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Comparative validity of the OIDP and OHIP-14 in describing the impact of oral health on quality of life in a cross-sectional study performed in Spanish adults

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Abstract

Objectives: We aimed to compare the utility and validity of two popular socio-dental indicators (OIDP and OHIP-14) for describing the impact of oral conditions on quality of life applied simultaneously.

Study design: We recruited a consecutive sample of 270 healthy Spanish workers visiting the Employment Risk Prevention Centre for a routine medical check-up. OHIP-14 was self-completed before the oral examination and the face to face interview of the OIDP was performed. Both instruments were compared by evaluating its reliability and its validity.

Results and Conclusions: The standardised Cronbach alphas for OHIP-14 and OIDP were 0.89 and 0.74 respectively. OIDP showed lower face validity but higher content validity than OHIP-14. Both indicators showed high construct and criterion validity, since individuals perceiving need for dental treatment or having any complaint about their mouth obtained significantly higher total OIDP and OHIP scores than their counterparts. The prevalence of impacts was much higher using the OHIP (80.7%) than the OIDP (27.8%).

Key words: *Oral health-related quality of life, Validity, cross-sectional studies, Self-assessment.*

Introduction

Currently, the assessment of oral health status is increasingly complemented by patient-centred measures, which consider the impact of oral conditions on everyday life (1-3). A number of these Oral Health-related Quality of Life (OHQoL) indicators have been developed and tested among different populations to describe the impact of dental disease or to evaluate the benefit of professional interventions aimed at improving oral health.

Recently, there has been a growing trend to use and compare a small number of OHQoL indicators across different cultures in order to achieve transcultural validations and to compare populations in terms of wellbeing. In this sense, a panel of experts belonging to "The European Global Oral Health Indicators Development Project" recommended focusing on three OHRQoL indicators: the OHIP-14 (4), the OHQoL-UK (5) and the OIDP (6). Of these, the two most successful internationally used and accepted ones are OHIP-14 (Oral Health Impact Profile) (4) and OIDP (Oral Impacts on Daily Performances) (6). Both instruments are based on Locker's Model of oral health (7), which postulates that diseases impair and limit functions at the level of the organ, however, the individual may become disabled or even die and/or may become socially disadvantaged. Moreover, both indicators have been shown to have adequate psychometric properties in different populations, proving to be reliable and valid in cross-sectional population-based studies. But nowadays comparative research focussed on increasing the evidence of the validity of various instruments is vital to justify the selection of available instruments and also to legitimate the comparison of OHQoL scores between groups within and across cultures.

In Spain, the OIDP and the OHIP-14 have recently been validated in parallel among adults and the elderly (8, 9). However, there are few reports addressing the simultaneous use of both instruments within the same setting to make a comparative analysis of their validity (10). The present work aims to compare the usefulness and validity of the OIDP and the OHIP-14 in a cross-sectional study performed in Spanish adults.

Materials and Methods

Instruments

The OHIP-14 is comprised of 14 items that explore seven dimensions of impact (functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap) and participants respond to each item according to frequency of impact on a 5-point Likert scale ranging from never to very often.

The OIDP assesses the impacts of oral conditions on the abilities of individuals to perform eight daily activi-

ties. For each dimension (eating, speaking, hygiene, occupational activities, social relations, sleeping-relaxing, smiling, and emotional state), the severity and either the frequency or duration of each impact are recorded on a Likert scale, and information about the oral condition that led to the impact is also gathered.

Study Design

A cross-sectional epidemiological study was performed in the City of Granada and its province. A consecutive sample of healthy Andalusian Government staff visiting the Employment Risk Prevention Centre for a routine medical check-up was invited to take part in the study. All interviewees were briefed about the purpose and processes involved in the study, and written consent was sought for questionnaire-led interviews and simple oral examinations. Individuals younger than 25 years of age or seeking dental treatment were excluded in order to establish baseline impact scores in adults. The OHIP was self-administered and completed in the waiting room, but the OIDP was completed in a face-to-face interview after an oral examination conducted in a quiet private room by a trained and calibrated examiner.

Other data were collected from the participants: socio-demographic data (age, sex, occupation), behavioural data (e.g., brushing frequency, dental visits), clinical data (i.e., presence of caries, periodontal disease and prosthesis), and also subjective data (perceived needs of dental treatment, the most highly valued aspects of the mouth, and the main complaints related to the mouth), because these items gathered subjective criteria with which to explore the construct validity of the two instruments and assess their adequacy for capturing the perceptions or dimensions most valued by the subjects. Because there is no universally accepted gold standard for assessing the criterion validity of quality of life measures, and because a key property of these instruments is their contribution to needs assessment, data were collected on perceived treatment needs as a proxy. Construct validity was also evaluated by testing the outcomes of the OIDP and OHIP-14 against complaints about the mouth, considered as a proxy of perceived impairment, in accordance with the theoretical framework (7).

Participants were also asked to rate their global oral satisfaction on a 0 to 10 visual analogue scale (OSS). Measuring self-assessment of oral satisfaction is an attractive method to contrast the convergent validity of OHQoL instruments. The 0-10 scale has been widely used as a gold standard to assess oral health in cross-sectional (11) and longitudinal (12) studies, and has already been validated in the Spanish population (8).

Scoring methods

Different methods of summarising the OHRQoL data were used. First, the presence of any impact was recorded for each measure. For OHIP, an impact was re-

Table 1. Sociodemographic, behavioural, subjective and clinical description of the sample (n= 270).

SOCIODEMOGRAPHICS VARIABLES	n	%
Sex		
Male	123	45.6
Female	147	54.4
Social Class^a		
High	113	41.8
Medium	112	41.5
Low	45	16.7
Residence		
Urban	154	57.0
Rural	116	43.0
Age (95%-CI ^b)	44.1-46.4	
BEHAVIOURAL VARIABLES	n	%
Brushing habits		
2-3 times/day	181	67.0
Once/day	70	25.9
Less than once/day	19	7.0
Dental visit pattern		
Check-up visits	98	36.3
Problem-based visits	172	63.7
PERCEIVED HEALTH VALUES		
Perceived need for dental treatment		
NO	150	55.4
YES	120	44.6
Complaints about the mouth		
NO	92	34.1
YES	178	65.9
Most valued aspects of mouth		
Oral health	93	34.4
Aesthetics	67	24.8
Chewing	49	18.2
Oral Hygiene	43	15.9
Breath Odour	18	6.7
Prosthetic variables	Mean ± SD	
Missing teeth	3.3 ± 3.7	
Replaced teeth	1.3 ± 2.8	
Occlusal Units	6.4 ± 2.2	
Aesthetic Units	5.7 ± 1.0	
Standing teeth	26.4 ± 4.2	
Number of replaceable teeth	1.4 ± 2.2	
Caries variables		
Decayed teeth	3.2 ± 2.5	
Healthy restored teeth	4.3 ± 3.5	
DMFT (Sum of decayed, missed and filled teeth)	10.7 ± 5.0	
Healthy non-restored teeth	17.8 ± 5.6	
Periodontal variables^c		
Sextants with CPI=0	3.1 ± 2.2	
Sextants with CPI=1	0.9 ± 1.4	
Sextants with CPI=2	0.5 ± 0.8	
Sextants with CPI=3	1.1 ± 1.6	
Sextants with CPI=4	0.1 ± 0.5	

^aSocial Class was estimated in occupational terms as follows: High: skilled non-manual worker; Medium: skilled manual worker; Low: non-skilled manual worker.

^b95%- CI: Confidence Interval at the 95% level; SD: Standard deviation.

^cCPI: Community Periodontal Index.

corded as present if it was reported at the threshold of “occasional” or more frequently. For OIDP, an impact was considered if it was recorded at a moderate or more severe level. Second, the number of impacts per person was calculated by the so-called “simple count method”. Finally, the total scores derived from the OHIP and OIDP were calculated. For the OHIP, the total score was calculated by summing the item codes for the 14 items (additive method). For the OIDP an arbitrary scoring system quantified the total impact by multiplying the frequency and severity scores in each of the eight dimensions, the sum of these scores being considered as the total impact score which was converted into percentage format to yield an intuitive oral impact score.

Data analysis

The psychometric properties of an instrument for measuring perceptions must be tested by evaluating its reliability and its validity. Here, reliability was evaluated by testing the internal consistency using the standardised Cronbach’s alpha and Cronbach’s alpha values if items were deleted. Face and content validities were assessed by observing the ease of use and the coverage of the relevant dimensions of the underlying construct. Also, both instruments were compared in terms of construct and criterion validity, tested by using non-parametric tests (Mann-Whitney test, Kruskal-Wallis and Chi-square test) since the OHIP-14 and OIDP total scores

were not normally distributed. The Statistical Package for Social Sciences (SPSS v.15) was used for the statistical analyses, taking the cut-off level for statistical significance at 0.05.

Results

For the three-week period of data collection, 295 healthy workers visited the Centre, 270 of which participated in the study (91.5%), while 25 were drop-outs, although all were similar in terms of socio-demographic characteristics. Usable data from all participants were fully available for both indicators, but for the self-administered OHIP-14 nine subjects (3.3%) had to fill in one or two uncompleted items before the oral examination.

The mean age of the participants was 45.2 ± 9.5 years ($\chi \pm SD$): 45.6% were male; 83.3% were non manual workers, and 57% lived in the City of Granada. In behavioural terms, 93% of subjects brushed their teeth at least once a day and 36.3% routinely visited their dentist at least once a year. 44.6% of the sample perceived dental treatment needs and 34.1% had no complaint with their mouth.

On clinical examination, the participants mostly had a good state of oral health. More than 90% were dentate, with a mean of 6.4 ± 2.2 posterior occlusal units and 5.7 ± 1.0 anterior occlusal units. The sample had a mean of 26.4 ± 4.2 standing natural teeth, with 17.8 ± 5.6 healthy

Table 2. Criterion and construct validities of OIDP and OHIP according to non-parametric tests (Mann-Whitney and Kruskal-Wallis Tests).

	n (%)	OIDP-ADD ^a 95%- CI ^b	OHIP-ADD ^a 95%-CI ^b
CRITERION VALIDITY			
PERCEIVED NEEDS OF TREATMENT			
No	150 (55.4)	1.9 – 4.2	6.7 – 8.9
Yes	120 (44.6)	8.0 – 13.0	10.4 – 13.2
		p<0.001	p<0.001
CONSTRUCT VALIDITY			
COMPLAINTS ABOUT THE MOUTH			
No	92 (34.1)	1.1 – 2.9	4.8 – 6.8
Yes	178 (65.9)	6.7 – 10.5	10.4 – 12.8
		p<0.001	p<0.001
CONVERGENT VALIDITY			
ORAL SATISFACTION (0-10 VAS ^c)			
< 5 (DISSATISFIED)	40 (14.8 %)	13.5 – 22.9	15.7 – 21.1
5 (NEUTRAL)	25 (9.3 %)	3.8 – 11.3	8.2 – 12.2
>5 (SATISFIED)	205 (75.9 %)	2.8 – 5.3	7.0 – 8.7
		p<0.001	p<0.001

^aTotal scores obtained by the Additive Method (See Scoring Methods in Material and Methods).

^b95%- CI: Confidence Interval at the 95% level.

^cVAS: Visual Analogue Scale.

OIDP: Oral Impacts on Daily Performances.

OHIP: Oral Health Impact Profile.

non-restored teeth. The decayed, missing and filled teeth index (DMFT) was 10.7 ± 5.0 , of which a mean of 3.2 ± 2.5 teeth were decayed; 3.3 ± 3.7 were missing, and 4.3 ± 3.5 were filled. Periodontal status afforded a CPI score of zero in 3.1 ± 2.2 of sextants. A wider description of these variables is in (Table 1).

Internal consistency

The standardised Cronbach alphas for OHIP-14 and OIDP were 0.89 and 0.74 respectively. In both indicators, the alpha values were lower or equal when an item was deleted from the scale.

Face and content validity

OIDP has lower face validity, since it has filters and contingency questions to enquire into the frequency and severity of each impact recorded, hampering self-completion by the subjects. By contrast the OHIP-14 is designed favourably to be self-completed because the 14 items and all possible responses are presented together in a matrix. Furthermore, both instruments have adequate content validity since they focus on the physical, psychological and social activities that could be impaired by oral conditions.

Construct and criterion validity

Both indicators revealed high construct and criterion validity, since the individuals perceiving needs of dental treatment or having any complaint about their mouth obtained significantly higher OIDP and OHIP total additive scores than their counterparts (Table 2). Regarding convergent validity, the total OHIP-14 and OIDP scores were significantly lower in the satisfied than in the neutral or dissatisfied groups.

Prevalence and level of impacts

According to the OIDP, 75 subjects (27.8%) had at least one impact on OHQoL reported to be moderate or more severe. The mean OIDP-ADD total score was 6.5 ± 11.2 . According to the OHIP-14, 218 subjects (80.7%) reported at least one impact, referring to it as occasional or more frequent. The mean total OHIP-ADD score was 9.6 ± 7.6 . Although the total OIDP and OHIP scores were both skewed to the left, the mean value is given because in the OIDP more than half of this sample scored zero and hence the median value-based comparison would lose relevant information.

Discussion

This study aimed to compare the usefulness of two widely known OHQoL measures (OIDP and OHIP-14) in cross-sectional studies. The sample size ($n=270$) and the high response rate (91.5%) of this pseudo-probabilistic method of subject recruitment seems to be adequate for the purpose of the study. Moreover, none of the participants was seeking dental diagnosis for acute problems, in our attempt to detect the baseline impact of this population. In general, they had a good state of oral health for their age range. In spite of the simultaneous

application of these instruments, the method of administration was different: the OHIP-14 was self-completed by the subjects while OIDP was completed by a trained examiner in a face-to-face interview. This is because of the weak face validity of the OIDP, which requires a trained interviewer to overcome the complexities of the instrument. Nevertheless, we used the administration methods recommended by the original authors (4,6) and this was therefore the best approach to compare their usefulness since the aforementioned method is a part of the instrument. However a recent study performed among Spanish adolescents has demonstrated successful psychometric properties of a self-administered version of the OIDP (13). The face validity of the OHIP-14 was so high that only 9 subjects (3.3%) were required to fill in one or two uncompleted items.

In terms of reliability, both indicators showed adequate internal consistency, alpha values above 0.7 being obtained, which is the minimum recommended. However, the OHIP-14 showed much higher consistency (0.89 versus 0.74) than the OIDP, affording values of excellent homogeneity. These values are higher than those reported in the original development studies (4,6). The lower consistency of the OIDP may have been due to the lower number of items because there is a general psychometric principle that postulates that the reliability of an index decreases as the number of items decreases.

In terms of content validity, both instruments are adequate. However, it seems that the OIDP has a higher content validity, since it only takes into account the so-called ultimate impacts, which according to the Locker Model of oral health (7) correspond to "disability" and "handicap". In contrast, the OHIP focused on the frequency of appearance of different types of oral impact, ignoring the effect on individuals' daily activities. This leads to an overestimation of the prevalence of impact among these non-dental patients with a mostly healthy mouth when assessed with the OHIP-14 (80.7%) versus the OIDP (27.8%). In contrast, this higher floor effect (percentage of subjects with the lowest score) of the total OIDP score could limit application in intervention studies, in which an improvement in the global score is desirable. However, the total score and the prevalence of impacts would be much higher in dental patients than that reported here. In fact, both indicators discriminated in the expected direction between subjects who perceived needs of dental treatment or had complaints about the mouth, demonstrating their construct and criterion validities. With regard to convergent validity, both indicators showed a coherent and significant inverse relationship with self-rated oral satisfaction (Table 2), supporting the hypothesis that oral impacts and oral satisfaction are opposing but complementary approaches in assessing oral well-being (8). We preferred to contrast the criterion and construct validity

using subjective criteria, since OHQoL indicators assess functional, psychological and sociological aspects that can only be expressed subjectively and, according to Locker's Model (7), this is not always impaired by the presence of disease.

In conclusion, the OIDP and OHIP-14 are valid instruments to describe the impact of oral conditions on quality of life. In epidemiological studies, the OHIP-14 should be preferred because of its higher reliability and easier administration. However, this instrument may overestimate the impact of several frequent but not severe events, such as bleeding gums, and may underestimate some rare but more severe events, such as neuralgia. Accordingly, a severity-based approach may be preferable for assessing patient-centred outcomes. Longitudinal studies would be required to examine the sensitivity of these indicators to detect changes in oral well-being after therapeutic interventions.

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