ORIGINAL PAPER

VALIDATION OF FAMILY IMPACT SCALE TO ASSESS ORAL HEALTH-RELATED QUALITY OF LIFE IN PARENTS OF CHILEAN PRESCHOOLERS

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ABSTRACT

Introduction: Health-related quality of life results from the perspective that well-being of patients is an important point considered in their treatment. From the 1960s, research and data collection with surveys began with the creation of multiple measurement tools for estimation of subjective opinions in a population. However, these tools must be translated into native language of a country of interest, and it also requires a correct validation by obtaining appropriate psychometric properties.

Objectives: To assess the validity of Family Impact Scale (FIS) in parents of Chilean preschoolers living in the province of Concepción, Chile.

Material and methods: Target group was parents of preschoolers in the province of Concepción. Variables included oral health-related quality of life (OHRQoL) measured using Early Childhood Oral Health Impact Scale (ECOHIS) and FIS, oral hygiene, caries history, dental service utilization, sex, children's age, parent's age, and parent's education level. Moreover, psychometric properties with internal consistency, temporal stability, criterion, and discriminative validity were evaluated. Cronbach's α was estimated for internal consistency, and the following statistics were generated: intra-class correlation coefficient (ICC) for temporal stability, and Pearson's r correlation coefficient for criterion and discriminative validity ($p < 0.05$).

Results: Regarding internal consistency, FIS presented a global Cronbach's α of 0.765, being acceptable. For the temporal stability, an ICC of 0.99 ($p < 0.001$) was found, which indicated excellent temporal stability. For the criterion validity, moderate correlations (0.6 < Pearson's $r > 0.3$) were found between FIS and ECOHIS as well as for most of the dimensions.

Conclusions: The Chilean version of the family impact scale exhibits questionable reliability and validity, despite its' excellent temporal stability. Therefore, it is not recommended to use FIS in parents of Chilean preschoolers.

Key words: children, quality of life, oral health, psychometric properties, validation.

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INTRODUCTION

Given that oral diseases are negatively associated with quality of life in both adults and children [1, 2], various instruments have been developed and validated to measure oral health-related quality of life (OHRQoL) in different populations around the world [3-6]. In case of children and adolescents, various instruments have been developed to measure OHRQoL, such as Child Perceptions Questionnaires (CPQ 8-10 or CPQ 11-14), Child Oral Health Impact Profile (child-OHIP), Child Oral Impact on Daily Performance Index (child-OIDP), scale of oral health outcomes for 5-year-old (SOHO-5), Parental-Caregiver Perceptions Questionnaire (P-CPQ), Family Impact Scale (FIS), and Early Childhood Oral Health Impact Scale (ECOHIS) [7].

Specifically, both ECOHIS and SOHO-5 are valid and widely used instruments to determine OHRQoL in preschool children [7]. Furthermore, FIS has proven to be an excellent instrument to measure the impact of oral health in the family. In FIS, despite having been initially developed for children between 6 and 14 years old, psychometric properties have been evaluated in 3-years-old children and older [7].

In Chile, caries in children continues to be an unsolved public health problem, with prevalence reaching 80% [8], which predict a low level of OHRQoL in Chilean preschoolers. Therefore, ECOHIS and SOHO-5 have been cross-culturally adapted to determine the OHRQoL in that population [9, 10]. Although both instruments have good psychometric properties and discriminable validity, ECOHIS exhibits the greatest discrimination regarding oral health status of preschoolers [11]. Although FIS has been cross-culturally adapted to Spanish [12], its' validity has not been tested in Chilean preschoolers, which hinders the chance to assess OHRQoL in this population.

OBJECTIVES

This study aimed to assess the validity of FIS scale in parents of Chilean preschoolers living in the Concepción province, Chile.

MATERIAL AND METHODS

DESIGN AND ETHICS

This was a cross-sectional study, which aimed to assess the validity of FIS scale in parents of Chilean preschoolers living in the province of Concepción, Chile. The protocol was prepared according to the Declaration of Helsinki, and it was approved by the Bioethics Committee of Universidad Andrés Bello School of Dentistry (approval number: PROPRGFOC_00201915).

PARTICIPANTS

Target group was parents of preschoolers in the province of Concepción, Chile. The study excluded illiterate or intellectually handicapped parents and preschoolers with serious medical illnesses.

FIS SCALE

Spanish version of FIS [12] is comprised of 14 items, divided into 4 sections, including parental/family activity (PA), parental emotions (PE), family conflicts (FC), and financial burden (FB). Each item is evaluated on a 5-point Likert scale, with answers, such as *never* = 0, *once or twice* = 1, *sometimes* = 2, *often* = 3, *almost every day* = 4, and *I don't know*, which is not scored. Total value of FIS can range from 0 to 56, where high values indicate a greater impact of child's oral health condition on family's quality of life. No modifications to this Spanish version were made.

VARIABLES

Variables were assessed in five groups: (1) demographics, such as sex, children's age, parents' age, and parents' education level; (2) OHRQoL measured using ECOHIS [7] and FIS [12]; (3) clinical data evaluated as oral health, with oral hygiene (oral hygiene index simplified, OHIS) and caries history (dmft); (4) dental service utilization: last visit to the dentist, with the reason (urgency, treatment, or check-up), time (months), and type of healthcare center (public or private); (5) psychometric properties, including internal consistency, reliability, criterion validity (correlation with ECOHIS and its dimensions), and discriminative validity (correlation with clinical variables).

DATA COLLECTION

Patients were recruited from four public schools in Concepción, Chile. Parents willing to participate signed an informed consent, answered the questionnaire, and their child received a clinical examination. A random selection of 20 patients was appointed 2 weeks later to re-test FIS.

STATISTICAL ANALYSIS

Summary measures for all variables were calculated. Cronbach's α was estimated for internal consistency, intraclass correlation coefficient (ICC) for reliability, and Pearson's *r* correlation coefficient for criterion and discriminative validity ($p < 0.05$). STATA/SE version 14 (Stata Corp., USA) was applied for analysis.

TABLE 1. Sample's characterization

Variables	Males	Females	General
Child's age (months), mean ± SD	68.73 ± 6.83	67.88 ± 6.70	68.31 ± 6.76
Parent's age (years), mean ± SD	33.60 ± 7.81	34.13 ± 7.81	33.86 ± 7.79
Last visit to the dentist (months), mean ± SD	9.18 ± 10.10	6.48 ± 5.03	7.86 ± 8.12
Parent's educational attainment (years), mean ± SD	13.48 ± 3.17	13.71 ± 2.55	13.59 ± 2.87
FIS (score), mean ± SD	4.52 ± 6.38	4.44 ± 5.53	4.48 ± 5.96
Dmft, mean ± SD	5.25 ± 4.05	5.02 ± 4.37	5.14 ± 4.20
dmft-d	4.29 ± 3.83	3.92 ± 3.74	4.11 ± 3.78
dmft-m	0.07 ± 0.29	0.08 ± 0.47	0.07 ± 0.39
dmft-f	0.92 ± 1.69	1.02 ± 1.56	0.97 ± 1.62
OHI-S debris, mean ± SD	0.81 ± 0.47	0.81 ± 0.45	0.81 ± 0.46
OHIS-S calculus, mean ± SD	0.16 ± 0.25	0.13 ± 0.23	0.15 ± 0.24
Last visit to the dentist (reason), %			
Check-up	68.2	68.2	68.2
Treatment	26.1	27.1	26.6
Urgency	5.7	4.7	5.2
Last visit to the dentist (place), %			
Public	75.0	74.1	74.6
Private	25.0	25.9	25.4

TABLE 2. Internal consistency of Family Impact Scale (FIS)

Item	Item-test correlation	Item-rest correlation	Cronbach's α without item
FIS1	0.60	0.50	0.66
FIS2	0.50	0.37	0.67
FIS3	0.50	0.38	0.67
FIS4	0.23	0.08	0.71
FIS5	0.29	0.15	0.70
FIS6	0.49	0.36	0.67
FIS7	0.38	0.24	0.69
FIS8	0.35	0.21	0.69
FIS9	0.26	0.11	0.70
FIS10	0.40	0.26	0.69
FIS11	0.46	0.33	0.68
FIS12	0.47	0.34	0.68
FIS13	0.54	0.42	0.67
FIS14	0.49	0.36	0.67
FIS15	0.54	0.42	0.67
Total			0.70

RESULTS

A total of 175 children were surveyed, with a distribution of 89 boys and 86 girls, aged between 56 and 79 months. Clinical and socio-demographic classification by sex is shown in Table 1. Regarding the internal consistency, FIS presented a global Cronbach's α of 0.765, being acceptable. Cronbach's α values for the dimensions were: parental activity: 0.494 (questionable); parental emotions: 0.623 (unacceptable); family conflicts: 0.481 (unacceptable); financial burden scored only one item, so it could not be calculated. Details of the correlations and internal consistency for each item are shown in Table 2.

Regarding the temporal stability of FIS, an intraclass correlation coefficient (ICC) of 0.99 ($p < 0.001$) was noted, which indicated excellent temporal stability. In the criterion validity, moderate correlations (0.6 < Pearson's $r > 0.3$) were found between FIS and ECOHIS as well as for most of the dimensions. Details of the correlations between the dimensions are presented in Table 3. Finally, the correlations with clinical variables were weak to moderate, which are demonstrated in Table 4.

DISCUSSION

This was the first study that assesses the validity of FIS in parents of Chilean preschool children in the context of oral health. Currently, FIS is the only instrument available to assess the impact of the oral health status of children on the quality of life of the family. To date, its' validity and reliability have been demonstrated in various English-speaking countries [13, 14], and

non-English speaking ones, including Brazil [15, 16], Libya [17], India [18, 19], Finland [20], and Peru [12].

Despite an acceptable global internal consistency observed for FIS, the sub-scales presented questionable or unacceptable values. This is in contrast with Peruvian [12], Brazilian [15], and Finnish [20] versions, in which good to high values were reported for both global and sub-scales. The domain with the lowest results was family conflicts. Participants were possibly affected by such direct questions on the scale as item 9: 'Has your child been jealous of you or other members of your family?' For the participants in this study, it was likely that it was very invasive to be consulted about personal emotions, which tended to reject and many times falsify the answer.

Regarding the internal correlations of FIS with the global scores, the results were mostly weak to moderate, which demonstrated its' internal consistency questionable. This is in agreement with the findings of Kumar *et al.* [19], where both the original version and abbreviated version of FIS presented weak internal correlations with their global score. Likewise, the Peruvian version presented a statistically significant correlation between the global scores with the sub-scales; however, these were not strong either [12]. Overall, the internal consistency of FIS in parents of Chilean preschoolers was not good, pointing out that questions included in FIS probably did not focus on a clear/unified concept. Regarding sub-scales, future research must consider factory analysis to assess the structure of the scale, and the necessity to remove, modify, or replace some items to improve their psychometric properties.

On the other hand, the temporal stability was excellent, which probably was related to directness and simplicity of the questions, but also the stability of the situation (impact on family) assessed by FIS. However, the relevance of this is marginal considering the poor performance on the other psychometric properties.

A statistically significant correlation between FIS and ECOHIS was found; however, it was weak to moderate. Moreover, the correlation values were higher between dimensions of FIS and ECOHIS impact on child dimensions, as compared with the impact on the family. This situation questions the FIS criterion validity to specifically assess the impact on the family. Furthermore, regarding the discriminative validity, FIS presented weak correlations with dmft, which agrees with the fact that the Canadian [13] and Brazilian [15, 16] versions found no significant relationships between quality of life and caries history. This is in contrast to the findings of the Peruvian version, in which FIS significantly discriminated between groups with and without a history of caries [12].

On the other hand, the Indian version of FIS showed good psychometric properties regarding the impact of malocclusions on the family [18]. However, that paper included adolescent school children between 12 and 15 years old, which is expectable considering the great impact of oral morbidities during adolescence [21]. In this study, malocclusion was not assessed, because it has a marginal effect on OHRQoL in Chilean preschoolers [22]. It is important to emphasize that the use of clinical variables for discriminative validity assumes that those variables have a significant impact on the OHRQoL of a population under study; otherwise, they must not be used. Moreover, malocclusion impact scale for early childhood (MIS-EC) was recently developed and validated for that purpose [23]. Therefore, for criterion validity, using MIS-EC appears as a good option to validate OHRQoL scale for preschool children in future research [24].

This study has some important limitations to mention. The scale was applied to parents of preschoolers attending public schools, so its' applicability in other socio-economic and age settings cannot be guaranteed. Furthermore, most of the children evaluated in the study were under some type of dental treatment or follow-up due to dental care guaranteed by GES (garantías explícitas en salud, explicit health guarantee) program for every 6-year-old child, and special dental programs for under-6-year-old children in Chile [20]. This situation could affect the perceptions of parents, especially those related to PA and FB sections in FIS. The latter is especially relevant, as dental care for children in other countries is not guaranteed and depends on payment/time capacity of parents/guardians. Moreover, preschool children attending public schools and day care centers usually receive their full dental treatment inside those facilities for free. Therefore, the impact on the family

TABLE 3. Criterion validity

	ECOHIS child	ECOHIS family	ECOHIS total
FIS parental activity	0.466**	0.373**	0.469**
FIS parental emotions	0.442**	0.391**	0.461**
FIS family conflict	0.375**	0.243*	0.353**
FIS financial burden	0.241*	0.260*	0.271**
FIS total	0.538**	0.445**	0.548**

*$p < 0.05$; **$p < 0.001$

TABLE 4. Correlation (Pearson's *r*) of Family Impact Scale (FIS) with clinical variables

	FIS PA	FIS PE	FIS FC	FIS FB	FIS total
dmft[1]	0.249*	0.223*	0.277**	0.127	0.302**
dmft-d	0.184*	0.148	0.140	0.077	0.197*
dmft-m	0.103	0.149*	0.200*	0.159*	0.187*
dmft-f	0.210*	0.202*	0.340**	0.137	0.290**
OHI-S debris[#]	0.072	0.160*	0.091	0.033	0.136
OHIS-S calculus[#]	0.147	0.175*	0.169*	0.143	0.209*

[#]Pearson's r; *$p < 0.05$; **$p < 0.001$

of these children would be especially limited to issues at home.

CONCLUSIONS

The Chilean version of the family impact scale exhibits questionable reliability and validity, despite its' excellent temporal stability. Therefore, it is not recommended to use FIS in parents/ guardians of Chilean preschoolers. Further research is necessary to develop and validate an instrument to assess the impact of children's oral health in their families.

CONFLICT OF INTEREST

The authors declare no potential conflict of interests with respect to the authorship and/or publication of this article.

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