Evaluation of oral health related quality of life with the short forms of the child perceptions questionnaire in a Nigerian population

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ABSTRACT:

Objectives: Objective: The study objective was to compare the performance of the complete Child Perceptions Questionnaire (CPQ_{11-14}) and the short versions of the Child Perceptions Questionnaire (CPQ_{11-14}) in evaluating the Oral Health Related Quality of Life (OHRQoL) of a population of school children.

Methods: Two hundred secondary school children aged 11-14 years selected through the multi staged sampling technique from public and private secondary schools in Ile-Ife,completed the CPQ_{11-14} a generic measure of OHRQoL, the Impact Short Forms (CPQ_{11-14} -ISF:16 and CPQ_{11-14}-ISF:8), and the Regression Short Forms (CPQ_{11-14}-RSF:16 and CPQ_{11-14}-RSF:8). Criterion validity, construct validity and internal consistency reliability were assessed.

Results: The mean score for CPQ_{11-14}-ISF:16 was 13.7 ± 7.2, CPQ_{11-14}-RSF:16 had a mean of 14.0 ± 7.2. Mean scores for CPQ_{11-14}-ISF:8 and CPQ_{11-14}-RSF:8 were 6.6 ± 3.7 and 6.4 ± 4.0 respectively. The mean scores standardized to 0-100 were higher on the short forms than the original CPQ_{11-14} except theCPQ_{11-14}-RSF:8, differences were significant between the original CPQ_{11-14} and CPQ_{11-14} -ISF:16 and CPQ_{11-14}-RSF:16 ($p < 0.05$). There were strong significant correlations between scores of all short forms and original CPQ_{11-14}(0.78-0.93; $p < 0.001$). All short forms were positively correlated with the ratings of oral health and overall well-being ($p< 0.05$). Cronbach's Alpha ranged from 0.59 - 0.74.

Conclusions: Similar to the complete (CPQ_{11-14}), all short forms detected variability in children's OHRQoL, they demonstrated excellent criterion validity and good internal consistency reliability. The 16 item versions which performed better than the 8 item versions should be the preference for clinical use and epidemiological surveys.

KEYWORDS: Children, Oral health, Quality of life, Oral health Related Quality of life, Child Perception Questionnaire (CPQ)

INTRODUCTION: Quality of life has been defined by the World Health Organization as people's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.[1] Health-Related Quality of Life (HRQoL) is an assessment of how the individual's well-being may be affected over time by a disease, disability, or disorder.[2]It is a multidimensional construct capturing physical, psychological, and social domains of health, seen as distinct areas that are influenced by a person's experiences, beliefs, expectations and perception. [3] Oral health related quality of life (OHRQoL) is the impact of oral disorders on aspects of everyday life that are important to patients and persons, with those impacts being of sufficient magnitude whether in terms of severity, frequency or duration to affect an individual's perception of their life overall.[4]

Early versions of health care-related quality of life measures referred to simple assessments of physical abilities by an external rater, as with any situation involving multiple perspectives, patients' and physicians' rating of the same objective situation were

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found to differ significantly,[5] consequently, health-related quality of life is now usually assessed by the patient who may be considered to be the ultimate expert concerning the impact of a given condition on quality of life.[6] Various measures have been developed to measure OHRQoL, these include social indicators, global self-ratings of OHRQoL and multiple items questionnaires of OHRQoL.[7] Multiple items questionnaires are the most widely used method to assess OHRQOL, these questionnaires include generic instruments that measure oral health overall and condition-specific instruments that measure specific oral conditions.[8] Both strategies have advantages and a combination of both tools is often helpful.[9] The generic instruments have the potential advantage of being more able to measure side-effects or complications of treatment between different conditions, they also allow comparison of various domains of QoL for the condition being studied across populations.[10]

The need to evaluate the impact of oral health on well-being of children led to the development of instruments for measuring oral health-related quality of life (OHQoL) for use with children. The Child Oral Health Quality of Life questionnaires (COHQoL) are a set of multidimensional scales developed by Jokovic et al[11] measuring the negative effects that oral and oro-facial diseases and disorders may have on the well-being of 6-14 year olds and their families. The components of the COHQoL are the Parental/Caregiver Perceptions (PPQ) the Family Impact Scale (FIS) and the Child Perceptions Questionnaires for Children ages 6 to 7 (CPQ_{6-7}), 8 to 10 (CPQ_{8-10}) and 11 to 14 (CPQ_{11-14}).[12] The CPQ_{11-14} consists of 37 questions organized into four domains: Oral symptoms, Functional limitation, Emotional well-being and Social well- being. It also contains two global questions on a child's oral health and the extent to which oral/oro-facial conditions affect his/her overall well-being[6].

Various methods have been used to shorten questionnaires which include expert opinion, statistical methods with factor analysis and item impact methods .The CPQ_{11-14} was shortened to 16 and 8 items through the item impact and regression methods, to enhance its psychometric properties and facilitate its use in clinical settings and population based health surveys.[6] For the item impact questionnaire, questions in the original CPQ_{11-14} were ranked within health domains according to their impact scores which represented products of the question's frequency and the mean rating of its importance on a 4 point scale. The top four and two ranked questions in each domain were selected for the CPQ_{11-14}-ISF:16 and the CPQ_{11-14}-ISF:8, respectively.[6] For the regression method the dependent variable was the overall score for the long-form CPQ_{11-14} and the independent variables were the scores for individual questions in it. A single model was generated and a forward stepwise procedure used to identify the best predictors of the overall score. The four and two questions from each health domain making the largest contribution to the coefficient of variation were selected for the CPQ_{11-14}-RSF:16 and the CPQ_{11-14}-RSF:8, respectively. Initial evaluation of the short form CPQ_{11-14} questionnaires showed that they demonstrated excellent criterion validity and good construct validity.[6]

Foster Page et al [13] compared the performance of the four short-form versions of the CPQ_{11-14} with that of the long-form version in a sample of children from New Zealand in order to determine which short-form version was the most valid. Their findings suggest that the short-form versions all show acceptable properties, but the 16-item versions performed better. The Brazilian versions of CPQ_{11-14}-ISF:8 and ISF:16 were also reported to have satisfactory psychometric properties, similar to those of the original instrument.[14] Lau et al [15] found that the items used in the short forms contain sufficient information in measuring OHRQoL for children in Hong Kong, Wong et al[16] also indicated that RSF:8 measured OHRQoL for adolescents in Hong Kong consistently across gender. Cross-sectional epidemiological surveys in New Zealand, Brunei and Brazil reported that the 16-item short-form item impact version of the CPQ11-14 performs well across diverse cultures and recommended further exploration of the face and content validity of the measure in different populations.[17]

In dentistry, measures of oral health-related quality of life (OHRQoL) provide essential information for assessing treatment needs, making clinical decisions and evaluating interventions, services and programmes, the most common measures used to examine child OHRQoL today are the Child Perceptions Questionnaires.[18] The original CPQ_{11-14} has been previously validated in this study environment, it was able to identify the impacts of oral health on the quality of life of studied children. [19] The CPQ_{11-14} is a lengthy questionnaire (37 questions),[14] its use is limited

Table 1: Descriptive statistics for original CPQ11-14 and the various shortforms.

Short form	Range of possible values	Range of scores	Mean (SD)	% with minimum score	% with maximum score
CPQ	0-148	0-79	30.1 (15.1)	2 (1.0)	0 (0)
CPQ_{11-14}-ISF:16	0-64	0-34	13.7 (7.2)	4 (2.0)	0 (0)
CPQ_{11-14}-RSF:16	0-64	0-37	14.0 (7.2)	3 (1.5)	0 (0)
CPQ_{11-14}-ISF:8	0-32	0-20	6.6 (3.7)	10 (5.0)	0 (0)
CPQ_{11-14}-RSF:8	0-32	0-17	6.4 (4.0)	8 (4.0)	0 (0)

Table: Comparison of mean CPQ_{11-14} score standardized to 100 percent

Short form of CPQ			CPQ_{11-14}		T		p value
	MEAN	SD	MEAN	SD			
CPQ_{11-14}-ISF:16	21.5	11.2	20.3	10.2	-3.415	199	0.001
CPQ_{11-14}-RSF:16	21.9	11.2	20.3	10.2	-4.936	199	<0.001
CPQ_{11-14}-ISF:8	20.5	11.7	20.3	10.2	-.269	199	0.788
CPQ_{11-14}-RSF:8	19.9	12.4	20.3	10.2	1.127	199	0.261

Table 3: Criterion validity – Spearman's Rank correlations between scores of the short forms and original CPQ_{11-14} (n = 200)

	Long form	
Short forms	Rho	P value
CPQ_{11-14}-ISF:16	0.91	<0.001
CPQ_{11-14}-RSF:16	0.93	<0.001
CPQ_{11-14}-ISF:8	0.78	<0.001
CPQ_{11-14}-RSF:8	0.89	<0.001

Table 4: Correlational construct validity Spearman's rank Correlations between short forms scores and oral health and overall wellbeing global ratings.

	Oral health		Overall well-being	
Short forms	Rho	P value	Rho	P value
CPQ_{11-14}-ISF:16	0.21	0.003	0.21	0.003
CPQ_{11-14}-RSF:16	0.20	0.004	0.19	0.008
CPQ_{11-14}-ISF:8	0.22	0.002	0.19	0.008
CPQ_{11-14}-RSF:8	0.20	0.004	0.17	0.016

Table 5: Reliability statistics for the Short forms of the CPQ_{11-14}

Short form	Cronbachs α	Range of α if item deleted	Range of corrected item total correlations
CPO_{11-14} ISF:16	0.74	0.71-0.74	0.28-0.44
CPO_{11-14}RSF:16	0.74	0.71-0.74	0.27-0.45
CPO_{11-14}-ISF:8	0.61	0.54-0.58	0.30-0.41
CPO_{11-14}-RSF:8	0.59	0.53-0.58	0.22-0.37

in large epidemiological surveys because of the time required to complete it and the financial costs of data collection. Shortening the questionnaire reduces the risk of total and item non-response and facilitates its use in clinical settings and epidemiological surveys. The short forms of the questionnaire which have not been previously validated in this study environment would be welcome alternatives for use to measure OHRQoL in child populations. The study objective was therefore to compare the performance of the complete Childs Perception Questionnaire (CPQ_{11-14}) and the short versions of the Child Perceptions Questionnaire (CPQ_{11-14}) in evaluating the Oral Health Related Quality of Life (OHRQoL) of a population of Nigerian school children.

METHODS

The study sample was obtained through a multi stage sampling technique. List of all government-approved schools in Ife Central local Government Area Ile-Ife, Osun State were obtained. From the lists of schools, two schools, one Public and one Private were selected by stratified sampling. In each of the selected schools, classes to study were selected from the junior secondary classes by simple random sampling, from each selected class, individual students were selected by stratified sampling to obtain a total of 100, with equal number of boys and girls (50 male and 50 female). A total of 200 children were therefore selected for the study from both schools. Only children aged 11 to 14 years were selected to participate in this study. Ages of participants were determined as age at last birthday.

Selected participants were requested to complete the CPQ_{11-14} a generic measure of OHRQoL including the short forms; CPQ_{11-14} -ISF:16, CPQ_{11-14}-ISF:8, CPQ_{11-14}-RSF:16 and CPQ_{11-14}-RSF:8 administered in English. Completion of questionnaires was done independently by the children without consulting with their colleagues. The first two questions on the CPQ_{11-14} are the global ratings of the child's oral health and the extent to which the oral/oro-facial condition affected his/ her wellbeing, worded as follows. "Would you say that the health of your teeth, lips and mouth is ….." and "How much does the condition of your teeth lips and jaws and mouth affect your life overall?" A 5-point response format ranging from 'Excellent' = 0 to 'poor' = 4 and from 'Not at all' = 0 to 'Very much' = 4 respectively is offered for these ratings. The remaining questions are organized into four health domains. Oral symptoms (n = 6), functional limitations (n = 9) emotional well-being (n = 9) and social well-being (n = 13). The questions ask about the frequency of events in the previous three months in relation to the child's oral/oro-facial condition. The response options are 'Never' = 0, 'Once/twice' =1; 'Sometimes' = 2; 'Often' = 3; 'Everyday/ almost everyday' = 4.[6] Scores for overall CPQ_{11-14}, CPQ_{11-14} -ISF:16, CPQ_{11-14}-ISF:8, CPQ_{11-14}-RSF:16 and CPQ_{11-14}-RSF:8 were computed by addition of scores for all items in each questionnaire. Criterion validity was determined using Spearman's correlation tests to evaluate the relationship between the original CPQ_{11-14} and the short form questionnaires, correlational construct validity was also determined with Spearman's correlation tests between the short form questionnaires and the global ratings of oral health and well-being present on the original CPQ_{11-14}. Internal consistency reliability was determined using Cronbach's alpha.

Ethical approval was obtained from the Institute of Public Health, Obafemi Awolowo University Ethics Committee. Approval to conduct the study was obtained from the Local Education Office of the Local Government Area and the appropriate school authorities. The study was conducted in full compliance with the study protocol, Informed consent were obtained from the parents of study participants, participants also provided assentafter duly explaining study objectives, risk and benefits, voluntary nature of participation and freedom to withdraw at any time. All efforts were made to minimize risks to participants such as loss of confidentiality. All data were collected without the names of participants. Participants experienced no direct benefit from participation in the study and no compensation was paid

RESULTS

Two hundred school children, 100 male and 100 female with mean age of 12.84 (SD =1.00) year participated in this study. The mean ages of male (Mean = 12.9, SD = 1.0) and female participants (Mean = 12.7, SD = 1.1) were not significantly different (t = 1.41, df = 198, p = 0.16). The range of scores for the original CPQ_{11-14} and the various short forms are as shown in Table 1. Participants demonstrated floor effects with all short forms of the scale and the original $CPQ_{11-14.}$ Scores for the original CPQ_{11-14} ranged from 0 to 79 with a mean score of 30.1 ± 15.1, the mean score for CPQ_{11-14} -ISF:16

was 13.7 ± 7.2 while the mean for CPQ_{11-14}-RSF:16 was 14.0 ± 7.2. Mean scores for CPQ_{11-14}-ISF:8 and CPQ_{11-14}-RSF:8 were 6.6 ± 3.7 and 6.4 ± 4.0 respectively.

The CPQ_{11-14} -ISF:16 and CPQ_{11-14} -RSF:16 both found that 96.5% of the studied children experienced 1 or more impacts 'Often' or 'Everyday/ almost everyday', the 8 item short form CPQ_{11-14} questionnaires detected fewer children with impacts, the CPQ_{11-14}-ISF:8 detected more children than CPQ_{11-14}-RSF:8 (85% vs 80.5%). Table 2 shows the mean scores of the original CPQ_{11-14} and the short forms standardized to 0-100. All mean scores of the short forms of CPQ_{11-14} were higher than the original CPQ_{11-14} with the exception of theCPQ_{11-14}-RSF:8. The differences between the short forms and original CPQ_{11-14} were significant between original CPQ_{11-14} and CPQ_{11-14} -ISF:16 ($p = 0.001$), original CPQ_{11-14} and CPQ_{11-14}-RSF:16 ($p < 0.001$).

Correlation tests to determine criterion validity showed there were strong significant correlations between all short form scores and the original CPQ_{11-14} scores (0.81-0.92; $p < 0.001$) (Table 3). The correlations between the original CPQ_{11-14} and 16 item questionnaires CPQ_{11-14} -ISF: 16 and CPQ_{11-14} -RSF:16 were identical and better than the 8 item questionnaires. The correlation coefficient with CPQ_{11-14}-ISF:8 was the lowest (0.78, $p < 0.001$).

Correlational construct validity was confirmed from the correlation between the short form scores and oral health and overall well-being ratings. All short form questionnaires demonstrated positive significant correlations with the global ratings of oral health and overall well-being ($p < 0.05$). The strength of correlations of all the short form CPQ_{11-14} questionnaires with the ratings of oral health and overall wellbeing were similar ranging from 0.20-0.22 with the ratings of oral health and 0.17-0.21 with the ratings of overall wellbeing. (Table 4) Correlation of the short form questionnaires with both global questions were better than the results with the original $CPQ_{11-14.}$ Internal consistency was determined using Cronbach's Alpha. Cronbach's Alpha was 0.74 for both CPQ_{11-14} -ISF: 16 and CPQ_{11-14} -RSF:16, 0.61 for CPQ_{11-14}-ISF:8 and 0.59 CPQ_{11-14}-RSF:8 (Table 5).

DISCUSSION

Health-related quality of life (HRQoL) is a multidimensional construct, which at a minimum addresses physical, mental and social domains of health.[20] Oral health-related quality of life (OHRQoL) is subjective and therefore should be addressed from the individual's perspective whenever possible. [20] the CPQ_{11-14} permits documentation of the individual's perspective.[11]

This study set out to compare the OHRQoL of a population of children evaluated using the short forms of the Child Perceptions Questionnaire (CPQ_{11-14}) and the Original CPQ_{11-14}. All short forms detected substantial variability in the children's perception of Oral health-related quality of life. Strong correlations were observed between all short form scores and the original CPQ_{11-14} scores, demonstrating criterion validity; correlational construct validity was confirmed from the positive correlation between the short form scores and oral health and overall well-being ratings, all short form questionnaires were also found to be reliable.

Similar to Jokovic et al.[6] we found no participant with ceiling effect i.e. the maximum obtainable score, but unlike their results we observed floor effects with all the short forms of CPQ_{11-14}. Our mean short form CPQ_{11-14} scores were comparable to the report of Jokovic et al, [6] also similar to their findings, the CPQ_{11-14} -RSF: 8 detected the lowest impact of oral health on OHRQoL in this study. Our mean CPQ_{11-14}-ISF:8 score was also similar to the value obtained with the Brazilian version of the same questionnaire.[9] With the CPQ_{11-14}-ISF:16 our participants reported higher impacts than their counterparts in Northland, New Zealand, studies in Brunei however gave higher scores on the ISF:16 compared to our study.[17] The observed similarities and differences in mean scores may represent variations in the perceived impacts of oral health on OHRQoL of children in the various geographic locations, which may be mediated by socio-cultural differences. Oral health may also have been of great importance to the Brunei children who reported worse OHRQoL.

When the mean scores of the short form questionnaires were standardized to 100 and compared with the original $CPQ_{11-14,}$ the short forms detected higher levels of impact than the original $CPQ_{11-14,}$ except for CPQ_{11-14} -RSF: 8. This could be because the questions that were the best predictors and showed the greatest impacts on QoL were selected for the short forms. However unlike the report of Jokovic et al,[6] significant differences were identified only between the original CPQ_{11-14} and CPQ_{11-14}-ISF:16 and CPQ_{11-14}-RSF:16 scores.

Criterion validity was good for all short forms, an indication that all the short forms were measuring a

similar construct with the original $CPQ_{11-14.}$ We observed a similar pattern with the work of Jokovic[6]; the 16 item questionnaires detected greater impacts and showed higher correlation with the original $CPQ_{11-14.}$ The implication of this is that although construct validity was good for all short forms, the 16 item questionnaires performed better than the 8 item questionnaires and may be the preference for use.

In determining correlational construct validity, we found that for correlations with the global question on oral health, our values were similar to those of Jokovic et al,[6] however contrary to the findings of Jokovic et al[6] in Toronto and those of Foster Page et al[13] in New Zealand, correlational values with the global question on overall wellbeing was lower than values with oral health in our study. Our participants' perception of their OHRQoL was more closely related to their oral health than overall well-being. We opine that the concept of oral health was probably easier to comprehend and relate with for our secondary school children than overall well-being, it is also possible that our participants did not regard oral health issues (the condition of their teeth lips and jaws and mouth) as significant influences on their overall well-being.

We obtained lower Cronbach's alpha values for ISF:8 and ISF:16 compared with values obtained with the Brazilian versions.[14] We also obtained lower values for RSF:8 and RSF:16 compared with results in New Zealand,[13] this could be a reflection of the distribution of our participants OHRQoL scores. However similar to their findings, alpha value was lowest for CPQ_{11-14}-RSF:8 in our study, we also observed like these aforementioned studies that Cronbach's alpha values were lower with the 8 item questionnaires compared with the 16 versions, the fewer number of questions in the 8 item short forms may be responsible for this observation.

A limitation of this study was that we did not test construct validity i.e the ability for the questionnaires to detect gradients in the impacts of paedodontic, orthodontic and orofacial conditions on children's QoL. A previous work with the original CPQ_{11-14} in the same study environment showed that it was unable to discriminate between participants with different grades of malocclusion,[19] similarly, Dimberg et al[21] found no clear association between higher severity of malocclusion and higher impact on OHRQoL among Swedish children using the CPQ_{11-14}. Agbaje et. al.[22] also reported that OHRQoL did not differ significantly across DAI grades of malocclusion with the United Kingdom Oral Health-Related Quality of Life (OHRQoL-UK) questionnaire, a generic measure of OHRQoL.

The CPQ_{11-14} was shortened to broaden its application by reducing the time and financial costs of data collection and the risk of total and item non –response. While shortening of items on lengthy questionnaires using various methods could result in scales that perform as different instruments, we found that all the short-form versions of the CPQ_{11-14} show acceptable properties. They generally detected greater impacts and better correlation with the global questions on oral health and overall well-being than the original CPQ_{11-14}, although the 16 item versions (CPQ_{11-14}-ISF:16 and CPQ_{11-14}-RSF:16) showed better performance than the 8 item versions (CPQ_{11-14}-ISF:8 and CPQ_{11-14}-RSF:8). In New Zealand, Foster Page et al[18] set out to examine the reliability and validity of the impact short-form CPQ_{11-14} in 5-to-8-year-old children, and to determine whether a single measure for children aged 5-14 is feasible. The performance of the questionnaire appeared to be acceptable in this younger age group and showed that younger children are capable of providing their own perceptions of oral health impacts. Research among this younger age group should be explored in our study environment.

CONCLUSIONS

All short-form versions revealed variability in children's oral health-related quality of life (OHRQoL). They demonstrated excellent criterion validity and good internal consistency reliability. The short item questionnaires with the exception of CPQ_{11-14}-RSF: 8 detected greater impacts in OHRQoL than the original $CPQ_{11-14.}$ All short forms had better correlation with the global questions on oral health and overall well-being than the original CPQ_{11-14}. Differences in content had little effect on the performance of the item-impact and regression versions, but with regards to length the 16 item versions performed better and may be the preference for clinical use and epidemiological surveys. Further investigations to determine discriminant construct reliability will be beneficial.

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