Testing of the Serbian version of the Oral Health Impact Profile-14 (OHIP-14) questionnaire among professional members of the Serbian Armed Forces

Testiranje srpske verzije upitnika *Oral Health Impact Profile-14* (OHIP-14) kod profesionalnih pripadnika Vojske Srbije

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Abstract

Background/Aim. The quality of life regarding oral health is a multidimensional concept that shows to which extent oral diseases and disorders impact the quality of life of each individual. One of the most frequently used questionnaires for testing the impact of oral health on the quality of life is the Oral Health Impact Profile-14 (OHIP-14). The aim of this study was to test the short form of the OHIP-14 questionnaire among professional members of the Serbian Armed Forces. **Methods.** A cross-sectional design was applied in this study. The reliability of the questionnaire was determined by Cronbach's coefficient alpha. The validity of the OHIP-14 questionnaire was assessed by the factor analysis. **Results.** A total of 1,611 participants, professional members of the Serbian Armed Forces, with a mean age of 33.5, agreed to participate in the study (the participation rate was 97.4%). The majority of the participants were males (88.8%). The overall Cronbach's alpha coefficient of the OHIP-14 scale was 0.960. The alpha reliability coefficients of all OHIP-14 subscales were between 0.732 and 0.865, indicating that the internal consistency reliability of all subscales was good. The Principal components analysis, same as inspection of the scree plot and parallel analysis supported a one-factor solution for the OHIP-14 scale. **Conclusion.** The OHIP-14 manual is equally reliable for determining the impact of oral health on the quality of life of professional members of the Serbian Armed Forces as it is with the civilian population.

Key words:
military personnel; oral health; serbia; surveys and questionnaires; quality of life.

Apstrakt

Uvod/Cilj. Kvalitet života s obzirom na oralno zdravlje jeste višedimenzionalni koncept koji pokazuje u kojoj meri oralna oboljenja i poremećaji utiču na kvalitet života svakog pojedinca. Jedan od najčešće korišćenih upitnika za testiranje uticaja oralnog zdravlja na kvalitet života jeste *The Oral Health Impact Profile* (OHIP-14). Cilj ove studije je bio testiranje kratke forme upitnika OHIP-14 na profesionalnim pripadnicima Vojske Srbije. **Metode**. Istraživanje je sprovedeno po tipu studije preseka. Pouzdanost upitnika određena je *Cronbach*-ovim alfa koeficijentom. Validacija upitnika određena je faktorskom analizom. **Rezultati.** Ukupno 1 611 učesnika, profesionalnih pripadnika Vojske Srbije, prosečne starosti 33,5 godina, pristalo je da učestvuje u studiji (stopa učešća je bila 97,4%). Većina učesnika su bili muškarci (88,8%). Ukupni *Cronbach*-ov koeficijent na skali OHIP-14 bio je 0,960 što ukazuje na pouzdanost interne konzistencije upitnika. Alfa-koeficijenti pouzdanosti svih podskupova OHIP-14 bili su između 0,732 i 0,865, što ukazuje na to da je pouzdanost unutrašnje konzistencije svih podskupova dobra. **Zaključak.** Uputnik OHIP-14 podjednako je pouzdan za utvrđivanje uticaja oralnog zdravlja na kvalitet života kako profesionalnih pripadnika Vojske Srbije tako i civilnog stanovništva.

Ključne reči:
kadar, vojni; usta, zdravlje; srbija; ankete i upitnici; kvalitet života.

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Introduction

The quality of life related to oral health is an important measure of the disease and the outcome of therapeutic interventions [1]. The state of oral health greatly affects the psychological and physical condition of patients [2]. There are various quality of life indices, general or specific, developed to assess the impact of oral diseases on quality of life. For this purpose, one of the most commonly used questionnaires worldwide is the Oral Health Impact Profile – short version (OHIP–14) [3]. The patient's self-perception about his/her oral health and related life quality are significant in clinical dental practice, dental education and research. It is widely shown that oral conditions can have varied impacts on everyday life [4].

OHIP-14 is the most frequently used instrument to evaluate the effects of intraoral disorders on the perception of the well-being of patients [5]. Derivation and validation of a short form of the oral health impact profile were developed by Slade [6]. The original version contained 49 questions and later it was reduced to 14 questions, keeping the same dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and inability to conduct day-to-day activities [6]. OHIP-14 was originally written in the English language and so far it has been translated into 15 languages [7–10].

The OHIP-14 has shown great reliability [8, 9]. Lower total results of the OHIP-14 have been significantly linked with better self-evaluation of oral status, reduced need for dental treatment, a larger number of natural teeth and better results of clinical examination [10]. Some reports on the impact of oral health on military personnel are available in the literature [11–13]. However, data on the impact of oral health on the quality of life of professional members of the Serbian Armed Forces have not been published so far. The purpose of this study was to test the short form of the OHIP-14 questionnaire among professional members of the Serbian Armed Forces.

Methods

The study was conducted as an observational cross-sectional study in the territory of the Republic of Serbia during the years 2017–2018. Based on the data from the suitable available literature [11], with the study strength of 0.8 (80%), for the assessment of oral health it is necessary to include at least 1,537 participants. Therefore, the study group included professional members of the Serbian Armed Forces who were examined at the Clinic for Dentistry of the Military Medical Academy and dentist's offices at military barracks in the entire territory of the Republic of Serbia. Parts of the sample, under the principle of the stratified sample, were chosen so they would provide a good assessment at the level of the entire Serbian Army, then for the level of particular regions and cities. The study approval was obtained by the Ethics Committee of the Military Medical Academy in Belgrade (No. 1/15-17). Participation in the study was voluntary, and all participants signed informed consent before doing the survey.

Adults, $\geq$ 20 years, dentulous persons with $\geq$ 6 teeth present, able to read, comprehend and respond to the series of questions, willing to undergo a dental examination were included in the study.

Patients with heart murmurs that would require antibiotics prior to dental examination were excluded from the study [14].

A total of 1,654 participants were included in the analysis; the participation rate was 97.4%. Out of the 1,654 respondents, 43 did not return the questionnaire or the questionnaire was not completely filled. Questionnaires with missing data were not included in the analysis. Thus, the final sample consisted of 1,611 subjects.

This questionnaire consists of 14 questions distributed in 7 dimensions of oral impact: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Each question is evaluated on a Likert scale of 5 points (never = 0, hardly ever = 1, occasionally = 2, fairly often = 3 and very often = 4). The "don't know" option is also present. The questions relate to how often individuals have experienced each problem in the last 12 months [10].

The questionnaire OHIP-14 has been translated from the original English language into the Serbian language in accordance with internationally accepted recommendations [15].

Statistical analysis

The reliability of the OHIP-14 was determined by the internal consistency coefficient, ie. Cronbach's coefficient alpha. The Cronbach's coefficients > 0.70 were considered acceptable, while values $\geq$ 0.80 were preferable.

The validity of the OHIP-14 was evaluated by Principal components analysis. The Varimax rotation was used for this analysis, with Kaiser Normalization (delta = 0). The factors' importance was assessed according to the Kaiser criterion (all factors with eigenvalues greater than 1.0). Value for the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.966, while the value for Bartlett's test of sphericity was highly significant ($p < 0.001$), which confirmed the adequacy of the choice of the factor analysis. The Cattell`s scree plot (or Kaiser criterion) was used to determine the number of statistically significant factors to keep in the analysis of the principal component.

Parallel Analysis, based on random data generation (using the Monte Carlo simulation technique), was used for determining the number of components or factors to retain from the analysis of the Principal component.

Statistical analyses were performed using the SPSS 20.0 (IBM SPSS Statistics, Chicago, IL, USA).

A p-value of < 0.05 was considered statistically significant for all tests.

Results

The majority of participants were males (1,430; 88.8%). The mean age of the participants was 33.5 ± 9.2 years (range

20–59 years). More than half of them (55.2%) had a partner (Table 1).

Table 2 shows that question 5, 'has been self-conscious', seems to have a higher average score than the other items. Concerning internal consistency, all item-total correlations were more than 0.5, indicating good internal consistency. In this case, deleting question 5 does not increase Cronbach's alpha score, thus deletion was not considered.

The alpha reliability coefficients of all OHIP-14 sub-scales were between 0.732 and 0.865, indicating that the in-ternal consistency reliability of all subscales was good (Table 3). The overall Cronbach's alpha coefficient of the OHIP-14 scale was 0.960.

The Principal Components Analysis with Varimax rota-tion illustrated the presence of one main component with an eigenvalue greater than 1, explaining 66.5% of the variance (Table 4). The factor loads of each item of the OHIP-14 were only on one factor and were in a high degree (> 0.5). Inspec-tion of the scree plot supported a one-factor solution (Figure 1). The parallel analysis indicated that one component should be retained for the OHIP-14.

Table 1

Baseline characteristics of the study participants (n = 1,611)

Characteristics	Values
Male, n (%)	1,430 (88.8)
Female, n (%)	181 (11.2)
Age (years), mean ± SD (range)	33.5 ± 9.2 (20–59)
Age (years), n (%)	
≤ 20	78 (4.8)
21–30	584 (36.3)
31–40	545 (33.8)
41–50	341 (21.2)
≥ 51	63 (3.9)
Marital status, n (%)	
without partner	722 (44.8)
with partner	889 (55.2)

SD – standard deviation.

Table 2

Descriptive statistics for the OHIP-14 questionnaire

Items of OHIP-14	Mean ± SD	Corrected item (total correlation)	Cronbach's alpha if item deleted
Q1. Had trouble pronouncing some words	0.386 ± 0.667	0.685	0.950
Q2. Felt sense of taste had worsened	0.386 ± 0.658	0.771	0.948
Q3. Had painful aches	0.478 ± 0.733	0.778	0.948
Q4. Found it uncomfortable to eat food	0.558 ± 0.835	0.799	0.947
Q5. Has been self-conscious	0.958 ± 1.251	0.536	0.960
Q6. Felt tensed	0.696 ± 0.973	0.756	0.949
Q7. Diet has been unsatisfactory	0.383 ± 0.670	0.764	0.948
Q8. Had to interrupt meals	0.438 ± 0.701	0.826	0.947
Q9. Found it difficult to relax	0.398 ± 0.675	0.846	0.946
Q10. Has been a bit embarrassed	0.512 ± 0.776	0.813	0.947
Q11. Has been a bit irritable	0.428 ± 0.709	0.795	0.947
Q12. Had difficulty doing usual jobs	0.372 ± 0.650	0.836	0.947
Q13. Felt life, less satisfying	0.448 ± 0.754	0.832	0.946
Q14. Been totally unable to function	0.343 ± 0.611	0.814	0.947

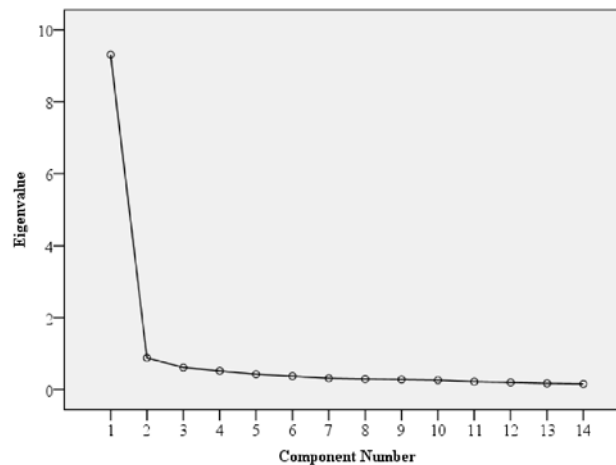**OHIP-14 – Oral Health Impact Profile – short version; SD – standard deviation.**

Table 3

Internal consistency of the OHIP-14 subscales

Subscales	Cronbach's coefficient alpha
Functional limitation	0.794
Physical pain	0.816
Psychological discomfort	0.732
Physical disability	0.848
Psychological disability	0.830
Social disability	0.865
Handicap	0.858

OHIP-14 – Oral Health Impact Profile – short version.

Table 4

Factor analysis with Varimax Rotation Method for the OHIP-14 scale items

Items of OHIP-14	Component matrix 1	Communalities
Q1. Had trouble pronouncing some words	0.734	0.539
Q2. Felt sense of taste had worsened	0.814	0.663
Q3. Had painful aches	0.813	0.661
Q4. Found it uncomfortable to eat food	0.826	0.682
Q5. Has been self-conscious	0.568	0.323
Q6. Felt tensed	0.775	0.600
Q7. Diet has been unsatisfactory	0.806	0.650
Q8. Had to interrupt meals	0.864	0.746
Q9. Found it difficult to relax	0.883	0.780
Q10. Has been a bit embarrassed	0.843	0.710
Q11. Has been a bit irritated	0.835	0.697
Q12. Had difficulty doing usual jobs	0.878	0.771
Q13. Felt life, less satisfying	0.867	0.751
Q14. Has been totally unable to function	0.860	0.739
% variance	66.5	

OHIP-14 – Oral Health Impact Profile – short version.

Fig. 1 – The Oral Health Impact Profile-14: scree plot

Discussion

The findings of the present study suggest good reliability and one-dimensional structure for the OHIP-14 scale among professional members of the Serbian Armed Forces.

Questionnaire OHIP-14 has been used in numerous studies for measuring the impact of oral health on the quality of life [8–10]. The OHIP-14-TR (Turkish version of OHIP-14) is a reliable, valid, and comprehensible scale for measuring oral health-related quality of life [16]. So far, the OHIP-14 scale has been applied to the general population, and very rarely in the military population [13, 17]. It is most often used for testing the impact of oral health on the quality of life in people with braces, patients without teeth, and those with orthodontic anomalies or systemic diseases which have manifestations in the oral cavity [18, 19]. In one Belgrade study [7], the adaptation of the OHIP-14 questionnaire was done in the Serbian language in purpose to measure the impact of oral health on the senior citizens' quality of life: in this study, question number 5 was left out ("Have you been self-conscious because of your mouth or dentures?"), because it was incomprehensible to

the majority of participants. In contrast to that, this item had Corrected Item-Total Correlation > 0.5 in our study, which points out to the good internal consistency. This difference has occurred most likely due to the large difference in age between tested population groups.

In our study, the questionnaire OHIP-14 showed adequate reliability in the sense of its internal consistency: Cronbach's alpha for OHIP-14 was high (0.960). The coefficients of reliability of all OHIP-14 subscales were between 0.732 and 0.865, which points out that the reliability of internal consistency of all subscales is good. In the study conducted in Nigeria, similar results have been obtained as in our study – Cronbach's alpha for the OHIP-14 was high (0.88) [20]. Good validity and reliability of the OHIP-14 have been determined in the Malesia adult population (the Cronbach's alpha was 0.95) [21]. Moreover, in the assessment of the quality of life in regard to the oral health of patients with cancer of the head and neck, the questionnaire OHIP-14 has shown good internal consistency (α = 0.861) [22]. The evaluation of the reliability of the Persian version of the OHIP-14 has also shown good results – the reliability was

excellent (α = 0.954), and Cronbach's coefficient of reliability for all 14 questions in each dimension was more than 70% [23].

In the available literature, we were not able to find the data on validation of the questionnaire OHIP-14 among the military population. Our study showed the presence of one main component with an eigenvalue larger than 1, explaining 66.5% of the variance. Similarly, the Rio de Janeiro study [24] revealed that one factor explained 65.6% of the total variance. Certain studies that had been evaluating the dimensional structure of the OHIP-14 scale presented contradictory results: seven factors in the original study [6], four [25], three [16], two [26], or one factor [24]. Differences in the factor structure of the OHIP-14 questionnaire may be related to the differences in the applied methods, as well as comorbidity and the different sociodemographic characteristics of the respondents in these studies (age, gender, occupation, and education level).

To the best of our knowledge, this is the first study to evaluate the reliability and validity of the OHIP-14 in the Serbian population, and one of the first OHIP-14 validation studies among the members of the armed forces in the world. Furthermore, the strength of this study is that it included a large number of military personnel. However, the study has several limitations. First, there are the known drawbacks of the cross-sectional study design. Secondly, it is necessary to compare the results of this study with the clinical examination of the participants, to get more reliable results. A larger study among middle-aged civilians also needs to be done to compare the results of our study. This survey confirmed that the Serbian version of the questionnaire OHIP-14 has excellent psychometric properties; therefore, it is a reliable instrument.

Acknowledgments

Conflict of interest

The authors declare that they have no conflict of interest.

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