Journal of Dentistry Indonesia

Volume 28
Number 1 *April*

Article 8

4-30-2021

An Indonesian Version of Child Oral Health Impact Profile-Short Form 19 (COHIP-SF19): Assessing Validity and Reliability

Siti L. Nuraini
Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Jalan Salemba No. 4, Jakarta 10430, Indonesia

Anton Rahardjo
Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Jalan Salemba No. 4, Jakarta 10430, Indonesia

Diah Ayu Maharani
Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Jalan Salemba No. 4, Jakarta 10430, Indonesia, diah.ayu64@ui.ac.id

Recommended Citation

Nuraini, S. L., Rahardjo, A., & Maharani, D. A. An Indonesian Version of Child Oral Health Impact Profile-Short Form 19 (COHIP-SF19): Assessing Validity and Reliability. J Dent Indones. 2021;28(1): 45-53

Journal of Dentistry Indonesia 2021, Vol. 28, No. 1, 45-53
doi: 10.14693/jdi.v28i1.1247

ORIGINAL ARTICLE

An Indonesian Version of Child Oral Health Impact Profile-Short Form 19 (COHIP-SF19): Assessing Validity and Reliability

Siti L. Nuraini, Anton Rahardjo, Diah Ayu Maharani*

Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Jalan Salemba No. 4, Jakarta 10430, Indonesia
**Correspondence e-mail to: diah.ayu64@ui.ac.id*

ABSTRACT

Previous surveys have indicated that the majority of Indonesian children have poor oral health. However, scant information is available on children's oral health related quality of life (OHRQoL). The purpose of this study was to assess reliability as well as discriminant and convergent validity of Child Oral Health Impact Profile-Short Form 19 (COHIP-SF 19) Indonesian version. **Methods:** The Indonesian version of COHIP-SF 19 was developed according to the guidelines for the cross-cultural adaptation process. The instrument was tested among 529 children between 12 – 15 years old who were randomly selected from six junior high schools in Jakarta. The psychometric testing included internal consistency reliability, test-retest reliability, discriminant validity, and convergent validity. Results: Mean age of the participants was 13.3±0.9 years and 54% of the participants were female. The mean COHIP-SF 19 score was 57.8±8.8 and the median was 58 (range 27 – 75). The internal consistency and test-retest reliability was excellent for COHIP-SF 19 score with Chronbach's alpha 0.83 and intra-class correlation coefficient 0.81. Children with active decay, untreated caries with pulpal involvement, and gingivitis had significantly lower COHIP-SF 19 scores (p-value ≤ 0.030). Correlation between COHIP-SF 19 score, subscale scores and clinical severity as well as self-rated general or oral health were very low to low (rs = 0.04 – 0.27, p-value ≤ 0.028), after adjustment for children's age and gender. **Conclusions:** The Indonesian version of COHIP-SF 19 was successfully developed to be used as an OHRQoL instrument for Indonesian school-age children. The internal consistency, test-retest reliability, discriminant validity, and convergent validity of COHIP-SF 19 Indonesian version were confirmed.

Key words: children, Indonesia, oral health related quality of life, reliability, validity

How to cite this article: Nuraini SL, Rahardjo A, Maharani DA. An Indonesian version of Child Oral Health Impact Profile-Short Form 19 (COHIP-SF19): Assessign validity and reliability. J Dent Indones. 2021;28(1):45-53

INTRODUCTION

The World Health Organization (WHO) defined quality of life (QOL) as an individual's perceptions of their position in life in the context of the culture and value system where they live, and in relation to their goals, expectations, standards, and concerns.[1] Oral Health-Related Quality of Life (OHRQoL) characterizes a person's perception of how oral health influences their life quality and overall well-being.[2] OHRQoL has an important role in clinical practice and dental research because it provides a good understanding about patient's evaluations of and experience with oral healthcare.[3,4]

To evaluate oral health impact from the individual perspective, various instruments have been created and used widely.[5] OHRQoL instruments must be valid, reliable, and interpretable[6]; and capture both positive and negative impacts. Discriminating by extent of the condition and potentially across diagnostic or treatment-seeking groups.[3,7] Several OHRQoL instruments have been developed for children, including Child Perceptions Questionnaire (CPQ), Child Oral Impact on Daily Performance (C-OIDP), Child Oral Health Impact Profile (COHIP), Early Child Oral Health Impact Scale (ECOHIS), Scale of Oral Health Outcome for 5-years-old (SOHO – 5), the Michigan Oral Health-Related Quality of Life scale (MOHRQoL), and the Pediatric Oral Health-Related Quality of Life Measure (POQL). All of these instruments are self-administered, except MOHRQoL and ECOHIS which target very young children.[8]

The Child Oral Health Impact Profile (COHIP) is a widely used, valid measure and is appropriate for use as

Table 1. The original English version and Indonesian version of Child Oral Health Impact Profile (COHIP)

COHIP	COHIP Indonesia Version
In the past 3 months, how often have you? (Scoring: Never, Almost Never, Some-times, Fairly Often, Almost All the Time)	Dalam 3 bulan terakhir, seberapa sering kamu? (Tidak pernah, Jarang, Kadang-kadang, Lumayan sering, Hampir setiap saat)
Had pain in his/her teeth/toothache.	Sakit gigi
Had crooked teeth or spaces between his/her teeth.	Merasa gigimu tidak rapih atau ada celah di antara gigi
Had discolored teeth or spots on his/her teeth.	Merasa gigimu terdapat noda atau berubah warna
Had bad breath.	Merasa mulutmu bau
Had bleeding gums.	Berdarah gusinya
Been unhappy or sad because of his/her teeth, mouth, or face.	Sedih karena gigi, mulut, atau wajahmu
Missed school for any reason because of his/her teeth, mouth, or face.	Tidak sekolah karena gigi, mulut, atau wajahmu
Been confident because of his/her teeth, mouth, or face.	Percaya diri karena gigi, mulut, atau wajahmu
Had difficulty eating foods he/she would like to because of his/her teeth, mouth, or face.	Susah makan makanan yang kamu inginkan karena gigi, mulut, atau wajahmu
Felt worried or anxious because of his/her teeth, mouth, or face.	Merasa khawatir atau gelisah karena gigi, mulut, atau wajahmu
Not wanted to speak/read out loud in his/her class.	Tidak mau berbicara atau membaca dengan suara keras di kelas karena gigi, mulut, atau wajahmu
Avoided smiling or laughing with other children because of his/her teeth, mouth or face.	Menghindari tersenyum atau tertawa dengan anak-anak lain karena gigi, mulut, atau wajahmu
Had trouble sleeping because of his/her teeth, mouth, or face.	Susah tidur karena gigi, mulut, atau wajahmu
Been teased, bullied or called names by other children because of his/her teeth, mouth or face.	Diejek atau dikatain oleh anak-anak lain karena gigi, mulut, atau wajahmu
Felt that he/she was attractive (good looking) because of his/her teeth, mouth, or face.	Merasa berpenampilan menarik karena gigi, mulut, atau wajahmu
Felt that he/she looks different because of his/her mouth, teeth, or face.	Merasa bahwa kamu terlihat berbeda karena gigi, mulut, atau wajahmu
Had difficulty saying certain words.	Merasa kesulitan mengucapkan suatu kata
Had difficulty keeping his/her teeth clean.	Susah menjaga kebersihan gigi
Been worried about what other people think about his/her teeth, mouth or face.	Merasa khawatir dengan apa yang orang lain pikirkan tentang gigi, mulut, atau wajahmu
Overall, please rate your oral health? (Scoring: poor, fair, average, good, excellent)	Bagaimana kamu menilai kesehatan gigi dan mulut kamu? (tidak baik, cukup baik, baik, sangat baik, sempurna)

a condition-specific assessment of oral health impact on children's daily lives.[9] It was designed to differentiate children based on clinical condition and clinical severity.[8] It can be used in a broad age range (8 – 18 years old) across oral conditions and includes positive OHRQoL aspect, like confidence and attractiveness, and also negative impacts like tooth pain. COHIP consisted of 34 items comprised of five subscales: oral health, functional well-being, social/emotional well-being, school environment, and self-image.[10]

The COHIP has shown good psychometric properties in different community samples.[7, 10-17] Because of linguistic difference and cross-cultural issues, OHRQoL instruments must not only be adapted and translated but also validated in the target population. The purpose of this study was to develop an appropriate Indonesian version of Child Oral Health Impact Profile and to assess reliability as well as discriminant and convergent validity in 12 – 15 years old Indonesian children.

METHODS

Study Population

This study was conducted in Jakarta the capital city of Indonesia with children age 12 – 15 years old as participants. As was suggested by Charter, the minimum sample size needs to be larger than 400 to evaluate reliability and validity, so a sample size of 500 was chosen.[18] The principal sampling unit was

the school; six schools were randomly selected among 326 public junior high school located in Jakarta, which was available from the official website of the Jakarta's education office. Therefore, a total of 529 children were selected to participate the study. Students completed a self-administrated questionnaire prior to dental examination. The same questionnaire was used approximately 2 weeks later on 49 of the participants for the purpose of estimating test-retest reliability.

Translation of COHIP-SF 19

The original COHIP-SF 19 English version was obtained by the developer Dr. Broder and was translated by a bilingual professional in accordance to the guidelines for the cross-cultural adaptation process.[11,19] The translation was assessed and revised by an expert panel with regard to concept and item equivalence between the original version and Indonesian version. The panel consisted of a dentist, and a dental public health researcher familiar with quality of life questionnaires. The consensus version was pilot tested in 49 children between 12 – 15 years old to determine its sensitivity to Indonesian culture and to the selection of proper wording. For the transcultural adaptation, face-to-face interviews were conducted with the children. The consensus version was translated back into English. This backward translation of the Indonesian version of COHIP into English was performed by an Indonesian dentist who is undergoing Master Degree in the US, who was masked to the original wording of the COHIP-SF. Finally, COHIP-SF 19 was confirmed by the expert panel after minor revision and then confirmed by the COHIP author. This resulted in the final questionnaire that was used for the study (Table 1).

The COHIP-SF 19 Questionnaire

COHIP has a short form version called Child Oral Health Impact Profile-Short Form 19 (COHIP-SF 19). The reliability and validity of the short 19-item version of the COHIP showed comparable results with the long 34-item version of the COHIP.[11] The 19-item short form of the COHIP was derived from the original 34-item version by using confirmatory factor analyses to identify items with low factor loadings and after removing items with significant overlap in content. This short version was considered not only more convenient for the respondents but also the COHIP-19 seems to be most promising when considering its sufficient psychometric properties. The shortened COHIP is created for clinical research and epidemiological studies and is considered to be more efficient than the longer scales in assessing children's OHRQoL. COHIP-SF comprises 19 items and 3 subscales (oral health, functional well-being, and social well-being).[11] Since the COHIP-SF 19 was developed and published in 2012 by Broder et al, translation has been published in Mandarin, and German version.[12,15]

The Indonesian version was adapted from the original COHIP-SF 19 which was composed of 19 questions inquiring how frequently the child had experienced oral impacts during the past three months under three conceptual subscales: 5 items of oral health, 4 items of functional well-being, and 10 items of socio-emotional well-being subscale.[9,11] Two of the items were positively worded questions. Responses to the two positively worded questions were reversed-scored. Children rated whether they had "almost all of the time", "fairly often", "sometimes", "almost never" or "never" experienced in the past three months any of the situations listed. Responses were scored on a scale ranging from 0 (almost all the time) to 4 (never) with a higher score indicating satisfactory OHRQoL. Thus higher COHIP-SF 19 score reflected more positive OHRQoL.[4] Subscale scores were computed as the sum of the responses on that subscale. The overall COHIP-SF 19 score was calculated by summing all 19 items scores within a range of 0 – 76.[8] Responses for the two self-rated items concerning general health and oral health were recorded as "very poor" to "excellent" (0 – 4).[12] The COHIP-SF 19 questionnaires were self-administered at school, on the day of the dental examination, for the main validation process and for the test-retest procedure.

Dental Examination

Following the completion of COHIP-SF 19, each child received a dental examination performed by a trained and calibrated dentist, to decrease the potential of diagnostic variability. The consistency of the examiner was determined by duplicate examinations on 10% of the sample, with a time interval of at least 30 minutes between examinations, as recommended by the WHO, to ensure the reproducibility of recordings and consistency of the individual examiner.[20] The examiner was not able to identify the subjects who are re-examined, or know that a subject has been examined previously, since this information may affect the thoroughness or quality of the duplicate examination. Duplicate examinations was conducted at the start of the survey (immediately after calibration), about half-way through and at the end of the survey, to allow detection and correction of any examiner error.[20] The dentist achieved satisfactory intra-examiner consistency. Intra-class correlation coefficient (ICC) for the examination of clinical oral health assessment consists of DMF-T, PUFA, and Gingival Indices were 0.97, 0.96, and 0.94, respectively.

Information on the Decayed, Missing and Filled Teeth Index (DMFT) was acquired. The D component includes all teeth with caries or filled teeth with caries. Very early enamel-only caries is not scored; however, caries that included an unmistakable cavity, undermined enamel, or detectably softened floors or walls was scored. The M component comprises of missing teeth due to caries. The F component includes filled teeth with no caries. Teeth with fissure sealant, or fixed dental prosthesis/bridge abutment, special crown or veneer/implant are not included in calculations of

the DMFT index. The number of carious teeth was recorded according to World Health Organization (WHO) criteria [20] and was subsequently dichotomized into non-active decay (DT = 0) and active decay (DT > 0).

PUFA index was recorded according to Monse et al.[21] PUFA is an index used to assess the presence of oral conditions resulting from untreated caries. The PUFA index records the presence of severely decayed teeth with visible pulpal involvement (P), ulceration caused by dislocated tooth fragments (U), fistula (F) and abscess (A). The index is recorded separately from the DMFT, and the PUFA score per person is calculated in the same cumulative way as for the DMFT and represents the number of teeth that meet the PUFA diagnostic criteria. Only one score is assigned per tooth. In case of doubt concerning the extent of odontogenic infection, the basic score (P) is given. PUFA analysis was dichotomized into negative PUFA (PUFA =0) and positive PUFA (PUFA > 0).

Gingival Index was recorded according to Silness and Loe.[22] Clinical appearance (color, texture, shape, size, absence of ulceration) on all gingival surfaces were observed. Probing was performed on all four surfaces of the gingival sulcus of each tooth. Occurrence of bleeding after ten seconds were observed and noted. Index was scored according to Löe and Silness to describe gingival inflammation clinical severity. Erythematic appears in early gingivitis lesions. At this stage, bleeding on probing could be detected. GI dichotomized into no gingivitis (GI ≤ 1) and gingivitis (GI > 1) for Gingival Index.

Data Analysis

Descriptive statistics were used to provide a description of the study sample. The participants were dichotomized and analyzed by gender and age. Psychometric testing of the scale included both reliability and validity testing. Internal consistency of the COHIP-SF 19 was measured using Chronbach's alpha and evaluation of each item included was evaluated with the corrected item-total correlation and Chronbach's alpha if an item was deleted. Test-retest reliability was assessed by ICC. Discriminant validity of COHIP-SF 19 and each subscale scores was assessed by comparing the mean of total score across the clinical oral health assessment. Discriminant validity was further evaluated by examining the associations between COHIP-SF 19 scores and the number of decayed teeth, PUFA score, and Gingival score, adjusted by age and gender. Convergent validity was assessed by examining the relationship between COHIP-SF 19 and the rating of self-rated general and oral health after controlling for demographic covariates. SPSS version 20 was used for analysis.

Table 2. Descriptive statistic of COHIP-SF 19 and each subscale scores (n= 502)

Scale (possible range)	Mean (SD)	Median (range)
COHIP-SF 19 (0-76)	57.8 (8.8)	58 (27-75)
Oral health (0-20)	13.0 (3.3)	13 (0-20)
Functional well-being (0-16)	13.7 (2.3)	14 (3-16)
Socio-emotional well-being (0-40)	31.0 (5.0)	31 (13-40)

Table 3. Internal reliability analysis of COHIP-SF 19 and each subscale (n= 502)

Scale (number of items)	Crobach's alpha	Corrected item-total correlation	Alpha if an item is deleted
COHIP-SF 19 (19)	0.83	0.08-0.60	0.79-0.83
Oral health (5)	0.59	0.23-0.42	0.49-0.60
Functional well-being (4)	0.65	0.32-0.52	0.51-0.67
Socio-emotional well-being (10)	0.73	0.14-0.56	0.62-0.73

RESULTS

Descriptive Statistics

529 children were selected to participate the study yielding a 94.9 % response rate. Mean, median, and range of the overall COHIP-SF 19 and subscale scores are shown in Table 2. 79.9% of all participants experienced at least one COHIP-SF 19 impact. Impacts for subscale COHIP-SF 19 were frequently reported in socio-emotional well-being subscale (62.9%) and oral health subscales (48.2%), whereas impact were infrequently found in functional well-being subscale (8.6%). Further, self-rated general health and also self-rated oral health were described. Of all participants, 75.1% (n = 377) and 68.3% (n = 343) rated their general health and oral health respectively as either good, very good, or excellent. Moreover, 24.9% (n = 125) and 31.7% (n = 189) of the sample rated their global general health and global oral health ratings respectively either fair or poor. 71.9% and 68.3% of the fathers' and mothers' education status respectively were middle or high schools graduated. Only 17.7% and 13.3% fathers and mothers respectively have attained education beyond high school. The prevalence of gingivitis and decayed teeth was 28%, and 87%, respectively. Approximately one-quarter of the decayed teeth had dental pulp involvement. The mean and standard deviation of decayed teeth, missing, filling, and total DMFT were 4.23 ± 0.13, 0.16 ± 0.03, 0.01 ± 0.01, 4.40 ± 0.14.

Table 4. Comparison of COHIP-SF 19 and each subscale scores with the clinical oral health assessment of caries, PUFA, and gingivitis (n=502)

	COHIP-SF 19 Mean (SD)	Oral health Mean (SD)	Functional well-being Mean (SD)	Socio-emotional well-being Mean (SD)
Non-active decay (n=64)	60.0 (7.6)	14.2 (2.9)	13.7 (2.4)	32.0 (4.4)
Active decay (n=438)	57.4 (8.9)	12.8 (3.3)	13.7 (2.3)	30.9 (5.0)
p-value	0.030*	0.003**	0.764	0.048*
Negative PUFA (n=395)	58.6 (8.6)	13.3 (3.4)	13.9 (2.2)	31.4 (4.9)
Positive PUFA (n=107)	54.8 (8.8)	12.0 (2.9)	13.1 (2.6)	29.8 (5.0)
p-value	0.000**	0.000**	0.002**	0.001**
No Gingivitis (n=361)	58.6 (8.5)	13.4 (3.3)	13.9 (2.1)	31.3 (4.9)
Gingivitis (n=141)	55.7 (9.1)	12.0 (3.3)	13.3 (2.6)	30.3 (5.2)
p-value	0.002**	0.000**	0.019*	0.084

Mann-Whitney U test were used. *p < 0.05, ** p < 0.01

Table 5. Partial Spearman correlations between clinical severity indicators and the COHIP-SF 19 and each subscale scores (n=502)

	Caries index (DT)		PUFA index		Gingival index	
	rs	p-value	rs	p-value	rs	p-value
COHIP-SF 19	-0.10	0.028*	-0.17	0.000**	-0.16	0.000**
Oral health	-0.12	0.006**	-0.15	0.000**	-0.19	0.000**
Functional well-being	-0.06	0.169	-0.16	0.000**	-0.13	0.004**
Socio-emotional well-being	-0.06	0.158	-0.12	0.006**	-0.09	0.040*

Partial Spearman correlations adjusted by age and gender were used.
*p < 0.05, ** p < 0.01

Table 6. Descriptive analysis of COHIP-SF 19 and each subscale scores regarding age and gender (n=502)

	Age			Gender		
	Mean (SD)		p-value	Mean (SD)		p-value
	12-13 y.o	14-15 y.o		Male	Female	
COHIP-SF 19	58.0 (8.3)	57.5 (9.4)	0.940	57.5 (8.5)	58.0 (9.0)	0.567
Oral health	13.2 (3.2)	12.8 (3.5)	0.319	12.9 (3.4)	13.0 (3.3)	0.629
Functional well-being	13.7 (2.3)	13.7 (2.3)	0.941	13.6 (2.4)	13.9 (2.2)	0.242
Socio-emotional well-being	31.1 (4.7)	31.0 (5.3)	0.852	31.0 (4.8)	31.1(5.1)	0.959

Mann-Whitney U test were used.

Table 7. Partial Spearman correlations between the self-rated assessment and the COHIP-SF 19 and each subscale scores (n=502)

	Self-rated general health		Self-rated oral health	
	r_s	p-value	r_s	p-value
COHIP-SF 19	0.25	0.000	0.27	0.000
Oral health	0.21	0.000	0.24	0.000
Functional well-being	0.12	0.006	0.14	0.002
Socio-emotional well-being	0.25	0.000	0.25	0.000

Partial Spearman correlations adjusted by age and gender were used. All p-value < 0.01

Reliability
The internal consistency was excellent for the overall COHIP-SF 19 score as shown in Table 3. The corrected item-total correlations were all positive and ranged from 0.08 to 0.60 for COHIP-SF 19 and all the subscales. The test-retest reliability was excellent, with ICC value 0.81 for the overall COHIP-SF 19. Meanwhile, the test-retest reliability was good for the functional well-being, socio-emotional well-being, and oral health subscales with ICC values 0.78, 0.66, and 0.60, respectively.

Discriminant Validity
Comparing COHIP-SF 19 subscale score with the clinical oral health assessments (active decay, positive PUFA, and gingivitis) are presented in Table 4. Mann-Whitney U test results revealed that children with no active decay (DT = 0) had higher COHIP scores for total COHIP- SF 19 ($p = 0.030$) and two subscales ($p \leq 0.05$). No difference was found on the functional well-being subscale ($p = 0.764$) by decay status. Children with negative PUFA (PUFA = 0) had higher total COHIP scores for COHIP-SF 19 ($p = 0.000$) and across each subscale ($p \leq 0.002$). Children with no gingivitis ($GI \leq 1$) had higher score for total COHIP-SF 19 ($p = 0.002$).

Discriminant validity was further addressed by examining the relationship between clinical severity indicator and COHIP-SF 19 and subscales scores, after controlling for participant age and gender (Table 5). The number of decayed teeth (DT range = 0 – 16) was significantly correlated with COHIP-SF 19 and oral health subscale. The number of PUFA (range = 0 – 4) was significantly negatively correlated with COHIP-SF 19 and all three subscales ($p \leq 0.006$), although the relationships were weak ($|rs| = 0.12 – 0.17$). The GI ranged from 0.0 to– 2.7, and was significantly negatively correlated with COHIP-SF 19 and all three subscales ($p \leq 0.040$). Yet, it is noted that these relationships were weak ($|rs| = 0.09 – 0.19$). Table 6 illustrates the comparison of the COHIP-SF 19 scores with demographic variables. There were no statistical differences found between the two age groups (12 – 13 years and 14 – 15 years) or differences by gender. Moreover, there was also no statistical difference in the total COHIP-SF 19 score by school ($p = 0.250$) nor differences by father's and mother's education.

Convergent Validity
All of the partial correlations were significant, and all of the coefficients were positive values ranged from 0.12 to 0.27, as shown in Table 7. The COHIP-SF 19 score and the self-rated oral health showed the highest partial coefficient, with the value of 0.27. Among the partial correlations coefficient, the lowest value was between the functional well-being subscale score and the self-rated general health, with the value of 0.12.

DISCUSSION

In a cross-cultural adaptation of COHIP-SF 19, it is important to demonstrate that the adapted instrument is culturally relevant and valid in the country for which it is adapted. The initial step included the multi-step translation procedure: translation, back translation, expert committee review, and obtaining confirmation by the original developer, as per established guidelines.[19] The Indonesian version of COHIP-SF 19 was shown to have satisfactory psychometric properties for school-age children in Jakarta based on the findings of the study. The instrument was valid and reliable for estimating OHRQoL among Indonesian children whose age 12 – 15 years old.

Chronbach's alpha for COHIP-SF 19 was 0.83, similar to the original version (0.82 –0.88) and slightly higher than the Chinese version (0.81).[11,12] The Chronbach's alpha value did not increase if any of the items were deleted, indicating that there was no need to delete any item from the scales. The test-retest reliability was excellent, with ICC value 0.81 for the overall COHIP-SF 19, which showed good reproducibility.
Discriminant validity test differentiated children with different clinical indicators. It showed that children with better oral health status had higher OHRQoL scores. Similar to previous studies, children without active decay reported a higher OHRQoL than children with active decay.[11-13]

Convergent validity was proven by positive relationship between COHIP-SF 19 and the ratings of self-rated general and oral health, implying that when OHRQoL was higher, self-rated general and oral health were also higher.[11,12,14] COHIP-SF 19 had a stronger relationship with self-rated oral health than with general health. The relationship between clinical severity indicator (DMFT, PUFA, GI) in this study and COHIP-SF 19 subscales scores were weak. This was similar compared to other OHRQoL reports.[12,14,15,23] This highlighted the utility of using a disease-specific instrument of quality of life to evaluate the impact of oral health conditions and concern among children.[10,24,25] COHIP-SF 19 score from the study sample were relatively high, indicating generally good OHRQoL. Yet the prevalence of COHIP-SF 19 impact was high (79.9%), similar to previous studies in Asian countries that demonstrated a high prevalence of COHIP impact (56.3% – 96.2%).[12,13] Evidence of floor and ceiling effects was relatively minimal.[8]

There were no differences by school or parents' education in the quality of life scores. This might be due to the similar respondents' characteristics among schools. These six schools are typical of the Indonesian public middle school system in terms of size, infrastructure and systems, receiving full support

and provisions from the Government. All six schools are similar in terms of location and socio-demographics and are attended only by children aged 12-15 years. The socio-demographic profile of the children attending these schools and their families are similar.

This study developed and verified the COHIP-SF 19 Indonesia version, providing validated measure of OHRQoL to supplement clinical oral evaluation in oral health surveys and dental clinics in Indonesia. This paper is also important for enabling International comparison of OHRQoL using the standardized COHIP.[26] Moreover, with the high prevalence of decayed teeth (87.3%) and oral impacts in Indonesian school-age children, the OHRQoL instrument should play more important role in future clinical studies, epidemiological surveys and potential public health policy in Indonesia.

The results presented in this paper should be considered in light of the study's limitations. Analytic longitudinal studies are required to estimate longitudinal validity and responsiveness of these measurements.[11,12] Further studies may be needed to assess the COHIP-SF 19 Indonesian version among various age and ethnic groups of Indonesian children, and also to study the concordance between parents and child reports of children's oral health-related quality of life, and further to evaluate the factor structure of the Indonesian COHIP empirically.[29,30,31] The COHIP was previously developed and validated using a cleft palate population; therefore evaluation of the measure in additional pediatric patients is warranted to test its sensitivity in measuring treatment needs of children.[27,28] However, the present study has explored other aspects of oral status, through evaluation using the DMF-T, PUFA, and Gingival index. The results from this study compare very favorably to other validation oral health-related quality of life reports in children.[8,32,33]

CONCLUSION

This study demonstrates that the Indonesian 19-items version of the COHIP is a valid measure and is appropriate for measuring children's OHRQoL in Indonesia. It was developed according to standard procedures of a cross-cultural adaptation of a self-reported instrument in a representative community sample of 12- to 15-year-old Indonesia children. Further research is required to evaluate its sensitivity, specificity and its ability to detect clinically important changes over time in children.

ABBREVIATIONS

COHIP-SF 19: Child Oral Health Impact Profile-Short Form 19; OHRQoL: Oral health-related quality of life; ICC: Intra-class correlation coefficient; DT: the number of decayed permanent teeth; WHO: World Health Organization.

DECLARATIONS

This study was approved by the Ethics Committee of the Faculty of Dentistry, University of Indonesia (Ref. No. 09750715). Schools were approached through local educational authorities. Consistent with the ethics committee, explanatory letters were sent to parents, and informed consents were obtained from the parents prior to the study. Only those children whose parents returned written consent were included. Written parental consent and each child's verbal consent were obtained for all the participants.

FUNDING

We acknowledge the Oral Epidemiology and Clinical Studies in Dentistry Research Cluster Faculty of Dentistry Universitas Indonesia, and the Indonesian Ministry of Research, Technology, and Higher Education for supporting this study.

AVAILABILITY OF DATA AND MATERIALS

The raw data is available from the authors to any author who wishes to collaborate with us.

AUTHORS' CONTRIBUTIONS

DAM performed the design of the study, development of the Indonesian version COHIP-SF 19, acquisition of the data, analysis and interpretation of data, and drafting the manuscript. SLN helped with the acquisition of the data. AR helped in the development of the Indonesian version COHIP-SF 19 and collection of the data. All authors read and approved the final manuscript.

ACKNOWLEDGEMENTS

The authors wish to thank the school teachers, children and their parents for participating in the study. We also thank Avina A. Nasia and Putu ADS Ustriyana for assisting the fieldwork and undertaking translations of the instrument.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

REFERENCES

1. World Health Organization. Health Promotion Glossary. 1998.
2. Dobaria N, Aapaliya P, Choudhary G, Sanadhya S, Jain S, Sharma N. Assessment and comparison of clinical dental status and its impact on oral health-related quality of life among rural and urban adults of Udaipur, India: A cross-sectional study. J Basic Clin Pharm. 2015;6:50.
3. Sischo L, Broder HL. Oral Health-related Quality of Life: What, Why, How, and Future Implications. J Dent Res. 2011;90:1264–70.
4. Genderson MW, Sischo L, Markowitz K, Fine D, Broder HL. An overview of children's oral health-related quality of life assessment: from scale development to measuring outcomes. Caries Res. 2013;47 Suppl 1:13–21.
5. Cohen-Carneiro F, Souza-Santos R, Rebelo MAB. Quality of life related to oral health: contribution from social factors. Cien Saude Colet. 2011;16 Suppl 1:1007–15.
6. Bennadi D, Reddy CVK. Oral health related quality of life. J Int Soc Prev Community Dent. 2013;3:1.
7. Broder HL, McGrath C, Cisneros GJ. Questionnaire development: Face validity and item impact testing of the child oral health impact profile. Community Dent Oral Epidemiol. 2007;35:8–19.
8. Gilchrist F, Rodd H, Deery C, Marshman Z. Assessment of the quality of measures of child oral health-related quality of life. BMC Oral Health. 2014;14:40.
9. Dunlow N, Phillips C, Broder HL. Concurrent validity of the COHIP. Community Dent Oral Epidemiol. 2007;35:41–49.
10. Broder HL, Wilson-Genderson M. Reliability and convergent and discriminant validity of the Child Oral Health Impact Profile (COHIP Child's version). Community Dent Oral Epidemiol. 2007;35:20–31.
11. Broder HL, Wilson-Genderson M, Sischo L. Reliability and validity testing for the Child Oral Health Impact Profile-Reduced (COHIP-SF 19). J Public Health Dent. 2012;72:302–12.
12. Li C, Xia B, Wang Y, Guan X, Yuan J, Ge L. Translation and psychometric properties of the Chinese (Mandarin) version of the Child Oral Health Impact Profile-Short Form 19 (COHIP-SF 19) for school-age children. Health Qual Life Outcomes. 2014;12:169.
13. Ahn YS, Kim HY, Hong SM, Patton LL, Kim JH, Noh HJ. Validation of a Korean version of the Child Oral Health Impact Profile (COHIP) among 8- to 15-year-old school children. Int J Paediatr Dent. 2012;22:292–301.
14. Osta NE, Pichot H, Soulier-Peigue D, Hennequin M, Tubert-Jeannin S. Validation of the child oral health impact profile (COHIP) french questionnaire among 12 years-old children in New Caledonia. Health Qual Life Outcomes. 2015;13:176.
15. Sierwald I, John MT, Sagheri D, Neuschulz J, Schüler E, Splieth C, Jost-Brinkmann PG, Reissmann DR. The German 19-item version of the Child Oral Health Impact Profile: translation and psychometric properties. Clin Oral Investig. 2016;20(2):301-13.
16. Geels LM, Hoogstraten J, Prahl-Andersen B. Confirmative factor analysis of the dimensions of the Child Oral Health Impact Profile (Dutch version). Eur J Oral Sci. 2008, 116(2):148-52.
17. Asgari I, Ahmady AE, Broder H, Eslamipour F, Wilson-Genderson M. Assessing the oral health-related quality of life in Iranian adolescents: validity of the Persian version of the Child Oral Health Impact Profile (COHIP). Oral Health Prev Dent. 2013;11:147-54.
18. Charter RA. Sample Size Requirements for Precise Estimates of Reliability, Generalizability, and Validity Coefficients. J Clin Exp Neuropsychol. 1999;21:559–66.
19. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures : Literature review and proposed guidelines. J Clin Epidemiol. 1993;46:1417–32.
20. World Health Organization. Oral health surveys basic methods. 5th ed. Geneva: World Health Organization; 2013.
21. Monse B, Heinrich-Weltzien R, Benzian H, Holmgren C, Palenstein V. PUFA – An index of clinical consequences of untreated dental caries. 2010;77–82.
22. Löe H. The Gingival Index, the Plaque Index and the Retention Index Systems. J Periodontol. 1967;38:610–6.
23. Calis EM, Geels LM, Prahl-Andersen B, Zentner A. Oral health-related quality of life and dental esthetics in Amsterdam schoolchildren. J Dent Child. 2009, 76(2):130-5.
24. McGrath C, Broder H, Wilson-Genderson M. Assessing the impact of oral health on the life quality of children: implications for research and practice. Community Dent Oral Epidemiol. 2004, 32:81-5.
25. Ravaghi V, Ardakan MMM, Shahriari S, Mokhtari N, Underwood M. Comparison of the COHIP and OHIP- 14 as measures of the oral health-related quality of life of adolescents. Community Dent Health. 2011;28(1):82–8.
26. Slade GD, Reisine ST. The child oral health impact profile: current status and future directions. Community Dent Oral Epidemiol. 2007;35 Suppl 1:50–3.
27. Bos A, Prahl C. Oral health-related quality of life in Dutch children with cleft lip and/or palate. Angle Orthod. 2011;81(5):865–71.
28. Geels LM, Kieffer JM, Hoogstraten J, Prahl-Andersen B. Oral health-related quality of life of

children with craniofacial conditions. Cleft Palate Craniofac J. 2008;45(5):461-7.
29. Wilson-Genderson M, Broder HL, Phillips C. Concordance between caregiver and child reports of children's oral health-related quality of life. Community Dent Oral Epidemiol. 2007;35(Suppl 1):32-40.
30. Bos A, Hoogstraten J, Zentner A. Perceptions of Dutch orthodontic patients and their parents on oral health-related quality of life. Angle Orthod. 2010;80(2):367–72.
31. Cho YI, Lee S, Patton LL, Kim HY. Confirmatory factor analysis of the Child Oral Health Impact Profile (Korean version). Eur J Oral Sci. 2016;124(2):72-8.
32. Jokovic A, Locker D, Guyatt G. Short forms of the Child Perceptions Questionnaire for 11-14-year-old children (CPQ11-14): development and initial evaluation. Health Qual Life Outcomes. 2006;19(4):4.
33. Castro RA, Cortes MI, Leão AT, Portela MC, Souza IP, Tsakos G, Marcenes W, Sheiham A. Child-OIDP index in Brazil: cross-cultural adaptation and validation. Health Qual Life Outcomes. 2008;15(6):68.

(Received March 8, 2021, Accepted March 21, 2021)