ORIGINAL ARTICLE

APPROVAL OF THE USE OF THE SHORT FORM 19 OF THE CHILD'S ORAL HEALTH IMPACT PROFILE (COHIP-SF 19) FOR DENTAL PUBLIC HEALTH NEEDS

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ABSTRACT
The aim: Is an adaptation, determination of psychometric properties, and approbation of the use of COHIP-SF 19 for the needs of dental public health in the Ukrainian sample of children and teenagers.

Materials and methods: A cross-sectional validation study was conducted on a sample of 236 Ukrainian children aged 6 to 18. The psychometric indicators of the questionnaire were evaluated; analysis of the reliability and internal structure of the methodology based on correlation and factor analysis, calculation of Chronbach's alpha; reliability of re-testing (Intraclass Correlation Coefficient); assessment of convergent and discriminant validity (Mann-Whitney U test, ROC analysis, and correlation analysis). STATISTICA 6.1 (StatSoftInc., № AGAR909E415822FA) was used to analyze the results. The ethics of the study was confirmed by the conclusion of the relevant commission.

Results: After cultural direct and reverse translation of the original version, the Ukrainian version of COHIP-SF 19 UK was obtained. The internal consistency of the subscales and COHIP-SF 19 UK was generally sufficient (Cronbach's alpha is greater than 0.7).

Sufficient reliability of retesting, convergent and discriminant validity of the methodology was proved. The presence of a correlation between COHIP-SF 19 UK indicators and self-assessment of children's health and quality of life was determined.

Conclusions: The study proved that COHIP-SF 19 UK is a reliable valid method for assessing the quality of life-related to oral health among Ukrainian children and adolescents, and its good psychometric properties are sufficient for research in the field of dental public health.

KEY WORDS: child oral health impact profile-short form 19 (COHIP-SF 19), oral health-related quality of life (OHRQoL), children, questionnaire validation, dental public health

INTRODUCTION

Dental Public Health (DPH), which defines both the science and the art of oral disease prevention at both the individual and population levels through the organized efforts of society, is not integrated into the public health system in a quarter of the world, but in 62% of countries are only partially integrated [1].

Recognizing the fact that oral and non-communicable diseases have common modifiable risk factors, the World Federation of Public Health Associations (WFPHA) in collaboration with the World Health Organization (WHO) has developed a Global Charter for Public Health integrating oral health with public health systems through effective advocacy, partnerships and collaboration [2].

It is noted that DPH should be developed based on a systematic approach using feedback mechanisms [3], which can be carried out based on population surveys, determining their quality of life and quality of life related to oral health-related quality of life (OHRQoL).

OHRQoL, one of the main goals of dental public health, is an integral part of the general state of human health and well-being and provides a theoretical basis for the development of oral hygiene measures [4]. Preventive dental measures are most effective among school-age children, as oral diseases among children and adolescents are a serious public health problem. It is during childhood and adolescence that sustainable patterns of health behavior are formed, and beliefs and guidelines related to dental health are effective [5].

The study of OHRQoL in children is becoming increasingly popular in population-based research. Researchers have used a variety of measurements to assess oral health-related quality of life, some for children under 6 and others for older age groups. These measurements are usually assessed through interviews with children who can speak and write, or by completing questionnaires by children or their parents. [6].

There are currently about 18 COHQoL indicators for children aged 2 to 18 [7], among which the most common are the Child Perceptions Questionnaire (CPQ), the Child Oral Impacts on Daily Performances (C-OIDP), and the Child Oral Health Impact Profile (COHIP), which cover a wide age range and different conditions and, therefore, can be used in studies of different profiles [8].

The Child Oral Health Impact Profile Short Form (COHIP-SF) 19 is an abbreviated version of the 34-item COHIP scale that has been found to be a reliable tool for measuring oral health-related quality of life in the school population age. [8].

COHIP-SF was developed in 2012 to meet the challenge of reducing the number of questions. The questionnaire contains 19 items, grouped by three subscales: oral health, functional well-being, and socio-emotional well-being.

The short form, with less time spent on research, retains the good psychometric properties of the original version, is designed for children aged 7-18, is suitable for longitudinal research, and is a good tool for international comparisons of OHRQoL in children and adolescents. [9, 10].

The COHIP-SF method was validated and showed good psychometric properties in Chinese, French, German, Arabic, and Japanese child populations [10 – 14]. Its good discriminant and convergent properties have also been confirmed in the English, Dutch, Korean and Persian versions of [12].

The relevance of the study was that COHIP-SF was not validated in the Ukrainian sample of children, and the method itself was used mainly for clinical purposes, while there is a growing need to obtain reliable and reliable data on OHRQoL for dental public health.

THE AIM
Adaptation, determination of psychometric properties, and approbation of the use of COHIP-SF 19 for the needs of dental public health in the Ukrainian sample of children and adolescents.

MATERIALS AND METHODS
The original English COHIP-SF 19 [15] was translated into Ukrainian (COHIP-SF 19 UK) using a cross-cultural direct and reverse translation procedure involving a professional linguist and 2 public health professionals.

COHIP-SF 19 UK, like the original version, consists of 19 questions that form 3 conceptual subscales: oral health (5 questions), functional well-being (4 questions), and socio-emotional well-being (10 questions) and an additional question regarding self-assessment of oral health.

Answers to the questions, as in other international studies, were assessed on a five-point Likert scale from «never» (4 points) to «almost constant» (0 points) and on the reverse scale for two questions with positive wording. The total score was calculated by summing the scores on all responses, the maximum possible score was 76 points and corresponded to the highest quality of life OHRQoL [9 – 11].

To adapt the questionnaire, a cross-sectional validation study was conducted on a sample of 236 Ukrainian school-children and college students aged 6 to 18. The inclusion of children from the age of 6 was due to the fact that in Ukraine it is at this age that children go to school.

The approbation of the questionnaire included several stages: data collection to assess the psychometric indicators of the questionnaire; analysis of reliability and internal structure of the methodology based on correlation and factor analyses; reliability of re-testing; assessment of convergent and discriminant validity of the methodology.

To assess the reliability of the method, 94 children (39.8%) were examined by dentists, among 70 respondents (29.7%) after 1 month was re-interviewed. The recommendations of Chinese experts on surveying children according to this questionnaire [11] were used.

Convergent validity was assessed by assessing the correlation between COHIP-SF scores and self-assessment of oral health and overall quality of life assessment using the EUROHIS-QOL 8-item index (WHOQOL-8) [16].

Discriminant validity of the method was assessed by evaluating the results among different categories of subjects (with and without oral diseases), comparing the results of COHIP-SF 19, and assessing the condition of the oral cavity of children according to dentists.

Before the start of the study, the informed consent of each child and one of their parents (guardians) was obtained. Compliance of the study with the requirements of the Declaration of Helsinki and the principles of biological ethics and medical deontology was confirmed by the conclusion of the Committee on Biological Ethics of the Dnipro State Medical University (Protocols №6 dated 30.09.2020).

Methods of descriptive and analytical statistics were used during the analysis and evaluation of the results. Estimation of the distribution of quantitative traits was determined by the Shapiro-Wilk and Kolmogorov-Smirnov criteria, as amended by Lilliefors.

Correlation analysis was performed using Spearman's rank correlation coefficient (r_s). The internal consistency of COHIP-SF 19 was measured using Chronbach's alpha α for the overall scale and separately for the subscales, with a coefficient of α≥0.7 considered to be an indicator of satisfactory internal consistency [10]. The reliability of retesting was studied using the Intraclass Correlation Coefficient (ICC). Confirmatory factor analyzes (CFA) were performed to verify the factor structure of the scale. The Mann-Whitney U test was performed to determine differences between groups.

To determine the discriminatory possibilities of the method, ROC analysis was performed to determine the sensitivity, specificity, and area under the ROC curve (AUC). Relationship between the area under the ROC curve and diagnostic accuracy: 0.7-0.8 – good; 0.8-0.9 – very good; 0.9 – 1.0 – excellent [17].

The significance level was set at p<0.05 for all types of analysis.

Statistical processing was performed using Microsoft Excel (Microsoft Office 2016 Professional Plus, Open License 67528927) and software product STATISTICA 6.1 (StatSoftInc., Serial № AGAR909E415822FA).

RESULTS
The average age of the surveyed students and adolescents was 11.3 years with a 95% confidence interval of 95% CI 10.9 – 11.6 years. Of the total number of respondents, 58.9% were girls and 41.1% were boys; 61.0% lived in cities and 39.0% in rural areas.

Table I. Descriptive statistics for COHIP-SF 19 UK and subscale scores (n= 236)

Scale (possible range, scores)	Mean (SD)	95% CI for Mean	Median (95% CI for Median)	25th quartile	75th quartile
Oral health (0 - 20)	14.0 (3.6)	13,6 - 14,5	14 (13 - 15)	12	17
Functional well-being (0 - 16)	13.5 (2.9)	13,2 - 13,9	14 (14 - 15)	12	16
Socio-emotional well-being (0 - 40)	30.5 (6.1)	29,8 - 31,3	32 (31 - 32)	27	35
Overall COHIP-SF 19 UK (0 - 76)	58.1 (10.9)	56,7 - 59,5	60 (58 - 61)	52	67

Table II. Internal reliability analysis of COHIP-SF 19 UK and each subscale

Scale (number of items)	Chronbach's alpha	95% lower confidence limit	Effect of dropping variables
Oral health (5)	0.71	0.66	0.62 - 0.66
Functional well-being (4)	0.78	0.74	0.70 - 0.75
Socio-emotional well-being (10)	0.82	0.79	0.77 - 0.81
Overall COHIP-SF 19 (19)	0.89	0.87	0.79 - 0.88

Table III. Spearman correlations of self-perceived assessment of oral health and overall quality of life (WHOQOL-8) with the overall COHIP-SF 19 UK and each subscale scores (n = 236)

Scale	Perceived general health		Perceived oral health		Perceived WHOQOL-8	
	rs	p value	rs	p value	rs	p value
Oral health	0.26	p=0.014	0.53	p<0.001	0.28	p<0.001
Functional well-being	0.28	p=0.006	0.48	p<0.001	0.21	p=0.001
Socio-emotional well-being	0.32	p=0.001	0.31	p<0.001	0.26	p<0.001
Overall COHIP-SF 19 UK	0.33	p<0.001	0.31	p<0.001	0.30	p<0.001

In general, the respondents rated the health of their oral cavity as poor – 6 participants (2.5%), satisfactory – 43 (18.2%), mediocre – 57 (24.2%), good – 103 (43.6%) and very good 27 (11.4%). Among the 94 examined among dentists, 31 (33.0%) were diagnosed with diseases of the oral cavity.

The general state of their health was assessed as very bad and bad – 17 people (7.2%), satisfactory – 75 (31.8%), good – 103 (45.8%), and very good 36 (15.3%).

A direct, statistically significant correlation was found between self-assessments of general health and oral health – r_s=0.30 (p<0.001).

According to WHOQOL-8, the overall quality of life was assessed as bad and very bad – 5 people (2.1%), neither bad nor good – 56 (23.7%), good – 125 (53.0%), very good 50 (21.2%).

Estimation of the distribution showed that the distribution of total COHIP-SF 19 UK scores and scores on all subscales differed significantly from normal (p<0.001). Descriptions of the central values of the overall COHIP-SF 19 UK score and subscale scores are given in Table I. The median Overall values of the Overall COHIP-SF 19 UK score were 60.0 (95% CI 58.0 – 61.0) points with a maximum of 76 points, Oral health 14.0 (95% CI 13.0 – 15.0) points with a maximum of 20 points, for Functional well-being 14.0 (95% CI 14.0 – 15.0) points with a maximum of 16 points, for Socio-emotional well-being 32.0 (95% CI 31.0 – 32.0) points with a maximum of 40 points.

There were no gender differences in the overall assessment of overall COHIP-SF 19 UK (p=0.179), oral health (p=0.262), functional well-being (p=0.413), and socio-emotional well-being (p=0.351). There were also no discrepancies in estimates in the age groups up to 12 years and older than 12 years (respectively, according to the general estimate and subscales p=0.273; p=0.273; p=0.565; p=0.267).

There were statistically significant differences in the overall COHIP-SF 19 UK score among urban residents compared to rural residents – Me (25%; 75%): 63 (54; 67) vs. 57 (50; 65); p = 0.011. A similar situation is determined for all subscales (Fig. 1).

According to the theoretical model, when conducting factor analysis, we chose a 3-factor solution, which ultimately explained 65.5% of the data variance. The factor load factor matrix after Varimax raw is fully in line with the theoretical model: all points belong to their scales with loads: 0.23 – 0.88. Three questions, Q6, Q16, and Q19 had the lowest factor load (<0.3); Q1, Q5 Q8 Q11 Q12 Q14 Q15 had the highest factor load (>0.7).

The internal consistency for the overall COHIP-SF 19 UK score in general and by individual subscales is given in Table II. Internal consistency for the overall COHIP-SF 19 UK score for Chronbach's alpha was α=0.71, for Functional well-being – α=0.78, for Socio-emotional well-being – α=0.82, for Overall COHIP-SF 19 – α=0.89, which is considered a sufficient level (α>0.7). Chronbach's alpha value did not increase if any of the items were removed.

All correlations between the elements were positive and ranged from 0.22 to 0.79 for COHIP-SF 19 and its sub-
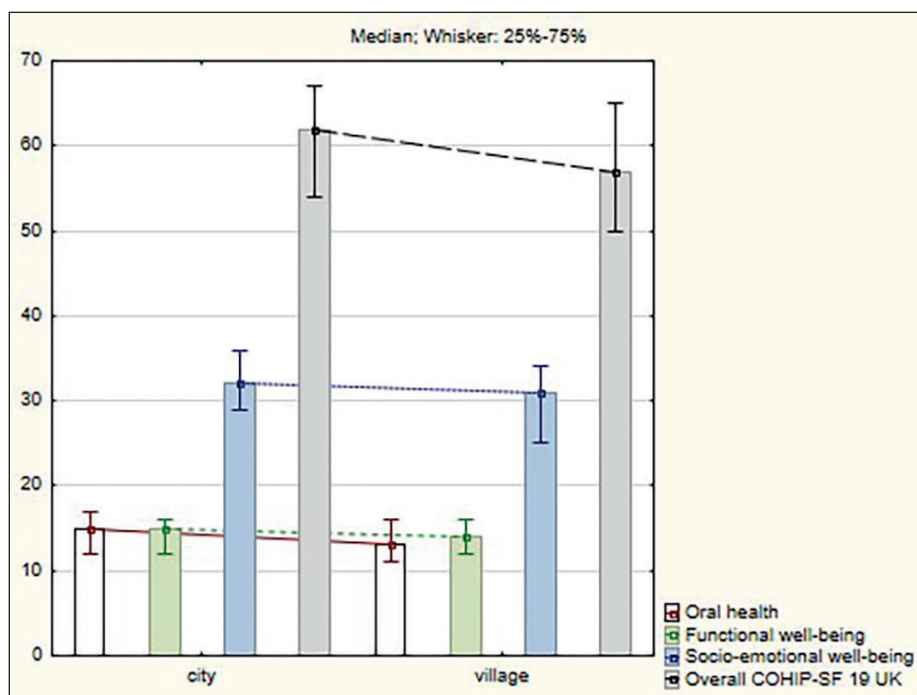
Fig. 1. The average OHRQoL score of the surveyed urban and rural residents according to COHIP-SF 19 UK
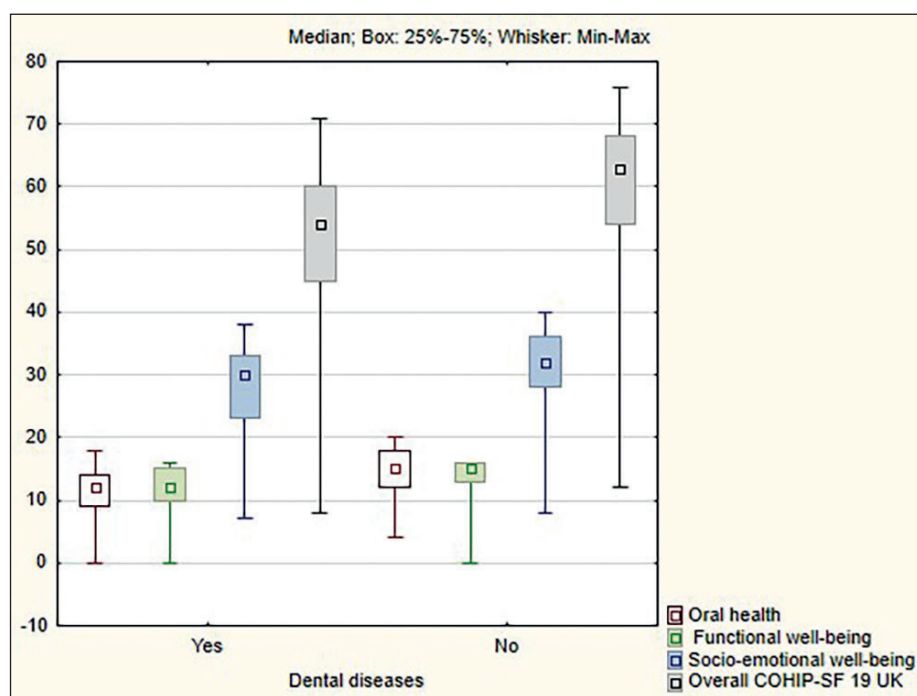

Fig. 2. The average score of COHIP-SF 19 UK and each subscale in the subjects depending on the presence of oral diseases

scales. Reliability in repeated tests by Intraclass Correlation Coefficient was for the overall test COHIP-SF 19 UK ICC = 0.81 (p<0.001); for subscales oral health – ICC = 0.87 (p<0.001), functional well-being – ICC=0.80 (p<0.001), socio-emotional well-being – ICC = 0.64 (p<0.001), which indicates good reliability of repeated tests.

Discriminant validity was assessed by comparing the results obtained with COHIP-SF 19 UK and its subscales with the results of an examination by a dentist who determined the presence or absence of oral health problems (Fig. 2). Children without dental problems had a significantly higher overall score on the COHIP-SF 19 UK scale – 54.0

(45.0; 60.0) versus 63.0 (54.0; 68.0); p <0.001 and all three subscales: Oral health – 15.0 (12.0; 18.0) vs. 12.0 (9.0; 14.0); p <0.001; Functional well-being – 15.0 (13.0; 16.0) vs. 12.0 (10.0; 15.0); p <0.001; Socio-emotional well-being – 32.0 (28.0; 36.0) vs. 30.0 (23.0; 33.0); p <0.001.

Discriminant validity was assessed using ROC analysis, which showed its good diagnostic characteristics: Sensitivity 80.1%; Specificity 71.1%; AUC=0.722 (p <0.001), 95% CI 0.661 – 0.779.

The Convergence Validity Assessment (Table III) showed that all correlation coefficients between COHIP-SF 19 UK, its subscales, and self-assessment of oral health were statis-

tically significant (p <0.05), positive and ranged from 0.21 to 0.53 (p <0.05). The highest correlation coefficients were between the overall COHIP-SF 19 UK score and its oral health self-assessment subscales. The highest correlation was found between perceived oral health and oral health – r_s=0.53 (p<0.001).

Statistically significant correlations were found between all COHIP-SF 19 UK subscales and WHOQOL-8 quality of life assessments, the largest of Overall COHIP-SF 19 UK being r_s=0.30 (p<0.001).

DISCUSSION

Improving the quality of life associated with oral health is a leading public health goal [1], so it is essential to have a short, valid methodology for assessing OHRQoL [9].

Unlike other studies [9 – 14], ours focused on the wider application of the methodology for the needs of the public health sector, at the level of which all measures to support dental health should be developed and coordinated from childhood.

Overall score Overall COHIP-SF 19 UK (maximum possible value 76) in the sample of Ukrainian children was 60.0 points (95% CI 58.0 – 61.0) with statistically significant differences in place of residence (p=0.011) and no age differences and article (p>0.05). The Functional well-being subscale score was the closest to the highest possible value, indicating that Ukrainian children have little or no problems with their mouths due to sleep, pronunciation, eating, and maintaining clean teeth.

The majority of surveyed children rate oral health (55.0%) and general health (61.1%) as good and very good. Self-esteem on these indicators is directly correlated with each other (r_s=0.30; p<0.001), so the worse the health of the oral cavity, the worse the assessment of the general condition and vice versa. This is confirmed in many other studies [8].

We obtained good psychometric properties of the technique, similar to the Chinese, Japanese, and most other versions [10 – 12].

Internal consistency for the overall score of COHIP-SF 19 UK as a whole and for individual subscales was sufficient (more than 0.7), for Overall COHIP-SF 19 was the highest – 0.89, the lowest for Oral health – 0.71.

The three-factor model COHIP-SF 19 UK was confirmed by factor analysis.

The validity of repeated studies was proven using the Intraclass Correlation Coefficient and ranged from 0.64 to 0.87 (p<0.001) for COHIP-SF 19 UK and its subscales.

Discriminant validity of the method was proved by comparing the results of COHIP-SF 19 UK among children in whom the dentist found abnormalities in the health of the oral cavity and without them – significantly lower values (p <0.001) in general and on all subscales were determined in the surveyed, who had dental health problems. ROC analysis showed a good discriminant ability of COHIP-SF 19 UK to detect oral health problems – AUC=0.722 (p<0.001).

The convergent validity of the method was proved by correlation analysis, which determined the presence of direct statistically significant correlations (p<0.05) COHIP-SF 19 UK and its subscale with self-assessment of health in general, oral health, and quality of life assessments for WHOQOL-8. The latter proves that the deterioration of OHRQoL has a lower health-related quality of life, so a positive impact on OHRQoL can lead to improved public health.

At present, the definition of OHRQoL among children and adolescents is used more for clinical practice [6] than for dental public health. COHIP-SF 19 was developed for use in clinical situations, OHRQoL assessment of children with different clinical conditions and different disease severity. This has some basis, as a subjective assessment of oral health provides unique data that correlates with clinical outcomes [9].

However, oral health is currently one of the determinants of quality of life. In recent years, many studies have been conducted on the impact of oral hygiene on quality of life, both general and specific – OHRQoL [8]. This was confirmed in our study. Therefore, the definition of OHRQoL is important for strengthening the public health system and building the dental public health sector.

Methodological limitations of the study include the inclusion of children from the age of 6 in the sample, which may lead to a certain shift in the sample. Also, the use of WHOQOL-8 quality of life assessment methods is more suitable for high school children and adolescents. Prospects for further research include a survey of a larger sample of children according to the methods of COHIP-SF 19 UK, oral health self-assessment (WHO), quality of life according to WHOQOL-8 to assess the impact of dental health on children's quality of life.

CONCLUSIONS

The study proved that COHIP-SF 19 UK is a reliable valid method for assessing the quality of life-related to oral health among Ukrainian children and adolescents, and its good psychometric properties correspond to those of other countries and are sufficient for research in the field of dental public health.

Recognizing that oral hygiene is an important component of overall health and well-being, it is important that national public health systems intensify the inclusion of oral hygiene and preventive measures in the field of DPH.

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