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Adaptation and validation for Spain of the child-oral impact on daily performance (C-OIDP) for use with adolescents

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Abstract

Objectives. To linguistically and culturally adapt the Child-OIDP, an Oral Health-Related Quality of Life (OHRQoL) index, into Spanish for use among adolescents, and to validate it by evaluating the psychometric properties of the self-administered version. **Study design.** Following a forward - backward translation procedure, the English version of the questionnaire was translated by independent translators and the reconciled version was then sent to three experts for assessment. A pilot study was conducted on a sub-sample of 30 adolescents aged between 11 - 12 years to assess their understanding of the questionnaire and its wording. The participants in the main study comprised 425 school children aged from 11 to 14 and pertaining to the oral health survey on school children in Navarre; these children were given a clinical examination and answered a structured questionnaire on oral health self-perception, satisfaction and perceived dental treatment needs. We evaluated the content validity, face validity, criterion validity, internal consistency and reliability. **Results.** With regard to the face validity, the experts' opinion was that the version was adequate. The pilot study indicated minor changes to the wording to better adapt it for the target population. Regarding criterion and construct validity, the association of the C-OIDP with the self-perception variables gave statistically significant results ($p < 0.01$) in all cases. For the internal consistency analysis, no negative correlations were present in the correlations matrix nor were any of the values too high to become redundant; the majority were statistically significant ($p < 0.05$). Cronbach's alpha value was 0.68, with corrected item-total values of between 0.20 and 0.56 and with no alpha if-item-deleted values greater than 0.68. The test-retest analysis gave an intraclass correlation coefficient (ICC)=0.98. **Conclusion.** The Spanish version of the self-administered questionnaire for the C-OIDP for adolescents adequately demonstrated successful psychometric properties and, therefore, is a valid and reliable instrument for measuring the OHRQoL of adolescents.

Key words: *Quality of life, oral health, adolescents, psychometric properties.*

Introduction

Health should not be understood as the mere absence of disease or infirmity but should be considered in its wider sense as a state of complete physical, mental and social wellbeing. From a practical point of view, the ability to function was added to the definition of health, a concept proposed by Terris (1) and subsequently adopted by the WHO (2). Thus, the measurement of health must encompass much more than clinical indicators. For years, oral health epidemiological surveys have been solely centred on the measurement of clinical parameters to determine the so-called normative needs. However, as Sheiham et al. (1982) pointed out, although these clinical indicators are not only valid, but also essential, the problem arises when they are equated with treatment needs whilst, in actual fact, they are but one dimension of such needs (3).

As a result, the last few years have seen an increasing importance in the literature of a concept that has come to be called oral health related quality of life (OHR-QoL), which encompasses factors coming within four broad categories: functional factors; psychological factors; social factors and the existence of discomfort or pain (4). These same dimensions are also applied to the measurement of the OHRQoL in children and adolescents (5). The OHRQoL can be measured through questionnaires, with different methodologies (6). As far as we are aware, at present there are four questionnaires specifically directed at the child-adolescent population: the Child Perception Questionnaire (CPQ11-14) (7), the Michigan OHRQoL (8), the Child-Oral Impact on Daily Performance (C-OIDP) (9) and the Child Oral Health Impact Profile (COHIP) (10).

All these instruments are Anglo-Saxon in origin and need to be translated and adapted to the different languages and socio-cultural contexts (11,12); this is a better alternative to the creation of a new index (13). To date, the C-OIDP index has been validated in Thailand (9), France (14), United Kingdom (15) and, very recently, in Peru (Spanish) (16) and Brazil (Portuguese) (17). The work conducted by Bernabé et al. (16) to adapt the C-OIDP to the Spanish of Peru is an example of comprehensive validation work, not only for its psychometric qualities, but also for the complementary methodology developed.

The objective of this study was to adapt and validate the self-administered version of the C-OIDP in Spanish for use with adolescents in Spain. This C-OIDP adaptation and validation has been performed through two different yet complementary projects, with shared methodology: one in Andalusia on children aged 6-12 years (project: "Evaluation of the PADI Child Dental Care Program in Andalusia; see acknowledgements) and the other in Navarre on adolescents aged from 11 to 14, within the context of the project: "Estudio sobre la salud den-

tal de los niños y adolescentes de Navarra (4ª edición). Necesidades normativas, percibidas y calidad de vida en relación a su salud oral". This article reports on the process to adapt and validate the version for use with adolescents, conducted in Navarre as the main sample and taking Andalusia for the test-retest analysis.

Material and Methods

Participants

The school children participating in the main sample formed part of the Navarre oral health survey. This survey was based on a probabilistic multi-stage sample (state/ private schools and provincial capital / province) drawn from all the schools in the autonomous community, taking the classroom as a sampling unit. The sampling was conducted independently for each age group: 11-12 and 13-14 years. Further information on the methodology can be obtained elsewhere (18).

English version of the C-OIDP

The C-OIDP index is specifically designed to show the final impact of a number of oral health related conditions which can affect one's daily life. Eight activities are considered: eating, speaking, cleaning teeth, relaxing, emotion, smiling, studying, and social contact. The impact on each activity is assessed in terms of frequency and severity, using a scale of 0-3.

The index score is based on the score for each of these eight daily activities. The score for each activity (eating, speaking, etc) is obtained by multiplying the frequency value by the severity value; the maximum score is therefore $3 \times 3 = 9$. Thus, the score scale for each activity is between 0 and 9. The total score is calculated by adding the scores for all activities, divided by the maximum score possible ($8 \times 9 = 72$) and multiplying by 100. The index score ranges therefore between 0-100.

The C-OIDP has two modes of the same questionnaire: one is interviewer-administered and the other is self-administered, and the latter is used in this validation for adolescents. Both modes have been shown to produce similar results (19).

Translation into Spanish

The translation into Spanish was made independently by 4 native Spaniards, fluent in English: 2 post-graduate dentists in Public Health (trained in the USA and England respectively), 1 professional translator unconnected with the medical sector and 1 expert in sociological studies (CIES. Sociological Research and Study Centre. Pamplona, Spain). Together with the translation, each translator reported any difficulties encountered, a justification of the wording adopted, so that it would be appropriate for the ages under study, and provided alternative words and/or expressions in case of any doubts. These translations were reconciled into a single version, which the research team approved by consensus, and which then underwent a backward translation.

Backward translation

This was made by 3 independent native English (professional) translators who were fluent in Spanish and who had no prior knowledge of the original version. The differences were discussed by the research team and translators and a reconciled version was then sent to the authors that developed the C-OIDP at University College London (UCL, UK) for approval. Based on this evaluation, the Spanish version was adopted.

Panel of experts

This version was sent to three independent advisors, who are experts in odontology and familiar with surveys; they found the translation to be appropriate. A small pilot test amongst schoolchildren was then conducted in order to assess the level of understanding of the wording used and, where appropriate, to make any necessary changes.

Pilot test

The version adopted was pilot tested on a sample of 30 boys and girls aged 11-12, by two people from the research team (FJCM and JAO). The questionnaire was administered at a school, in separate rooms for each of the interviewers in order to maintain confidentiality, and was followed by a short discussion with the children interviewed with regard to their level of understanding of the questions and any words which could be confusing or possibly misunderstood, and noting down the alternative words proposed by the schoolchildren. The pilot test made it possible to make slight changes to the wording of the version adopted. The adaptation of the C-OIDP to the self-administered version was made within the context of the Andalusian project. Finally, two students in their final year of their Diploma for Nursing, were trained to conduct the surveys.

Main study. Data collection

The data collection for the main study was conducted between April and May 2007. This study is part of a broader oral health survey and data were collected through a clinical examination and questionnaires. Here, we report only on the questionnaire findings, in particular those related to oral health-related quality of life. In addition to the self-administered version of the C-OIDP, data were collected through a questionnaire on habits, self-perception of oral health and perceived dental treatment needs. School children aged 13-14 and 11-12 years, as well as the parents of the 11-12 year-old children, answered a structured questionnaire with questions on self-perception, satisfaction with oral health and perceived treatment needs, with a range of responses from "very good or excellent" to "very poor" and "highly satisfied" to "highly unsatisfied".

Psychometric properties

These refer to the assessment of validity (content, face, criterion and construct) and reliability (internal consistency, test-retest).

Statistical analysis

All the analyses were conducted independently for each age group. For each schoolchild, data were collected on age, gender, location (rural/urban), social class (high, middle and working), origin (Spanish / foreigner), C-OIDP (and its dimensions), and self-perceptions. Together with the descriptive statistics (means, standard deviations and percentage distributions), adequate methods were used to evaluate the validity of the questionnaire based on the methodology proposed by Streiner et al. (20). For the internal consistency, correlation matrixes were constructed and Cronbach's alpha was calculated. For the criterion validity, the association between the C-OIDP and the three oral health self-perception questions was measured. For the test-retest analysis, the ICC was used.

The data were computerised using the program Access XP 2003 (10.6771.6811) SP3, with an automatic error detection system. The statistical analysis was performed with the SPSS Windows 15.0 package (SPSS Inc., Chicago, IL).

Results

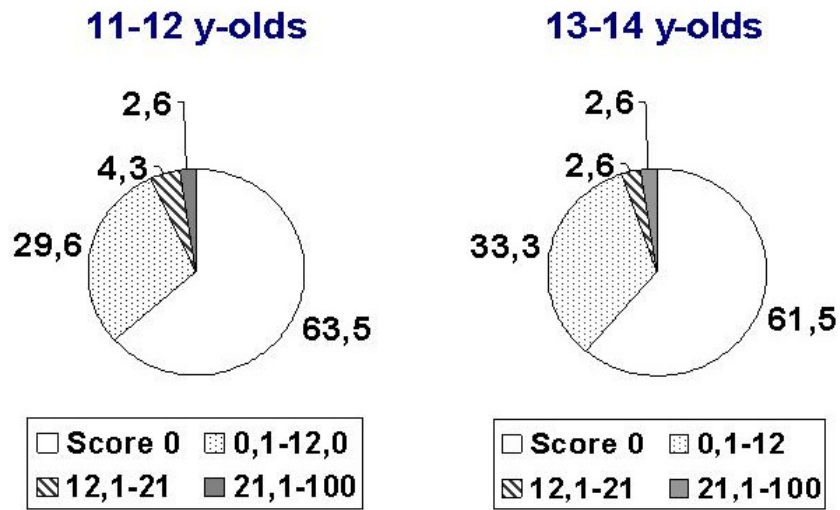
A total of 425 schoolchildren responded to the questionnaire, 230 aged 11-12 and 195 aged 13-14 years; mean age 11.4±0.5 and 13.5±0.5 respectively. Their distribution according to the socio-demographic variables is presented in (Table 1). For the test-retest analysis, 22 schoolchildren randomly selected from the Andalusia sample completed the survey at the start and one week later.

The descriptive analysis shows a low oral health impact on the daily activities of these adolescents. 36.5% and 38.5% of schoolchildren aged 11-12 and 13-14

Table 1. Sample distribution.

Age group	11-12 (n=230)	13-14 (n=195)
Mean age (±sd)	11.4±0.5	13.5±0.5
Gender (%)		
Male	48.3	43.1
Female	51.7	56.9
Residential location (%)		
Urban	53.9	52.8
Rural	46.1	47.2
Socioeconomic level (%)		
High	25.0	25.6
Medium	28.9	32.8
Low	46.1	41.5
Origin (%)		
Spain	89.6	91.8
Non-Spain	10.4	8.2

Fig. 1. C-OIDP percentage distribution by age groups.



years showed some impact, however the overall scores were low: around 30%, had a C-OIDP score between 0.1-12 and only 2.6% showed score greater than 21.1 (scale 0-100) (Fig. 1). The mean C-OIDP score was 2.69 ± 5.62 and 3.08 ± 7.95 respectively. The daily performances showing the greatest oral impacts are eating, cleaning teeth and smiling; lower impact were reported for relaxing and emotional stability; and an insignificant, almost zero impact in relation to speaking, studying and social contacts (data not shown). 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 schoolchildren's ages. The face validity was compared to the pilot study on a sub-sample of 30 schoolchildren, which was independent of the main study. Based on the changes proposed by the schoolchildren themselves, the wording was changed slightly to improve the level of understanding. With regard to the criterion validity, a statistically sig-

Table 2. Criterion validity. Spearman's correlation.

	Age group	
	11-12	13-14
Perceived oral health problems	0.27*	0,23*
Self-satisfaction with oral health	0.19*	0,29*
Perceived oral treatment need (no/yes)	0.27*	0,27*

* $p < 0.01$.

nificant association was found ($p < 0.01$) between the three measures and the C-OIDP score (Table 2). With regard to the internal consistency analysis, the correlations matrix showed no negative correlation, with values between 0.03 and 0.41, the majority of which were statistically significant ($p < 0.05$) except for the correlations of "studying" with "eating", "speaking", "cleaning teeth" and "social contact" (Table 3). Cronbach's alpha

Table 3. Psychometric properties of the Spanish C-OIDP. Inter-item correlations matrix.

Performance	Eating	Speaking	Cleaning mouth	Sleeping	Emotion	Smiling	Studying	Social contact
Eating	1.00							
Speaking	0.18*	1.00						
Cleaning m.	0.36*	0.13*	1.00					
Sleeping	0.36*	0.37*	0.07	1.00				
Emotion	0.33*	0.38*	0.36*	0.38*	1.00			
Smiling	0.16*	0.24*	0.22*	0.27*	0.36*	1.00		
Studying	0.04	0.08	0.03	0.35*	0.13*	0.15*	1.00	
Social c.	0.34*	0.22*	0.18*	0.20*	0.26*	0.41*	0.07	1.00

* $p < 0.05$.

Table 4. Internal reliability of the Spanish C-OIDP. Corrected item-total and alpha if item deleted. Cronbach's alpha.

Performance	Corrected item-total correlation	Alpha if item deleted
Eating	0.41	0.64
Speaking	0.39	0.65
Cleaning mouth	0.36	0.65
Sleeping	0.47	0.63
Emotion	0.56	0.61
Smiling	0.41	0.68
Studying	0.20	0.68
Social contact	0.46	0.66
Alpha=0.68		

was 0.68; the corrected item total values were between 0.20 and 0.56 and the deleted item alpha values were between 0.61 and 0.68 (Table 4). The reliability analysis gave an ICC of 0.98.

Discussion

To date, the C-OIDP index has been translated and adapted to suit a number of languages and socio-cultural contexts, demonstrating its applicability and successful psychometric properties in all of these (9, 14-17). Although it was originally conceived as an instrument to be administered through a personal interview, it has also recently been validated in a self-administered mode (19) and, as such, has been used in this validation study. The self-administered mode represents an important step forward with regard to its application in oral health surveys, due to the subsequent resource savings and ease of application. Nowadays, the measurement of quality of life and perceived needs are important factors, in view of the recommendation to complement the clinical diagnosis of the oral health surveys (normative needs) with subjective aspects of health (3,21); whilst the possibility of using a self-administered instrument makes such a recommendation easier to implement.

In this process to translate - adapt the C-OIDP index, the recommendations of the International Test Commission (22) were followed, principally with regard to the adaptation to the linguistic and cultural differences of the target population, the wording used, the familiarity of the target population with the item contents, the equivalence with the original version and the evaluation of validity.

The mere validation of an instrument, which has already amply demonstrated its psychometric qualities on numerous occasions, can make little or no additional contributions to what has already been established (16). However, every time an instrument is used in a

new culture, its psychometric properties should be assessed. Starting from this premise, the rigorous process of translating and adapting the test to the cultural reality of the new target population is shown to be one of the most important aspects. For this reason, when adapting the C-OIDP into Spanish for adolescents, particular care was taken over the translation, evaluating all the wording changes required to adapt it to the target population. A similar approach was followed by a recent cultural adaptation to Spanish of another instrument (23).

Content, face and criterion validity

In our case, we have considered that the content validity has already been sufficiently evaluated on prior occasions (9, 14-17) and does not affect the adaptation process into Spanish; it forms an intrinsic part of the questionnaire. For this reason, we limited ourselves to having the adapted questionnaire assessed by three experts in odontology and health surveys, who all found the version to be appropriate.

The face validity, qualitatively assessed through the pilot test, showed that the schoolchildren had a high level of understanding of the questionnaire, whilst their suggestions enabled slight changes to be made to the wording. This was then checked by the children themselves, by repeating the questionnaire in the same pilot test. Finally, all the schoolchildren said that they had understood the entire content of the questionnaire.

With regard to the criterion validity, there was an adequate association between the index responses and the variables used, with significant levels ($p < 0.01$). In other words, low C-OIDP scores corresponded to a high self-perception of health, whilst high scores corresponded to low self-satisfaction values and greater perceived needs.

Descriptive values and reliability analysis

The descriptive values of the index (36.5/38.5%; mean $2.69 \pm 5.62 / 3.08 \pm 7.95$) are clearly lower than those encountered by Tubert-Jeannin et al. in France (14) with 73% and a mean of 6.32 ± 8.22 and Castro et al. in Brazil (17) with 80.7% and a mean of 9.2 ± 10.1 . and similar to those found by Tsakos et al. in an English population, mean 3.16 ± 5.33 (19). We have no knowledge of the health level of these populations; in our case, the prevalence of disease is low or very low (11-12 years: % DMFT:28.5; mean DMFT:0.63) which, in our opinion, justifies the low C-OIDP levels.

With regard to internal consistency, the evaluation gave good results, comparable to those obtained in other validation processes. All the inter-item correlation values were positive, but not high enough to indicate question redundancy. The corrected item-total correlation values were higher than the recommended 0.20 (20) except for the "studying" item which just reached this value. Cronbach's alpha was 0.68, higher than the minimum of 0.50 and practically at the recommended level of 0.70

(20), and higher than all the prior validation processes. The test-retest showed very high reliability figures (ICC=0.98).

Another important aspect is that this C-OIDP validation study, unlike the usual tendency of being carried out on convenience samples, was conducted on a sample representative of an entire community, which implies a sample of adolescents who represent, overall, the whole society of the target socio-cultural context, at all its socio-demographic levels.

Study limitations

The selection of the sample was made on the basis of school units and not on the basis of individuals. Nevertheless, the random selection represents the group of adolescents living in Navarre and can be extrapolated to Spain as a whole, whilst awaiting the results of the aforementioned counterpart project in Andalusia. It cannot be presumed that this sample selection process has caused results bias, particularly when these results are similar to those obtained in other validation studies.

Due to the logistic limitations of the fieldwork, which was conducted throughout the geographic area of Navarre the repetition of surveys for the analysis of test-retest reliability was conducted on the Andalusian sample and not in Navarre. Both projects are co-ordinated, with the same methodology and the same questionnaire.

In conclusion, despite these limitations, this study has adapted in Spanish the self-administered C-OIDP index for adolescents and successfully demonstrated its validity and reliability. It will therefore be possible to use this instrument to measure the oral health related quality of life of children and adolescents.

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