



ORIGINAL ARTICLE

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Transcultural adaptation and reliability of the Spanish version of a questionnaire about oral hygiene advice given by dentists in Chile.

Abstract: Aim: To adapt and evaluate validity and reliability of the Spanish version of a questionnaire about oral hygiene advice given by dentists in Chile. Materials and methods: A validation study was conducted according to recommendations of COSMIN. The original questionnaire was adapted from English into Spanish using translation, back translation, expert review and pilot test sample by 56 dentists. The instrument consisted of 3 sections: recommendations for oral hygiene, relevance given to delivery of oral hygiene instruction and training and experience in delivering oral hygiene recommendations. It was reapplied in 5 of them a week later. Reliability was measured with internal consistency (Cronbach's alpha), test-retest reliability (Cohen's kappa and weighted kappa) and measurement error (limits of agreement, LdA). Content validity was evaluated by experts and construct validity by using convergent validity (Pearson correlation). Results: A good level of internal consistency that applies to 5 items (Cronbach's alpha = 0.73) was obtained. For items on a nominal scale, Cohen Kappa coefficient was 0.80 (95% CI=0.64 to 0.95) and for ordinal items weighted kappa coefficient (linear weighting) was 0.76 (95% CI=0.65 to 0.88). The difference between the scores calculated for the measurements was 1 standard deviation 2.35. Ninety five percent of the differences were between -5.7 to 3.7 (+/-4.7 LoA = 1) and the variance of the total score was 29- 41. A good level of convergent validity (Pearson correlation=0.63) was obtained. Conclusion: The final questionnaire is valid and reliable to be applied to Chilean dentists with a profile like those included in this study in order to identify and quantify the oral hygiene instruction they provide to patients. Future studies should assess validity and reliability of this adaptation for other Spanish-speaking countries.

Keywords: Questionnaires, Oral Hygiene, translating, Validation of questionnaire.

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INTRODUCTION.

One of the strategies to decrease dental caries morbidity is educational interventions, such as dental education, which includes oral hygiene recommendations delivered by dentists to their patients. The current Chilean clinical guidelines direct both professional dentists and members of

the healthcare team to deliver information about healthy habits related to brushing techniques and dietary habits, especially regarding consumption of sugary food and beverage frequency, and use of fluorides for 6-year-old children¹, adolescents², pregnant women³ and special patients⁴.

In 1996, Kay and Locker carried out a systematic review

to evaluate the effectiveness of educational recommendations for oral health delivered by dentists. They reported three findings: (a) an increase in the knowledge of oral health on the part of patients who receive education for oral health, (b) a small and transient decrease in the levels of dental plaque accumulation and (c) and none effect on caries levels⁵. Also, they found that most of the studies lacked a design or appropriate report and it urged to develop instruments and studies that could be used to measure the impact of educational interventions⁵. One of the requirements for evaluating these interventions is to identify what the recommendations for oral hygiene delivered by dentists are.

Recently, Morgan *et al.*⁶, from the University of Cardiff, England, developed a questionnaire using recommendations based on the evidence of the British Association for the Study of Community Dentistry⁷. It was meant to assess three aspects: (a) oral hygiene recommendations, (b) relevance and importance of the oral hygiene recommendation and³ training and professional experience. However, this instrument has not been validated in Spanish or any other language. To our knowledge, there is no other questionnaire developed for this purpose. Therefore, the aim of our study is to translate and validate the Spanish version of the instrument developed by Morgan *et al.* It was applied to dentists so as to evaluate recommendations delivered by health professionals about oral hygiene.

This validated instrument would allow beginning to identify recommendations delivered by professionals from Chile. Also, it would help to conduct comparative studies or assess educational interventions in oral health, identifying factors related to dentists, such as age, career length, post-graduate studies, gender and other demographic variables that might influence recommendations delivered or the relevance and importance that dentists give to them.

MATERIALS AND METHODS.

This validation study is based on the questionnaire developed by Morgan *et al.*⁶ from the School of Dentistry of the University of Cardiff. For its use in Spanish, it was intercul-

turally adapted based on the recommendations put forward by Guillemín *et al.*⁸. The present report about the translation and adaptation process supports the recommendations and terminology recommended by COSMIN guidelines⁹. This research protocol was approved by the Scientific Ethics Committee of the Faculty of Medicine of the Universidad Austral de Chile.

The instrument

The original version by Morgan *et al.*⁶ was also applied to undergraduate dental students and dental hygiene students at the University of Cardiff. The questionnaire, entitled “Comparison of oral hygiene advice given by student dentists, hygienists and therapists with evidence-based recommendations” includes three sections: (a) recommendations for oral hygiene with twelve closed questions to analyze specific features of oral hygiene tips given by respondents to their patients or the general population. Additionally, participants are asked to give specific examples, like the recommended fluoride concentration when suggesting a toothpaste; (b) relevance given to the delivery of oral hygiene recommendations, with ten items measured in 4-point Likert scale, and (c) training and experience in delivering oral hygiene recommendations, with six closed-ended questions about the participants’ academic training in prevention and their experience in delivering recommendations. Each question had an option indicating “other” where they could specify the response.

Spanish Translation

Translation and intercultural adaptation was performed according to the recommendations by Guillemín *et al.*⁸ which included five steps: translation, back-translation, revision, pre-testing and score weighting.

Translation

Two native Spanish-speakers, members of the research group and dental graduates, independently translated the questionnaire from English into Spanish. This Spanish version was number 1.

Back-translation

Then, the questionnaire in Spanish was independently translated into English by two professional translators. These translators had no professional relationship with dentistry.

This English version was number 2.

Review

Two experts in dentistry and research, one was a native Spanish-speaker and the other was not, both fluent in English (with residence in English-speaking countries for longer than 12 months), members of the research group, compared the original questionnaire, the translation and the back-translation. They evaluated the importance of each item by assigning them a value from 1 to 4 and calculating their content validity Index (I-CVI). Subsequently, the Validity Index of the scale (S-CVI) was calculated according to what was suggested by Polit and Beck¹⁰. Items with values less than 1 were removed and both experts created the Spanish version number 3 of the questionnaire.

Pre-testing

Cultural adaptation was verified and confirmed in version number 3 of the questionnaire by five dentists with more than 5 years of experience and knowledge of the recommendations contained in the guidelines of the Ministry of Health of Chile. Each dentist evaluated the questionnaire individually and gave his written opinion for each of the items. These points of view, as well as the responses, were analyzed and discussed by the research group focusing on ensuring understanding of each item without losing validity of the questionnaire. Afterwards, the research group developed the final Spanish version (number 4).

Score weighting

For validating version number 4 of the questionnaire, each item was evaluated by two experts from the research group. In order to test the correlation between the number of recommendations and dentists' attitude towards their relevance, items in the recommendations and relevance section were scored assuming that dentists who give more recommendations consider them more relevant. Responses from the first section were categorized from 0 (not recommended) to 3 (most recommended) and, in the relevance section, Likert scale scores were recoded from 1 (least important) to 4 (most relevant), as shown in Table 1.

Participants

The study was conducted at the School of Dentistry of

the Universidad Austral de Chile from January until May, 2014. Dentists from the city of Valdivia were invited to participate by visiting them at the work address available in public records such as telephone directories. Fifty-five

Table 1. Score weighting.

Section 1. Oral higiene recomendations		Section 2. Relevance and importance of oral higiene recomendations	
	scores		scores
Ítem 1	0-3	Ítem 13	1-4
Ítem 3	0-1	Ítem 15	1-4
Ítem 4	0-3	Ítem 16	1-4
Ítem 6	0-1	Ítem 19	1-4
Ítem 7	0-1	Ítem 20	1-4
Ítem 8b)	0-1	Ítem 22	1-4
Ítem 8e)	0-1		
Ítem 8f)	0-1		
Ítem 9	0-1		
Ítem 10a)	0-1		
Ítem 10b)	0-1		
Ítem 10d)	0-1		
Ítem 11	0-1		
Ítem 12a)	0-1		
Ítem 12b)	0-1		
Ítem 12c)	0-1		
Maximum score	20		24

dentists agreed to participate and internal consistency and validation measures were determined with these data. Five participants were asked to answer the questionnaire again a week later to calculate test-retest results. The minimum sample size of 56 participants was chosen since it is considered as good for validation studies⁹.

Reliability

To assess reliability of the questionnaire, that is to say, it was free from error in measurement, internal consistency, test-retest reliability and measurement error were calculated.

Internal Consistency

The extent of inter-relationship was assessed between related items by using Cronbach's alpha. Values greater than 0.7 were considered as good internal consistency.

Test-retest reliability

Total variance attributed to real differences among parti-

participants was analyzed using the test-retest method. Five participants were invited to answer the questionnaire again.

Measurement Error

Limits of agreement (LOA) were estimated using the sum of the scores of questions shown in Table 1. It was assumed that during the week, the participants would not change their answers about recommendations and their relevance. Then, the difference between scores from the first and second administration of the questionnaire was calculated. As a result, mean differences and their standard deviation were obtained. LOA for the 95% confidence interval was expressed as the mean differences plus or minus two standard deviations.

Validity

The degree to which the questionnaire measured the construct it was designed for was assessed using content validity, construct validity, and transcultural validity.

Content validity

It was qualitatively evaluated by two experts and an index was calculated using I-CVI and S-I CVI. The experts rated all the items on a four-point scale from 1= not relevant to 4= very relevant. Afterwards, the scores were dichotomized into "relevant" or "not relevant" considering that "strongly agree" or "agree" expressed the item was relevant, while "Disagree" or "strongly disagree" expressed the item was not important.

Construct Validity

Convergent validity was assessed assuming that those dentists who delivered more recommendations were those who considered them as more relevant. Item scores were weighted as stated previously and displayed in Table 1. Convergent validity was calculated between the amount of recommendations and their relevance using Pearson correlation coefficient.

Transcultural Validity

To ensure transcultural validation, it had to comply with these requirements¹: each translator had to be bilingual, their mother tongue had to be Spanish, and they had to work independently and be related to the dental profession². For the back-translation, translators had to be bilingual, their mother tongue had to be English, they had to

work independently and not be related to dentistry³. The experts were bilingual, related to both dentistry and the specific area evaluated by the questionnaire and the cultural and professional characteristics of the place where the questionnaire would be applied.

RESULTS.

Spanish Translation

The four versions of the questionnaire that were translated and culturally adapted were analyzed by the bilingual experts without finding significant differences in content with respect to the original.

Likert scales were kept with the same number of items. All the items of the questionnaire were considered relevant. The transcultural adaptation included changing items in closed alternatives by their equivalents as they appeared in guidelines published by the Ministry of Health of Chile.

Reliability

Internal Consistency

The first five items associated with the same construct were included, namely, that dentists who give more recommendations consider them more relevant. The interrelationship between this set of items was good (Cronbach alpha coefficient of=0.73).

Test-retest

Five dentists participated in the test and a subsequent retest a week later. A 90.1% of the items remained unchanged in the second administration of the questionnaire. For items on a nominal scale, the coefficient of Cohen's kappa was 0.80 (95% CI=0.64 -0.95) and, for ordinal items, the weighted kappa coefficient (linear weighting) was 0.76 (95% CI=0.65 -0.88).

Measurement Error

The difference for the scores between the two measurements was 1, standard deviation 2.35. A 95% of the differences were between -5.7 to 3.7 (LoA= 1+ / -4.7) and the variance of the total scores was 29 to 41.

Validity

Content validity

The experts evaluated all items as relevant, with an index

of I-CVI and S-CVI equal to 1.

Construct Validity

A moderately positive correlation was found for the scores obtained between the first and the second part of the questionnaire (Pearson Correlation $r=0.60$; $p<0.01$)

Transcultural Validity

The translations were presented to five dentists, who gave their opinion. These comments were incorporated into the translation. The experts found no significant differences between the translated and the original version and regarded it as appropriate to be applied among the Chilean population of dentists.

DISCUSSION.

The objective of this study was to translate, culturally adapt and validate the questionnaire developed in the School of Dentistry of the University of Cardiff by Morgan *et al.* to evaluate the recommendations about oral hygiene delivered by dentists⁶. Although this questionnaire was designed to evaluate the recommendations delivered by dental hygienists, we decided to use and adapt it for dentists in Chile for two reasons: (a) the recommendations assessed are consistent with those of the Ministry of Health of Chile and (b), in Chile, there is no a career for hygienists, given that the dentist embraces this role. We find that the final version obtained was valid and reliable to be applied to Chilean dentists in order to identify and quantify oral hygiene recommendations that they give to their patients. We found that the proposed version is valid and reliable since Cronbach's alpha coefficient was 0.73, which represents a good level of internal consistency; kappa coefficients were higher than 0.7 which suggests good reliability; both I-CVI and S-CVI were equal to 1 and a Pearson's correlation coefficient was 0.63, which suggests a good level of validity of the questionnaire after its translation and adaptation.

The original questionnaire developed by Morgan *et al.*⁶ was also applied to dental students about to graduate and dental hygiene students. When designing the questionnaire, Morgan *et al.* sought to study the extent to which

oral health professionals delivered the basic oral hygiene recommendations, namely: (a) brushing teeth twice a day with fluoride toothpaste, (b) use of toothpaste containing at least 1350ppm fluorine, (c) brushing teeth before going to sleep, and (d) expectorate and not rinse after brushing. These basic recommendations supported by the evidence may have different hints. Therefore, validation of the questionnaire would allow potential comparative studies both between dentists and between dentists and professionals related to dentistry like assistants or medical staff.

Translation and adaptation was performed according to the recommendations of Guillemín *et al.*⁸ and the report according to suggestions of COSMIN⁹. Given that the questionnaire had been previously validated, we chose not to repeat the whole validation process, but we selected some measurements that we considered important to ensure that its use would make it possible to compare the results of this questionnaire with previous studies.

The sample could be a limitation of the study. Considering the voluntary nature of participation, it is difficult to estimate how representative the sample was with regard to dentists who work in very demanding clinical environments and usually have little time to participate. This is why the first 56 dentists who agreed to participate and the first 5 who accepted to complete the questionnaire again were chosen. However, it is important to consider that the objective was to validate the questionnaire, that is, to get enough responses to be able to assess the parameters described, regardless of the participating dentists' characteristics. From now on, it is expected that the validated, that is to say, it measures what it is intended to measure, and replicable instrument can be applied to different samples of dentists to assess differences in the delivery of oral hygiene recommendations.

The second administration of the questionnaire was conducted a week later, even when the recommendations of COSMIN suggest you to do it after two weeks. The time of the second application was chosen after considering the scarce literature on validating scales in Chile, and finding a study which used this scheme¹¹.

We believe the items considered for the calculations, which are shown in table 1 with their scores, represent the amount of recommendations delivered by dentists and the relevance they give to them. Those items without score represent the dentist's opinion about the recommendation itself and were not scored, for example, if he/she believed the Chilean population had good oral health. According to COSMIN, this kind of questions do not need to be included in the statistical analysis, since the chosen model was formative and not all the items were interrelated.

Another study limitation is that validation of the original questionnaire lacks the objective indicators to compare our results. Morgan *et al.* had experts to evaluate face validity and assessed content by verifying the questionnaire covered the objectives of the study. Afterwards, they conducted a pilot test, without reporting the results. However, the experts of the present study recognized the enclosed items appropriately represented recommendations about oral health contained in the guidelines of the Ministry of Health of Chile.

Ruiz *et al.*¹¹ validated a questionnaire about proximal caries treatment, and indicated an aspect that we share. They say even though the assessment of reliability and validity of an instrument adapted culturally could be maintained, it could also happen that, during the adaptation process, the questionnaire develops new features in a new context. We

believe that this aspect would be irrelevant given the concordance between the contents of the questionnaire and clinical guidelines for recommendations on hygiene in both Great Britain and Chile. Consequently, we do not believe that the instrument measures more things in its Spanish version than with the one in English.

CONCLUSION.

The results of the present study show that the instrument, adapted to Spanish, for measuring recommendations by dentists and their relevance is valid and reliable to be applied to Chilean dentists. Future studies could assess whether this validity and reliability is similar for other dentists from Spanish-speaking countries. The main use of the validated questionnaire would be to evaluate recommendations about oral hygiene delivered by dentists, so as to be able to identify factors affecting the delivery of these recommendations, like demographic factors, undergraduate, postgraduate training or type of practice, among others.

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Adaptación transcultural y confiabilidad del cuestionario en español de recomendaciones acerca de higiene oral entregadas por dentistas en Chile.

Resumen: Objetivo: Adaptar y evaluar validez-confiabilidad del cuestionario en español acerca de las recomendaciones de higiene oral entregada por dentistas en Chile. Método: Estudio de validación realizado según recomendaciones COSMIN. El cuestionario original en inglés se adaptó al español mediante traducción, retrotraducción, revisión de expertos y prueba piloto en muestra de 56 dentistas. El instrumento constaba de 3 secciones: recomendaciones de higiene oral, relevancia dada a la entrega de recomendaciones

de higiene oral y entrenamiento y experiencia en la entrega de recomendaciones de higiene oral. Se volvió a aplicar en 5 de ellos una semana después. Se midió confiabilidad mediante consistencia interna (alfa de Cronbach), test-retest (kappa de Cohen y kappa ponderado) y medición del error (límites del acuerdo, LdA). Se evaluó la validez de contenido por expertos y la validez de constructo mediante validez convergente (correlación de Pearson). Resultados: Se obtuvo un buen nivel de consistencia interna que aplica para 5 ítems (alfa de Cronbach=0.73). Para los ítems nominales el coeficiente de kappa de Cohen fue 0.80(95% IC=0.64- 0.95) y para los ordinales el coeficiente de kappa ponderado (pon-

deración-lineal) fue 0.76 (95%IC=0.65-0.88). La diferencia calculada para los puntajes entre mediciones fue 1, desviación estándar 2.35. El 95% de las diferencias estaban entre -5.7 hasta 3.7 (LdA=1+/-4.7) y la varianza del total de los puntajes fue de 29-41. Se obtuvo un buen nivel de validez convergente (correlación de Pearson=0.63). Conclusión: La versión final obtenida del cuestionario es válida y confiable

para ser utilizada en dentistas chilenos con un perfil similar a los incluidos en este estudio para identificar y cuantificar las recomendaciones de higiene oral que entregan a los pacientes. Futuros estudios deberán evaluar la validez y confiabilidad de esta adaptación otros países de habla hispana.

Palabras clave: *Cuestionarios, Higiene oral, Traducción, Validación de cuestionario.*

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