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Assessment of reliability and validity of Montenegrin version of the oral health impact profile for use among the elderly in Montenegro

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SUMMARY

Introduction/Objective The quality of life of elderly individuals has an active function in oral health; it is of great importance to learn that elders over the age of 65 years demonstrate an increase in seeking dental services. Oral Health Impact Profile-14 (OHIP-14) is especially suitable for use in the elderly. The aim of this study is to examine the reliability and validity of OHIP-14 in the Montenegrin population aged 65 and over and to determine the influence of oral health on the quality of their life.

Methods The research was conducted from September to December 2016 in the central region of Montenegro, at the Medical University in Podgorica and in the nursing homes of the elderly. The study covered 170 individuals, both sexes, with an average age of 72.32 ± 6.85 . The research instrument is OHIP-14 index. Standard statistical tests were used. The statistical significance level is 0.05.

Results The OHIP-14 is linguistically and culturally adapted for the Montenegrin population. The value of the Cronbach Alpha Index is 0.892. The relationship between correlations for individual issues and total correlations ranges from 0.21 to 0.69. The value of OHIP-14 is 19.24 ± 7.49 . Listed by domains: functional constraints 3.31 ± 1.75 ; physical pain 4.19 ± 1.31 ; psychological discomfort 2.52 ± 1.46 ; physical fitness 4.38 ± 1.40 ; mental incompetence 1.42 ± 1.23 ; social incapacity 1.18 ± 1.27 and handicap 2.21 ± 1.32 .

Conclusion The OHIP-14 index is reliable and valid and is recommended for use in the Montenegrin-speaking area, for the elderly. There is a significant impact of oral health on the quality of life of the elderly in the central part of Montenegro.

Keywords: quality of life; elderly; Montenegro

INTRODUCTION

The development of medicine and science in general has led to a prolonged life span. Demographers predict that by 2060 the average age of citizens of the European Union will be 47.2 years. In the next 40 years, people over 65 will make up nearly 30% of the European Union's population [1, 2]. Increased care for the aging, promotion, and implementation of the concept of "active aging" aims to contribute to the improvement of health, quality of life, and attainment of aging [3]. It is necessary to know the state of oral health of the elderly, and the impact it has on the quality of life, in order to be able to plan and organize dental care, as the ever-increasing number of individuals will be in need of that service in the future.

The health of the mouth and teeth is not considered only as the absence of the disease, but also the functional, psychological, and social aspect of oral diseases is examined.

This is fully in line with the definition of health of the World Health Organization and the definition of oral health [4, 5]. New definition of oral health: "Oral health is multifaceted and includes the ability to speak, smile,

smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex" [5, 6].

The first authors who began to examine the psychosocial aspect of oral health were Cohen and Jago in the 1970s. During the 1980s and 1990s, Reisine, Bailit, Sheiham, Croog, Rosenberg and many others continued the trials. Today, there are a vast number of clinically verified indices, and each day they are improving postures and creating new indexes [7, 8, 9].

The original version of the Oral Health Impact Profile (OHIP) has 49 questions (OHIP-49) [10], but in a large number of researches, there are uses of a reduced form of OHIP, with 14 questions. Slade first tested the reduced version in 1997, and then by Locker and Allen in 2002 [11, 12, 13]. Slade had shown that the shorter version has the same reliability and validity as the original version, and due to a smaller number of questions, it is particularly suitable for the research of the quality of life in the elderly [11]. To date, OHIP-14 has been translated into a number of languages and has been found in many countries around the world [14–23]. It is a comprehensive and multi-dimensional index

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that covers all aspects of physical health to the psychological and social sphere of life. It was designed so that it could be applied to people with different general characteristics (education, occupation, culture, social status, and other characteristics). OHIP-14 has experienced linguistic and cultural adaptation, clinical verification, and verification in countries such as Montenegro and its surroundings [24–27].

The aim of this study was to examine the reliability and validity of OHIP-14 in the Montenegrin population aged 65 and over and to determine the influence of oral health on the quality of their life in the central part of Montenegro.

METHODS

Prior to the realization of the research, the study was approved by the Ethical Committee of the Faculty of Medicine of the University of Montenegro in Podgorica. Respondents who participated in the research were previously informed and received their written consent for participation in the research. A research plan had been developed. A dentist who is a specialist in the field of dental prosthetics performed the examination.

The research was conducted from September to December 2016 in the central part of Montenegro, at the Medical University in Podgorica and in the nursing homes for the elderly “Ljubav Spaja” and “Nana” in Spuž and Danilovgrad.

Research sample

The study conducted covered 170 people. The average age of the respondents was 72.32 ± 6.85 (65–91). The sample accounted for 5% of the total population aged 65 and over, living in the central part of Montenegro. The research includes:

1. Persons aged 65 and over who have appeared for an examination at the Faculty of Medicine in Podgorica – Study program for dentistry, on specific days (Mondays and Wednesdays) from September to December 2016.
2. The beneficiaries of the services of nursing homes “Nana” and “Ljubav Spaja” in Spuž and Danilovgrad, whose state of general and mental health allowed them to be interviewed.

Research instruments

To determine the impact of oral health on the quality of life, the OHIP-14 index was used [11].

The OHIP-14 questionnaire consists of 14 questions. Each response is scored at a value of 0–4, using the Likert scale with five responses, depending on the extent to which the patient is affected by the problem. Over the past 12 months, according to one’s own assessment: (0 – no problems at all; 1 – have problems; 2 – often have problems; 3 – very often have problems; 4 – constantly have problems). The maximum possible number of points is 56. The higher the score was, the higher the negative impact of oral health on the quality of life of the respondents.

Since OHIP-14 was not applied in the Montenegrin population, it was first necessary to examine its reliability and validity.

The original OHIP-14 questionnaire was first translated using a two-way (back) translation (from English to Montenegrin and back). Two licensed interpreters translated the questionnaire from English into Montenegrin independently of each other. Then a person who was not familiar with the contents of the original text of the questionnaire made a back translation from Montenegrin to English (the person was a good connoisseur of both languages). It was taken into consideration that the essence of the issue was preserved and that the translation was simultaneously adapted to the Montenegrin language, the mentality, and culture of the population.

The first 30 respondents of this study who completed the questionnaire (independently or with the help of the dentist) understood the significance of all 14 questions and expressed the degree to which certain problems were expressed.

The reliability of the OHIP-14 questionnaire was established using the Cronbach Alpha test, which is standardly used to test the reliability of this and similar questionnaires. The reliability of the questionnaire was assessed by examining the internal consistency (homogeneity) of the answers from the questionnaire. In doing so, testing has been completed in three ways:

1. Omitting individual items (questions), while tracking changes in the Cronbach Alpha value;
2. By following the correlations between items interacting with each other;
3. Calculating the total correlations for all items.

For the purposes of further investigation, a regression analysis was performed where the dependent variable was the total OHIP-14 result, and the independent variables were sub-bases OHIP-14.

The OHIP-14 instrument has been tested according to various types of validity. First, the validity of the form and content of the questions was verified in the pilot study. The validity of the OHIP-14 as an instrument was tested by correlating (and examining the existence of a statistically significant difference) of OHIP-14 values depending on the specific characteristics of the respondents (age of the respondent, sex, presence and type of dental remuneration, education and occupation of the respondents).

In statistical data processing, structural validity was tested using Student’s t-test for two independent samples, one-way ANOVA with Bonferroni or Tamhane T2 after hoc tests. The homogeneity dispersion was checked by Leven test. The level of statistical significance was 0.05.

RESULTS

The study conducted involved 170 people, the average age was 72.32 ± 6.85 , of which: 104 (61.17%) subjects aged 65–74, 53 (31.17%) respondents aged 75–84, and 13 (7.6%) subjects aged 85 and older. Of the 170 respondents, there were 89 (52.35%) female examinees and 81 (47.64%) male

Table 1. Correlation between items (questions) of OHIP-14

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 | 1.00 | | | | | | | | | | | | | |
| 2 | -0.09 | 1.00 | | | | | | | | | | | | |
| 3 | 0.41# | 0.10 | 1.00 | | | | | | | | | | | |
| 4 | 0.45# | 0.15* | 0.10 | 1.00 | | | | | | | | | | |
| 5 | 0.43# | -0.06 | 0.21# | 0.33# | 1.00 | | | | | | | | | |
| 6 | 0.36# | -0.01 | 0.18* | 0.27# | 0.42# | 1.00 | | | | | | | | |
| 7 | 0.37# | 0.18* | 0.11 | 0.77# | 0.41# | 0.22# | 1.00 | | | | | | | |
| 8 | 0.18* | 0.06 | 0.15* | 0.38# | -0.06 | 0.28# | 0.21# | 1.00 | | | | | | |
| 9 | 0.38# | 0.04 | 0.05 | 0.47# | 0.39# | 0.34# | 0.54# | 0.11 | 1.00 | | | | | |
| 10 | 0.47# | -0.08 | 0.12 | 0.44# | 0.41# | 0.27# | 0.42# | 0.14 | 0.57# | 1.00 | | | | |
| 11 | 0.47# | -0.05 | 0.13 | 0.45# | 0.51# | 0.29# | 0.44# | 0.08 | 0.52# | 0.75# | 1.00 | | | |
| 12 | 0.46# | -0.11 | 0.12 | 0.43# | 0.45# | 0.30# | 0.48# | 0.08 | 0.57# | 0.61# | 0.75# | 1.00 | | |
| 13 | 0.54# | -0.05 | 0.25# | 0.49# | 0.46# | 0.37# | 0.42# | 0.26# | 0.46# | 0.48# | 0.48# | 0.51# | 1.00 | |
| 14 | 0.43# | 0.08 | 0.12 | 0.47# | 0.44# | 0.24# | 0.57# | 0.06 | 0.52# | 0.44# | 0.48# | 0.55# | 0.56# | 1.00 |

1–14 – questions from the OHIP-14 questionnaire;

*p < 0.05;

#p < 0.01

examinees. The structure of the respondents according to the level of education: the majority of respondents 64 (37.64%) have secondary education, 39 (22.94%) have higher education (university), 27 (15.88%) have post-secondary education (college), 32 (18.82%) with elementary education, while eight (4.70%) are without education. The structure of respondents by occupation (prior to retirement) demonstrated that the majority, 46 (27.05%) of respondents were in the field of service activities, 34 (20%) were occupied with production and 33 (19.41%) in the field of law and economics. There were a smaller number of respondents in the field of education 18 (10.58%) and lastly, there were 14 (8.23%) health workers. The condition of oral health of the respondents who participated in the research was not satisfactory. Out of the 170 people examined, 79 (46.47%) were without teeth. It was found that in 83 (48.82%) people there were mobile dental prostheses in both jaws. Of the respondents examined, 34 (20%) have mobile dental prostheses in one jaw, and teeth in the opposite jaw are not reimbursed. Denture strings replaced with fixed dental prostheses are present in 16 (9.41%) persons. The respondents who had one jaw mobile and the other fixed denture were 11 (5.88%). In 115 (67.65%) subjects, it was estimated that there was a need for rapid treatment, which mainly relates to the necessity of making new dental prosthesis. There was no need for emergency dental intervention in any of the respondents.

The Oral Health Impact Profile-14 reliability analysis

The value of the Cronbach Alpha index, derived from the correlation matrix, is 0.892. The internal consistency of OHIP-14 was first assessed by the analysis of the correlation between the items (questions) (Table 1). Differences in the value of coefficients have shown that no item is superfluous and it is necessary that all questions remain in the questionnaire.

Analyzing results in case of removal of individual items (questions) supports the inclusion of all questions that are

in the original questionnaire. The relationship between correlations for individual items (questions) and total, correlations ranges 0.21–0.69. The total correlation analysis (correlation between one item and all others) showed that all coefficients are above the minimum recommended value (0.20), which is necessary to include the question in the questionnaire (Table 2).

Table 2. Values of Cronbach Alpha coefficients and degree of correlation expressed on issues from questions 1–14

| Questions | Correlation of questions/ total correlation | Value of Cronbach's alpha index when a question is omitted |
|-----------|---|--|
| 1 | 0.611 | 0.835 |
| 2 | 0.211 | 0.873 |
| 3 | 0.285 | 0.850 |
| 4 | 0.690 | 0.826 |
| 5 | 0.511 | 0.83 |
| 6 | 0.425 | 0.843 |
| 7 | 0.666 | 0.828 |
| 8 | 0.250 | 0.855 |
| 9 | 0.627 | 0.833 |
| 10 | 0.628 | 0.835 |
| 11 | 0.665 | 0.833 |
| 12 | 0.646 | 0.834 |
| 13 | 0.678 | 0.830 |
| 14 | 0.635 | 0.834 |

1–14 – questions from the Oral Health Impact Profile-14 questionnaire

All of the above points to the high reliability of the OHIP-14 questionnaires and recommends it to be used in the Montenegrin-speaking area, in older persons.

The Oral Health Impact Profile-14 structural design analysis

The validity of the OHIP-14 as an instrument was tested by correlating and examining the existence of a statistically significant difference in the value of OHIP-14 according to certain characteristics of the respondents.

Monitoring of the Oral Health Impact Profile-14 value in relation to sex, age, education and occupation of respondents (prior to retirement)

Respondents aged 75 and older have a statistically significantly higher OHIP-14 value (20.76 ± 7.39) compared to patients aged 65–74 (18.27 ± 7.43) (Student's t-test for two independent samples, $t = -2.132$; $p = 0.034$) (Table 3).

In the male sex ratio, the OHIP-14 value is (19.81 ± 8.53) higher than for female respondents (18.54 ± 6.15), but there is no statistically significant difference between these values (Student's t-test for two independent samples, $t = 1.252$; $p = 0.213$) (Table 3).

Respondents who do not have education or have primary education have higher OHIP-14 values (20.50 ± 6.87) compared to those with secondary education (18.78 ± 6.93), post-secondary and higher education (18.73 ± 7.64). There is no statistically significant difference between these values (ANOVA, $F = 0.391$; $p = 0.815$) (Table 3).

There is no statistically significant difference in the value of OHIP-14 according to the respondents' occupations (ANOVA, $F = 1.072$; $p = 0.384$). The highest value of OHIP-14 is for the respondents who worked in production (20.29 ± 7.50). The lowest value of OHIP-14 is for educators and health workers (18.38 ± 8.35) (Table 3).

Monitoring of the Oral Health Impact Profile-14 value in relation to the type of dental prosthesis

There is a statistically significant difference in OHIP-14 values relative to the type of dental prosthesis (ANOVA; $F = 111.892$; $p < 0.001$). The Leven test indicates that dispersions may be considered homogeneous ($p = 0.267$) (Table 4).

Table 4. Values of OHIP-14 according to the type of denture

| Type of (I) denture | n | Value of OHIP-14 | Type of (J) denture | Difference of mean value (I and J) | p-value |
|---------------------|----|------------------|---------------------|------------------------------------|---------|
| NN | 27 | 31.66 ± 3 | FN | 24.479* | < 0.001 |
| | | | 2MN | 14.438* | < 0.001 |
| | | | NZ | 11.108* | < 0.001 |
| | | | MN + FN | 14.567* | < 0.001 |
| FN | 16 | 7.19 ± 4.25 | NN | -24.479* | < 0.001 |
| | | | 2MN | -10.041* | < 0.001 |
| | | | NZ | -13.371* | < 0.001 |
| | | | MN + FN | -9.913* | < 0.001 |
| 2MN | 82 | 17.17 ± 5.01 | NN | -14.438* | < 0.001 |
| | | | FN | 10.041* | < 0.001 |
| | | | NZ | -3.330* | < 0.001 |
| | | | MN + FN | 0.129 | 1.000 |
| NZ | 34 | 20.55 ± 3.38 | NN | -11.108* | < 0.001 |
| | | | FN | 13.371* | < 0.001 |
| | | | 2MN | 3.330* | 0.001 |
| | | | MN + FN | 3.459 | 0.156 |
| MN+FN | 11 | 17.54 ± 4.11 | NN | -14.567* | < 0.001 |
| | | | FN | 9.913* | < 0.001 |
| | | | 2MN | -0.129 | 1.000 |
| | | | NZ | -3.459 | 0.156 |

NN – no denture; FN – fixed denture; 2MN – mobile denture in both jaws; NZ – incompletely replaced tooth (due to mobile denture in one jaw, no denture in the other); MN + FN – mobile denture in one jaw, fixed denture in the other

- Persons who are partially or completely free of natural teeth and do not have remuneration have a statistically significantly higher OHIP-14 value than:
 - a person with a fixed dental prosthesis (Bonferroni test, $p < 0.0001$),
 - a person with a mobile prosthesis in both jaws (Bonferroni test, $p < 0.0001$),

Table 3. Values of the OHIP according to sex, age, education, and occupation of the respondents (before retirement)

| Structure of respondents | n | % | Mean value OHIP-14 | ± SD | Statistical test and statistical significance |
|-------------------------------|-----|-------|--------------------|------|---|
| Sex | | | | | |
| Male | 81 | 47.64 | 19.81 | 8.53 | Student t-test for two independent samples; $t = 1.252$; $p = 0.213$ |
| Female | 89 | 52.35 | 18.54 | 6.15 | |
| Age | | | | | |
| 65–74 years | 104 | 61.17 | 18.27 | 7.43 | Student t-test for two independent samples; $t = -2.132$; $p = 0.034^{**}$ |
| 75 years and older | 66 | 38.77 | 20.76 | 7.39 | |
| Education | | | | | |
| Uneducated | 8 | 4.7 | 20.50 | 6.87 | ANOVA test $F = 0.391$; $p = 0.815$ |
| Elementary education | | 18.82 | | | |
| Secondary education | 64 | 37.64 | 18.78 | 6.93 | |
| Post-secondary (college) | 27 | 15.88 | 18.73 | 7.64 | |
| Higher education (university) | 39 | 22.94 | | | |
| Occupation | | | | | |
| Service activities | 46 | 27.05 | 19.09 | 7.29 | ANOVA test $F = 1.072$; $p = 0.384$ |
| Production | 34 | 20 | 20.29 | 7.50 | |
| Field of law & economy | 33 | 19.41 | 19.96 | 6.96 | |
| Field of education | 18 | 10.58 | 18.38 | 8.35 | |
| Health workers | 14 | 8.23 | | | |

**Old significant difference

- a person with incompletely replaced teeth (there is a mobile denture in one jaw, and in the other lost teeth are not denture) (Bonferroni test, $p < 0.0001$),
 - persons with one jaw fixed denture, and in the other mobile (Bonferroni test, $p < 0.0001$).
2. Persons with fixed dental prosthesis have a statistically significantly lower OHIP value than:
 - a person with mobile dental prosthesis in both jaws (Bonferroni test, $p < 0.0001$),
 - a person with incomplete restored tooth (Bonferroni test, $p < 0.0001$),
 - persons with one jaw fixed denture, and mobile in the other (Bonferroni test, $p < 0.0001$).
 3. Persons with mobile denture in both jaws have a statistically significantly lower OHIP value of:
 - a person with incompletely replaced teeth (in one jaw they have mobile denture and in the other they have no natural teeth or dental prosthesis) (Bonferroni test, $p = 0.001$).

The impact of oral health on the quality of life of the elderly

The value of OHIP-14 in this study is 19.24 ± 7.49 (min. 0, max. 37). The OHIP-14 values expressed in terms of domains are as follows: functional limits 3.31 ± 1.75 , physical pain 4.19 ± 1.31 , psychological discomfort 2.52 ± 1.46 , physical fitness 4.38 ± 1.40 , psychological incompetence 1.42 ± 1.23 , social incapacity 1.18 ± 1.27 , and handicap 2.21 ± 1.32 .

The majority of people (91%) expressed difficulties in the field of physical incapacity, eating disorders (82% answered that “very often” or “constantly” change their diet regime due to mouth, teeth, or dental problems). Physical pain has been present in 90% of people in the last 12 months (74% of respondents “very often” or “constantly” avoids certain foods). Functional constraints were 78% (40% of respondents “often” and 36% “very often” or “constantly” have a feeling of taste change due to the condition of the mouth, teeth, and compensation). The impact is least

pronounced in the domains of psychological incompetence (56%) and social incompetence (51%) (Table 5).

DISCUSSION

The study of the impact of oral health on the quality of life was first carried out in Montenegro. The existence of the OHIP-14 translation into the languages of the states in the region of Montenegro has greatly facilitated the process of linguistic and cultural adjustment of the original text of the OHIP-14.

The Serbian version of this index has 13 questions, because the fifth question was left out (Have you been self-conscious because of your mouth or dentures?) [24]. In the pilot study, the authors estimated that the translation of this question was such that the issue was not sufficiently understandable for a significant number of respondents and that the questionnaire had a sufficient number of other questions from the psychosocial sphere. Croatian authors translated the fifth question from OHIP-14 questionnaires differently and put it in a questionnaire [24]. In order to adjust the spirit of the language in the Japanese version, a further 14 questions have been added to the fifth. It is considered that the structure of the questionnaire allows such changes, since the overall score is not crucial for the validity of the index [24].

The value of Cronbach alpha coefficient, derived from the correlation matrix, is 0.892 in this study. This is significantly more than the minimum recommended value of 0.70 [13, 14]. This recommends OHIP-14 for use among the Montenegrin population of the elderly.

The values of Cronbach alpha coefficient in studies that also examined the applicability of the OHIP-14 index among the elderly (with similar characteristics of the sample) are listed below. In a study conducted in Jordan, as in the Montenegrin study, the Cronbach alpha coefficient value is 0.89 [17]. In studies conducted in Greece and in Italy, the value of Cronbach's alpha coefficient was 0.90 [15, 18]. In a study done in Chile, the value of Cronbach's

Table 5. Expression of the influence of oral health on the quality of life

| Domains OHIP-14 | Quest. OHIP-14 | "I had no problems" n (%) | "Rarely" n (%) | "Often" n (%) | "Very often" "Constantly" n (%) | Domains % |
|----------------------------|----------------|---------------------------|----------------|---------------|---------------------------------|-----------|
| Functional constraints | 1 | 76 (46) | 43 (25) | 18 (10) | 33 (19) | 78 |
| | 2 | 18 (10) | 25 (14) | 65 (40) | 72 (36) | |
| Physical pain | 3 | 27 (15) | 91 (53) | 45 (28) | 7 (4) | 90 |
| | 4 | 5 (3) | 6 (3) | 33 (20) | 126 (74) | |
| Psychological discomfort | 5 | 34 (20) | 57 (33) | 58 (35) | 21 (12) | 77 |
| | 6 | 41 (24) | 78 (45) | 40 (29) | 11 (6) | |
| Physical incapacity | 7 | 5 (3) | 11 (6) | 13 (7) | 141 (82) | 91 |
| | 8 | 25 (15) | 58 (34) | 63 (37) | 24 (14) | |
| Psychological incompetence | 9 | 77 (45) | 67 (39) | 24 (15) | 2 (1) | 56 |
| | 10 | 70 (41) | 81 (47) | 18 (11) | 1 (1) | |
| Social incapacity | 11 | 70 (41) | 75 (44) | 23 (14) | 2 (1) | 51 |
| | 12 | 95 (55) | 59 (34) | 15 (10) | 1 (1) | |
| Handicap | 13 | 11 (6) | 95 (56) | 33 (19) | 31 (18) | 78 |
| | 14 | 62 (36) | 86 (50) | 19 (12) | 3 (2) | |

1–14 – questions from the Oral Health Impact Profile-14 questionnaire

alpha coefficient is 0.91 [19]. In Poland, a study dealing with two General Oral Health Assessment Index (GOHAI) and OHIP-14 indexes showed that the Cronbach alpha coefficient value was 0.89 for GOHAI and 0.97 for OHIP-14 [16]. The value of the Cronbach Alpha coefficient is 0.78, in one of numerous studies in Brazil [20].

The validity of the OHIP-14 index was estimated by correlating the OHIP-14 index values and individual characteristics of the respondents. In the Montenegrin study, patients aged over 75 had a statistically significantly higher OHIP-14 value compared to patients aged 65–74 (20.76 ± 7.39 versus 18.27 ± 7.43). In the elderly, the condition is where the mouth and teeth are worse (more missing teeth) and largely there are mobile dentures older than five years. Such remuneration no longer meets aesthetic, functional, and prophylactic requirements and does not follow changes in the dental system resulting from the physiological aging process.

The study showed that there is a statistically significant difference in the value of OHIP-14, depending on the type of denture. The highest value was observed in persons whose missing teeth were not replaced by dental prostheses. The lower value is in the holder of fixed prostheses in relation to persons with mobile prostheses. In a similar sample study done in Iran (the average age was 67.5 ± 11 , a high degree of no teeth, 87.5% without front teeth, 85.6% without side teeth, 31.3% had total dentures and 28.8% of the partial like in the Montenegrin research), it was estimated that OHIP-14 was statistically significantly higher in those who were not prosthetically treated compared to persons who did not require prosthetic treatment (25.75 ± 14.5 according to 21.18 ± 9.8 ; $p = 0.02$) [28]. The Polish authors conducted a two-index study (GOHAI and OHIP-14) in 2014 [17]. They concluded that the condition of the teeth, the presence of partial dentures, chewing problems and other problems with the mouth and teeth are significantly related to the values of both indexes. OHIP-14 was significantly higher in patients without teeth (26 ± 15.2) compared to those who had their own teeth (12.5 ± 13). Prosthetically rehabilitated patients were significantly lower (12 ± 12.9) compared to persons without natural teeth and without dental prostheses (22.5 ± 12.9).

In this study, the researchers estimated that the greatest influence of oral health on their quality of life is present in

the domains: physical incapacity, physical pain, and functional constraints. The smallest influence is in the domains: psychological disability and social incapacity. If one compares the results of the Montenegrin study with the results of the studies within the region and surrounding countries (Serbia, Macedonia, Croatia, Greece), the results are similar [15, 24–27]. Namely, in the areas of physical incapacity and functional limitations, the respondents expressed the greatest influence. The smallest influence was expressed in the domains of psychological and social incompetence.

Among the questionnaires that are used to examine the effect of oral health on quality of life in the elderly, we decided to use the OHIP-14 in this research because it was previously used in many countries. There are many scientific papers where OHIP-14 was used. We wanted to do research in Montenegro and compare our results with results in the world. We plan a research that will examine the quality of life before and after prosthodontic rehabilitation in the elderly and we will use the GOHAI questionnaire.

There is a limitation of this study in the use of OHIP-14 in middle-aged people of Montenegro. In the future, the impact of oral health on the quality of life among this and other age groups should be examined.

CONCLUSION

The OHIP-14 index is reliable, valid, and recommended for use in Montenegro among the elderly. There is a significant influence of the condition in which the mouth, teeth, and dental compensations are placed on the quality of life of the elderly in the central region of Montenegro. The influence of these conditions is mostly in the areas of physical incapacity, physical pain and functional limitations, and the smallest in the domains of psychological and social incapacity. In order to improve the condition of oral health and the quality of life of the elderly, it is necessary to plan and continuously work on the development of the dental service and on health literacy and education. It would be useful to form geronto-stomatological teams within health institutions and promote the concept of active aging.

Conflict of interest: None declared.

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Процена поузданости и валидности црногорске верзије профила утицаја оралног здравља на квалитет живота старих особа у Црној Гори

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САЖЕТАК

Увод/Циљ Квалитет живота старих особа у функцији оралног здравља има велики значај с обзиром на повећање броја корисника стоматолошких услуга старијих од 65 година. *Oral Health Impact Profile-14 (OHIP-14)* нарочито је погодан за примену код старих особа.

Циљ истраживања је да се испита поузданост и валидност *OHIP-14* код црногорског становништва старости 65 и више година и да утврди утицај оралног здравља на квалитет њиховог живота.

Метод Истраживање је рађено од септембра до децембра 2016. у средишњем региону Црне Горе, на Медицинском факултету у Подгорици и у домовима за стара лица. Истраживањем је обухваћено 170 особа, оба пола, просечне старости $72,32 \pm 6,85$ година. Инструмент истраживања је индекс *OHIP-14*. Коришћени су стандардни статистички тестови. Ниво статистичке значајности је 0,05.

Резултати Индекс *OHIP-14* је језички и културолошки прилагођен за црногорско становништво. Вредност индекса Кронбахове алфе износи 0,892. Однос између корелација за поједина питања и укупне корелације креће се од 0,21 до 0,69. Вредност *OHIP-14* износи $19,24 \pm 7,49$. Исказано по доменима: функционална ограничења $3,31 \pm 1,75$; физички бол $4,19 \pm 1,31$; психолошка nelaгодност $2,52 \pm 1,46$; физичка неспособност $4,38 \pm 1,40$; психичка неспособност $1,42 \pm 1,23$; социјална неспособност $1,18 \pm 1,27$ и хендикеп $2,21 \pm 1,32$.

Закључак Индекс *OHIP-14* је поуздан и валидан и препоручује се за употребу на црногорском говорном подручју, код старих особа. Постоји значајан утицај оралног здравља на квалитет живота старих особа у средишњем делу Црне Горе.

Кључне речи: квалитет живота; старе особе; Црна Гора