

Adaptation and content validity by expert judgment of the Oral Health Impact Profile applied to Periodontal Disease.

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Abstract: Background: In Mexico, there is no available instrument based on a biopsychosocial model to evaluate the impact of periodontal disease on oral health-related quality of life (OHRQL). The Oral Health Impact Profile (OHIP-14) was developed in Australia and the United States based on the same model and can be adapted to evaluate the impact of periodontal disease on OHRQL. Objectives: To adapt the OHIP-14 questions to periodontal disease evaluation and validate the content of this new instrument. Materials and Methods: One expert in periodontics and one expert in health psychology adapted the OHIP-14 to evaluate the impact of periodontal disease on OHRQL, creating the Oral Health Impact Profile applied to Periodontal Disease (OHIP-14-PD). Using the format proposed by Escobar and Cuervo, five experts in periodontics and public health performed the OHIP-14-PD content validation. Results: Item 7 had a compliance rate of 80% for clarity, and the other items, a compliance rate of 100%, for clarity, sufficiency, coherence and relevance. The kappa coefficient showed perfect agreement for items 1 to 6 ($k=1$) and 8 to 14, and very high agreement for item 7 ($k=0.967$). Conclusion: The OHIP-14-PD shows content validity.

Keywords: Oral health; quality of life; periodontitis; expert testimony; validation studies.

INTRODUCTION.

Subjective oral health status indicators reflect key elements of the World Health Organization's International Classification of Impairments, Disabilities and Handicaps.¹ Based on this classification of the consequences of a disease and its implications in the life of individuals, Locker adapted a model for oral health, with the purpose of capturing the functional and psychosocial implications of oral disorders that have an impact on the oral health-related quality of life (OHRQL). Locker's conceptual model of oral health shows that disease may have a simple linear progression or a more complex sequence, as it may directly result in handicap, without the previous stage of disability.²

The Oral Health Impact Profile (OHIP-49)³ and its short version (OHIP-14)⁴ measure self-perception of social impact of oral disease on OHRQL. Both profiles comprise seven dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. These dimensions assess the impact that oral disease can cause on physical and psychological aspects, and social or daily activities, expressed in terms of impairment, disability or handicap.¹

OHIP-49 and OHIP-14 have been validated in different countries.^{5,6}

They have been applied to evaluate the impact of having teeth with caries, which require extraction or present periodontal disease.^{7,8} In Mexico, there are studies that validate these instruments and evaluate said impact on OHRQL of older adults as a consequence of coronal caries, root caries, use of removable dentures and the need for periodontal treatment.^{9,10}

The development of measurement instruments first requires defining the construct to be evaluated in terms of indicators, that is, to operationally delimit its content. Content validity of a measurement instrument refers to the degree to which indicators or items represent the construct that is to be evaluated. One strategy used to establish content validity is expert judgment on the subject.¹¹ Afterwards, it is necessary to evaluate the reproducibility, the ability to evaluate the concept that is to be measured, its sensitivity and usefulness.¹²

The prevalence of periodontal disease in Mexico increases with age. Only 40% of adult patients aged 35-44 years have a healthy periodontium, decreasing to 30% in adults aged 65-74 years.¹³

Periodontal disease is the second cause of oral morbidity¹⁴ in the state of Nuevo Leon and in the city of Monterrey, as well as at a national level. Considering the clinical importance of periodontal disease and the absence of an instrument to evaluate the impact of periodontal disease on OHRQL in Mexico, OHIP-14-PD was developed based on the biopsychosocial model proposed by Locker.²

The aim of this study is to adapt and validate the OHIP-14 by experts for the evaluation of periodontal disease.

MATERIALS AND METHODS.

Participants

The process of adapting the OHIP-14 to the evaluation of the impact of periodontal disease on OHRQL was in charge of two experts, in periodontics and in health psychology respectively, of the Universidad Autónoma de Nueva León (UANL) in Mexico. The panel of experts was composed of five individuals highly skilled in periodontics and public health of the School of Dentistry, UANL. The recommended number of evaluators is between two and twenty. As the two experts participating in the adaptation phase were not among the experts evaluating the content validation phase and mastered the relevant contents for the

concept and its measurement, a minimum of two evaluators was considered to be sufficient. In turn, the panel of experts was reduced to five, as this number falls between the recommended range.¹¹

Instruments

In order to establish content validity, the expert judgment format proposed by Escobar and Cuervo was used.¹¹ It includes the categories of sufficiency (items belonging to the same dimension are enough for its measurement), clarity (writing is understandable, even for a person with a low education level), coherence (the item is logical in relation to the dimension or indicator being measured) and relevance (the item is essential or important to be included). Experts evaluated each item using these four categories. The evaluation was performed following a four point ordinal scale: 1="does not meet the criteria", 2="low level of compliance", 3="moderate level of compliance" and 4="high level of compliance". An open-ended question was included for each item to suggest modification or substitution in case of a low level of compliance. In addition, space was provided to include additional dimensions and items.

Development

Questions were elaborated according to the 14 items and the 7 dimensions of the OHIP-14.⁴ For the adaptation, the relationship between the main signs and symptoms of gingivitis and periodontitis and the consequences of these diseases were considered based on the criteria established in the Periodontal Disease Classification System of the American Academy of Periodontology.¹³ Furthermore, the information provided by patients diagnosed with gingivitis and periodontitis during the elaboration of their medical record, previous to periodontal treatment, was taken into account. This way the OHIP-14-PD was created.

The theoretical conceptual definition and purpose of the OHIP-14-PD instrument, as well as their individual participation, were explained to each of the experts. The present study was approved by the National Bioethics Committee of the Mexican Secretary of Health (DEISC-19-01-16-16).

Data analysis

To maintain an item without any modification, 80% of the experts had to agree and evaluate it as having "a high level of compliance".¹⁴ None of the experts should evaluate any item as "did not meet the criterion" in any of the asses-

sed characteristics. The elimination criterion was that four of the five experts had to agree to evaluate an item as “did not meet the criteria” in at least one of the four assessed characteristics. In other cases following the suggestions of the experts, it could be appropriate to modify an item.^{17,18}

The hypothesis that the high-level proportion of each

characteristic was greater than or equal to 0.8 was contrasted by means of the binomial test. Consistency among experts was checked by evaluating the four characteristics in each item using the Friedman Test for *k*-related samples. The rejection of the null hypothesis of mean ranges equivalence would reflect incoherence. Finally, concordance between

Table 1. Adaptation of OHIP-14 content to periodontal disease.

Dimension	OHIP-14	OHIP-14-PD
Functional limitation	<p>1. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?</p> <p>2. Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?</p> <p>OHIP-49³ includes one question about appearance affected and another question about the difficulty when chewing foods, the most frequent reason for patient visit is the presence of gingival swelling, which causes color change affecting the appearance of the gingiva. The severity of periodontal disease determines the presence of dental mobility and pathological migration, causing a change in the position of dental pieces, affecting occlusion, mastication and phonation, thus limiting function.</p>	<p>1. Have you noticed your gums are swollen and do not look good?</p> <p>2. Have you had difficulty chewing because of mobility and change of position of your teeth?</p>
Physical pain	<p>3. Have you had painful aching in your mouth?</p> <p>4. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?</p> <p>The patient is asked about the presence of pain to identify an acute condition and sensitivity as part of the symptoms of periodontal disease.</p>	<p>3. Have you felt pain in your gums?</p> <p>4. Have you had sensitive teeth when chewing or due to cold, hot, sweet foods or drinks?</p>
Psychological discomfort	<p>5. Have you been self conscious because of your teeth, mouth or dentures?</p> <p>6. Have you felt tense because of problems with your teeth, mouth or dentures?</p> <p>OHIP-49³ also includes the question: “Have you been worried by dental problems? Bad taste and bad odor of the mouth are symptoms of periodontal disease, and when mentioning them, patients report to be self conscious, uncomfortable and worried about suffering them.</p>	<p>5. Have you been worried because of bad taste in your mouth?</p> <p>6. Have you felt uncomfortable because of bad mouth odor?</p>
Physical disability	<p>7. Have you been unable to brush your teeth properly because of problems with your teeth, mouth or dentures?</p> <p>8. Have you had to avoid eating some foods because of problems with your teeth, mouth or dentures?</p> <p>Gingival bleeding caused by brushing, together with poor technique when brushing and an inadequate brush reduce oral hygiene. The loss of dental pieces caused by the progression of periodontal disease and the accumulation and/or food residue between the teeth. Interfere in the chewing and diet of the patient.</p>	<p>7. Has your oral hygiene been inadequate because of gum bleeding when brushing?</p> <p>8. Have you avoided chewing with all your teeth because of any absence of dental pieces or accumulation and/or food residue between the teeth?</p>
Psychological disability	<p>9. Have you found it difficult to relax because of problems with your teeth, mouth or dentures?</p> <p>10. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?</p> <p>The questions are directed towards the consequences that periodontal disease can have in patients’ mood and how they feel in front of the others because of the condition of their teeth and gingiva.</p>	<p>9. Have you felt sad about the health condition of your teeth and gums?</p> <p>10. Have you felt embarrassed by the appearance of your teeth and gums?</p>
Social disability	<p>11. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?</p> <p>12. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?</p> <p>The intention is to obtain information about the patients’ behavior towards others, because of periodontal disease and to know how the state of their teeth and gingiva affects their daily life.</p>	<p>11. Have you had difficulty doing any daily activities because of the state of your teeth or your gum disease?</p> <p>12. Have you avoided any contact with other people because of the state of your teeth or your gum disease?</p>
Handicap	<p>13. Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?</p> <p>14. Have you been totally unable to function because of problems with your teeth, mouth or dentures?</p> <p>The OHIP-49³ includes questions about general health in relation to oral health as well as financial loss in this dimension. Patients are asked about the presence of obstacles related to oral health that may prevent achieving good general health, as well as about the impact of the cost of periodontal care for the patient.</p>	<p>13. Has your general health been affected as a result of your oral health?</p> <p>14. Has your financial situation been affected by the state of your oral health?</p>

Table 2. Binomial test of the 14 items.

Item	Characteristic (x)	Compliance score				Binomial Test						k
		1	2	3	4	High	Not High	p_o	$1-p_e$	p_e	p	
1-6 and 8-14	Sufficiency	0	0	0	5	5	0	1	0	0.8	0.328	1
	Clarity	0	0	0	5	5	0	1	0	0.8	0.328	1
	Coherence	0	0	0	5	5	0	1	0	0.8	0.328	1
	Relevance	0	0	0	5	5	0	1	0	0.8	0.328	1
7	Sufficiency	0	0	0	5	5	0	0.8	.2	0.8	0.328	1
	Clarity	0	0	1	4	4	1	1	0	0.8	0.410	0.967
	Coherence	0	0	0	5	5	0	1	0	0.8	0.328	1
	Relevance	0	0	0	5	5	0	1	0	0.8	0.328	1

Compliance Score: 1= does not meet the criterion, 2= low, 3= moderate and 4= high.

Dichotomization of level of compliance: High (x= 4) and Not high (x≤3). p_o = observed proportion, p_e = expected proportion and p = exact meaning (unilateral).

k = Fleiss' kappa.

the experts was estimated by the Fleiss' kappa coefficient with a change in the estimate of the probability expected by chance, due to the concentration of the majority of the cases in the last category. Negative asymmetry and extreme tailing of the distributions made it inappropriate to calculate this probability from the observed values.^{16,18} The modification consisted of giving an equivalent value to each level of response in the calculation of the probability expected by chance. A kappa value <0.20 was interpreted as very low reliability, from 0.20 to 0.39, low, from 0.40 to 0.59, moderate, from 0.60 to 0.79, high, and ≥0.80, as very high.¹⁶

RESULTS.

The adaptation of the OHIP-14-PD was obtained from the items of the 7 dimensions of the OHIP-14,⁴ highlighting some of the items included in the OHIP-49³ that complemented the impact of periodontal disease on OHRQL (Table 1). The Spanish version, translated in Chile, was used.⁷

The five experts mostly indicated a high level of compliance of sufficiency, clarity, coherence and relevance (Table 2).

DISCUSSION.

A general application scale for oral diseases was adapted to evaluate the impact of signs and symptoms of periodontal disease on OHRQL. The original 14 items and 7 dimensions of the instrument created by Slade were considered.⁴ The definite items were considered to be sufficient, clear in their writing, coherent and relevant

for the evaluated concept. Only one indication in relation to reversing the order of the sentence to make it clearer was stated for item 7, which refers to the inability to brush properly due to bleeding gingiva. Being singled out by only one expert, the indication was ultimately not considered.

The indicators included in the adaptation of the OHIP-14-PD coincide with the categories of periodontal disease based on clinical findings.¹⁵ In addition, loss of periodontal support structure was considered to have negative effects on masticatory function and quality of life.¹⁹ Likewise, lower financial support reduces quality of life, but not social support.²⁰

Item 4, referring to sensitivity to chewing or eating cold, hot and sweet foods, evaluates a characteristic symptom of periodontal disease. However, this symptom is not very specific, and can be caused by other conditions, such as caries, enamel wear (attrition, abrasion and/or dental erosion), by improper brushing, tooth whitening or eating acidic foods.²¹ No expert pointed to problems in this regard, but it may be the least consistent aspect within the scale because of this lack of specificity.

Content validity established through expert judgment and measured by the Fleiss' Kappa coefficient was very high, as expected. It should be stated that this coefficient is a quotient between the variance of the mean ranges and their maximum value if experts assign each characteristic homogeneously to a range, and the distribution of these ranges corresponds to an arithmetic progression from the minimum to the maximum range (from 1 to 4). If maximum ranges are obtained for each characteristic,

then the null variance between ranges and the equivalence of mean ranges cause the coefficient to be null and not to reflect the situation of perfect agreement,^{16,18} hence the need to use this adaptation. At the same time, the average equivalence use of Kendall's W coefficient¹¹ was considered inappropriate, making it more reasonable to use the central tendency contrast with the Friedman test.

Reducing the panel to five experts, including oral public health researchers, should be noted as a limitation of the study. However, the number of experts falls within the recommended range of 2 to 20.¹¹ Furthermore, the public health researchers had experience in validating measuring instruments.

It should be mentioned that the content validity established by expert judgment can be complemented by the comprehensibility evaluation of the OHIP-14-PD

questions among dental care users and the evaluation of the usefulness of the scale between general dentists and dentists specialized in areas other than periodontics.

Its application in clinical and dental research is suggested. For this purpose, it is necessary to analyze its properties of reliability (internal consistency and temporal stability), factorial structure (change from the seven hierarchical factor model to one of higher order), convergent/divergent validity (with socio-demographic variables, mood, OHIP-14), cross-validity (between the general population and patients with periodontitis), as well as distribution (parameters and cutoff point).

CONCLUSION.

OHIP-14-PD presents content validity to evaluate the impact of periodontal disease on OHRQL.

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