DE GRUYTER OPEN

10.1515/bjdm-2017-0014

BALKAN JOURNAL OF DENTAL MEDICINE

BaSS

ISSN 2335-0245

Oral Health Related Quality of Life and Dental Status of Adult Patients

SUMMARY

Background: *The aim of this study was to assess the oral health-related quality of life in adult patients who visit the Dental Clinic of the Faculty of Stomatology, Pancevo, using a Serbian version of 14-items Oral Health Impact Profile (OHIP14) Questionnaire.* ***Material and Methods:*** *A total of 89 respondents (42 women and 47 men, mean age 52.83 ± 13.74 years) filled in the questionnaire themselves. Three calibrated dentists recorded the oral health status of the respondents (number of healthy, decayed, filled and missing teeth), the type and time of wearing prosthodontic replacements, if they existed, and assessed the need for prosthodontic treatment. The total OHIP-14 score was calculated by adding scores for all fourteen items; OHIP-14 subscale scores were calculated by adding the scores for the two items in each of the seven subscales.* ***Results:*** *Mean total OHIP score was 10.25 ± 8.89. Patients with less than eight extracted teeth, wearers of fixed prosthodontic appliances and patients without replacements who did not need prosthodontic treatment reported better oral health-related quality of life. The most severe oral impacts assessed by the subscale OHIP14 scores were recorded in psychological discomfort (2.44 ± 2.18), physical pain (1.87 ± 1.73) and psychological disability subscale (1.83 ± 1.88). Women more often than men were dissatisfied with their diet and had been irritable in contact with other people.* ***Conclusion:*** *Further studies using the OHIP14 questionnaire in a larger sample will permit identification of key factors related to poor oral health and planning of treatment protocols and preventive programs for the adult population in Serbia.*

Key words: Oral Health-Related Quality Of Life, OHIP14, Oral Health, Missing Teeth, Prosthodontics

Maja Lalić, Irena Melih, Ema Aleksić, Milica Gajić, Katarina Kalevski, Anika Ćuković

Faculty of Stomatology Pancevo
University Business Academy Novi Sad, Serbia

ORIGINAL PAPER (OP)
Balk J Dent Med, 93-99

Introduction

Oral diseases are significant public health burden worldwide but often not given adequate attention in many low and middle income countries. Oral diseases affect people's everyday lives subtle but pervasive, disrupting eating, sleep, work and social roles. Oral health is essential to overall health, well-being and quality of life. Health-related quality of life (HRQoL) is multidimensional concept which includes patients' physical, psychological and social well-being. A major factor that can strongly affect the overall HRQoL is the oral health of the individual[1, 2].

Although a relatively new concept, oral health-related quality of life (OHRQoL) receives rapidly growing attention. The concept of OHRQoL is of special interest for oral health promotion and access to oral health care in the community[3]. At the clinical research level, this concept is used to determine the patient's treatment needs, the specific type of treatment and to evaluate treatment outcome.

Since the quality of life is found to be an important outcome of dental care, a need for developing a range of instruments to determine oral health-related quality of life has arisen. OHRQoL can be measured using twenty indexes developed in the original English version, with numerous translations into other world languages[4]. The

Oral Health Impact Profile (OHIP) measures peoples' subjective perceptions of disability and discomfort caused by oral conditions[5]. The OHIP-49 contains 49 questions that refer to functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The OHIP-14 was developed as a shorter version expressing good reliability, validity and precision[6]. For each question, the subjects are asked how frequently they had experienced the problem in the last month. Responses are rated using a Likert-type scale (0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, 4 = very often). Zero indicates the absence of any problems, while high scores point to severely impaired oral health[5].

Studies in the field of oral health in Serbian population are relatively new and few. The Serbian version of the OHIP-14 index was introduced in the pilot study of Stancic et al.[7], who found that 60% of elderly people felt that life was generally less satisfying as a result of impaired oral health. The other pilot study of OHRQoL, measured using the Oral Impacts on Daily Performances (OIDP) index, reported that impaired oral health dominantly affected eating, speaking, social and emotional well-being of Serbian elderly adults[8].

One of the instruments developed for the assessment the oral health problems of older adults was the Geriatric Oral Health Assessment Index (GOHAI)[9]. The pilot study of oral health related quality of life in Serbian geriatric patients before and after prosthodontics rehabilitation showed that the Serbian preliminary version of the GOHAI questionnaire confirmed the consistency, stability, and validity of the questionnaire and revealed the causal relation between the quality of life and the characteristics of oral health of the patients with dentures[10]. Studies applying Serbian version of OHIP-14 and GOHAI questionnaire provided more in-depth analysis of patients' condition and could be very useful for treatment planning and estimation of dental treatment outcome[11].

The aim of our study was to apply the OHIP-14 questionnaire to determine the incidence and extent of oral impacts on quality of life related problems among patients who visited the Dental Clinic of the Faculty of Stomatology Pancevo for the first time, prior to any treatment, and to assess the relations between their dental status, treatment needs and OHRQoL.

Material and Methods

This study included a suitable sample of 89 urban adults who visited the Dental Clinic of the Faculty of Stomatology, Pancevo, during March - April 2015, seeking restorative or prosthodontic treatment. Patients with a medical history of chronic or systemic diseases and disabilities, and those with acute dental symptoms/pain were not included in the investigation. All patients signed an informed consent form. The study was approved by Ethical committee of Faculty of Stomatology Pancevo.

To assess the impact of oral health status on health-related quality of life, we used the Serbian version of the OHIP-14 index[7]. Additionally, data about age, educational and occupational background were recorded.

The respondents filled in a questionnaire themselves. Three previously trained and calibrated dentists were at their disposal to provide explanations regarding the questions, without suggesting the answers. These dentists conducted the clinical examination in a dental surgery, under artificial light, using a dental mirror and probe. They recorded the dental status of each patient (numbers of healthy, decayed, extracted or filled teeth), as well as the presence, type and approximate time of wearing prosthetic replacements. It was noted whether the patient had an adequate prosthetic appliance, and whether he or she needed prosthetic treatment. How long patients without any replacements but who needed prosthodontic treatment had been without their teeth was also recorded.

OHIP-14 scores were calculated in two ways[12]: first, the total OHIP-14 score was calculated by summing responses over all fourteen items, with possible scores ranging from 0 to 56; secondly, OHIP-14 subscale scores were calculated for each of seven dimensions indicated in Table 5 by adding scores for the two items in each subscale.

Statistics

Statistical analyses were performed using SPSS for Windows (release 17.0, SPSS, Chicago, IL). Mean differences in OHIP-14 scores according to age, sex, educational level, occupation and the presence of different prosthetic appliances were assessed by ANOVA. Differences in dental status expressed by the number of healthy, decayed, extracted or filled teeth between the sexes were evaluated using the t-test. Statistical significance was based on probability values of less than 0.05.

Results

This study included 42 women and 47 men. The mean age of the patients was 52,83 ± 13,74 years (range 19 to 72 years, median 56). Mean total OHIP-14 score (Table 1) in the whole sample was 10.25 ± 8.89 (95% confidence interval – 8.38 to 12.12). Total OHIP score was 9.06 ± 8.38 for men and 11.57 ± 9.35 for women ($p>0.05$). Data pertaining to age, educational level and occupation were missing for ten (11.24%), three (3.37%) and nine (10.11%) patients, respectively. This loss of data could be expected and tolerated when self-complete form of questionnaire is used. No significant differences in total OHIP score related to sex, age, education and employment status of the subjects were detected.

Table 1. The sample characteristics and differences in total OHIP-14 scores according to gender, age, educational and working status

	N	$\bar{\chi}$	SD	SE	95% Confidence interval for mean		Min	Max	F	p
					Lower limit	Upper limit				
Gender:										
male	47	9.06	8.38	1.222	6.60	11.52	0	35		
female	42	11.57	9.35	1.442	8.66	14.48	0	35		
Total	89	10.25	8.89	.942	8.38	12.12	0	35	1.782	ns
Age (years):										
30 to 45	17	10.76	7.45	1.806	6.94	14.59	0	21		
46 to 65	50	10.96	10.04	1.419	8.11	13.81	0	35		
over 65	12	8.42	7.63	2.204	3.57	13.27	1	23	0.375	ns
Education:										
elementary	10	9.20	7.69	2.430	3.70	14.70	1	23		
high school	48	10.27	9.43	1.361	7.53	13.01	0	35		
university	28	10.46	8.80	1.664	7.05	13.88	0	33	0.074	ns
Employment status:										
employed	27	10.11	10.01	1.927	6.15	14.07	0	35		
unemployed	21	9.52	8.57	1.870	5.62	13.43	0	26		
retired	32	9.81	8.98	1.587	6.58	13.05	0	35	0.024	ns

$\bar{\chi}$ - mean OHIP score; SD – Standard deviation; SE – standard error; p – statistical significance; ns-not significant

The average number of healthy (untereated) teeth was 9.41 ± 6.63 in the whole sample, while the mean number of decayed teeth was 2.52 ± 3.22; 12.75 ± 8.39 had been extracted and 6.11 ± 4.15 filled (Table 2). No statistically significant differences in dental status between men and women were found.

Table 2. The mean number of healyhy, decayed, missing and filled teeth according to gender

	Total (n = 89)	Men (n = 47)	Women (n = 42)	p
Healthy teeth	9.41(±6.63)	8.57(±6.45)	10.37(±6.79)	ns
Decayed teeth	2.52(±3.22)	2.35(±3.48)	2.71(±2.93)	ns
Missing teeth	12.75(±8.39)	13.91(±8.90)	11.44(±7.68)	ns
Filled teeth	6.11(±4.15)	6.37(±4.37)	5.83 (±3.92)	ns

p – statistical significance
ns-not significant

The differences in total OHIP scores according to the number of missing teeth are given in Table 3. Patients with more than eight teeth missing had the highest total OHIP score (11.94 ± 9.29), while it was 9.47 ± 8.37 for those with up to four and 5.44 ± 6.21 for patients with five to eight missing teeth (F = 3.60, p = 0.03).

Among all subjects, 42 (47%) had no prosthetic appliances, 19 (21%) had fixed prosthetic appliances (crowns and bridges), 8 (9%) had a combination of fixed appliances and/or partial dentures, 15 (17%) had immediate partial dentures, while 5 patients (6%) wore complete dentures. We found that 34 out of 42 patients (81%) who had no prosthetic appliances needed prosthetic rehabilitation. The average period of time that they had been without teeth was 3.19 ± 2.55 years. Among 43 respondents who already had replacements 29 (67%) required new ones. On average, the replacements were 7.77 ± 5.51 years old.

The presence and type of prosthetic replacement affected the total OHIP score (Table 4). Patients with crowns and/or bridges had the lowest total OHIP score (5.00 ± 5.82), while the highest scores were recorded among wearers of immediate partial (17.14 ± 8.88) and complete dentures (16.00 ± 11.58), with a significant difference between the groups (F = 5.002; p = 0.001).

Table 3. Mean OHIP-14 score according to the number of missing teeth

Number of missing teeth	N	$\bar{\chi}$	SD	SE	95% Confidence interval for mean		Min	Max
					Lower limit	Upper limit		
0 - 4	19	9.47	8.37	1.92	5.44	13.51	0.00	26.00
5 - 8	16	5.44	6.21	1.55	2.13	8.74	0.00	21.00
> 8	54	11.94	9.29	1.26	9.41	14.48	0.00	35.00

F = 3,60; p = 0,03

$\bar{\chi}$ - mean OHIP score; SD – Standard deviation; SE – standars error

Table 4. Total OHIP-14 score according to the type of prosthetic replacement

	N	$\bar{\chi}$	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower limit	Upper limit		
Without replacements	42	9.32	8.45	1.320	6.65	11.99	0	35
Crowns/bridges	19	5.00	5.82	1.372	2.11	7.89	0	21
Fixed partial denture	8	10.43	8.66	3.272	2.42	18.44	1	22
Immediate partial denture	15	17.14	8.88	2.374	12.01	22.27	5	33
Complete denture	5	16.00	11.58	5.177	1.63	30.37	7	35

df = 4; F = 5,002; p = 0,001

$\bar{\chi}$ - mean OHIP score; SD – Standard deviation; SE – standard error

Table 5. Mean subscales OHIP-14 scores and frequencies of "often" or "very often" responses

	OHIP-14 item	Distribution of "often" or "very often" answers (%)	Mean Subscale OHIP score (±SD)	Men	Women	p
Functional limitation	1 Trouble pronouncing any words 2 Sense of taste has worsened	1.18%	0.71 (±1.02)	0.74 (±1.13)	0.67 (±0.90)	ns
Physical pain	3 Had painful aching in your mouth 4 Uncomfortable to eat any foods	12.91%	1.87 (±1.73)	1.96 (±1.91)	1.76 (±1.53)	ns
Psychological discomfort	5 Been self conscious 6 Felt tense	22.35%	2.44 (±2.18)	2.21 (±2.00)	2.69 (±2.36)	ns
Physical disability	7 Diet has been unsatisfactory 8 Had to interrupt meals	10.59%	1.52 (±1.83)	1.10 (±1.52)	1.95 (±2.06)	0.032
Psychological disability	9 Difficult to relax 10 Been a bit embarrassed	9.41%	1.83 (±1.88)	1.57 (±1.79)	2.12 (±1.95)	ns
Social disability	11 Been a bit irritable with other people 12 Had difficulty doing your usual jobs	5.88%	1.01 (±1.51)	0.68 (±1.12)	1.38 (±1.79)	0.033
Handicap	13 Felt that life in general was less satisfying 14 Been totally unable to function	2.35%	0.89 (±1.13)	0.79 (±1.10)	1.00 (±1.17)	ns

SD – standard deviation; p – statistical significance; ns-not significant

The most severe oral impacts assessed by the subscale OHIP-14 scores were recorded in psychological discomfort (2.44 ± 2.18), physical pain (1.87 ± 1.73) and psychological disability (1.83 ± 1.88) subscale, while the least severe impacts (0.71 ± 1.02) were in the functional limitation subscale (Table 5). Oral pain frequently affected 3.37% of respondents, while 50.56% of the subjects reported occasional painful aching in the mouth. The majority of respondents reported no oral impacts on pronouncing words (n = 67) or ability to function (n = 66) and no changes of taste sense (n = 62).

Mean OHIP-14 scores calculated separately for each item (Table 6), were significantly higher in women than in men concerning unsatisfactory diet (item 7; 1.17 ± 1.46 *vs* 0.55 ± 1.02, p = 0.022) and being somewhat irritable with other people (item 11; 0.79 ± 1.02 *vs* 0.36 ± 0.82, p = 0.030).

Table 6. Distribution of OHIP items, ranging from 0 (never), 1 (hardly ever), 2 (occasionally), 3 (very often) to 4 (fairly often) and mean OHIP-14 scores

Question	0	1	2	3	4	Total OHIP score (SD)	Men OHIP score (SD)	Women OHIP score (SD)	p
1	67	16	5	1	0	0. 33 (0.64)	0.36 (0.70)	0.29 (0.55)	ns
2	62	21	5	1	0	0. 38 (0.65)	0.38 (0.64)	0.38 (0.66)	ns
3	41	39	6	3	0	0. 68 (0.75)	0.72 (0.85)	0.62 (0.62)	ns
4	41	15	15	7	10	1. 22 (1.40)	1.26 (1.42)	1.14 (1.39)	ns
5	30	12	22	16	9	1. 57 (1.38)	1.49 (1.30)	1.67 (1.48)	ns
6	44	24	13	5	3	0. 87 (1.08)	0.72 (0.90)	1.02 (1.24)	ns
7	57	6	15	5	6	0. 84 (1.28)	0.55 (1.02)	1.17 (1.46)	0.022
8	48	29	7	4	1	0. 66 (0.89)	0.55 (0.88)	0.79 (0.90)	ns
9	49	23	12	3	2	0. 72 (0.98)	0.62 (0.90)	0.83 (1.06)	ns
10	32	26	22	7	2	1. 11(1.06)	0.96 (1.02)	1.29 (1.09)	ns
11	57	22	4	4	2	0. 56 (0.94)	0.36 (0.82)	0.79 (1.02)	0.030
12	59	23	4	3	0	0. 45 (0.74)	0.32 (0.56)	0.60 (0.89)	ns
13	53	23	10	1	2	0. 61 (0.90)	0.51 (0.93)	0.71(0.86)	ns
14	66	22	0	1	0	0. 28 (0.52)	0.28 (0.45)	0.29 (0.60)	ns

p – statistical significance; ns-not significant

Discussion

The convenient, small sample of patients examined here, may be considered a limitation of this study. Most of these patients visited the Dental Clinic of the Faculty of Stomatology, Pancevo due to the possibility of receiving free dental care. This includes not only prosthetic rehabilitation, but also conservative, endodontic, periodontal and surgical treatment. In most dental clinics, both private and public, dental treatment is not fully covered by standard health insurance. Certainly, the part of the population that can afford adequate and prompt dental treatment and, therefore, probably with better oral health-related quality of life, was not in the majority in our research, so these results cannot be generalized and applied to the entire adult population of Vojvodina. Due to these limitations, this study should be considered a prospective one.

We used the self-completion questionnaire format of the Serbian version of the OHIP-14 index. The method of administration did not significantly influenced total OHIP14 scores, although more severe impacts were reported in some studies that used the interview compared to the questionnaire format of this index[13]. The use of the OHIP14 in the questionnaire format may result in loss of data and omission of answers. In our study the proportion of respondents who answered all the questions regarding age and social status was 88.76%. Although Stancic et

al.[7] suggested that item nr. 5 should be omitted in Serbian version of OHIP 14 questionnaire, participants of this study answered it without asking for clarification.

We found that psychological discomfort, physical pain, physical and psychological disability were the most common oral impacts, frequently affecting 9.41% to 22.35% of the respondents. Functional limitations and handicaps were the least severe oral impacts.

No significant differences in total OHIP scores according to the respondents' age, sex, educational level and occupation were noted in our study, although others indicated a considerable impact of social determinants on self-perceived oral health-related quality of life[14, 15]. Consistent with the results of earlier studies[16, 12], we found that women perceive that oral health affects quality of life to a greater extent compared to men. Respondents older than 65 years of age subjectively perceived oral health problems less frequently than the younger participants, although the differences in total OHIP scores between different age groups were not statistically significant. Slade and al.[17] reported that negative subjective perception of oral health problems is more common early in adulthood than in old age. This pattern probably indicates that young people have high expectations regarding oral health, while elderly express greater resilience. The older respondents more often seek medical than dental care, and dental treatment was mostly needed due to pain.

Summarized, the oral characteristic of our sample was a great number of extracted teeth (12.75 ± 8.39), and a high percentage of patients without replacements who needed prosthodontic treatment (81%) or those with inadequate prosthodontic replacements (67%).

Tooth loss is one general indicator of oral health status of a population. The presence of twenty teeth is an oral health goal of the WHO[18]. As the major physical characteristic of oral health, the number of teeth had an impact both on ability to chew food and oral health-related quality of life in prosthodontic patients[19]. Consistent with this, we found that total OHIP score was significantly higher in subjects who had more than eight teeth missing. Interestingly, oral health quality of life in patients with up to four missing teeth was worse than in patients with five to eight teeth missing, because oral symptoms in patients with a few missing teeth involved acute dental pain rather than reduced chewing ability. Brennan et al. [20] reported that the number of functional teeth was positively associated with chewing ability. The ability to chew food properly was positively associated with oral health-related quality of life and general health, which might be related to food choice and greater enjoyment of meals. Compromised chewing ability may not only negatively affect nutritional intake and oral health-related quality of life[21], but an inappropriate diet may also be deleterious general health[22, 23]. In our study, 10.59% of the subjects reported that they frequently had to interrupt meals and that their diet was unsatisfactory, while 19.10% of them stated that problems with their mouth or dentures interfered eating of any food. Women, significantly more often than men, were dissatisfied with their diet due to oral health problems.

The type of replacement significantly affected oral health-related quality of life. The greatest oral impacts were recorded in patients with immediate partial or complete dentures. Many patients with immediate dentures often use these appliances for a longer period than functionally acceptable[24], probably due to their financial inability to afford a more sophisticated solution. This could be the main reason for the high oral impacts on quality of life among these patients. Krunić et al. suggested that relining of complete dentures with silicone may improve the patient's satisfaction with dentures[25]. Many reports suggested that technically advanced appliances, i.e. implant overdentures, provided better function and oral health-related quality of life compared with conventional dentures[26, 27, 28].

Better scores for self-reported oral health in the group of patients with fixed appliances than in the group without any replacements, could be explained by the finding that 81% of those without prosthodontic replacements needed prosthetic rehabilitation.

The data collected in this study revealed the most common oral impacts in adult patients and could help dentists to plan individual treatment aimed to improvement of patient's oral and general health. We used only clinical data to assess different oral impacts on quality of life, while Slovenian and Croatian authors used self-reported oral health scores, which correlated with the scores in the Croatian and Slovenian versions of the 14-item Oral Health Impact Profile (OHIP-CRO14 and OHIP-SVN14) questionnaires[29, 30].

Conclusions

Future research should be directed towards the assessment of psychometric properties of the Serbian version of the OHIP14 Questionnaire by including both clinical and subjective, patient-reported variables in a larger sample, in order to assess the causal determinants of oral health in adult patients and include these findings in planning treatment protocols and preventive programs.

References

1. McGrath C, Bedi R. The importance of oral health to older people's quality of life. Gerodontol, 1999;16:59-63.

2. John MT, LeResche L, Koepsell TD, Hujoel P, Miglioretti DL, Micheelis W. Oral health-related quality of life in Germany. Eur J Oral Sci, 2003; 111:483-491.
3. Shamrany MA. Oral health-related quality of life: a broader perspective. East Mediterr Health J, 2006;12:894-901.
4. Hebling E, Pereira AC. Oral health-related quality of life: a critical appraisal of assessment tools used in elderly people. Gerodontol, 2007;24:151-161.
5. Slade GD, Spencer AJ: Development and evaluation of the oral health impact profile. Community Dent Health, 1994;11:3-11.
6. Slade GD. Derivation and validation of a short-form oral health impact profile Community Dent Oral Epidemiol, 1997;25:284-290.
7. Stancic I, Sojic LT, Jelenkovic A. Adaptation of Oral Health Impact Profile (OHIP-14) index for measuring impact of oral health on quality of life in elderly to Serbian language. Vojnosanit Pregl, 2009;66:511-515.
8. Stančić I, Kulić J, Tihaček-Šojić L, Stojanović Z. Applicability of a Serbian version of the "Oral Impacts on Daily Performance (OIDP)" index – assessment of oral health-related quality of life. Vojnosanit Pregl, 2012;69:175-180.
9. Atchison KA, Dolan TA. Development of the Geriatric Oral Health Assessment Index. J Dent Educ, 1990;54:680-687.
10. Popović Ž, Gajić I, Obradović-Đuričić K, Milošević D. Uvod u verifikaciju instrumenta GOHAI za merenje oralnozdravstvenog kvaliteta života osoba sa zubnim nadoknadama primenom preliminarne srpske verzije – pilot studija. Vojnosanit Pregl, 2015;72:1055-1062.
11. Jović Lj, Doder R. Primena OHIP 14 i GOHAI upitnika u cilju procene uticaja oralnog zdravlja na kvalitet života kod starije populacije. Medicina Danas, 2012;11:186-191.
12. Lawrence HP, Thomson WM, Broadbent JM, Poulton R. Oral health-related quality of life in a birth cohort of 32-year olds. Community Dent Oral Epidemiol, 2008;36:305-316.
13. Sousa PC, Mendes FM, Imparato JC, Ardenghi TM. Differences in responses to the Oral Health Impact Profile (OHIP14) used as a questionnaire or in an interview. Braz Oral Res, 2009;23:358-364.
14. Papaioannou W, Oulis CJ, Latsou D, Yfantopoulos J. Oral health-related quality of life of Greek adults: a cross-sectional study. Int J Dent, 2011;2011:360292.
15. Adams C, Slack-Smith LM, Larson A, O'Grady MJ. Edentulism and associated factors in people 60 years and over from urban, rural and remote Western Australia. Aust Dent J, 2003;48:10-14.
16. Mc Grath C, Bedi R, Dhawan N. Factors influencung older people's self reported use of dental services in the UK. Gerodontol, 1999;16:97-102.
17. Slade GD, Sanders AE. The paradox of better subjective oral health in older age. J Dent Res, 2011;90:1279-1285.
18. Petersen PE, Yamamoto T. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol, 2005;33:81-92.
19. Baba K, Inukai M, John MT: Feasibility of oral health-related quality of life assessment in prosthodontic patients using abbreviated Oral Health Impact Profile questionnaires. J Oral Rehabil, 2008;35:224-228.
20. Brennan DS, Spencer AJ, Roberts-Thomson KF. Tooth loss, chewing ability and quality of life. Qual Life Res, 2008;17:227-235.
21. Inukai M, John MT, Igarashi Y, Baba K. Association between perceived chewing ability and oral health-related quality of life in partially dentate patients. Health Qual Life Outcomes, 2010;8:118.
22. Nowjack-Raymer RE, Sheiham A: Association of edentulism and diet and nutrition in US adults. J Dent Res, 2002;82:123-126.
23. Moynihan P, Bradbury J: Compromised dental function and nutrition. Nutrition, 2001;17:177-178.
24. Gasparić LB, Catović A, Komar D, Bergman V, Catić A. Epidemiological study on prosthodontic appliance deliveries within elderly cohorts in the Republic of Croatia, 2002-2006. Coll Antropol, 2009;33:461-465.
25. Krunić N, Kostić M, Petrović M, Igić M. Oralno zdravlje i kvalitet života bezubih pacijenata nakon podlaganja totalnih zubnih proteza. Vojnosanit Pregl, 2015;72:307-311.
26. Rashid F, Awad MA, Thomason JM, Piovano A, Spielberg GP, Scilingo E et al. The effectiveness of 2-implant overdentures - a pragmatic international multicentre study. J Oral Rehabil, 2011;38:176-184.
27. John MT, Slade GD, Szentpétery A, Setz JM. Oral health-related quality of life in patients treated with fixed, removable, and complete dentures 1 month and 6 to 12 months after treatment. Int J Prosthodont, 2004;17:503-511.
28. Harris D, Höfer S, O'Boyle CA, Sheridan S, Marley J, Benington IC et al. A comparison of implant-retained mandibular overdentures and conventional dentures on quality of life in edentulous patients: a randomized, prospective, within-subject controlled clinical trial. Clin Oral Implants Res, 2013;24:96-103.
29. Petricević N, Celebić A, Papić M, Rener-Sitar K. The Croatian version of the Oral Health Impact Profile Questionnaire. Coll Antropol, 2009;33:841-847.
30. Rener-Sitar K, Celebić A, Petricević N, Papić M, Sapundzhiev D, Kansky A, et al. The Slovenian version of the Oral Health Impact Profile Questionnaire (OHIP-SVN): translation and psychometric properties. Coll Antropol, 2009;33:1177-1183.

Received on February 1, 2017.
Revised on March 20, 2017.
Accepted on March 29, 2017.

Correspondence:

Maja Lalić
Faculty of Stomatology Pancevo
Žarka Zrenjanina 179, Pancevo
Tel: 063/8444-287
e-mail: drmajalalic@gmail.com