ORIGINAL ARTICLE

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Adaptation and validation of Child Oral Impact on Daily Performance index in 11-14-year-old Chilean school children.

Abstract: The health condition of a population is often rated through clinical indicators. However, the psychological and social impact of diseases on quality of life has been noticed of late. Objective: to adapt, in cultural terms, the Child- Oral Impact on Daily Performance (C-OIDP) questionnaire in its self- administered form and evaluate its psychometric properties among Chilean teenagers aged 11-14 from the city of Licantén, Chile, in 2013. Methodology: A cross-sectional study on scales validation. Face validity was determined by experts opinion, criterion validity by correlation with measures of self-rated health and dental treatment needs, internal consistency using the Cronbach's alpha, and temporal stability using the intraclass correlation coefficient (ICC) for test- retest within a 10-day window. The sample consisted of 203 students aged 11 to 14 years from the urban sector of Licantén city. Results: Five experts determined proper face validity of the C-OIDP scale. Regarding criterion validity, statistically significance association (p<0.05) were found, positive for treatment need and negative for oral health satisfaction. Internal consistency scale showed an alpha = 0.719, all items showed correlations of 0.32 to 0.54 with the rest of the scale. The temporal stability gave an ICC=0.82. . Conclusion: the cultural adaptation of the self-administered C-OIDP questionnaire for Chilean students aged 11 to 14 years showed adequate psychometric properties, so it is a valid and reliable instrument to measure the oral health impact on quality of life in this population. Keywords: "Quality of life"[MeSH], "Oral Health"[MeSH], "Adolescent"[MeSH], "Reproductibility of results"[MeSH], "Chile"[MeSH].

Adaptación y validación del índice Child Oral Impact on Daily Performance en escolares chilenos de 11 a 14 años.

Resumen: Tradicionalmente el estado de salud oral de una población es evaluado mediante indicadores clínicos. Sin embargo, se ha venido reconociendo la importancia del impacto psicosocial de las enfermedades en la calidad de vida de la población. Objetivo: Adaptar culturalmente el cuestionario Child- Oral Index Daily Performance (C-OIDP) en su versión auto-administrada y evaluar sus propiedades psicométricas en adolescentes chilenos de 11 a 14 años de la ciudad de Licantén, año 2013. Metodología: Estudio de validación de escalas. Se determinó validez de fachada mediante opinión de expertos; de criterio mediante correlación con medidas de autopercepción de salud y necesidad de tratamiento; consistencia interna mediante Alpha de Cronbach; y estabilidad temporal mediante el coeficiente de correlación intraclase (ICC) para test-retest en un intervalo de 10 días. La muestra estuvo constituida por 203 escolares de 11 a 14 años del sector urbano de la ciudad de Licantén. Resultados: Cinco expertos determinaron una adecuada validez de fachada de la escala C-OIDP. Se hallaron correlaciones estadísticamente significativas (p<0,05), positivas para necesidad de tratamiento y negativas para autosatisfacción con estado de salud bucal. La consistencia interna de la escala mostró un alpha=0,719, todos los ítems presentaron correlaciones de 0,32 a 0,54 con el resto de la escala. La estabilidad temporal mostró un ICC=0,82. El C-OIDP mostró un promedio de 0.9704±0.89. Conclusión: La adaptación cultural del cuestionario autoadministrado C-OIDP para escolares chilenos de 11 a 14 años demostró propiedades psicométricas adecuadas, por lo que representa un instrumento válido y confiable para medir el impacto de la salud bucal sobre la calidad de vida en esta población. Palabras clave: Calidad de vida, salud bucal, adolescente, reproducibilidad de resultados, Chile.

Introduction.

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social wellbeing and not merely the absence of infirmity or disease"[1]. Traditional methods of dental health assessment are not able to create a live image of how oral health problems affect the daily life of people. They only give a superficial view of the real need for treatment[2].The idea of "quality of life" has been recently

expanded, and improving it has become an objective of good practices of health promotion and disease prevention[3, 4].

The current concept of oral health requires the inclusion of psychosocial aspects, such as those related to quality of life, which, in contemporary society, is closely related to human relations[5, 6]. Research in the area has developed the concept of "Oral Health related Quality of Life" (OHRQoL), which includes factors

that fall into four categories: functional factors, psychological factors, social factors and the existence of discomfort or pain[7].

The concept of OHRQoL refers to the impact that oral health or disease has on the daily activities of individuals. Various measuring instruments of OHRQoL are used, preferably for adults or an older population, to assess the impact of oral problems, such as the Oral Health Impact Profile (OHIP)[8, 9] and the Geriatric Oral Health Assessment Index (GOHAI)[10, 11]. Some authors have adapted and developed these instruments to apply them on children and adolescents[7, 12].

One of the measurements developed specifically for children is the Child-Oral Impact on Daily Performance (Child-OIDP). This instrument for relating oral health and quality of life was created by Gherunpong, Tsakos and Sheiman in 2004[13]; its goal is to allow planning according to the assessment of the needs of children. It has 8 dimensions that assess the impact of oral health on the daily activities of children[1]. There are two methods for conducting the survey: by individual interview and self-administration. Recently, it was found they both behave similarly, so that the self-administered version is preferred as it allows for the optimization of time[14]. The C-OIDP survey was developed in English[15], then validated in Thailand[16], and more recently in other countries[7, 14, 17, 18].

In Chile, there are currently no such validated instruments that can be applied safely in a school population, which is an obstacle for the development of this line of research in this community. The objective of this research was to adapt, in cultural terms, the self-administered version of the Child-Oral Impact on Daily Performance (C-OIDP) questionnaire and evaluate its psychometric properties among Chilean teenagers aged 11-14 from the city of Licantén, Chile.

Materials and methods.

Design: A cross-sectional study on scales validation was made.

Adaptation of the Spanish version of the C-OIDP: Was conducted a cultural adaptation of the Spain validated version of the self-administered C-OIDP questionnaire of Martinicorena *et al*[7]. Some words had to be modified from the original version to carry out an accurate cross-cultural adaptation of the questionnaire.

The modification of the questionnaire was made, in the first instance, by a group of 5 experts in odontopediatry and public health, with research experience in their respective areas. Subsequently, the first adapted version was used in a pilot study with a focus group of 15 randomly selected students, considering both, men and women, aged between 11 and 14; the questionnaire was applied by two members of the research team. The pilot study helped to make some changes that improved the understandability of some words used in the questionnaire.

Application of the C-OIDP Survey: The sample consisted of all school children from 11 to 14 years old from the city of Licantén. Just the public school and high school "Augusto Santelices Valenzuela" had 11 to 14 years old students. The exclusion criteria were: students who were outside the age range, those without a signed informed consent and those who did not wish to participate in the study. Prior to the implementation of the survey, we requested the approval of the schools' headmasters to work within their institutions and asked the legal guardians of the pupils to sign a consent form authorizing their participation.

The C-OIDP questionnaire was administered to 203 students aged 11 to 14, from the public School "Augusto Santelices Valenzuela" in Licantén city, Maule Region, Chile, during the last week of September 2013, including students from the 5th grade of elementary school to the 1st year of high school.

The questionnaire was administered in the classrooms, with previous instructions and guidance provided by one of the researchers. The students had the possibility to ask clarifying questions regarding the survey, and when they returned it a researcher oversaw that all questions were properly completed. The C-OIDP survey consisted of two parts: first, a list from which the students were asked to select all the oral problems they had experienced during the last three months. In the second part, the students were asked to indicate whether their oral problems had an impact on 8 activities of their daily life. These activities included eating, speaking, cleaning mouth, sleeping, maintaining the emotional status, smiling, studying and social contact. In the event that a child manifested an impact on any of these eight daily activities, he had to answer questions on the severity and frequency of the specific impact, using a score of 1-3 for each of them. When no impact was reported, the activity received a score of "zero".

Index calculation involves multiplying frequency by severity for each activity, and summing these scores, which results in a number from 0 to 72, which is divided by 72 and multiplied by 100 and thus the final C-OIDP score varies from 0 to 100.

In addition to applying to the students the self-administered version of the C-OIDP, they were asked to complete a self-perception questionnaire of oral and general health for subsequent criterion validity: self-perceived oral health status (from "very good" to "very bad"), satisfaction with oral health (from "very satisfied" to "not satisfied"), perceived need of dental treatment ("yes," "do not know", "no") and overall

health satisfaction (from "very satisfied" to "not satisfied").

Ten days after applying the survey, 25 children were randomly selected from the total sample and the questionnaire was applied again to determine the temporal stability of the scale.

The data were tabulated in an electronic spreadsheet (MS Excel 2003, Microsoft Corporation, USA) and then analyzed using the statistical package Stata 10/SE (Stata Corporation, USA). An exploratory analysis of the data was performed, determining data distribution measures by frequency and percentage, and averages with standard deviation. For criterion validity, we used the Spearman correlation; for internal consistency, Cronbach's Alpha and Pearson correlation matrix; for temporal stability, the Intraclass Correlation Coefficient (ICC). A statistical significance of $p < 0.05$ was considered for all cases.

Results.

Based on the C-OIDP validated in Spain[7], some words were changed, and some clarifying examples were added so that it could be better understood by Chilean adolescents.

The changes in the first part of the survey were: "Toothache" was changed to "toothache or molar ache"; "moving milk tooth" to "loose milk tooth"; "broken tooth" to "cracked tooth"; "mouth sores" to "mouth ulcers", adding the clarification "canker sores, herpes or fires"; "definitive tooth/molar growing" to "definitive tooth/molar appearing"; "definitive tooth/molar removed" to "definitive tooth/molar extracted", and in "Position of teeth", the clarification "mounted, askew, protruding apart" was changed to "crooked or spaced teeth".

In the second part of the survey, activity 1: eating, when asked "in the last 3 months, have you had any trouble eating (ordinary food, ice cream) because of problems with your teeth or mouth?", the clarification "ordinary food, ice cream" was changed to "normal, hot, cold and/or hard food". In Activity 5: "Maintaining the emotional status", the word "angry" was changed to "mad", and in activity 6: "smiling", "displaying your teeth" was changed to "showing your teeth". The five members of the expert's panel found an adequate face validity of the C-OIDP scale.

A total of 207 children were invited to participate in the validation study; all delivered an informed consent signed by their guardians and only 4 students chose not to answer the survey. 203 students participated, representing a response rate of 98%, 52.7% (107) of them women and 48.3% (96) men (Table 1). All the students who participated in the study answered the survey completely.

The scale showed an internal consistency of alpha = 0.719,

Age	Female (%)	Male (%)	Total (%)
11 years-old	26.17% (28)	15.63% (15)	21.18% (43)
12 years-old	22.43% (24)	29.17% (28)	25.62% (52)
13 years-old	28.04% (30)	30.21% (29)	29.06% (59)
14 years-old	23.36% (25)	25.00% (24)	24.14% (49)
Total	52.70% (107)	48.30% (96)	100% (203)

Table 1. Sample distribution by sex and age. Licantén 2013.

Performance	Alpha if item deleted.	Corrected item-total correlation values
Eating	0.7047	0.3415
Speaking	0.6900	0.4161
Cleaning mouth	0.6880	0.4380
Sleeping	0.7115	0.3239
Emotional status	0.6623	0.5431
Smiling	0.6937	0.4693
Studying	0.6960	0.4826
Social contact	0.6786	0.5045
C-OIDP scale	-	0.7190

Table 2. Internal consistency of the C-OIDP scale adapted to chilean school children aged 11 to 14 years old.

which is considered as adequate. The correlation values of the eight items with the rest of the scale were 0.32 to 0.54, and the values of a for the elimination of each item were 0.66 to 0.71 (Table 2). This indicates that the items of the scale had homogeneity without redundancy, i.e., they are all a set of the same OHRQoL construct, each measuring a different aspect of it.

This is reinforced by the correlation matrix between all the items (Table 3), which showed only positive values, 23 of 28 statistically significant ($p < 0.05$).

In the analysis of the criterion, we found a statistically significant association ($p < 0.05$) between the 4 measures of self-perception and the C-OIDP score for the general population and the subgroup of 13- to 14-year-olds, but not in the subgroup of 11 to 12 year old children (Table 4). We obtained positive values for perceived need of dental treatment and self-perceived oral health, and negative values for oral health satisfaction. The temporal stability analysis showed an ICC of 0.82, which is regarded as high.

Item	Eating	Speaking	Cleaning mouth	Sleeping	Emotional status	Smiling	Studying	Social contact
Eating	1,0000							
Speaking	0,1751*	1,0000						
Cleaning mouth	0,3887*	0,2255*	1,0000					
Sleeping	0,2428*	0,3668*	0,1254	1,0000				
Emotion	0,2121*	0,2693*	0,3132*	0,0655	1,0000			
Smiling	0,0984	0,2565*	0,3308*	0,2430*	0,4237*	1,0000		
Studying	0,3883*	0,4615*	0,2065*	0,3965*	0,3200*	0,1590*	1,0000	
Social contact	0,1293	0,2461*	0,1851*	0,0754	0,6089*	0,4495*	0,3484	1,0000

Table 3. Inter-item correlations matrix for the C-OIDP scale adapted to chilean school children aged 11 to 14 years old.
*p<0.05

Perception	11-12 years-old	13-14 years-old	General
Self-perceived oral health	0,1015	0,2230*	0,1693*
Oral health satisfaction	-0,3035*	-0,5401*	-0,4315*
Perceived need of dental treatment	0,0948	0,4447*	0,2680*
Overall health satisfaction	0,0847	0,3523*	-0,2223

Table 4. Criterion validity. Correlations with self-perception measures.
*p<0.05.

The descriptive analysis showed an average C-OIDP of 0.97 ± 0.89, higher in women (1.12 ± 0.88) than in men (0.80 ± 0.88). The oral problems affecting children most frequently were: color of teeth (42.36%), tooth position (41.87%), sensitivity to heat or cold (35.47%), caries (27.09%) and bleeding gums (26.60%).The most affected activities in children were eating (39.9%), smiling (34.48%) and cleaning mouth (32.2%), and the least affected were studying (4.93%) and social contact (7.88%).

Discussion.

The main contribution of this study was to carefully adapt the Child-OIDP index for Chilean adolescents of 11 to 14 years of age and to assess its psychometric properties, this being the first study on quality of life related to oral health carried out in the country using this index.

Was conducted a cross-cultural adaptation of the Child-OIDP survey previously used in a validation study in Spain[7] and followed the guidelines previously used in other validation studies[13-18]. The experience of pediatric dental professionals, who knew the terms used by children regarding oral health, was important in the modification process. Although modifications were made to some words, they did not affect the content of the questionnaire but made it more understandable for students in a different cultural context.

This type of adaptation and validation procedure may imply, however, an important limitation of the study, since traditional validation is performed using the original instrument, in this case in English through translations and back-translations[7]. In this instance, this procedure had already been carried out in Spain, so was decided to take the Spanish version as base instrument and make the adaptations suggested by experts and focus groups, performing minimal changes on specific words that in any way represent major changes to the original English version and the version validated in Spain[7], showing adequate psychometric properties in all aspects.

Whenever an instrument is used in different contexts or with a different population as for which it was originally created, it is necessary to reassess its psychometric properties[20]; that is the reason why it was nec-

essary to conduct this study in Chile.

The value of the resulting Cronbach's Alpha was higher at the recommended level of 0.7 and higher than the values obtained in validation studies of other populations, such as Spain with 0.68[7], Brazil with 0.63[14], England with 0.58[15], France with 0.57[17] and Peru with 0.62[18], with the exception of Tanzania where the value was 0.77[16].

The correlation values of the eight items with the rest of the scale indicated homogeneity, but the values were not so high as to indicate redundancy of the items in the scale or too low to suggest they were part of different constructs. This is reinforced by the correlation matrix between the items, which showed only positive values, the majority of which were statistically significant. The correlation values of the items with the rest of the scale were all much higher than the recommended value of 0.2.

Regarding criterion validity, we found a statistically significant association between the self-perception measures and the Child-OIDP score for the general population. In this sense, the scale was able to differentiate those with a poor satisfaction or perception of their health, or that perceive a strong need for dental treatment, showing higher Child-OIDP scores. The lack of correlation with overall health satisfaction was predictable, considering that it is influenced by many more aspects than oral ones.

However, in the subgroup of 11 and 12 years old, the correlations were not that marked. To better understand this result, it should be considered that the instruments for assessing the quality of life related to oral health must be specific to the child's age. The cognitive, emotional, social and language changes that occur during development should be taken into account. Although this questionnaire is designed for children aged 11-14, some children of 11 and 12 years of age had difficulty concentrating when answering the questionnaire, therefore, it is suggested that when applying the self-administered survey to the youngest groups, these contain no more than 20 students, always under close supervision to clarify any questions that arise at the time and it is very important to check that all the questions are complete.

The temporal stability analysis showed an ICC=0.82, which is regarded as high and shows that the measure is stable and can be compared with other validation studies of the Child-OIPD index[7, 14, 15].

This paper validates an instrument built specifically for children. Anguita *et al*[20] concluded that adapting an instrument is preferable to developing a new one. The development of questionnaires aimed for children and adolescents is recent and has specific features, different from the development of questionnaires for adults, so it is necessary to evaluate their psychometric properties[21]. Currently, of the existing questionnaires to measure OHRQoL in children, the validity and reliability which were tested in studies, only two have been cross-culturally adapted and validated in the Spanish language[22]: ECOHIS-Early Childhood Oral Health Impact Scale for parents[23] and the Child Oral Impacts on Daily Performances Index (Child-OIDP), the latter validated in Peru[18] and Spain[7].

The information provided by a questionnaire of quality of life related to oral health allows us to know the situation of children and to consider the psychosocial impact of oral diseases on general welfare. The modern concepts of oral health suggest that it should be defined in terms of physical, psychological and general welfare, i.e., considering people as integral beings[24, 25]. For this reason, it will be possible to obtain more information if clinical data is supplemented with data obtained in psychometric tests that measure quality of life related to both generic and disease-specific health[26, 27]. As this index can be applied by any trained person, not only by a dentist, it can be used in public health programs as a sociodental indicator of oral health[28]. The importance of using measuring instruments related to quality of life and oral health is to be able to plan, develop and evaluate public policies according to the actual needs perceived by the population and not necessarily with respect to regulatory needs, taking into account what people really value and need.

In conclusion, the cultural adaptation of the self-administered C-OIDP questionnaire for 11-14 year-old Chilean school children showed adequate psychometric properties, constituting a valid and reliable instrument to measure the impact of oral health on the quality of life of this population.

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