VALIDITY AND RELIABILITY OF THE NEPALI VERSION OF THE GENERAL ORAL HEALTH ASSESSMENT INDEX (GOHAI) IN NEPALI POPULATION

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ABSTRACT

Introduction

Oral health problems are more chronic and severe. Various instruments have been developed to measure Oral Health Quality of Life. General Oral Health Assessment Index (GOHAI) is a well-established, frequently used questionnaire for measuring OHQoL for geriatric and general population.

Objectives

The objective of the study is to translate the GOHAI in Nepali and to assess its reliability and validity.

Methodology

This study was conducted on the patient attending department of Prosthodontics, Kathmandu University School of Medical Sciences from March 2017 to February 2018. The GOHAI questionnaire was translated into Nepali version from English and back translated. Nepali version of GOHAI was pilot tested on 50 adult population to test the comprehensibility of the questionnaire, and then required alterations were done. The final Nepali version of GOHAI was administered to 301 (aged 20-70 years) adults along with the self-informed questionnaire. Clinical examination was done on the same day by a single examiner using World Health Organization (WHO) criteria. Reliability was analyzed using test-retest, cronbach alpha and split half reliability. For validity, discriminant validity and construct validity were calculated.

Results

Cronbach's alpha was 0.749, which indicated good overall internal consistency and homogeneity. For test-retest, the spearman's rho correlation coefficient between visits ranged from 0.641-0.952 for all twelve questionnaires indicating strong correlation with p-value< 0.001.

Conclusion

Nepali version of the GOHAI exhibited acceptable reliability and validity in the people of Kathmandu valley, Nepal. This instrument can be applied to evaluate OHRQoL of different age groups as it was carried out in all the age groups.

KEYWORDS

Translation, validation, Nepali version, GOHAI

INTRODUCTION

Dental demands from older patients continue to increase not only due to the growing number of people in this age group but also as a result of various causes of dentition loss. Oral health is one of the vital aspects of life. So, its degradation hinders a person's ability to perform and concentrate on daily activities. Dental problem can degrade the mental, physical, social and psychological well-being of an individual. With increase in age, oral problems are more chronic and severe as they have always been neglected in preference to other health problems[1].Oral health-related quality of life (OHQoL) has been defined as a self-report specifically pertaining to oral health – capturing the functional, social and psychological impacts of oral disease."[2] This definition includes both social and psychological aspects not just the absence of physical diseases. OHQoL needs to be evaluated for the purpose of data collection, policy formulation for health promotion and implementation of the disease prevention program. A number of instruments has been developed in the last two decades to measure OHQoL.[3] General Oral Health Assessment Index (GOHAI) is a well-established, frequently used questionnaire for measuring OHQoL basically for geriatric population. Self- perceived oral health is an important measure for assessing the priority requirements of this population and implementing actions that result in an improvement in quality of life through the development of various educational and preventive policies for this population.[4]

Most Oral health-related quality of life (OHQoL) instruments[5-7] that have shown to have adequate validity and reliability based on three main dimensions: physical symptoms, perception of well-being and functional capacity. The General Oral Health Assessment Instrument (GOHAI), developed by Atchison and Dolan, aims to complement clinical measures by paying special attention to problems related to physiological, physical and psychological needs of the patients.[8] Several studies have shown that the GOHAI is more suitable instrument to measure OHQoL of the elder population in Western cultures than the most frequently used Oral Health Impact Profile (OHIP).[9-10] The reliability of GOHAI was found to be satisfactory, and all hypotheses designed to assess and check its validity were confirmed in Swedish,[11] Dutch,[12] French[13] and Arabic[14] studies. To use it in Nepali context first it is essential to carry out a rigorous translation and validation process.[15] Transferring such indicators from one country to another presents problems at two levels. First, direct translations may present linguistic problems because some words and phrases have no direct translation and questions conceived in the context of one language may not be understood in the same way in the other language. Second, languages exist within social and cultural frameworks that are frequently unique and some questions may therefore become different or meaningless in a different culture and location.[7] Because of all these reasons it is essential to develop Nepali version of GOHAI and to verify its reliability and validity.

The aim of this study was to translate the GOHAI in Nepali and to assess its reliability and validity in Nepali Context.

MATERIALS AND METHOD

Study site and population:

This study was conducted on the patient attending department of Prosthodontics, Kathmandu University School of Medical Sciences from March 2017 to February 2018. The total numbers of 301 people aged 20-70 years were participated in the study. The sample size was based on the literature available, which mentions that in assessing the reliability and validity of an index or scale, the minimum necessary sample size for coefficient alpha is commonly suggested as 200-400.[16-17] The common view is that larger sample will produce more accurate result.

Ethical clearance:

Ethical clearance for the research was approved by the institutional review committee of the Kathmandu University School of Medical Sciences/Dhulikhel Hospital (IRC-KUSMS) (approval number: 26/17). Both written and verbal consent was obtained from the patient who agreed to participate in the study.

Linguistic adaptation:

The GOHAI questionnaire was translated into Nepali by one language expert and one dentist who were fluent in both Nepali and English. The Nepali version was back translated into English by two other people who were also fluent in both the languages. The original and back translated version was compared to verify, if the questionnaire were translated properly or not by two dentist who are fluent in both the languages.[18] The final Nepali version of GOHAI was then pilot-tested on a sample of adults (n=50) to make it more understandable.

GOHAI:

GOHAI was initially designed in United States in 1990 to assess the impact of oral conditions on the quality of life of the elderly population.[6] It was later termed as General Oral Health Assessment Index (GOHAI) due to its wider application in general population as well. GOHAI consists of 12 questionnaires which assessed oral health in three dimensions; that is, physical functions (eating, speaking, and swallowing), psychosocial functions (worry or concern about oral health, dissatisfaction with appearance, self-consciousness about oral health, avoidance of social contact because of oral problems), and pain or discomfort (use of medication to relieve pain, oral discomfort).

The questionnaires are worded sometimes in negative and sometimes in positive to compel the respondents to contemplate their answers. The responses were scored on a Likert scale ranging from 1 to 5 (1, always; 2, often; 3, sometimes; 4, seldom; 5, never). The summative score of the index was calculated for each subject, and it ranges from 12 to 60 indicated as additive GOHAI (ADD-GOHAI) where higher ADD-GOHAI score indicates a better OHQoL. A simple count score SC-GOHAI was also calculated for each individual by counting the number of items with response

"sometimes," "often" or"always" which shows the negative impact of OHQoL (reverse for questions 3,5 and 7 as the questions are worded positively) and ranged from 0 to 12.

Data Collection:

All the participants were requested to fill self-informed questionnaire. It comprised of the information regarding subject's age, gender, education, marital and employment status, frequency of tooth brushing, smoking and history of regular visit to dentist. The Nepali version of GOHAI was attached with the history sheet and the author was available all the time to make any queries clear.

Clinical examination was done on the same day by a single examiner when the questionnaire was delivered using World Health Organization (WHO) criteria.[19]

Data Analysis:

The conventional approach for this study consists of assessment of the reliability of the Nepali version of GOHAI and its construct and discriminant validity.

Reliability was analyzed using test-retest, cronbach alpha and split half reliability. To calculate test-retest reliability, 50 participants repeated the GOHAI questionnaire in the interval of one week. Cronbach's alpha was calculated to assess the degree of internal consistency reliability and uniformity between the items.[20] Split half reliability was calculated to the internal consistency of the questionnaire.

For the validity test discriminant validity and construct validity were calculated. The discriminant validity was certified by comparing the individuals' item responses and GOHAI scores with their objectively evaluated dental condition. It was hypothesized that there was correlation between the GOHAI score and the oral condition of the subjects. Construct validity was tested by hypothesized OHQoL decreases with more negative responses and increase in age, with participants aged more than 50 years old.

RESULTS

The total subjects for study were 301 among which 158 (52.49%) were male and 143 (47.51%) were female. The study population age range was between 20 to 70 years among which 42.2% were above 50 years of age. More than three quarters (77%) of the 301 participant were married whereas 37.54% were not employed. Only 26.91% visited dentist regularly whereas 68.77% brushed their teeth only once a day. Among the participants 46.51% had history of smoking on regular basis. The mean add GOHAI was 37.59 (SD=5.25; median= 38). The mean SC GOHAI was 4.14(SD=2.18; median=4).

For each questionnaire mean, standard deviation and median was calculated (Table: 1). The respondent expressed some functional problem. Around 54.15% (always, often or sometimes) had problem in eating various kinds of food due to their oral condition (Q1) while 48.68% had problem in chewing hard food (Q2). More than 80% of participants were able to swallow comfortably (Q3), able to eat without discomfort (Q5), pleased with the look of their teeth (Q7) and were self-conscious of their teeth, gums and dentures (Q10). While 26.91% were unable to speak clearly, (Q4) and 23.59% had to limit their contact with people (Q6) due to their oral condition. Less than 50% had history of using medication to relieve pain (Q8), were uncomfortable eating in front of others (Q11) and sensitive to hot, cold or sweet food (Q12). In addition, 55.15% of people were worried about their teeth, gum or dentures (Q9) as shown in figure 1.

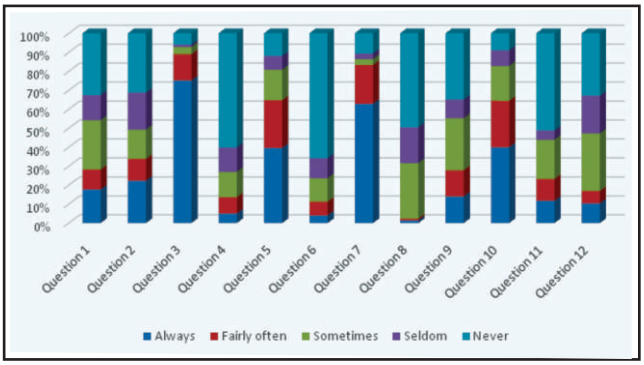

Figure 1: Frequency distribution of the responses for each item (n=301)

Reliability:

Reliability of the Nepali version of GOHAI was assessed with cronbach's alpha was calculated for the data. Cronbach's alpha was found to be 0.749, which indicated good overall internal consistency and homogeneity between the items. Test re-test reliability was assessed in 50 participants by repeating the same Nepali version of questionnaire in the interval of one week. The test-retest correlation coefficient between visits ranged between 0.641-0.952 (table:1) for all twelve questionnaires indicating strong correlation with p-value <0.001 which suggest statistically significant. The spearman's rho correlation coefficient for ADD GOHAI is 0.909 with p-value <0.001 and for SC GOHAI is 0.956 with p-value <0.001 which illustrate the strong correlation between two successive GOHAI score.

Split half reliability was calculated, the scale was divided into two equal parts (odd number questionnaire one half and even number questionnaire other half) consisting of 6 items each and Cronbach alpha was determined, the correlation between the halves was 0.689 and Spearman brown coefficient was 0.816. Guttmann split half coefficient was found to be 0.786.

Table 1: Test-retest correlation, Cronbach's alpha if deleted and descriptive statistics of GOHAI scale

	GOHAI Questionnaires	Test-retest correlation	Cronbach's alpha if item deleted	Mean	Median	SD
1.	Limit the kind of food consumed	0.952	0.679	3.33	1.47	3
2.	Trouble biting or chewing	0.905	0.678	3.23	1.55	4
3.	Able to swallow comfortably	0.703	0.744	1.49	1.06	1
4.	Unable to speak clearly	0.852	0.719	4.15	1.23	5
5.	Able to eat without discomfort	0.685	0.726	2.27	1.36	2
6.	Limit contact with people	0.889	0.722	4.27	1.17	5
7.	Pleased with appearance of teeth	0.843	0.720	1.78	1.30	1
8.	Use medication to relieve pain	0.641	0.768	4.14	0.96	4
9.	Worried about teeth, gum and dentures	0.752	0.745	3.38	1.43	3
10.	Self-conscious about teeth, gum and dentures	0.868	0.821	2.22	1.30	2
11.	Uncomfortable eating in front of others	0.941	0.701	3.72	1.47	5
12.	Sensitive to hot, cold or sweet food	0.804	0.713	3.58	1.29	4

GOHAI: General oral health assessment index, SD: Standard deviation

Validity:

The construct validity (Table:2) was contemplated for age,

sex, marital status, employment, frequency of brushing, smoking and regular visit to dentist in this population. With increasing age OHRQoL decreased, thus subjects aged more than 50 years of age reporting poorer OHQoL and higher number of negative responses. Statistically significant difference was seen in both the mean ADD and SC-GOHAI scores between age groups (*P<0.01*, *P*< 0.01 respectively). Unemployed and illiterate respondents perceived poorer OHRQoL. Mean ADD-GOHAI and SC-GOHAI score showed a statistically significant difference (*P*<0.01, P<0.001) respectively. Subjects who had no history of smoking and brushed twice daily reported better OHQOL and statistically significant difference was seen in both the mean ADD and SC-GOHAI scores based on their history of visit (*P* < 0.01, *P* = 0.01 respectively for smoking and P=0.0002, P<0.01 respectively for brushing). Contrary to the hypothesis OHQoL was poor in the subjects who visit the dentist regularly and was statistically significant (P<0.01) for both AAD-GOHAI and SC-GOHAI. No significant difference was seen in OHRQoL between male and female respondent (*P* =0.952 for ADD-GOHAI and P=0.463 for SC-GOHAI).

Table 2: Construct validity and descriptive statistics of the variables assessed in the study

Variable	*n* (%)	Mean ADD-GOHAI (SD)	Statistical test *P*	Mean SC-GOHAI (SD)	Statistical test *P*
Age					
≤30	100 (33.2)	39.6 (4.1)	ANOVA	3.1 (1.8)	ANOVA
31–50	74 (24.6)	38.5 (6.1)		3.6 (2.0)	
>50	127 (42.2)	35.5(4.8)	P<0.01	5.4(1.9)	P<0.01
Gender					
Male	158 (52.5)	37.6 (4.2)	T-test	4.2 (2.2)	T-test
Female	143 (47.5)	37.5 (4.1)	P=0.952	4.1 (2.1)	P=0.463
Education					
Literate	235 (78)	38.7 (4.7)	T-test	3.7 (2.0)	T-test
Illiterate	66 (22)	33.4 (4.9)	P<0.01	5.9 (1.7)	P<0.01
Marital status					
Married	233 (77.4)	36.99 (5.4)	T-test	4.5 (2.2)	T-test
Unmarried	68 (22.6)	39.54 (4.4)	P=0.0001	2.9 (1.8)	P<0.01
Employment					
Employed	188 (62.5)	38.9 (4.4)	T-test	3.6 (2.1)	T-test
Unemployed	113(37.5)	35.4 (5.9)	P<0.01	5.0 (2.0)	P<0.01
Frequency of brushing			-test		T-test
Once	207 (68.8)	36.9 (5.4)		4.5 (2.1)	
Twice	94 (31.2)	39.1(4.5)	P=0.0002	3.4(2.0)	P<0.01
Smoking					
Yes	140 (46.5)	36.3 (5.5)	T-test	4.7 (2.2)	T-test
No	161 (53.5)	38.7 (4.8)	P<0.01	3.7 (2.0)	P<0.01
Regular visit to dentist			T-test		T-test
No	81 (26.91)	39.6 (4.9)		3.4 (1.9)	
Yes	220 (73.09)	36.8 (5.2)	P<0.01	4.4 (2.2)	P<0.01

Discriminant validity (Table 3) analysis showed that lower mean ADD-GOHAI score was seen in patients with lesser number of teeth present, greater number of missing teeth, decayed teeth and gingival recession whereas there is not much difference in mean ADD-GOHAI restored and traumatized teeth. Mean ADD-GOHAI is higher for the crowned teeth. Statistically significant difference was seen in the mean GOHAI scores (both ADD-GOHAI, SC-GOHAI) for clinical parameters like number of teeth present, number of missing teeth, gingival recession and crowned teeth (*P* < 0.01 to 0.001). Whereas for number of decayed teeth, restored teeth and traumatized teeth no statistically significant difference was seen in both ADD-GOHAI and SC-GOHAI (P=0.116 to 0.606, P= 0.095 to 0.207 respectively).

Table 3: Discriminant validity for GOHAI scores

Variable	*n* (%)	Mean ADD GOHAI (SD)	Statistical test *P*	Mean SC GOHAI (SD)	Statistical t est *P*
Number of teeth present					
1–19	69 (22.9)	33.7 (4.2)	ANOVA	6.1 (1.7)	ANOVA
20–28	122 (40.5)	37.5 (5.6)		4.0 (2.1)	
29–32	110 (36.6)	40.2 (3.8)	P<0.01	3.1 (1.7)	P<0.01
Number of missing teeth					
Nil/0	42 (13.95)	38.2 (3.8)	ANOVA	3.6 (1.6)	ANOVA
1–4	115 (38.21)	40.9 (4.1)		2.8 (1.7)	
≥5	144 (47.84)	34.7 (4.9)	P<0.01	5.4 (1.9)	P<0.01
Number of decayed teeth Nil/0	110 (36.54)	38.2 (5.6)	T-test	3.9 (2.4)	T-test
≥1	191 (63.46)	37.2 (5.0)	P=0.135	4.3 (2.0)	P=0.095
Number of restored teeth Nil/0	108 (35.88)	37.0 (4.8)	T-test	4.4 (2.1)	T-test
≥1	193 (64.12)	37.9 (5.5)	P=0.116	4.0(2.2)	P=0.193
Number of teeth with gingival recession Nil/0	214(71.1)	38.2(5.3)	T-test	3.8 (2.2)	T-test
≥1	87 (28.9)	36.1 (4.9)	P=0.001	4.9(2.0)	P<0.01
Number of traumatized teeth Nil/0	266 (88.37)	37.6 (5.1)	T-test	4.1(2.2)	T-test
≥1	35 (11.63)	37.0 (6.6)	P=0.601	4.6 (2.2)	P=0.207
Number of crowned teeth					
Nil/0	231 (76.74)	36.6(5.3)	T-test	4.5 (2.3)	T-test
≥1	70 (23.26)	40.7 (3.6)	P<0.01	3.1 (1.5)	P<0.01

DISCUSSION

This study assessed the validity and reliability of the Nepali version of the GOHAI. The original GOHAI was validated in a well-educated, older Americans population. Though the GOHAI has been also validated for younger and for less educated population,[21,22] It remains important that reliability and validity problems related to differences in language or culture are ruled out to use in that population. Thus, the GOHAI should be tested in diverse populations in terms of language, culture and geography.

In this study, the first step consisted of translation process. Translation and back-translation were carried to ensure the precision and accountability of the questions, which led Nepali version of GOHAI with satisfactory psychometric properties. No significant difference in the mean GOHAI scores was observed on assessment of social and demographic parameters like age and gender.

The current study established the reliability and validity of Nepali version of GOHAI. The translated Nepali version was consistent, irrespective of the educational status of the study population. The Cronbach alpha for internal consistency was found to be 0.749 which showed the good internal consistency and similar to that of Hindi 0.79, Spanish 0.77, Persian 0.78, Portuguese 0.76 and Malay 0.79.[23-27] This value did not become undoubtedly larger by excluding any of the questions, except question 10 (Self-conscious of teeth, gums or dentures), which showed less internal consistency, suggesting poor compatibility with other GOHAI questions and exclusion of which will increase the value of Cronbach alpha (table 1).

Socioeconomic data suggest 37.5% are unemployed. Self-rating of oral health was particularly poor and perception of dental care needs was high, indicating a substantial negative impact of oral conditions. This is in accordance with previous findings showing that populations with lower socioeconomic

status experienced a greater negative impact of oral conditions on functioning and well-being.[28] The perception of oral health and the level of acceptance of oral conditions may vary according to the country and the socioeconomic status, irrespective of the objective dental status.[14,29]

Test-retest Spearman rho correlations between visits were very strong ($P < 0.001$) indicating high reliability and stability of Nepali version of GOHAI questionnaire similar to that of Tamil version.[30] The mean for the individual question ranges from 1.49 to 4.27, with minimum impact on unable to speak clearly and limit the contact with people. The maximum impact is seen in able to swallow comfortably, which was also seen in the longitudinal survey conducted by Dolan.[31] This question was originally developed for the people with xerostomia which is more common in older adults and seems less relevant to younger individuals,[21] thus inclusion of this question in GOHAI should be reconsidered.

Discriminant and construct validity were established. This study shows good correlation between GOHAI score, personal information and clinical parameters but the subjects with the crowned teeth had better OHQoL than the subject who did not have crown in their oral cavity. Similarly subjects with traumatized teeth and non-traumatized teeth had similar responses indicating irrespective of clinical condition, self-perception of one's own health play vital role in seeking professional advice. Thus the Nepali version of GOHAI can be used in general Nepalese population in all age group to assess the OHQol.

During the manuscript preparation of this study, another similar study done in Nepali geriatric population of eastern Nepal shows acceptable validity and reliability when used for geriatric people residing in old age homes.[32]

CONCLUSION

The Nepali version of the GOHAI exhibited acceptable reliability and validity in the people of Kathmandu valley, Nepal.

RECOMMENDATION

This instrument can be applied to evaluate OHRQoL of different age groups as it was carried out in all the age groups to formulate the oral health related policies in Nepal.

LIMITATION OF STUDY

Hospital based study at clinical setting may restrict the population level generalization.

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CONFLICTS OF INTEREST

The author(s) declare(s) that there was no conflict of interest.

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