic conditions and disorders to evaluate the validity in future studies.

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