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Applicability and cross-cultural adaptation of the self-administered Child–OIDP in a rural Nigeria community

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Abstract
Background: The utilization of the Child Oral Impact on Daily Performances (Child–OIDP), one of the most widely used quality of life measures for children, in rural communities will require cross adaptation of the measure since rural communities in Africa are in no small way influenced by the prevailing cultural norms and values. The aim of this study was to assess the applicability of self-administered Child–OIDP measure in a rural community in Nigeria.
Methods: A cross sectional study was conducted among 403 secondary school students in Igboora, Nigeria using self-administered Child–OIDP questionnaire translated into the local language.
Results: The mean age of the study participants was 12.4 (±0.7) years. The impact of oral health on their daily performances scores ranged from 0 to 66. Higher OIDP scores were significantly associated with perceived need for dental treatment ($p < 0.001$), satisfaction ratings of oral health condition ($p = 0.001$), satisfaction ratings of tooth appearance ($p = 0.030$) and pain ($p < 0.001$). The use of frequency or severity scales separately or combined exhibited similar and acceptable validity and reliability; however, the frequency scale alone had the highest Cronbach's alpha value (0.876), while use of both frequency and severity scales was best for inter–item correlations (0.552-0.714).
Conclusion: The translated version of the Child–OIDP measure is a valid and applicable tool in a rural community. Use of either the frequency or severity scale of this version of Child–OIDP is valid, cross-culturally adaptable and recommended.

Keywords: *Child, community, child–OIDP, quality of life, reliability, rural, validity*

Résumé
Contexte: L'utilisation de l'impact oral sur les performances quotidiennes de l'enfant (IOPQ-enfant), l'une des mesures de qualité de vie les plus utilisées pour les enfants, dans les communautés rurales nécessitera une adaptation croisée de la mesure puisque les communautés rurales en Afrique ne sont pas en très peu manière influencé par les normes et les valeurs culturelles en vigueur. L'objectif de cette étude était d'évaluer l'applicabilité de la mesure auto-administrée de l'IOPQ-enfant dans une communauté rurale au Nigéria.
Méthodes: Une étude transversale a été menée auprès de 403 collégiens à Igboora, Nigeria, en utilisant un questionnaire auto-administré IOPQ-enfant traduit dans la langue locale.
Résultats: L'âge moyen des participants à l'étude était de 12,4 (± 0,7) ans. L'impact de la santé bucco-dentaire sur leurs scores de performance quotidienne variait de 0 à 66. Les scores supérieurs de l'IOPQ étaient significativement associés au besoin perçu de traitement dentaire ($p < 0,001$), aux notes de satisfaction de l'état de santé bucco-dentaire ($p = 0,001$), aux notes de satisfaction de l'apparence de la dent ($p = 0,030$) et la douleur ($p < 0,001$). L'utilisation d'échelles de fréquence ou de gravité séparées ou combinées présentait une validité et une fiabilité similaires et acceptables; cependant, l'échelle de fréquence seule avait la valeur alpha la plus élevée de Cronbach's alpha (0,876), tandis que l'utilisation des échelles de fréquence et de gravité était meilleure pour les corrélations inter-item (0,552-0,714).
Conclusion: La version traduite de la mesure d'IOPQ-enfant est un outil valide et applicable dans une communauté rurale. L'utilisation de l'échelle de fréquence ou de gravité de cette version d'IOPQ-enfant est valide, inter-culturellement adaptable et recommandée.

Mots-clés: *Enfant, communauté, IOPQ-enfant, qualité de vie, fiabilité, rural, validité*

Introduction

The Child–OIDP is one of the most commonly used Oral Health Related Quality of life ($OHRQ_OL$) measures for children world-wide [1-9]. This measure assesses the self-perceived oral health status of children and how it impacts on their daily performances. It is a useful tool in the planning of oral health programmes as well as in the monitoring and evaluation of such programmes [4]. $OHRQ_OL$ measures are also used to complement normative

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needs assessment as they provide the advantage of taking into consideration the individual's views of personal oral health needs and how it affects daily activities. In addition, they take into cognizance the social, psychological and the functional aspects of the effect of oral health [4]. The Child–OIDP has the advantage of being short, easy to administer and measures behavioral impacts on the quality of life. The original version of the Child–OIDP was developed in English and validated among Thai children [10]. Since then, it has been validated in several countries and found applicable in these countries, assessing the self-perceived needs of children and the impacts of oral health on their quality of life [1-3,5-15]. Nonetheless, the Child–OIDP has not been validated among children in resource challenged rural regions of developing countries like Nigeria where children have been noted to have poor oral hygiene and live with high unmet dental needs [16]. Promotion of oral health among children in these communities is therefore of paramount interest, which will only be meaningful if the impact of their oral health on daily activities is assessed using measures such as Child–OIDP along with normative evaluation needed in planning and evaluation of such programmes.

Utilization of the Child–OIDP in such communities will require cross adaptation of the measure since rural communities in Nigeria are in no small way influenced by the prevailing cultural norms and values. Therefore, introduction of a new instrument developed from an environment with a different cultural lifestyle as well as language will necessitate cross-cultural adaptation of that instrument [17]. As such, it is essential to validate this measure, determine its applicability in terms of its reliability and validity before utilization.

Furthermore, the peculiarity of this region as regards resource constrain and lack of personnel requires consideration of the self-administered version of this questionnaire as well as evaluation of the individual frequency and severity scale along with the combined use of these scales. If found applicable, the sole use of the individual scales of the Child–OIDP will further lessen the cost of its administration. The aim of this study, therefore, was to determine the applicability of the Child–OIDP questionnaire in a Yoruba speaking rural Nigerian community.

Materials and methods

The study, a cross sectional survey, was conducted between September and December 2014 in Igboora, Southwestern Nigeria. Igboora is a rural community, within the Ibarapa Central Local Government Area (LGA) of Oyo State, Nigeria. The study participants were 403 first year junior secondary school students (7^{th} grade equivalent) aged 10 to 13 years attending three public and three private schools that were selected using systematic random sampling technique from the lists of schools in the town. Students aged 10 to 13 years were recruited because they are young adolescents for whom the original version of the child-OIDP index was developed and validated [10]. A minimum sample size of 384 students was estimated to be adequate to power the study using the Kish-Leslie formula for cross-sectional studies [18] with a prevalence of 50%, a precision (d) of 5% and confidence interval of 95%. After selecting the schools, using systematic random sampling technique, all the students in the selected schools in the first year of junior secondary who were aged between 10 and 13 years were then approached for the study.

The study was approved by the Oyo State Ethics Review Board. Permission and approval for the study was also obtained from the Local Inspectorate of Education of the Ibarapa Central LGA and the head teachers of the various schools involved in the study. Negative consent was sought from parents of the participating students and positive consent obtained from each student before participation in the study. Only students who understood Yoruba language, could read and write it and who consented to participate in the study were recruited. Excluded from the study were: students with language barrier; students whose oral examinations might be difficult such as those who might not open their mouths properly for a complete oral examination e.g. due to temporomandibular joint ankylosis; or those with mental disability.

Data collection

The students had intra oral examination to determine their dental needs and completed the questionnaire under supervision in their various classes. Two dentists blinded to the aim of the study supervised the filling of the questionnaires. The principal of each school allocated a teacher to each participating class to assist with the organization of the study. The students with oral complaints were referred appropriately for treatment.

Instrument of measure and its cross-cultural adaptation

Data were collected using self-administered translated Yoruba Child–OIDP questionnaires. The self-administration of the Child–OIDP has been found comparable with the original interviewer

administered version [19,20]. For this study, the original English version of the Child–OIDP, which consists of questions on the impact of oral health on eight daily performances within the preceding three months, was used. The daily performances were: difficulty in eating and enjoying food, speaking and pronouncing words, cleaning teeth, sleeping and relaxing, emotional stability, smiling and showing teeth, studying and social contacts. The Child–OIDP was quantified on a response frequency scale and severity scale graded from "0 to 3". Each performance score was calculated by multiplying the frequency score with the severity score and a total score generated by the sum of the eight performance scores, with a minimum score of 0 X 0 X 8 = 0 and a maximum of 3 X 3 x 8 = 72. A standardized score was obtained for each participant by dividing this calculated total score by 72 and multiplying it by 100 to give a percentage score that ranged from 0 to 100. A total frequency score and severity score for each performance was also calculated by additive method to determine and compare the reliability of each of these components of the Child–OIDP scale if used singly.

Two experts well versed in English and Yoruba languages translated this English version of the Child–OIDP into Yoruba language. A different dentist who did not have any understanding of the objectives of the study then back translated the Yoruba questionnaire into English language. The translating team modified minor changes found accordingly. A pilot survey was conducted among 20 students who did not participate in the final study; discussion was held with them to ascertain the face validity and the feasibility of self-administration of the questionnaire without employing picture aids that was used in the first validation of the instrument among Thai children [10]. The face validity evaluates if the instrument of measure is actually assessing what it sets out to measure. The content validity on the other hand determines the extent to which the instrument or tool is addressing the subject of concern by a team of professionals. A team of dentists working in the community and community health assistants determined the content validity of the questionnaire.

Additional questions included in this questionnaire were on the satisfaction ratings of oral health, which asked if the children were satisfied with the present condition of their teeth and on satisfaction ratings of teeth appearance, which asked if the children were satisfied with the present appearance of their teeth; both with responses on a Likert scale ranging from "very satisfied to very dissatisfied". Other information sought included: presence or absence of pain and perceived need for treatment assessed by asking the children "Do you need dental treatment?" and the response options were "yes," "no" or "don't know". These questions evaluated the subjective ratings of oral health and since no gold standards existed for assessing the criterion validity of quality of life measures, these questions were used as "proxy" to determine the construct validity of the questionnaire.

The discriminate validity is the ability of an instrument to distinguish between those with oral conditions or unmet dental needs and those without such conditions. This was determined by the association between dental needs and Child–OIDP scores. Dental needs were assessed as present or absent, evaluated by intraoral examination conducted by a trained and calibrated dentist who examined each participant's mouth according to the basic oral health survey methods. Examination was done with the pupil seated upright on a chair and natural lighting served as the source of illumination. Unmet dental need was recorded when there was presence of untreated dental caries, untreated fractured teeth, periodontal disease, oral ulcer and malocclusion, which was assessed with the index of orthodontic treatment need. Those without these oral conditions or who required oral instruction and motivation only were considered as not having dental needs. The reliability of the questionnaire was determined using the test retest reliability of randomly selected students reassessed a week after the initial administration of the questionnaire. The internal consistency and corrected inter item correlation of this questionnaire were also evaluated.

Data management and analysis

The reliability of the Child–OIDP was analyzed using the Cronbach's alpha coefficient, intra class coefficient, item total and inter-item correlation. The test retest reliability was assessed using Kappa statistics. Construct validity was evaluated by testing for the association between the OIDP scores and the perceived need for treatment, pain and satisfaction ratings of oral health using Mann Whitney statistics. For this purpose; the satisfaction ratings of oral health was dichotomized; with "very dissatisfied", "dissatisfied" and "neither dissatisfied nor satisfied" in a group and "satisfied" and "very satisfied" in another group.

Results

In the study, 410 students were approached for recruitment and 403 consented to participate in the

study i.e. a response rate of 98.3%. The mean age of the study participants was 12.4 (Standard Deviation = 0.70) years and 207 (51.4%) were females. The majority 385 (95.5%) was of the Yoruba ethnic group, the predominant ethnic group in the community; 14 (3.5%) were Igbo and 4 (1.0%) were of Hausa extraction but all spoke the Yoruba language.

A total of 167 (41.4%) had at least an impact of oral health on their quality of life in the preceding three months of which 79 (38.2%) were females. The most prevalent activity affected was eating and enjoying food (Table 1). Ninety eight (24.3%) participants had an unmet dental need.

Table 1: Prevalence of oral impact on daily performances of the respondents

Child–OIDP inventory	Number	%
Eating and enjoying food	149	37.0
Speaking and pronouncing words	112	27.8
Cleaning teeth	136	33.7
Smiling	73	18.1
Relaxing /sleeping	104	25.8
Emotional stability	78	19.4
Doing school work	67	16.6
Social contact	82	20.3
At least an impact	167	41.4

Face and content validity

The face validity was good as established during the pilot survey and the main study. In addition there were no missing values for any of the questions despite the questionnaire being self-administered. The content validity as determined by the dentists and the community health assistants showed that each of the translated questions was appropriate and actually measured what it set out to assess.

Construct validity

The total Child–OIDP scores correlated significantly with the satisfaction ratings of oral health condition and teeth appearance and pain. Children with pain had higher OIDP scores than those without pain ($p < 0.001$). Similarly, those who were very dissatisfied, dissatisfied, or neither dissatisfied nor satisfied with the condition of their teeth had higher OIDP scores ($p < 0.001$). In addition, a higher proportion of children who perceived a need for dental treatment reported an impact on their daily performances compared with those who did not perceive a need for treatment, $p < 0.001$ (Table 2). The frequency and severity scales analyzed singly also similarly correlated significantly with the satisfaction ratings of oral health condition and teeth appearance, and pain in the expected direction ($p < 0.005$).

Discriminate validity

The combined scale was able to distinguish between those with unmet normative dental needs and those without dental needs. Those with unmet dental needs had more impacts on daily activities compared with those with no dental needs $p < 0.001$. The use of the frequency scale and severity scale, singly, also showed this significant relationship $p < 0.001$.

Reliability

Frequency scale

Assessing the corrected inter-item correlation of only the frequency scale gave a Cronbach's alpha value of 0.876. The inter-item correlations matrix ranged from 0.293 (eating and enjoying food) to 0.592 (studying and emotional stability). The corrected inter-item correlation ranged from 0.584 (eating and

Table 2: Relationships between satisfaction ratings of oral health, perceived need for treatment, pain, unmet dental need and standardized Child–OIDP scores

Variable	Categories	OIDP Scores			
		Median	U**	Z	p value
Satisfaction with teeth appearance	Satisfied	0.0	18446.0	-2.16	0.031*
	Dissatisfied	3.0			
Satisfaction with present condition of teeth	Satisfied	0.0	17329.5	-3.44	0.001*
	Dissatisfied	2.5			
Presence of pain	No	0.0	6266.0	-6.98	0.001*
	Yes	2.0			
Perceived need for dental treatment	No	0.0	13928.0	-4.83	< 0.001*
	Yes	2.3			
Unmet dental needs	No	0.0	10433.5	-5.27	<0.001*
	Yes	2.0			

* – Statistically significant, ** – Mann-Whitney U Test

enjoying food) to 0.684 (studying). The intra class coefficient was 0.875.

Severity scale

Assessment of reliability of the sole use of the severity scale gave a Cronbach's alpha value of 0.841. The inter-item correlations matrix ranged from 0.270 (sleeping and speaking) to 0.574 (contact and smiling). The corrected inter-item correlation ranged from 0.497 (sleeping) to 0.626 (eating). Intra class coefficient for the severity scale was 0.830.

Table 3: Correlations between items in the combined frequency and severity scales

Child–OIDP inventory	Correlation between items	p value
Eating and enjoying food	0.603	<0.001
Speaking and pronouncing words	0.574	<0.001
Cleaning teeth	0.578	<0.001
Smiling	0.399	<0.001
Relaxing /sleeping	0.583	<0.001
Emotional stability	0.456	<0.001
Doing school work	0.428	<0.001
Social contact	0.482	<0.001

Table 4: Corrected inter-item correlations of the Child–OIDP inventory

Child–OIDP inventory	Corrected item–total correlation			Alpha if item deleted		
	FS	F scale	S scale	FS	F scale	S scale
Eating and enjoying food	0.627	0.584	0.626	0.834	0.865	0.804
Speaking and pronouncing	0.552	0.642	0.540	0.843	0.858	0.818
Cleaning teeth	0.568	0.592	0.526	0.840	0.864	0.819
Smiling	0.659	0.655	0.497	0.835	0.858	0.821
Relaxing /sleeping	0.610	0.673	0.572	0.835	0.855	0.812
Emotional stability	0.714	0.666	0.595	0.822	0.856	0.809
Doing school work	0.582	0.684	0.597	0.842	0.854	0.815
Social contact	0.566	0.588	0.605	0.840	0.864	0.808
Standardized Cronbach's alpha				0.864	0.876	0.841

FS – Frequency and severity scale multiplication, F – Frequency scale only calculated by additive method, S – Severity scale only

Combined use of frequency and severity Child–OIDP scales

The standardized Child–OIDP score gave a Cronbach's alpha value of 0.864 and the items correlated significantly to the others (Table 3). The inter-item correlations matrix ranged from 0.276 (contact and cleaning) to 0.714 (sleeping and emotional stability). The corrected inter-item correlation (Table 4) ranged from 0.552 (speaking) to 0.714 (emotional stability). The intra class coefficient was 0.854. The test retest reliability gave a kappa score of 0.81.

None of the deleted Child–OIDP items generated a Cronbach's alpha score greater than the standardized Cronbach's alpha score when the frequency, severity and both scales together were considered (Table 4). This showed that each item was important for the questionnaire. Likewise the inter item correlation scores showed homogeneity of the items when any of the scales was used singly or in combination.

Discussion

The present study is the first to determine the applicability of the Child–OIDP in a Yoruba speaking as well as rural community. In addition, this study evaluated the use of self-administered version of the Child–OIDP in a population-based sample in a resource challenged setting. This is notable as this version of the Child–OIDP helped in cost reduction since there was no need for interviewers and time was also saved. The results from this study showed that the Yoruba version of the Child–OIDP has acceptable psychometric properties with good validity and reliability. The face and content validity of the Child–OIDP was found acceptable. The construct validity of the Child–OIDP showed that children with oral impacts on their daily activities more often had pain and were less satisfied with their oral health condition or appearance of their teeth and perceived a need or treatment. This has been documented previously [9] showing that these measures are significantly related. The ability of the Yoruba version of Child–OIDP to be able to distinguish between those with normative dental

needs and those with no dental needs was also established, providing added value for this instrument. The discriminative property of Child–OIDP being able to distinguish between those with clinical oral conditions has been documented by others [7,14].

The outcome of evaluating the reliability of the combined frequency and severity scales of the Child–OIDP showed that all the items in the index correlated significantly, likewise the internal consistency gave a Cronbach's alpha score of 0.86, which is above the recommended value of 0.7. This Cronbach's alpha value was comparable to, although slightly higher than, those reported by other authors [7,9,15]. Deleting any of the component items did not result in lowering the Cronbach's alpha value in the present study, thus reflecting the importance of all the items in the instrument.

The use of either the frequency scale or the severity scale individually yielded a Cronbach's alpha value of 0.88 and 0.84 respectively, which is also above the recommended 0.7. Similarly, deletion of any of the items in the severity or frequency scales when used singly did not result in lowering of the Cronbach's alpha value. This therefore shows that either the frequency or severity scale may be utilized to assess the oral health related quality of life of children, with the frequency scale appearing to be a better instrument based on the findings of this study. This was similarly observed in adults with the frequency component of the OIDP measure [17].

This finding will also be of enormous benefit in similar environments where resources for oral health care are limited coupled with the need to plan an effective intervention, which will require assessment of oral health and how it impacts on daily activities. The use of the single scale Child–OIDP will go a long way in assisting oral health researchers in this environment in terms of cost and time saved, which will translate to less financial burden and fewer personnel required. The corrected inter-item correlation ranged from 0.28 to 0.5, which is above the recommended 0.2. The Yoruba version of the Child–OIDP is a stable instrument, evidenced by the good test-retest reliability.

The results revealed that 41.4% of the respondents in this study had at least an impact of oral health on their daily activities as similarly reported by Yusuf et al., [9], however, the values here are lower than reported in Albania [7] and Tanzania [21]. The differences in the prevalence of impact on oral health related quality of life has been attributed to variations in and distribution of diseases across the globe as well as cultural variations [9]. Eating and enjoying food was the most often reported activity impacted upon by oral health status. Castro *et al.*,[3] have similarly reported this. The value associated with eating, as a major function of the mouth and teeth, is possibly responsible for this finding.

The Yoruba version of the Child-OIDP can be utilized in regions of the world, such as in West Africa and where there are immigrants with roots in the region, where Yoruba is a language spoken by the inhabitants. The strength of the present study included selection of a representative sample using a probability sampling technique, in addition to both private and public schools within the community being sampled, thus involving the two major school types that exist in the country.

In conclusion, the translated version of the Child–OIDP measure is a valid and applicable tool in a Yoruba speaking rural community. Use of either the frequency or severity scale of this version of Child–OIDP is valid, cross-culturally adaptable and recommended.

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