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Assessment of oral health-related quality of life: Comparison of two measurement tools

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Original Article

Abstract

BACKGROUND AND AIM: Development of patient-based outcome measures has enhanced our ability to assess the oral health-related quality of life (OHRQoL). Present study aimed to compare the performance of the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile-14 (OHIP-14) as two methods of assessment of oral health-related quality of life.

METHODS: In this cross-sectional survey, a sample of 400 healthy participants which were 18-65 years old was recruited in Kerman School of Dentistry, Iran. Main measurement tools were the validated Persian version of GOHAI and OHIP-14 questionnaires. Data were collected by means of personal interview. Internal consistency and discriminant validity were carried out to compare the two measures.

RESULTS: The internal consistencies of both tools were acceptable and Pearson's correlation coefficient between the scores was 0.739. Both measures discriminated between dentate subjects over and under 25 natural teeth and wearing removable dentures or not, both also showed significant associations with dental attendance, self-rated oral health and satisfaction with oral health status.

CONCLUSION: Both GOHAI and OHIP-14 are appropriate instruments with equal power for survey of OHRQoL on under-elderly population.

KEYWORDS: Oral Health, Quality of Life; Oral Health-Related Quality of Life (OHRQoL); Oral Health Impact Profile-14 (OHIP-14); Geriatric Oral Health Assessment Index (GOHAI)

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The new definition of oral health refers to the individual's experience and perception of thorough physical, psychological and social health. Based on this patient-based model, the patient's appraisal of health has, to a great extent, replaced clinical aspects of patient assessment[1,2] and its relevant assessments have become qualitative and subjective.[3] Oro-dental conditions are very common and they not only have physical complications but also have economic, social and psychological complications, too. These conditions seriously affect the quality of life in a large number of patients and influence many aspects of their lives.[4,5] An individual's personal appraisal of the extent of the effects of functional, psychological and social factors and experience of pain and discomfort in relation to his/her oral problems is defined as Oral Health-Related Quality of Life (OHRQoL).[6]

Based on OHRQoL concept, an acceptable level of oral health is no longer defined as the absences of disease in the oral cavity or disturbance in its functions; rather, it refers to the absence of negative effects of oral conditions on the social life and the positive feeling the oral status exerts on self-confidence

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in relation to the dento-facial system.[7] The most valid tools to measure OHRQoL are self-reported and multiple choice questionnaires, of which two questionnaires, Oral Health Impact Profile-14 (OHIP-14) and Geriatric Oral Health Assessment Index (GOHAI) are more famous all over the world than others. These two questionnaires are widely used in research; however, some believe that OHIP-14 tool is not sufficiently sensitive to minor changes in individuals' quality of life of.[8]

On the other hand, relative differences between the items of these two questionnaires have prompted the researchers to believe that GOHAI is more appropriate for the evaluation of physical symptoms and signs such as pain and dysfunction and that OHIP-14 is more suitable for the evaluation of psychological effects of changes in oral health.[9,10] Some other researchers believe that the validity of using them in populations with low-to-moderate treatment needs requires further studies.[11] Although OHIP-14 can be used for adults of all ages, some researchers believe that GOHAI has been useful for the evaluation of the outcome of oral diseases at younger age groups, too; therefore, in recent years "G" in the abbreviation stands for "General", rather than for "Geriatric". The problem of selecting a superior tool from these two questionnaires for use in studies and clinical evaluations has not been solved to date.[9-11]

An important consideration is the fact that to date no study has been undertaken to compare these two questionnaires in terms of OHRQoL for non-geriatric subjects. In addition, the validated Persian versions of these tools, OHIP-14 and GOHHAI questionnaires, are available,[12-14] the present study aimed to compare the performance of these two measurement tools for OHRQoL.

Methods

The present cross-sectional study was carried out through interviewing individuals, using convenience sampling technique. Half of the subjects consisted of patients referring for oral and dental screening to Department of Diagnosis and Oral Medicine, Kerman School of Dentistry, Iran, and the other half consisted of the individuals accompanying these patients, with an age range of 18–65 years. Before initiating the study, an oral medical history was taken from each participant for a history of affliction with systemic or psychological conditions. In case of a positive history of such conditions, the patient was excluded from the study.

OHIP-14 and GOHAI questionnaires were completed for all the subjects and the following variables were registered for study population: gender, marital status, level of education, the rate of visiting a dentist or dentists during the previous year (defined as no visits, one visit, and more than one visit), subject's satisfaction with his/her oral health (very satisfied, satisfied, dissatisfied, and very dissatisfied), oral examination based on the number of natural teeth in the oral cavity (except for third molars) and use of removable partial or complete dentures, in order to compare the two tools.[9,15,16]

Data were collected and the questionnaires were completed during sessions when the patients and the individuals accompanying them referred to the School of Dentistry for treatment. Considering to filling out the questionnaires equally, for all illiterate and literate subjects questionnaires were filled out by the researcher. All the subjects submitted informed consent forms to be included in the study and their personal data were kept confidential. This study was approved by the ethics committee of Kerman University of Medical Sciences under the protocol number of K/92/456.

OHIP-14 questionnaire consists of 14 questions, all of which ask the interviewee to reply the questions in relation to the problems with his/her teeth, the oral cavity or dentures based on his/her experience during the previous 12 months. The responses are registered based on Likert scale, with the code 4 for a problem that always exists, code 3 for

"in most case", code 2 for "sometimes", code 1 for "seldom" and the code zero for "never". As a result, the overall score range would be 0-56 and the OHRQoL would decrease with a higher overall score.[12]

GOHAI questionnaire consists of 12 questions and the answers to the questions should be based on problems experienced during the preceding 3-month period. The pattern of the questions is like this: "When have you experienced ... in relation to your month or teeth"? The responses to 12 questions are registered based on Likert scale in 5 choices as follows: "never", "seldom", "sometimes", "in most cases" and "always". The overall score for each subject is calculated via adding up the scores of all the 12 replies, which will have a range of 12-60, score 5 for "never" and score 1 for "always". A low overall score would indicate a low OHRQoL and a high overall score would indicate a high OHRQoL, i.e. fewer problems in relation to the effect of oro-dental problem on the individuals' quality of life.[13]

The standardized Persian versions of the questionnaires were used.[12-14]

The sample size was determined to be 300 subjects based on similar studies,[15,16] which increased to 400 subjects to increase the accuracy of the results. Data were analyzed via SPSS software (version 17.0, SPSS Inc., Chicago, IL, USA), using commonly used distribution parameters to estimate the frequency distribution of demographic variables. To evaluate concurrent validity, the statistical index of internal consistency was used at an acceptable level of the more than 0.7. To this end, Cronbach's alpha coefficient was calculated for the total questions of the two GOHAI and OHIP-14 questionnaires. Spearman's correlation coefficient was calculated two-by-two for these tools. Independent t-test was used to evaluate discriminant validity at a significance level of 0.01. In the evaluation of discriminant validity, the mean scores of the two questionnaires were compared with the subjects' responses to clinical questions.

Results

A total of 400 subjects were included in this study, with a mean age of 32.73 ± 9.98 years and an age range of 18-65 years (Table 1).

Table 1. Demographic characteristics and clinical oral conditions of 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Variables		Frequency (%)
Sex	Male	138 (34.5)
	Female	262 (65.5)
Marital Status	Married	252 (63.0)
	Single	141 (35.3)
	Others	7 (1.7)
Level of Education	Illiterate	23 (5.8)
	Diploma	60 (15.0)
	Academic	317 (79.2)
	None	121 (30.2)
Dental visit in last year	Once	134 (33.5)
	More than once	145 (36.3)
Self-oral health assessment	Excellent	18 (4.5)
	Good	147 (36.8)
	Moderate	183 (45.7)
	Poor	52 (13.0)
Satisfaction from oral health	Very satisfied	21 (5.3)
	Satisfied	236 (59.0)
	Unsatisfied	126 (31.5)
	Very unsatisfied	17 (4.2)
Number of natural teeth	< 25	56 (13.9)
	≥ 25	344 (86.1)
To have removable denture	Yes	20 (5.0)
	No	380 (95.0)

Cronbach's alpha was 0.797 for GOHAI and 0.842 for OHIP-14. The mean total scores (± standard deviations) of respondents were calculated for both tools as 14.96 ± 7.04 for GOHAI and 11.85 ± 7.67 for OHIP-14. Two-by-two Pearson's correlation coefficients

Table 2. Relative frequency (frequency) of answers to GOHAI items among 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Questions	Seldom	Sometimes	Fairly often	Very often	All the time
Limit the kinds or amount of food	30.50 (122)	35.00 (140)	21.00 (84)	11.00 (44)	2.50 (10)
Have trouble chewing food	22.25 (89)	34.75 (139)	25.75 (103)	13.50 (54)	3.75 (15)
Able to swallow comfortably	58.50 (234)	24.50 (98)	12.00 (48)	4.00 (16)	1.00 (4)
Prevention of speaking the way you wanted	66.50 (266)	23.00 (92)	6.50 (26)	2.75 (11)	1.25 (5)
Able to eat without discomfort?	32.75 (131)	37.50 (150)	19.00 (76)	9.50 (38)	1.25 (5)
Limit contacts with people	70.50 (282)	19.00 (76)	7.50 (30)	2.50 (10)	0.50 (2)
Pleased with the looks of teeth	15.00 (60)	15.25 (61)	20.25 (81)	36.75 (147)	12.75 (51)
Use medication to relieve pain or discomfort	34.00 (136)	31.75 (127)	20.25 (81)	9.75 (39)	4.25 (17)
Worried about the problems with teeth	11.75 (47)	25.75 (103)	25.50 (102)	23.00 (92)	14.00 (56)
Feel nervous because of problems with teeth	17.75 (71)	29.25 (117)	25.5 (102)	20.75 (83)	6.75 (27)
Feel uncomfortable eating in front of people	53.75 (215)	27.5 (110)	11.00 (44)	6.25 (25)	1.50 (6)
Teeth ،gums sensitive to hot, cold or sweets?	9.00 (36)	30.00 (120)	33.25 (133)	20.00 (80)	7.75 (31)

GOHAI: Geriatric Oral Health Assessment Index

were calculated yielding the result of 0.739. Tables 2 and 3 present frequencies of responses of the subjects to the questions of both questionnaires.

Independent samples t-test showed a significant relationship between the mean scores of the two questionnaires and all the clinical questions evaluated ($P < 0.001$).

Table 3. Relative frequency (frequency) of answers to OHIP-14 items among 400 subjects referring to Kerman School of Dentistry for oral and dental screening

Questions	Never	Seldom	Sometimes	Often	Very often
Had trouble pronouncing any words	78.00 (312)	15.75 (63)	4.50 (18)	1.50 (6)	0.25 (1)
Felt that your sense of taste has worsened	71.00 (284)	20.25 (81)	6.00 (24)	2.50 (10)	0.25 (1)
Had painful aching in mouth	27.50 (110)	35.00 (140)	27.00 (108)	9.75 (39)	0.75 (3)
Uncomfortable to eat any foods	38.50 (154)	32.25 (129)	20.75 (81)	7.75 (31)	0.75 (3)
Been self-conscious	9.25 (37)	20.75 (83)	17.25 (69)	32.75 (131)	20.00 (80)
Felt tense	35.75 (143)	30.25 (121)	18.00 (72)	10.75 (43)	5.25 (21)
Diet been unsatisfactory	61.00 (244)	23.00 (92)	8.75 (32)	4.50 (18)	2.75 (11)
Had to interrupt meals	60.75 (243)	23.25 (93)	10.75 (43)	4.75 (19)	0.50 (2)
Found it difficult to relax	50.25 (201)	29.00 (116)	13.00 (52)	5.75 (23)	2.00 (8)
A bit embarrassed	60.00 (240)	25.00 (100)	7.00 (28)	5.75 (23)	2.25 (9)
A bit irritable with other people	28.25 (113)	33.00 (132)	19.00 (76)	15.50 (62)	4.25 (17)
Had difficulty doing your usual jobs	61.00 (244)	27.00 (108)	8.75 (35)	2.75 (11)	0.50 (2)
Felt that life in general was less satisfying	63.25 (253)	23.75 (95)	7.50 (30)	3.75 (15)	1.75 (7)
Been totally unable to function	83.00 (332)	12.50 (50)	3.50 (14)	1.00 (4)	0.00 (0)

OHIP-14: Oral Health Impact Profile-14

In other words, both GOHAI and OHIP-14 questionnaires were consistent in relation to the following variables: the rate of visits to a dental office during the past one-year period, personal appraisal of the oral health status, satisfaction with oral health (based on the number of remaining natural teeth), and use of partial or complete dentures. In addition, based on evaluations made with the use of the two GOHAI and OHIP-14 tools, subjects with higher OHRQoL had paid more visits to a dentist during the post one-year period and had a better appraisal of their oral health status. Therefore, they were more satisfied with their oral health status, had a lower rate of use of partial or complete dentures and had more natural teeth remaining in their oral cavity.

Discussion

Evaluation of OHRQoL is one of the necessities in epidemiologic and clinical studies of communities in order to provide correct information about the promotion of health and programming for prevention of diseases.[12] In the present study, the capabilities of two OHIP-14 and GOHAI tools were evaluated to determine OHRQoL. The results showed that these two tools are almost equally efficacious. The major difference between the present study and previous studies on the subject was the age factor of the subjects; in this context, contrary to previous studies, attention was not focused on the elderly population and an age range of 18-65 years was selected, concluding that GOHAI was equally effective like OHIP-14 for non-geriatric subjects. However, Hassel et al. believe that GOHAI is more suitable for the elderly.[17] It can be concluded from the results of the present study and the study by Hassel et al. that in non-geriatric adult subjects both OHIP-14 and GOHAI tools are effective.

In the present study, subjects selected for evaluation of OHRQoL enjoyed an acceptable level of general health, which is similar to the conditions of the study carried out by Hassel et al.;[17] however, it is different from the conditions of a study by Locker et al.[18] because the majority of their subjects suffered from chronic and debilitating conditions. Comparisons between OHRQoL studies will be more valid if subjects in different studies be in the same general physical condition because some conditions such as diabetes mellitus affect the orodental status, making it difficult to make comparisons with healthy subjects.

The present study was carried out on subjects with an age range of 18-65 years; therefore, it was easy to select systemically healthy subjects. However, in studies on elderly subjects, it will be rather difficult to select and include subjects without any chronic systemic conditions. The mean sores on the two OHIP-14 and GOHAI questionnaires were 11.85 and 14.99, respectively, indicating a lower level of OHRQoL compared to that of participants in the study by Hassel et al. in Germany;[17] such a difference might be attributed to different reasons, including economic, social and cultural factors. However, the mean scores of GOHAI and OHIP-14 questionnaires in the study carried out by Ikebe et al. were 11.7 and 10, respectively,[19] indicating lower levels of OHRQoL in Japan compared to the present study; such a difference might be attributed to differences in the ages of the subjects between the two studies. In the study by Ikebe et al., subjects over 65 years of age were evaluated.

Evaluation of internal reliability of the two tools used in the present study showed Cronbach's alpha coefficients of 0.842 and 0.797 for OHIP-14 and GOHAI, respectively, both were acceptable. In similar studies by Locker et al.,[18] Hassel and Ikebe et al.,[19] the ranges of Cronbach's alpha for OHIP-14 and GOHAI were 0.87-0.95 and 0.75-0.87, respectively. As it is evident, Cronbach's alpha in the present study for GOHAI was acceptable compared to other studies in other parts of the world and for OHIP-14 it was 30% lower than other studies.

In the present study, the correlation

coefficient between GOHAI and OHIP-14 tools was calculated at 0.79, which is acceptable and similar to that of the study by Ikebe et al, (0.728).[18] In the present study, the rate of zero response for the OHIP-14 was in the range of 9-83% for its questions. One of the drawbacks of OHIP-14 questionnaire, reported by previous researchers, is the presence of zero responses, which makes it difficult for this tool to determine changes in the quality of life.[18] In other words, the rate of responses of zero in the OHIP-14 tool does not completely coincide with the similar rate (ie. 60) for GOHAI.[17] The difficulty of interpretation of responses to the OHIP-14 tool due to the presence of zero choice was considered as a high floor effect by Ikebe et al.[19] and was confirmed by El Osta et al.[20]

All the clinical parameters of oral function in the present study in the evaluation of the reliability of the tool exhibited a significant relationship with questionnaire scores. The rate of satisfaction with oral health was used as a parameter to evaluate reliability by Hassel et al.[17] and Locker et al.[18] Personal appraisal of oral health was evaluated by Ikebe et al.;[19] however, Locker et al. evaluated personal appraisal of general health with the use of a checklist consisting of 17 items.[18] Similar to the present study, Ikebe et al, used the number of natural teeth as a criterion for the evaluation of reliability.[19] Locker et al.[18] and Hassel et al.,[17] similar to the present study, took into the account the use of dentures, too. It is obvious that the variable of the number of visits to a dental office was used in the present study for the first time as a clinical criterion for the comparison of questionnaire scores. Some previous studies have used more complex parameters to this end. For example, Locker et al.[18] used a 7-item questionnaire to evaluate xerostomia and de Souza et al.[21] used temporomandibular joint (TMJ) pains as criteria. In this context, the most comprehensive and complex evaluations were carried out in a study by Ikebe et al., in which a laboratory technique was used to evaluate the masticatory efficacy, the salivary flow rate and occlusal forces.[19] One of the advantages of the present study compared to similar previous studies was the sample size. In the present study, the largest sample size (400 subjects) was evaluated, with Ikebe et al.[19] study ranking the second in relation to sample size (290).

However, analysis of the results of the present study showed that 79.2% of the subjects had university and college education, which shows a probable education bias in the selection of subjects and can be considered one of the disadvantages of the present study.

Conclusion

The final finding of the present study indicates the equal efficacy of the two OHIP-14 and GOHAI tools to evaluate OHRQoL; in addition, these two tools were equally useful in systemically healthy non-geriatric subjects. Both these tools exhibited almost equal and acceptable level of efficacy in evaluating physical and psychological aspects of OHRQoL. Therefore, it is suggested that researchers use GOHAI with elderly subjects and if the subjects are under 65 years of age it is possible to use both tools. Of course, studies with structures similar to that of the present study with the use of these questionnaires in other languages might substantiate these recommendations by providing further evidence because it is always difficult to interpret the results of studies on OHRQoL.[22]

Conflict of Interests

Authors have no conflict of interest.

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References

1. Tubert-Jeannin S, Riordan PJ, Morel-Papernot A, Porcheray S, Saby-Collet S. Validation of an oral health quality of life index (GOHAI) in France. Community Dent Oral Epidemiol 2003; 31(4): 275-84.
2. Navabi N. A science metric study of Iranian published articles about oral health-related quality of life. J Oral Health Oral Epidemiol 2013; 2(2): 49-55.
3. Hassel AJ, Rolko C, Koke U, Leisen J, Rammelsberg P. A German version of the GOHAI. Community Dent Oral Epidemiol 2008; 36(1): 34-42.
4. Naito M, Yuasa H, Nomura Y, Nakayama T, Hamajima N, Hanada N. Oral health status and health-related quality of life: a systematic review. J Oral Sci 2006; 48(1): 1-7.
5. Murariu A, Hanganu C, Bobu L. Evaluation of the reliability of the geriatric oral health assessment index (GOHAI) in institutionalised elderly in Romania: A Pilot Study. OHDMB 2010; 9(1): 11-5.
6. Al Shamrany M. Oral health-related quality of life: a broader perspective. East Mediterr Health J 2006; 12(6): 894-901.
7. Navabi N. Unacceptable performance in oral health related quality of life assessments in Iran (letter to editor). J Res Dent Sci 2015; 11(4): 187-9.
8. Atchison KA, Dolan TA. Development of the geriatric oral health assessment index. J Dent Educ 1990; 54(11): 680-7.
9. John MT, Hujoel P, Miglioretti DL, LeResche L, Koepsell TD, Micheelis W. Dimensions of oral-health-related quality of life. J Dent Res 2004; 83(12): 956-60.
10. Kressin NR, Atchison KA, Miller DR. Comparing the impact of oral disease in two populations of older adults: application of the geriatric oral health assessment index. J Public Health Dent 1997; 57(4): 224-32.
11. Calabrese JM, Friedman PK, Rose LM, Jones JA. Using the GOHAI to assess oral health status of frail homebound elders: reliability, sensitivity, and specificity. Spec Care Dentist 1999; 19(5): 214-9.
12. Navabi N, Nakhaee N, Mirzadeh A. Validation of a Persian version of the oral health impact profile (OHIP-14). Iran J Public Health 2010; 39(4): 135-9.
13. Navabi N, Salahi S, Shariatmadar Ahmadi A. Assessment of oral health assessment index (GOHAI) validity in Iranian elderly population. J Res Dent Sci 2012; 9(3): 161-9.
14. Rodakowska E, Mierzynska K, Baginska J, Jamiolkowski J. Quality of life measured by OHIP-14 and GOHAI in elderly people from Bialystok, north-east Poland. BMC Oral Health 2014; 14: 106.
15. Abud MC, dos Santos JF, da Cunha V, Marchini L. TMD and GOHAI indices of Brazilian institutionalised and community-dwelling elderly. Gerodontology 2009; 26(1): 34-9.
16. Bae KH, Kim C, Paik DI, Kim JB. A comparison of oral health related quality of life between complete and partial removable denture-wearing older adults in Korea. J Oral Rehabil 2006; 33(5): 317-22.
17. Hassel AJ, Steuker B, Rolko C, Keller L, Rammelsberg P, Nitschke I. Oral health-related quality of life of elderly Germans--comparison of GOHAI and OHIP-14. Community Dent Health 2010; 27(4): 242-7.
18. Locker D, Matear D, Stephens M, Lawrence H, Payne B. Comparison of the GOHAI and OHIP-14 as measures of the oral health-related quality of life of the elderly. Community Dent Oral Epidemiol 2001; 29(5): 373-81.
19. Ikebe K, Hazeyama T, Enoki K, Murai S, Okada T, Kagawa R, et al. Comparison of GOHAI and OHIP-14 measures in relation to objective values of oral function in elderly Japanese. Community Dent Oral Epidemiol 2012; 40(5): 406-14.
20. El Osta N, Tubert-Jeannin S, Hennequin M, Bou Abboud NN, El Osta L, Geahchan N. Comparison of the OHIP-14 and GOHAI as measures of oral health among elderly in Lebanon. Health Qual Life Outcomes 2012; 10: 131.
21. de Souza RF, Terada AS, Vecchia MP, Regis RR, Zanini AP, Compagnoni MA. Validation of the Brazilian versions of two inventories for measuring oral health-related quality of life of edentulous subjects. Gerodontology 2012; 29(2): e88-e95.
22. Tsakos G, Allen PF, Steele JG, Locker D. Interpreting oral health-related quality of life data. Community Dent Oral Epidemiol 2012; 40(3): 193-200.