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Original Research

Comparison of the Arabic Versions of the Early Childhood Oral Health Impact Scale (ECOHIS) and the Scale of Oral Health Outcomes-5 (SOHO-5) in Assessment of Oral Health Related Quality of Life

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ABSTRACT

Aim: To compare the accuracy of the validated SOHO-5 to a previously validated version of the Early Childhood Oral Health Impact Scale (ECOHIS)

Materials and Methods: Five hundred fifty four preschool children between the age of 4 and 6 years in Riyadh city, Kingdom of Saudi Arabia were submitted to oral examinations. Parents answered Oral Health Related Quality of Life (OHRQoL) questionnaire (ECOHIS or SOHO-5). The number of decayed, missed, and filled deciduous tooth surfaces (dmfs) served as the measure to determine content and construct validity. Statistical analysis involved the Independent samples t-test as well as the calculation of Pearson's correlation coefficient.

Results: A statistically significant ($p<0.05$) positive correlation was found between SOHO-5 and ECOHIS, SOHO-5 and dmfs, and ECOHIS and dmfs. No statistically significant relation was found between SOHO-5, ECOHIS, and dmfs with gender ($p>0.05$). Cronbach's alpha for internal consistency reliability on SOHO-5 and ECOHIS was 0.756 and 0.747 respectively.

Conclusion: The results of this study suggest that the Arabic versions of both SOHO-5 and ECOHIS are equally effective as measures to assess OHRQoL in children below five years of age

INTRODUCTION

When it comes to oral health, the earlier the diagnosis is made, the easier the treatment, an issue that is more pronounced in children. [1, 2] The ages between 2-5 years are referred to as pre-school years and children undergo major development and changes in their oral structure. Problems at this age could have serious and severe consequences on their quality of life and health in later age. A majority of the studies done in the Kingdom of Saudi Arabia (KSA) showed that caries distribution varied from 90-95%, with some studies suggesting that only 4% of Saudi children aged between 6-7years of age were free of dental caries. [3-6]

One of the most important ways to mitigate oral risks and to limit their impact on quality of life is to conduct an early diagnosis and complete an impact scale assessment. [7] Of the many scales for Oral Health Related Quality of Life (OHRQoL) in children, two scales that have been developed exclusively for children below the age of 6 years are the Early Childhood Oral Health Impact Scale (ECOHIS) and the Scale of Oral health Outcomes-5 (SOHO-5). While the ECOHIS was developed in the United States [8], the SOHO-5 was developed in the United Kingdom. [9]

Tsakos *et al.* (2012) developed a new version of the self-reported scale for 5 year children and named it SOHO-5. The authors stated that most tools including the traditional SOHO depend on parental reports and hence suggested a more accurate report based on self-reported measures. The proposed tool was developed and validated in the UK. [9] A research that developed the ECOHIS to measure the OHRQoL of preschool children

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and their families reported that the ECOHIS performed well in assessing OHRQoL among children and their families. It suggested studies in other populations to further establish the instrument's technical properties. [10] Another study using an Arabic version of the ECOHIS to evaluate the differences in parental perception of the OHRQoL of their children found that Saudi fathers may not be apt as proxies to assess the QHRQoL of their children and their concern did not correlate to the oral status of their child. [11]

The translation of scales into different languages and adaptation of these scales across cultures is an important aspect of the development of scales. The ECOHIS is limited to the perceptions of parents/guardians [10], however the SOHO-5 was developed to evaluate the OHRQoL of 5-year-old children through both self-reports as well as proxy reports by parents/guardian. [12] The ECOHIS has been successfully adapted and translated into several languages including French, Chinese, Farsi, Portuguese, and Arabic. [11, 13-16]

The SOHO-5 on the other hand remains a comparatively new tool and only recently have there been attempts made to adapt it into Portuguese [17]. It has also been adapted and validated cross culturally for use on Brazilian children aged five to six years. [18] Hence there is a need to translate the SOHO-5 into Arabic, to validate this translation, and to compare the Arabic forms of the SOHO-5 and the ECOHIS in their ability to adequately determine the oral health related quality of life of children in early childhood in KSA. The aim of the study is to validate the Arabic version of the SOHO-5 questionnaire and to compare the accuracy of the validated SOHO-5 when compared to a previously validated version of the ECOHIS.

MATERIALS AND METHODS

A cross-sectional study was conducted with preschool children of five years of age and their parents/caregivers in Riyadh city after obtaining informed consent. A total of 554 children were recruited from 20 pre-schools and these institutions were randomly divided into the ECOHIS or the SOHO-5 groups. The study sought to evaluate children aged between 4-6 years who were enrolled in a preschool/daycare center in the city. Children with long standing medical conditions were excluded from the study.

The ECOHIS questionnaire had a total of 12 questions. Closed questions were utilised permitting participants to scale responses from “never” (Score–1) to “very often” (Score–6) on a six-point scale across twelve items. On the other hand, SOHO-5 questionnaire had a total of 8 questions. Closed questions were utilised permitting participants to scale responses from “no” (Score–1) to “a lot” (Score–3) on a three-point scale across eight items. The SOHO-5 was translated into Arabic with the help of subject-matter experts in language and dentistry. Content and context validity was performed using the methodology outlined by Abanto *et al.* (2013). [18] A previously translated and validated version of the ECOHIS was used for this study. [19]

Parents of the recruited children completed the OHRQoL questionnaire (ECOHIS or SOHO-5) in Arabic to obtain demographic and social information about their children. The person who was conducting the interview was first trained and made aware of the research scope and tool concept. For the purpose of this study, construct and validity of the questionnaire was evaluated by the results obtained and correlating it to the actual dmfs of the child. The reliability of the questionnaires was evaluated by re-administering the test to group of parents and applying the Cronbach’s alpha statistics. The number of decayed,

extracted, and filled primary teeth (def) served as the measure to determine content and construct validity.

Ethical approval for this study was obtained from the Institutional Review board of the Riyadh Colleges of Dentistry and Pharmacy. Anonymity and confidentiality were assured. There were no personal identifiers on the questionnaire and no record was kept of children attending the sessions. Family consent was obtained from children parents prior to the commencement of the interviews.

The quantitative data was analysed using the Statistical Package for Social Science (IBM SPSS) version 22 for Windows. Descriptive analysis was undertaken to present an overview of the findings from this population. Level of statistical significance was set at $p \leq 0.05$. After inputting the data for the parents of all 554 children, the following parameters were calculated and analyzed: Pearson's r correlations between the ECOHIS/SOHO 5 scores and def scores, Cronbach's Alpha parameters to test consistency and reliability of the repeated ECOHIS scores (test, re-test reliability), and the Independent sample t-test was used to compare the accuracy of the ECOHIS score with the SOHO-5 score.

RESULTS

A total of 554 children and their mothers were included in this study. No questionnaire was excluded from the analysis due to incomplete data. The mean (±SD) age of the children and mother was 5.46±0.4 years and 32.10±4.3 years respectively. The mean (±SD) dmf, d, m, and f score was 8.25±2.7, 7.79±2.6, 0.14±0.4, and 0.38±0.8 respectively (Figure 1). The mean (±SD) age of the male children was marginally higher (5.50±0.5 years) than the female (5.41±0.4 years). The overall quality of life scores for males were higher than for females. Although the overall ECOHIS for males was higher than females, the child impact scale (CIS) was higher for females. The overall dmf for males and females were approximately equal (Table 1).

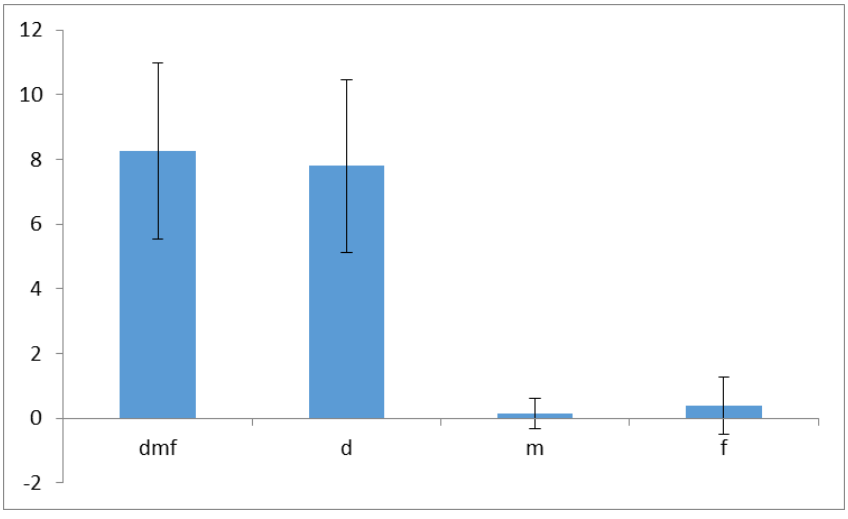

Fig 1: Mean (± SD) dmf, d, m, and f

Table 1: Mean (± SD) age of child, SOHO-5, CIS, FIS, ECOHIS, d, m, f, and dmf by gender

	Gender of Child	Mean	Std. Deviation	Std. Error
Age of Child	Male	5.5089	.50081	.02988
	Female	5.4191	.49432	.02997
SOHO-5	Male	5.9644	3.78609	.22586
	Female	5.7537	3.84213	.23296
CIS	Male	12.8114	6.65395	.39694
	Female	12.8382	7.16410	.43439
FIS	Male	7.3416	4.11843	.24568
	Female	6.9890	3.93722	.23873
ECOHIS	Male	20.1530	10.02291	.59792
	Female	19.8272	10.54229	.63922
d	Male	7.8292	2.65370	.15831
	Female	7.7463	2.69035	.16313
m	Male	.1210	.38677	.02307
	Female	.1765	.51376	.03115
f	Male	.3808	.87067	.05194
	Female	.3824	.90149	.05466
dmf	Male	8.2456	2.73081	.16291
	Female	8.2684	2.70261	.16387

There was a statistically significant relation between age and gender of the children ($p<0.05$). However, no statistically significant relation was found between SOHO-5, CIS, FIS, ECOHIS, d, m, f, and dmf and gender ($p>0.05$) (Table 2). A strong positive correlation was found between SOHO-5 and CIS (r=.801), SOHO-5 and FIS (r=.773), SOHO-5 and ECOHIS (r=.826), CIS and FIS (r=.748), CIS and ECHOIS (r=.966), and FIS and ECHOIS (r=.895). Furthermore, this relation was statistically significant ($p<0.05$). There was a positive correlation between SOHO-5 and S8 (Parentally reported dental emergency), CIS and S8 (Parentally reported dental emergency), FIS and S8 (Parentally reported dental emergency), and ECOHIS and S8 (Parentally reported dental emergency) and was statistically significant ($p<0.05$) (Table 3).

Furthermore, a positive correlation was found between SOHO-5 and Toothache, Satisfaction with oral health, Abscess, Pulp therapy, and oral health; CIS and Toothache, Satisfaction with oral health, Reported caries, Caries, Abscess, Pulp therapy, and oral health; FIS and Toothache, Satisfaction with oral health, Reported caries, Caries, Abscess, Pulp therapy, and oral health; and ECOHIS and Toothache, Satisfaction with oral health, Reported caries, Caries, Abscess, Pulp therapy, and oral

health. All the relations were statistically significant ($p<0.05$) (Table 3).

A statistically significant positive correlation was found between SOHO-5 and d, m, f, and dmf; and ECOHIS and d, m, f, and dmf ($p<0.05$). There was a negative correlation between d and m ($p>0.05$); and between d and f ($p<0.05$) and a positive correlation between m and f ($p>0.05$); and d, m, and f and dmf ($p<0.05$) (Table 5).

Reproducibility was measured on a recall sample of 50 mothers who were re-administered with both questionnaires after 3 months. The Cronbach's alpha was calculated between the baseline score and the recall score of each questionnaire. Although the components of the ECOHIS (Table 5) had a higher alpha score than those of the SOHO-5 the scores of both scales were greater than the minimum acceptable score of 0.7.

Table 2: Significance of difference in age of child, SOHO-5, CIS, FIS, ECOHIS, d, m, f, and dmf with gender

	t-test for Equality of Means		
	t	**df**	**p value**
Age of Child	2.121	550.789	.034*
SOHO-5	.650	551	.516
CIS	-.046	551	.964
FIS	1.029	551	.304
ECOHIS	.373	551	.710
d	.365	551	.716
m	-1.431	503.298	.153
f	-.021	551	.983
dmf	-.099	551	.921

* Differences significant at $p<0.05$

Table 3: Correlation between the measured scales and different parentally reported variables

		S8 (Parentally reported dental emergency)	Toothache	Reported Caries Experience	History of Pulp Therapy	History of Abscess	Perceived oral health
SOHO-5	r	.299*	.549*	.107*	.640*	.231*	.138*
	p value	.000	.000	.012	.000	.000	.001
CIS	r	.218*	.472*	.086*	.567*	.193*	.138*
	p value	.000	.000	.043	.000	.000	.001
FIS	r	.211*	.476*	.113*	.555*	.202*	.147*
	p value	.000	.000	.008	.000	.000	.001
ECOHIS	r	.229*	.589*	.102*	.599*	.209*	.150*
	p value	.000	.000	.016	.000	.000	.000

* Correlation significant at p<0.05

Table 4: Correlation between SOHO-5, ECOHIS, d, m, f, and dmf

		d	m	f	dmf
SOHO-5	r	.544*	.196*	.137*	.622*
	p value	.000	.000	.001	.000
	n	554	554	554	554
ECOHIS	r	.541*	.178*	.144*	.608*
	p value	.000	.000	.001	.000
	n	554	554	554	554

* Correlation Significant at p<0.05

Table 5: Cronbach's Alpha for the reproducibility score

Component	Alpha
SOHO-5	0.712
C-IS	0.743
F-IS	0.724
ECOHIS	0.749

DISCUSSION

Oral health related quality of life (OHRQoL) is an important part of a child's oral health. Increasingly the role of OHRQoL in determining both treatment approaches and treatment outcomes is becoming popular.Due to different language and different culture across countries, a cross-cultural adaptation of an instrument to measure quality of life may be essential in a country other than where it was developed. The extent of adaptation required would depend on similarities in language structure and in culture. [20] The purpose of this study was to assess the cross cultural adaptability of the Arabic translations of two early childhood OHRQoL scales.

The Arabic version of ECOHIS has been validated and found to be culturally suitable in Saudi Arabia. [19 20] The cross cultural adaptation and validation of the SOHO-5 into Arabic was conducted using methods that have previously been used for the ECOHIS. [21-23] In the current study among 4 to 6 year old children the validated Arabic ECOHIS was used to find the parental perception on the OHRQoL of their children and the reliability of the substitution of parents in assessing the OHRQoL of their children was seen. Construct validity showed that there was strong correlation between overall SOHO-5 and ECOHIS scores with caries experience (dmft). For construct validity, the associations between SOHO-5 and ECOHIS with different subjective oral health measures (current toothache, toothache, satisfaction with oral health, and reported caries), as well as with an aggregate oral health measure, and based on both clinical (caries, pulp therapy) and subjective (current toothache, toothache) variables were considered. All associations were found to be statistically significant. The construct validity of validated Arabic SOHO-5 was similar in comparison to Arabic ECOHIS.

The psychometric properties of SOHO-5 showed very satisfactory results supporting its reliability and validity in terms of internal consistency and test-retest. Internal consistency reliability was established through different statistics. All inter-item correlations were positive and none was very high, and all item-total correlation coefficients were above the recommended level of 0.2. [24] This can be compared to the study in Brazil. [25] Similar finding was found in the ECOHIS scale of measurement.

Cronbach's alpha was 0.75, above the arbitrary threshold of 0.7, [26] and it was lower when any of the items was deleted. While the value of alpha tends to be higher on indices that have more questions, this study revealed very good internal consistency for the SOHO-5. This finding was comparable with the Brazilian study. [25] The

Cronbach's alpha for ECOHIS scale of measurement was 0.74. This was marginally lower than the ECOHIS version for Malaysia (0.83), [21] Brazil (0.86), [27] Farsi (0.85), [22] and higher than the Chinese version (0.64). [23] The accuracy of validated Arabic SOHO-5 can be compared to previously validated Arabic ECOHIS scale. The sample used may not be representative of the general population of children of 4 to 6 years old. The included children had already sought dental treatment in the screening program. The oral impacts of the general population may be varied. However, the fact that the dental caries history in the sample was similar to that of the general population of 5-year-old children in KSA tends to suggest that these results may not vary, even if the sample size is increased. [25]

The outcome of SOHO-5 could be used to evaluate oral health promotion programs and services for the very young children. [28] The young children represent a high risk group for oral health like dental caries. [29] By using the SOHO-5 and ECOHIS to measure the QHRQoL it will assist the oral healthcare professionals, researchers, and public and private health agencies understand the quality of life of young children and their families. This will help to plan oral interventions, promote and implement oral health care among the Saudi population. The fact that this study focused on the parents of children attending daycare/pre-school in Riyadh city which is an urban area suggest that it may not be representative of the Saudi population. Even though the SOHO-5 has a child perception component (SOHO-5c), only parental perception (SOHO-5p) of the OHRQoL was measured and no attempt was made to assess the child perception.

CONCLUSION

The results of this study demonstrated that the Arabic versions of both the ECOHIS and the SOHO-5 were met the tests of cross cultural adaptability. Within the limitations of this study it can be concluded that both the ECOHIS and the SOHO-5 are culturally valid tools for the measurement of OHRQoL among the parents of children below five years of age. Based on the results of this study it is recommended that investigators can use the Arabic version of either SOHO-5 or ECOHIS for the measurement of OHRQoL in children.

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