Assessment of Psychometric Properties of Malayalam Version of COIDP Questionnaire

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Abstract
Purpose : *The purpose of this study was to assess the psychometric properties of the Malayalam version of COIDP questionnaire.*
Materials and methods: *The present study was conducted at the Department of Pedodontics and Preventive Dentistry, Government Dental College, Thiruvananthapuram. 70 children between 6-11 years of age in the mixed dentition stage who had untreated dental caries on examination participated in the study. The impact on Oral Health Related Quality Of Life (OHRQoL) was assessed by the Malayalam version of COIDP questionnaire (m-COIDP).. The psychometric properties of the COIDP were evaluated in terms of face, content and convergent validity in addition to internal consistency, inter observer and test-retest reliability.*
Results : *The Malayalam version of COIDP questionnaire had excellent interobserver (ICC = 0.988) and test retest (ICC = 0.996) and good internal consistency reliability (Cronbach's alpha = 0.546). It had good face, content and convergent (Spearman's rho = 0.718, p value = 0.0001) validity.*
Conclusion : *The Malayalam version of the C-OIDP questionnaire adequately demonstrated successful psychometric properties and, therefore, is a valid and reliable instrument for measuring the OHRQoL in children.*
Keywords : *COIDP questionnaire, Malayalam version, OHRQoL, psychometric properties*

I.   Introduction

In the preamble of its constitution, the World Health Organization (WHO) states "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity." The shift in the perception of health from merely the absence of disease and infirmity to complete physical, mental, and social well-being happened in the second half of the 20th century. This resulted in the conception of health related quality of life (HRQOL) and subsequently oral health related quality of life (OHRQOL).   The   concept of "OHRQOL" captures the aim of new perspective i.e., the ultimate goal of dental care mainly good oral health. According to the US Surgeon General, oral disease and conditions can "…undermine self-image and self-esteem, discourage normal social interaction, and cause other health problems and lead to chronic stress and depression as well as incur great financial cost. They may also interfere with vital functions such as breathing, food selection, eating, swallowing and speaking, and with activities of daily living such as work, school, and family interactions"[1] In literature, a number of OHRQoL measures have been developed to assess and describe the oral impacts on people's quality of life. Five of these instruments were designed to assess the OHRQoL in children specifically. These include the following questionnaires: Child Perception Questionnaire (CPQ11-14), the Michigan OHRQoL scale, the Child Oral Health Impact Profile (Child-OHIP), the Early Childhood Oral Health Impact Scale (ECOHIS) and the Child Oral Impact on Daily Performance (Child-OIDP). In line with the WHO's International Classification of impairments, disabilities and handicaps , the Child-OIDP focuses on measuring the ultimate impacts of disabilities and handicaps thus capturing more proximal and intermediate impacts such as pain, discomfort, functional limitation and dissatisfaction with appearance. [2]   The   Child OIDP was developed by *Gherunpong et al* from The Oral Impact on Daily Performance (OIDP) index in 12 year old Thai children. OIDP was the latest developed socio-dental health indicator in 2000. It claimed to overcome some of the disadvantages of other indicators and cover all major qualifications of an index, namely, that the index should be brief and easy to use, have an appropriate scoring system and be supported by a relevant theoretical model. The development of the OIDP index was based on the theoretical model of oral health consequences.[3]

Though Child - OIDP have been translated and adapted to different languages and sociocultural contexts, it has not been adapted and validated for use in Kerala. In the current study, the objective was to evaluate the reliability and validity of Malayalam version of Child OIDP.

II. Methods

2.1 Study design

The study was conducted at the Department of Pedodontics, Government Dental College, Trivandrum. Permission from the Institutional Ethics Committee was obtained prior to the conduction of study(IEC/R/24/2015/DCT/dtd1/12/2015). Verbal and written informed consent was obtained from parents or caregivers of the child. Assent from the child was also obtained.

2.2 Participants :

Children aged between 6-11 years who were in the mixed dentition stage and those who reported to the tertiary dental health care centre, Government Dental College, Thiruvananthapuram having untreated dental caries for the past six months were the sampling units.

2.3 Measures :

C-OIDP is a socio-dental health indicator measuring the social effect of dental conditions based on the theoretical model of oral health consequences. The questionnaire consists of 8 questions to assess the daily performances(eating, speaking, cleaning, relaxing, emotion, smiling, school work and contact) due to untreated dental cariesThe Malayalam version of C-OIDP(m-C-OIDP) questionnaire was derived by translating the tool from the English version and back translating the same by another person well versed in both Malayalam and English. Then, the Malayalam version was revised through a consultation process involving the principal investigator. The Malayalam version thus obtained was back translated by another bilingual person well versed in both languages. This back translated English version was compared with the original English version. A series of pre-tests was conducted among colleagues to refine the wording of items and to assess the comprehensibility of the tool and also to obtain peer review and respondent's review. The questions were administered and the participants were asked to rate both the severity and the frequency of their oral impact. The recall period was three months and was scored on a four-point Likert scale.[Table 1]

Daily performances	Severity (s)	Frequency (f)
1.Are you having difficulties in eating(biting, chewing)?How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
2. Are you having difficulties with speech or word pronunciation? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
3. Are you having problems washing your mouth due to mouth related issues? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
4.Have you had sleepless nights due to toothaches or other mouth related issues? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
5.Did you feel ill because of problems inside your mouth? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
6. Do you avoid smiling or showing your teeth because of problems inside your mouth? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
7. Have toothaches or other mouth related problems ever prevented you from attending schools? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3
8. Have your problems with teeth prevented you from meeting your friends or from other social activities? How often, during the past 3 months, have you encountered these difficulties?	None at all-0 Very little-1 Pretty much-2 Quite a lot -3	None at all-0 Very little-1 Pretty much-2 Quite a lot -3

Table 1 showing COIDP questionnaire

The calculation of the index involves the multiplication of the severity and frequency of each performance. A sum is made of the values obtained for the eight performances, resulting in a number from 0 to 72, which is divided by 72 and then multiplied by 100, so that the final Child-OIDP score varies from 0 to 100.

$$\text{COIDP Score} = \frac{\text{Total Impact Score}}{72} \times 100$$

2.4 Procedure

m-C-OIDP questionnaire was administered to 6-11 year old children who reported to Government Dental College, Trivandrum who had untreated dental caries on clinical examination (total 70) to determine the feasibility of the study and to check for finer refinement of the tool. It was also done to check the inter observer and test retest reliability of m-C-OIDP questionnaire. Global Oral Health Question (GOHQ) was also dministered to the patients to assess self perceived oral health related quality of life to compare the results of COIDP questionnaire and to find its convergent validity. The responses were scored on a 5 point scale.[Table 2]

How do you rate your oral health related quality of life?
1 -very good, 2 -good, 3 -fair, 4 - poor, 5 - very poor

Table 2 showing Global Oral Health Question

2.5 Statistical Analysis

Data was tabulated using Microsoft Excel 2007. Statistical analysis was done using SPSS 16.0 version. Test retest reliability and inter observer reliability of the m-C-OIDP was determined with the help of intra class correlation coefficient (ICC). The internal consistency reliability of m-COIDP was tested by Cronbach's alpha test. Convergent validity of m-COIDP and GOHQ was assessed by Spearman's correlation.

III. Results

The Malayalam version of questionnaire was tested for its inter observer , test retest and internal consistency reliability. Inter observer reliability was analyzed by Intra class correlation (ICC). The value was found to be 0.988, which was excellent. Similarly, test retest reliability was also analyzed by Intra class correlation (ICC). The value was found to be 0.996, which was excellent. Internal consistency reliability was analyzed by Cronbach's alpha. The value was found to be 0.546, which was acceptable.The face validity of the Malayalam version of COIDP was assessed by a panel of experts in the field of Pediatric Dentistry. Based on the changes proposed by the subject experts, the wordings were changed slightly. With regard to content validity, the panel of experts gave a favourable evaluation of the questionnaire contents, its thematic areas and its ease of understanding for the mentioned children's ages. Convergent validity takes two measures that are supposed to be measuring the same construct and shows that they are related. For this Global Health Question was also included in the questionnaire which measured patient's self percerption on OHRQoL. The correlation between COIDP scores and GOHQ score were analyzed using Spearman's Correlation. It was found to be 0.718, which was significant,(p value = 0.0001) and thus good correlation between COIDP scores and GOHQ scores establishes convergent validity.

IV. Discussion

The COIDP is short, easy to administer, less time consuming and well tolerated by children. The recall period for recording impacts is 3 months which can be easily remembered by children. It is the only questionnaire which measures both frequency and severity of impacts. It covers most of the affected daily activities of children. Of all the available OHRQoL measures, C-OIDP inventory has the ability to provide information on condition-specific impacts whereby the respondent attributes the impacts to specific oral conditions or diseases.[4] It has been found to be a valid and reliable index among children in Thailand [5], France[6], Brazil[7], UK[8], Tanzania[9], Italy[10], Spain[11], Malaysia[12], Chile[13], Israel [14]. Its use in different countries and age groups is advocated. In order to validly use the instrument in Kerala, it is important to investigate its psychometric properties of Malayalam version of COIDP. One of the objectives of this study was to evaluate the psychometric properties of the Child-OIDP for use among children in Kerala.The present study showed that the Malayalam version of Child-OIDP index has excellent reliability and excellent validity among a sample of 6 –11 year-old children in Trivandrum, thus indicating its applicability for child populations of similar ages in Kerala. Inter observer reliability assess the degree to which different raters/observers give consistent estimates of the same phenomenon. 2 observers administered the same questionnaire to the children at a time difference of 30 minutes. The results were analyzed by Intra class correlation (ICC). The value was found to be 0.988, which showed excellent inter observer reliability, ie it was stable among raters. Inter observer reliability of COIDP has not been tested in studies conducted till date.Test retest reliability assess the consistency of a measure from one time to another. To obtain this value the Malayalam version of the questionnaire was administered to children twice, the second time spanned over 2 weeks by the same observer. The results were analyzed by Intra class correlation (ICC). The value was found to be 0.996, which was excellent. This result gave a higher value

compared to other validation studies of the Child-OIDP [6,8,9,15]. Thus it can be used by any trained person, and not only a dentist, in public health programs as a sociodental indicator of oral health. Internal consistency reliability is a measure of how well the items on a test measure the same construct or idea. It was analyzed by Cronbach's alpha. The value was found to be 0.546, which was acceptable. The value of the resulting Cronbach's Alpha was lower than the values obtained in validation studies of other populations, such as Spain[11] with 0.687, Brazil[7] with 0.6314, England[8] with 0.5815, France[6] with 0.5717 and Peru[15] with 0.6218. This value is dependent not only on the magnitude of the correlation among the items but also on the number of items in the scale [16]. Lower values of Cronbach's alpha can be expected from shorter scales . The Child-OIDP, which has few items (less than 10), falls into this category. Thus, a questionnaire with fewer items will be less internally consistent as each item is less relevant to the others and will result in patient scores that fluctuate more, due to random responses, in comparison to a longer instrument where a few items can be closely related (e.g. eating, drinking and chewing) and thus obtain a high value of Cronbach's alpha. Hence, it is not sufficient to simply compare Cronbach's alpha levels when looking for a reliable instrument, because the alpha level will be lower in instruments with fewer items. Higher reliability coefficients cost more than lower ones since they require more items. Children may not cooperate well with a long index. It is important that OHRQoL measures should be as brief as possible and user friendly in order to reduce the time and cost burden of researchers and children, yet capturing all the dimensions related to OHRQoL.[8] Therefore, there is no merit in increasing the number of items, with the aim of achieving higher alpha values, as this will negatively affect the applicability of the measure.[7]Validity is the extent to which a test measures what it is intended to measure. Face validity is the degree to which a procedure, especially a psychological test or assessment, appears effective in terms of its stated aims. The face validity of the Malayalam version of COIDP was assessed by a panel of experts in the field of Pediatric Dentistry. Based on the changes proposed by the subject experts, the wording was changed slightly. ontent validity (also known as logical validity) refers to the extent to which a measure represents all facets of a given construct. With regard to content validity, the panel of experts gave a favourable evaluation of the questionnaire contents, its thematic areas and its ease of understanding for the mentioned children's ages.Convergent validity takes two measures that are supposed to be measuring the same construct and shows that they are related. For this Global Health Question was also included in the questionnaire which measured patient's self percerption on OHRQoL. The correlation between COIDP scores and GOHQ score were analyzed using Spearman's Correlation. It was found to be 0.718, which was significant.(p value = 0.0001). Similarly, convergent validity was found to be significant in the study by Lazrak et al [17] who studied the crosscultural translation and adaptation of the Moroccan version of COIDP. The strength of the study is that a valid questionnaire in Malayalam was developed to assess the OHRQoL in children. Based on the findings of this study, it is imperative that dental researchers, policy makers and practitioners can they come out with a much improvised comprehensive oral health policy to address the oralhealth problems of the masses in our country.

Limitations of the present study include that it was a cross-sectional study and focused only on the children attending a tertiary health care centre, who may be having more consequences of untreated dental caries as well as poor OHRQoL. Findings from this study must be considered preliminary because of the small sample size the and results cannot be generalized to all.

V. Conclusion

This study has shown that the Malayalam version of Child-OIDP had excellent reliability and validity. Oral health-related quality of life measurements are aimed at complementing clinical indicators, which are useful in moving the focus of provision of health services to patient's perceived needs and quality of life. This is particularly important in children as their experiences in early life may influence their future attitudes and behaviours.

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