ORIGINAL ARTICLES

Oral health-related quality of life of institutionalized elderly in Serbia

Kvalitet života povezan sa oralnim zdravljem korisnika domova za stara lica u Srbiji

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Abstract

Background/Aim. Elderly residents in nursing homes have a great risk of periodontal and tooth diseases. Improving oral health can also improve residents' general health and quality of life. The objective of our study was to investigate oral health related quality of life of institutionalized elderly in Serbia using Geriatric Oral Health Assessment Index (GOHAI). **Methods.** The Serbian version of the GOHAI questionnaire was developed in accordance with the recommended backward-forward method. A total of 301 participants completed the Serbian version of the GOHAI questionnaire. The questionnaire sought information about sociodemographic characteristics and self-reported perception of general and oral health. Clinical examination included assessment of periodontal and dental status. Reliability, internal consistency, and concurrent and convergent validity of GOHAI scores were examined. **Results.** There were 197 female and 104 male participants with the average age of 78.6 (SD ± 7.8) and average time spent in nursing home 4.9 (SD ± 4.7) years. The average score of the GOHAI was 48.4 (SD ± 8.4). Low GOHAI scores were associated with perceptions of poor oral and general health. Cronbach's alpha coefficient for the Serbian version of GOHAI was 0.79. This instrument showed a high level of internal consistency and homogeneity between questions. The respondents who perceived that they needed dental treatment at the time had significantly lower GOHAI scores. A total of 48.5% of the participants reported 'always' having difficulties when chewing. On the other hand, a small number of participants (0.3%) used medications 'always' to relieve dental pain. **Conclusion.** The Serbian version of the GOHAI showed acceptable reliability and validity. The GOHAI final score was considered low, indicating low oral health self-perception by the institutionalized elderly in Serbia.

Key words:
periodontics; tooth; aged; homes for the aged; surveys and questionnaires; sensitivity and specificity; serbia.

Apstrakt

Uvod/Cilj. Stariji korisnici domova za stara lica izloženi su velikom riziku od nastanka periodontalnih bolesti i bolesti zuba. Poboljšanje oralnog zdravlja može poboljšati opšte zdravlje i kvalitet života korisnika domova za stara lica. Cilj našeg istraživanja bio je da se ispita oralno zdravlje i njegova povezanost sa kvalitetom života korisnika domova za stara lica u Srbiji pomoću indeksa *Geriatric Oral Health Assessment* (GOHAI). **Metode.** Srpska verzija upitnika GOHAI razvijena je u skladu s preporučenom *backward-forward* meto-dom. Ukupno 301 ispitanik učestvovao je u studiji. Upitnik je sadržao pitanja o sociodemografskim karakteristikama i sopstvenoj percepciji oralnog i opšteg zdravlja. Klinički pregled uključivao je procenu periodontalnog i dentalnog statusa. Ispitivani su pouzdanost, interna konzistentnost i konkurentna i konvergentna valjanost upitnika GOHAI. **Rezultati.** Ispitano je 197 ženskih i 104 muška ispitanika, prosečne starosti od 78,6 (SD ± 7,8) godina sa prosečnim vremenom provedenim u domu od 4,9 (SD ± 4,7) godina. Prosečna vrednost skora GOHAI bila je 48,4 (SD ± 8,4). Nizak GOHAI bio je povezan s percepcijama lošeg oralnog i opšteg zdravlja. Koeficijent Cronbach alfa za srpsku verzi-ju GOHAI iznosio je 0,79. Ovaj instrument je pokazao visok nivo interne konzistentnosti i homogenosti između pitanja. Ispitanici koji su imali potrebu za stomatološkom intervencijom pokazali su značajno niže GOHAI rezultate. Ukupno 48,5% ispitanika imalo je "uvek" poteškoća u toku žvakanja. S druge strane, mali broj ispitanika (0,3%) "uvek" koristi lekove za ublažavanje zubobolje. **Zaključak.** Srpska verzija GOHAI pokazala je prihvatljivu pouzdanost i validnost. Konačni GOHAI rezultat je nizak, što ukazuje na loše oralno zdravlje i sa njim povezan kvalitet života korisnika domova za stara lica u Srbiji.

Ključne reči:
periodontologija; zubi; stare osobe; starački domovi; ankete i upitnici; osetljivost i specifičnost; srbija.

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Introduction

Despite its relatively recent emergence over the past few decades, oral health-related quality of life (OHRQoL) has important implications for the clinical practice of dentistry and dental research [1]. OHRQoL is a multidimensional construct that includes a subjective evaluation of the individual's oral health, functional well-being, emotional well-being, expectations and satisfaction with care, and sense of self. It is an integral part of general health and well-being and it is recognized by the World Health Organization (WHO) as an important segment of the Global Oral Health Program (2003) [1]. A growing number of elderly people spend the last years of their lives in long-term care facilities [2]. Within the elderly population, there is a greater risk of caries, periodontal disease and teeth loss, especially among functionally dependent and cognitively impaired residents in nursing homes [3]. Therefore, improving oral health can also improve residents' general health and quality of life.

In the past three decades, different OHRQoL have been introduced into clinical practice because it has been shown that the exclusive use of clinical evaluation does not take into consideration the functional and psychosocial aspects of oral health [4]. The most commonly used indexes are Oral Health Impact Profile (OHIP) [5], Oral Impacts on Daily Performance (OIDP) [6] and Geriatric/General Oral Health Assessment Index (GOHAI) [7]. Geriatric Oral Health Assessment Index (GOHAI) was originally developed to assess the oral health of elderly patients. The assessment index consists of a questionnaire composed of 12 questions intended to evaluate following three different aspects of oral health related to quality of life: physical functioning including nutrition, speech, ingestion; psychosocial functioning including oral health care or consideration for oral health, appearance dissatisfaction, self-awareness, avoidance of social contacts due to oral problems, and pain or discomfort including the use of pain relievers [7]. In some studies [8], the GOHAI has been used for self-ratings of dental appearance in the elderly population as well as to assess correlation between the impact of oral diseases to everyday functioning and welfare in two populations of elderly people [9], and it proved to be a sensitive instrument for evaluating the dental treatment success, as well [10].

The objective of our study was to investigate OHRQoL of institutionalized elderly in Serbia using GOHAI index.

Methods

Sample

The research was conducted in the Belgrade Gerontology Center, which consists of 4 nursing homes located in the urban area. Participants were contacted on working days, during January, February and March of 2014. The protocol for this study was approved by the local Ethics committee (No. 36/31) at the Faculty of Dental Medicine University of Belgrade. The inclusion criteria were as follows: the participant should be over the age of 65, a resident of the Belgrade Gerontology Center, and should not have had previously verified cognitive and psychiatric disorders (confirmed by insight into medical documents of the residents). All the patients signed informed consent forms that had been approved by the Ethics Committee. Sample size calculation was based on test-retest reliability measured by the intraclass correlation (r). The assumed expected GOHAI r was 0.7. An r of 0.6 or higher would have been acceptable (Ho : Po = 0.6 and H1 : P1 = 0.7). Using a two-sided test suggested by Walter et al. [11] with $\beta = 0.2$ (80% power) and $\alpha = 0.05$, a sample size of 205 subjects was required. The sample size was increased to 301, assuming a possible dropout rate of 30%.

Serbian version of Geriatric Oral Health Assessment Index

The first step in testing the OHRQoL using the GOHAI was to create a Serbian version of the questionnaire. It was developed in accordance with the recommended internationally used method, which consists of a cross-cultural adaptation process [12]. The process is comprised of forward translation, back translation, pre-testing and a final version [12]. The draft of the Serbian version of GOHAI was obtained by translation of the English version by four dentists who were involved in the study. Subsequently, a consensus version in Serbian was obtained. The consensus Serbian version was translated into English by a professional translator who was not involved in the study but was familiar with the dental terms. A back translation was performed without previous knowledge about the original text in English. The two obtained versions of GOHAI (Serbian and English) were reviewed by the entire research team and a professional translator. After reconciliation of opinions, a preliminary Serbian version of the GOHAI questionnaire was obtained. The next step in the verification of this index was a pilot survey, which implied examination of intelligibility of the questions by the elderly population. The sample for the pilot survey consisted of 20 respondents of older age who were patients at the Clinic for Prosthetic Dentistry at the Faculty of Dental Medicine in Belgrade. The pilot study showed that the questionnaire had been carefully designed and that the questions had been precisely translated. After that, a final Serbian version of the GOHAI questionnaire was obtained. Internal consistency and homogeneity of the translated GOHAI was assessed based on Cronbach's alpha. To test the concurrent validity of the translated GOHAI, the answers to self-perceived questions related to the self-assessment of general health, oral health and need for dental treatment were used. It was assumed that people with different answers to these questions would have different GOHAI scores.

Oral health related quality of life assessment

The participants were asked nine negatively worded and three positively worded questions. There were five categories of answers for each question and a score was assigned to each category (1 = always, 2 = often, 3 = sometimes, 4 = rarely and 5 = never). The results from positively worded questions were reversed during data processing, so that the directions of all answers were the same. The GOHAI score

was calculated by adding the results of all the answers for 12 questions. Therefore, the GOHAI score ranged from 12 to 60 with higher scores indicating better oral health.

In addition to the 12 questions within the GOHAI, the questionnaire consisted of questions related to personal data and self-perceived questions of oral and general health. These self-perceived questions were necessary for the psychometric analysis of the questionnaire (oral hygiene of the participants, self-perception of their oral and general health, the need for dental treatment, the presence of toothache, gum bleeding, bad breath, dry mouth, pain in the temporomandibular joint and chewing disability).

Then, the participants were clinically examined in accordance with procedures and criteria for diagnosis as recommended by the World Health Organization [13]. Clinical examination included the number of decayed and missing teeth.

Statistical analysis

The data were analyzed using statistic software SPSS, version 11.5 for Windows, SPSS Inc. Chicago, IL, USA. Cronbach's alpha was calculated to assess the degree of internal consistency and homogeneity between the items. The intraclass correlation coefficient (ICC) was used for the assessment of test-retest reliability. Pearson's correlation coefficient was used for examination of the correlation between the self-perceived general and oral health status and the need for dental treatment with the total GOHAI score, which was the rating of concurrent validity. Additionally, the Kruskal-Wallis test, the Mann-Whitney U-test and the t-test were used for the convergent validity. Statistical significance was determined as $p < 0.05$.

Results

Characteristics of the participants

A total of 301 people were clinically examined and interviewed, and their data included into the analysis. There were 197 female and 104 male participants and all of them were between 65 and 100 years of age, with the average age of 78.6 (SD ± 7.8) years. The average time spent as a resident of a home was 4.9 (SD ± 4.7) years. Other sociodemographic characteristics are presented in Table 1.

Reliability

The Cronbach's alpha coefficient for the Serbian version of the GOHAI was 0.79. Inter-item correlation coefficients between GOHAI questions ranged from 0.04 to 0.67, while the mean value of inter-item correlation was 0.24 (Table 2).

The test-retest correlation coefficient ranged from 0.40 to 0.85 for each individual question. The test-retest correlation coefficient for the total GOHAI result was 0.66, which indicated good stability.

Validity

Concurrent validity for the GOHAI was evaluated by determining the correlation between the self-perceived general and oral health status and the need for dental treatment with

Table 1
Sociodemographic and other important characteristics of the participants (n = 301)

Variable	n	%
Gender		
male	104	34.6
female	197	65.4
Mean age (years)	78.59	
Educational level		
less than high school	98	32.6
high school or more	203	67.4
Mean time spent in nursing home (years)	4.96	
Functionally dependent elderly		
yes	111	36.8
no	190	63.1
if answer is yes, how long? (mean in years)	4.82	
Maintenance of oral hygiene		
independently	244	81.1
with the assistance	7	2.3
does not maintain	50	16.6
Tooth brushing		
< twice daily	159	52.8
≥ twice daily	142	47.2
The use of additional funds		
yes	12	4.0
no	289	96.0
Frequency of dental visits		
< once a year	274	91.0
≥ once a year	27	9.0
Last visit to the dentist		
within last year	65	21.6
1–3 years	45	15.0
3–5 years	31	10.3
5–10 years	79	26.2
> 10 years	81	26.9

the total GOHAI score (Table 3). Worse general and oral health perception resulted in lower GOHAI scores. Moreover, the respondents who perceived that they needed dental treatment at the time had significantly lower GOHAI values, which indicated that bad oral health was related to quality of life.

Lower GOHAI results were related to self-reported toothache, sensitivity to hot and cold, dry mouth, bad breath and inability to chew food, which supports the convergent validity (Table 4). The participants with one or more missing or decayed teeth had lower GOHAI scores than those with no missing or decayed teeth.

Self-perception of oral and general health

The majority of the participants (44.2%) thought that their general health was good, while 7% rated their health as very good. Speaking of oral health, 60.5% thought it was good, while 5% rated it as very good. Overall, 44.9% of the participants considered that they needed a dental treatment, and according to the participants' perception the most common oral problems were dry mouth (59.5%) and sensitivity of teeth to hot and cold (20.6%). Self-assessment of general and oral health is presented in Table 5.

Clinical examination showed that 27.2% of the examinees had 1 or more decayed teeth. The average number of missing teeth was 25.2 (SD ± 8.2), while 99.7% of the examinees had 1 or more missing teeth.

Table 2

Reliability analysis of Geriatric Oral Health Assessment Index: corrected item-total correlation, Cronbach's alpha and alpha if item deleted (n = 301)

Item	Corrected item-total correlation	Alpha if item deleted	Test-retest correlation*
Limit foods	0.49	0.76	0.85
Trouble biting, chewing	0.39	0.78	0.78
Swallow comfortably	0.29	0.78	0.49
Trouble speaking	0.44	0.77	0.77
Eat without discomfort	0.53	0.76	0.61
Limited social contacts	0.51	0.77	0.84
Pleased with appearance	0.42	0.77	0.83
Use of medication	0.30	0.78	0.40
Worry/concern	0.50	0.76	0.78
Nervous/self-conscious	0.51	0.76	0.58
Uncomfortable eating with people	0.56	0.76	0.49
Teeth or gums sensitive	0.24	0.79	0.50

$\alpha = 0.79$

*Intraclass correlation coefficient.

Table 3

Concurrent validity: A correlation between self-reported general and oral health and the need for dental care and the Geriatric Oral Health Assessment Index (GOHAI) scores (n = 301)

Item	GOHAI score (mean ± SD)	Pearson's correlation coefficient
Self-reported general health		
very bad (n = 25)	41.0 ± 8.4	
bad (n = 122)	47.8 ± 8.2	
good (n = 133)	49.9 ± 8.3	0.27
very good (n = 21)	51.4 ± 5.1	
Self-reported oral health		
very bad (n = 15)	41.8 ± 8.2	
bad (n = 89)	44.4 ± 8.2	0.36
good (n = 182)	50.7 ± 7.6	
very good (n = 15)	50.8 ± 8.5	
Self-reported need for dental treatment		
yes (n = 135)	45.2 ± 8.9	
no (n = 166)	51.0 ± 7.1	0.35

Table 4

Convergent validity: differences in the average of the Geriatric Oral Health Assessment Index (GOHAI) scores according to self-reported responses to different health-related questions and objective assessment of oral health (n = 301)

Item	GOHAI score (mean ± SD)	p-value
Self-reported toothache		
yes (n = 43)	42.8 ± 7.5	< 0.05[a]
no (n = 258)	49.3 ± 8.2	
Self-reported sensitivity to hot and cold		
yes (n = 62)	43.4 ± 8.6	< 0.05[a]
no (n = 239)	49.7 ± 7.9	
Self-reported TMJ pain		
yes (n = 20)	44.9 ± 8.5	0.52[b]
no (n = 281)	48.6 ± 8.4	
Self-reported bleeding gums during brushing		
yes (n = 34)	46.1 ± 9.4	0.15[b]
no (n = 267)	48.7 ± 8.3	
Self-reported dry mouth		
yes (n = 179)	46.9 ± 8.5	< 0.05[b]
no (n = 122)	50.6 ± 7.9	
Self-reported bad breath		
yes (n = 53)	46.1 ± 9.3	< 0.05[b]
no (n = 248)	48.9 ± 8.2	
Self-reported inability to get chewed up food		
yes (n = 71)	42.7 ± 8.1	< 0.05[b]
no (n = 230)	50.2 ± 7.8	
Missing teeth (25.2 ± 8.2)	48.4 ± 8.4	< 0.05[c]
Decayed teeth (0.8 ± 1.9)	48.4 ± 8.4	< 0.05[c]

[a]Kruskal-Wallis test; [b]Mann-Whitney U test; [c]t-test; TMJ – temporomandibular joint.

Table 5
Distribution of participants according to self-reported health-related ratings (n = 301)

Variable	n	%
Self-reported general health		
very bad	25	8.3
bad	122	40.5
good	133	44.2
very good	21	7.0
Self-reported oral health		
very bad	15	5.0
bad	89	29.6
good	182	60.5
very good	15	5.0
Self-reported need for dental treatment		
yes	135	44.9
no	166	55.1
Self-reported toothache		
yes	43	14.3
no	258	85.7
Self-reported sensitivity to hot and cold		
yes	62	20.6
no	239	79.4
Self-reported TMJ pain		
yes	20	6.6
no	281	93.4
Self-reported bleeding gums during brushing		
yes	34	11.3
no	267	88.7
Self-reported dry mouth		
yes	179	59.5
no	122	40.5
Self-reported bad breath		
yes	53	17.6
no	248	82.4
Self-reported inability to chew food		
yes	71	23.6
no	230	76.4

TMJ – temporomandibular joint.

Distribution of Geriatric Oral Health Assessment Index

The responses to the different questions of the GOHAI questionnaires are listed in Table 6. The GOHAI score of the examinees ranged from 23 to 60, with higher values indicating better quality of life. The average value of the GOHAI score was 48.4 (SD ± 8.4). As for the distribution of GOHAI answers, oral impacts were frequent for item 2: 48.5% of the participants reported 'always' having difficulties when chewing. On the other hand, a small number of participants (0.3%) used medications 'always' to relieve dental pain (item 8). Also, oral impacts were minimal for item 3: 0% of the participants answered with 'never' to the question 'How often were you able to swallow comfortably?'.

Discussion

This research shows that poor oral health of institutionalized elderly in Serbia has a negative impact on their daily activities and quality of life. The obtained results of psychometric characteristics of the Serbian GOHAI are satisfactory, with good reliability and convergent and concurrent validity. However, there are some issues about the applied methods and results that need to be discussed and compared to other studies.

The GOHAI was originally developed in English language and designed for use in North America. The quality of translation and validation of the translated instrument plays a significant role in ensuring that the results obtained in cross-cultural research are not due to errors in translation, but rather due to real differences or similarities between cultures in the measured phenomena [13, 14]. Considerable effort has been invested in the appropriate cultural adaptation to overcome language and cultural differences. The methods used (back translation and monolingual pre-testing) have been recommended by the WHO and experts in this field [12, 15], and proven to be valid in many studies carried out in different cultural settings. Also, to minimize possible negative effects and flaws of the back-translation method, in this research a preliminary version (after back translation) was pre-tested on a small sample of the target population (pilot study).

Considering the lower educational level in Serbia comparing to the countries of origin of the GOHAI, the forward method was used with simple phrases. Literal translation was avoided as much as possible, in accordance with recommendation of cross-cultural validation. The major problem was with question 5, mainly because of the positive "able to eat anything" and negative "without feeling discomfort" direction of this question. Because of that, some discrepancies

between the original text and back-translation were found, which were resolved by the research team. Additionally, problems of lexical compatibility occurred with the phrase "self-conscious" in question 10 because it does not have the dictionary equivalent in Serbian. Considering that the goal was semantics rather than literal equivalence [13, 16], an acceptable approximation was found (Appendix 1).

The frequency of examinees who gave positive answer to the question "How often were you able to swallow comfortably?" was very low. The same was noticed in a Dolan's longitudinal study [10]. Additionally, this question showed the low item-total and test-retest correlation, which is compatible with the results in the French version. This question was originally developed to detect problems with swallowing in the elderly, mainly because of xerostomia. Yet, the use of this question should be reconsidered as an instrument for the assessment of quality of life of younger populations in whom xerostomia is not commonly present.

The obtained values of the GOHAI score – mean 48.4 (SD ± 8.4) are larger than values in the Arabic version – mean 40.9 (SD ± 10.6) [17] and the French version – mean 46.4 (SD ± 9.5) [18] and very similar to the results of the Chinese version – mean 48.9 (SD ± 7.2) [19].

As far as the distribution of responses to certain issues, the negative impact of oral health on quality of life was observed in question 2. Almost every second participant always had trouble biting or chewing any kinds of food, such as firm meat or apples, due to problems with teeth or dentures, which is much more than in other studies (7.9%) [17]. A high percentage of patients with this response shows that half of the sample has problems in their daily diet and that their quality of life is poorer because of unsatisfactory oral health. For questions 3 and 8 there are no so many obvious discrepancies, compared with other studies.

Cronbach's alpha coefficient (0.79) confirmed a high degree of internal consistency and homogeneity among items. The value is similar to the Malay version of the GOHAI, and it is within the range of obtained values (0.64–0.88) of the coefficient of the GOHAI version in other languages.

The item-scale correlations varied from 0.24 to 0.56 in the Serbian version, compared with 0.28 to 0.61 in the Chinese version [19], -0.08 to 0.72 in the Romanian version [20], and 0.38 to 0.69 in the Malay version [21].

The obtained values for the test-retest correlation were within the range from 0.40 to 0.85, where the correlation coefficient for the GOHAI score was 0.66, which was similar to the values in the Swedish version (0.64) [22]. The lowest value was associated with the question "use of medication" with the correlation coefficient of 0.40.

Concurrent validity showed the relationship between the GOHAI score and the self-reported general and oral health and the self-reported need for dental treatment. Lower GOHAI scores were associated with lower ratings for self-reported general and oral health and self-reported need for dental treatment. However, the obtained values are lower than the values of the original English [7] and Arabic [18] versions of the GOHAI. Regarding limitations of concurrent validity, 60.5% of respondents thought that their present oral health status was satisfactory, and this value is larger than the values cited in other studies [21, 22]. This can be explained by the environment in which these old people lived. In this region (but also in many others) there is still the rule that for older age edentulousness is expected and the absence of pain is the equivalent to "good oral health." That is, there are different perceptions of what is "problematic" according to individual contexts, besides regional and historical tradition, where dental treatment is still poorly accessible, and where it will be more or less likely that a problem was interpreted or perceived as such [23]. Therefore, it is necessary to improve social importance of oral health and oral health care for institutionalized elderly. Consequently, over the years, this will change the expected image of "good oral health" in elderly, from a toothless person to person with natural teeth or dental prothesis.

Convergent validity confirmed the results of certain studies [18] by showing that self-reported toothache, sensitivity to hot and cold, dry mouth, bad breath and inability to chew food were related to the lower GOHAI scores. Additionally, the participants in the study with one or more missing or decayed teeth had lower GOHAI scores than those who did not have missing or decayed teeth.

Conclusion

The GOHAI final score was considered low, indicating low oral health self-perception by the institutionalized elderly in Serbia. These data suggest that oral health has a significant effect on the overall health of the institutionalized individuals.

The Serbian version of GOHAI showed acceptable reliability and validity for research of elderly. Future studies are necessary to determine the stability of the instrument as well as its sensitivity to dental treatment by correlating data between institutionalized and non-institutionalized persons.

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Item responses (proportions) and items (n = 301)

During the past three month (Tokom poslednja tri meseca…)	Never (nikada)	Seldom (retko)	Sometimes (ponekad)	Often (često)	Always (uvek)
How often did you limit the kinds or amounts of food you eat because of problems with your teeth or dentures? (Koliko često ste ograničavali vrstu ili količinu hrane koju jedete zbog problema sa zubima ili protezama?)	174 (57.8%)	34 (11.3%)	28 (9.3%)	39 (13.0%)	26 (8.6%)
How often have you trouble biting or chewing any kinds of food, such as firm meat or apples? (Koliko često imate probleme sa odgrizanjem ili žvakanjem neke vrste hrane, kao što su žilavo meso ili jabuke?)	71 (23.6%)	22 (7.3%)	20 (6.6%)	42 (14.0%)	146 (48.5%)
How often were you able to swallow comfortably? (Koliko često ste mogli da gutate lagodno?)	0 (0%)	3 (1.0%)	9 (3.0%)	32 (10.6%)	257 (85.4)
How often have your teeth or dentures prevented you from speaking the way you wanted? (Koliko često su Vas Vaši zubi ili proteze sprečavali da govorite onako kako ste želeli?)	180 (59.8%)	28 (9.3%)	34 (11.3%)	30 (10.0%)	29 (9.6%)
How often were you able to eat anything without feeling discomfort? (Koliko često ste mogli da jedete bilo šta bez osećaja nelagodnosti?)	18 (6.0%)	31 (10.3%)	32 (10.6%)	53 (17.6%)	167 (55.5%)
How often did you limit contacts with people because of the condition of your teeth or dentures? (Koliko često ste ograničavali kontakt sa ljudima zbog stanja vaših zuba ili proteza?)	239 (79.4%)	15 (5.0%)	18 (6.0%)	22 (7.3%)	7 (2.3%)
How often were you pleased or happy with the looks of your teeth and gums, or dentures? (Koliko često ste bili zadovoljni ili srećni sa izgledom Vaših zuba i desni ili proteza?)	58 (19.3%)	33 (11.0%)	20 (6.6%)	56 (18.6%)	134 (44.5%)
How often did you use medication to relieve pain or discomfort from around your mouth? (Koliko često ste koristili lekove da bi ublažili bol ili nelagodnost u Vašim ustima?)	257 (85.4%)	13 (4.3%)	18 (6.0%)	12 (4.0%)	1 (0.3%)
How often were you worried or concerned about the problems of your teeth, gums or dentures? (Koliko često ste bili zabrinuti ili zaokupljeni problemima sa zubima, desnima ili protezama?)	150 (49.8%)	34 (11.3%)	27 (9.0%)	55 (18.3%)	35 (11.6%)
How often did you feel nervous or self-conscious because of problems with your teeth, gums, or dentures? (Koliko često ste se osećali nervozno zbog problema sa zubima, desnima ili protezama?)	172 (57.1%)	32 (10.6%)	30 (10.0%)	49 (16.3%)	18 (6.0%)
How often did you feel uncomfortable eating in front of people because of problems with your teeth or dentures? (Koliko često ste se osećali neprijatno da jedete pred ljudima zbog problema sa zubima ili protezama?)	214 (71.1%)	19 (6.3%)	29 (9.6%)	18 (6.0%)	21 (7.0%)
How often were your teeth or gums sensitive to hot, cold, or sweets? (Koliko često su Vam zubi ili desni bile osetljive na toplo, hladno ili slatko?)	217 (72.1%)	24 (8.0%)	26 (8.6%)	23 (7.6%)	11 (3.7%)

Geriatric Oral Health Assessment Index (GOHAI) score: mean 48.4 [standard deviation (SD) ± 8.4]; minimum = 23; maximum = 60.