ORIGINAL RESEARCH

Psychometric Properties of Telugu Version of Scale of Oral Health Outcomes for 5-year-old Children

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Abstract

Introduction: Only a finite number of standard oral health-related quality of life (OHRQoL) measures are available for young children. However, instead of using parents as proxies to report a child's oral health status, children's self-reported oral health measures would be more accurate in providing their own perceptions of oral impacts.

Aim: The study aimed to evaluate the psychometric properties of the Telugu version of the scale of oral health outcomes (SOHO-5T) for 5-year-old children in Telangana.

Materials and methods: The forward-backward translated SOHO-5T was pilot-tested among thirty children. The tested questionnaire was administered to 419 children, followed by a clinical oral examination using dentition status to evaluate dental caries (DC). Children ($n = 30$) were readministered the same questionnaire after a 2-week interval to test reliability. Internal consistency and test-retest reliability were determined by Cronbach's α and intraclass correlation. Correlation with global ratings of oral health questions was done to assess construct validity. Discriminant validity was evaluated based on the presence or absence of DC. A $p < 0.05$ was considered statistically significant.

Results: The mean SOHO-5T score was 4.70, and the mean decayed teeth score was 2.48, with 49.16% of children having DC. Cronbach's α scores and the intraclass correlation (ICC) coefficient for overall SOHO-5T were 0.90 and 0.91, respectively. SOHO-5T also demonstrated good construct validity with a significant positive correlation with global ratings of oral health. SOHO-5T showed good discrimination between the presence (9.43 ± 3.10), or absence (0.14 ± 1.01) of DC.

Conclusion: This study shows good internal consistency and test-retest reliability. It also exhibited good construct and discriminant validity.

Keywords: Children, Oral health, Psychometric analysis, Psychometric, Telugu.

International Journal of Clinical Pediatric Dentistry (2024): 10.5005/jp-journals-10005-2911

Introduction

Dental caries (DC) is a predominant oral disease and is considered to be a significant public health problem among children.[1] Although the etiological mechanisms of DC are well known, various other factors contributing to DC include sociodemographic characteristics (age, gender[2] and total children in the family),[3] psychological factors (mother's sense of coherence[4] and verbal bullying[5]), and clinical conditions (pain due to caries).[2] Untreated DC may have severe consequences, resulting in acute pain and infections, influencing eating behaviors and sleep habits.[6] These consequences harm functional and psychosocial aspects and the overall oral health-related quality of life (OHRQoL) of children.[7]

Apart from evaluating conventional dental criteria, OHRQoL focuses on individuals, thereby encompassing their psychosocial experiences and physical functioning in defining appropriate treatment goals and outcomes.[8] OHRQoL is a multidimensional construct that refers to the extent to which one's daily living is disrupted by oral problems.[9] Deleterious effects of DC on OHRQoL were observed in current epidemiological studies.[10–12] Castro et al.,[13] reported that oral problems such as DC, perception of gingival bleeding, and malocclusion impaired daily functioning among 88.7% of Brazilian children. Do and Spencer[14] reported that the presence of DC was associated with lower OHRQoL among Australian children. Hence, OHRQoL is an important factor to understand the impact of oral diseases on daily activities. Studies[7,15] conducted locally have reported that children with DC experience more oral pain and difficulties in chewing, difficulty in saying words, and are concerned about what people think about their teeth. They also tend to avoid smiling.

Only a finite number of standard OHRQoL measures are available for young children, and earlier, young children were considered unreliable informants.[16] However, instead of using parents as proxies to report a child's oral health status, children's self-reported oral health measures would be more accurate in providing their perceptions of oral impacts.[17] Also, Connolly and Johnson[18] reported that children aged 4–6-year can themselves state their general health and QoL accurately.

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How to cite this article: Meghana D, Sukhabogi JR, Doshi D, *et al.* Psychometric Properties of Telugu Version of Scale of Oral Health Outcomes for 5-year-old Children. Int J Clin Pediatr Dent 2024;17(8):933–937.

Source of support: Nil

Conflict of interest: None

Since there is no validated measure to assess OHRQoL among Telugu-speaking 5-year-olds in Telangana, the present cross-sectional study aimed to assess the psychometric properties of the Telugu version of the scale of oral health outcomes (SOHO-5T) among 5-year-olds in Telangana.

Materials and Methods

A pilot study was conducted among 35-year-old children to determine the sample size. Based on the mean dental caries score of 5.26 ± 0.52 and using the formula,

$$n = \frac{Z^2 1-\alpha / 2 \times SD^2}{d^2}$$

Z^2 1−α/2 = Deviation from normal at a considerable level of significance.

SD = Standard deviation.

d = Precision of the condition (*Z**SE of the mean).

With 95% confidence interval, 419 samples were required.

Before the start of the study, permission was obtained from the principals of preschools. We obtained ethical approval from the Institutional Ethics Committee of Osmania Medical College, Hyderabad (IEC-BHR/OMC/M.NO(05)/P-59). Upon agreement and explanation of the study, a signed consent form based on the Declaration of Helsinki[19] was obtained from parents. All the study participants were assured of confidentiality and anonymity. Based on the permissions obtained from preschools, cluster random sampling was utilized to include preschool children from five municipal corporation zones of Hyderabad.

Children around 5 years of age who could understand Telugu and had written informed consent from parents were included. Children with intellectual and physical disabilities, such as Down syndrome, autism, and congenital abnormalities like cleft lip and palate, as well as those with systemic diseases like acute infections and bleeding disorders, were excluded. Additionally, children not willing to undergo an oral examination, those who did not answer the questions, and those who were absent on the day of examination were excluded.

Two translators translated the English version of the SOHO-5[20] scale to Telugu, with one translator being aware of the aim and objectives. This version was back-translated into English, and an expert committee consisting of all the translators and two public health dentists developed the final version of SOHO-5T based on the guidelines proposed by Beaton et al.[21] This version was tested among 30 children, all of whom were later interviewed by the same interviewer. A structured interview of the 7-item SOHO-5T questionnaire was carried out by the examiner. Responses were recorded on a three-point Likert scale, varying from (0—no, 1—a little, 2—a lot). The total score ranged between 0 and 14. The greater the score, the poorer the OHRQoL. To test the test-retest reliability, the questionnaire was readministered to 30 children after a gap of 2 weeks. To assess construct validity, the following global oral health rating questions[22] were used—(how happy are you with your teeth? Not happy = 2, a little happy = 1, and very happy = 0) and the presence of dental caries (Do you have cavities in your teeth? No = 0, Yes = 1).

Dental caries was evaluated using World Health Organization (WHO) criteria.[23] Discriminant validity was assessed by comparing SOHO-5T responses to caries experience (presence/absence).

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) (version 26.0). Descriptive statistics, including means, standard deviations, and frequency distributions, were computed. Internal consistency of the questionnaire was determined using Cronbach's α coefficient. Intraclass correlation (ICC) was evaluated using Spearman's correlation. Additionally, construct validity was tested by assessing the correlation of SOHO-5T with other global oral health rating questions. Discriminant validity estimated the difference in the mean SOHO-5T scores between children with the presence of caries and those without dental caries [decayed, missing and filled tooth (dmft) > 0 vs dmft = 0]. Statistical significance was set at $p < 0.05$.

Results

The study population included 419 5-year-old children. Of these, 53.46% (224) were male and 46.54% (195) were female. The majority of them belonged to families with fewer than three children (49.40%; 207), and they brushed once daily (87.11%; 365) (Table 1).

Overall, 49.16% of the study population had dental caries, and the mean caries experience was 3.03 ± 3.56. The mean decayed score was the highest (2.48 ± 2.92) compared to the mean missing (0.39 ± 0.88) and mean filled (0.16 ± 0.64) components.

Based on global oral health rating questions, most of the children were very happy with their teeth (60.86%; 255) and reported having no holes or cavities in their teeth (61.81%; 259).

The overall mean SOHO-5T score for this study population was 4.70 ± 5.18. The highest mean score of 0.90 ± 0.98 was recorded for item 1—"Has it ever been hard for you to eat because of your teeth?" The lowest mean score was recorded for item 3—"Has it ever been hard for you to speak because of your teeth?" (0.40 ± 0.58).

The Cronbach's α coefficient was 0.902, indicating good internal consistency of SOHO-5T. For test-retest reliability, the ICC coefficient was 0.91, indicating excellent reproducibility of SOHO-5T (Table 2). The construct validity showed that the SOHO-5T scores were significantly associated with global oral health rating questions and in the expected direction (Table 3). Children with the presence of dental caries exhibited a significantly higher mean overall SOHO-5T score (9.43 ± 3.10) for all the questions compared to children without caries (0.14 ± 1.01). This demonstrates good discriminant validity of SOHO-5T (Table 4).

Table 1: Demographic distribution of the study population

Variables		*n (%)*
Gender of the child	Males	224 (53.46)
	Females	195 (46.54)
Number of children in family	Only child	117 (27.92)
	<3 children	207 (49.40)
	>3 children	95 (22.67)
Frequency of child tooth brushing	Twice a day or more	40 (9.55)
	Once a day	365 (87.11)
	Rarely or not every day	14 (3.34)
Overall sample		419 (100)

Table 2: Internal consistency of SOHO-5T scores: item total correlation coefficients and Cronbach's α

Questions	*Item total correlation*	*Cronbach α*	*ICC coefficient (95% CI)**
Has it ever been hard for you to eat because of your teeth?	0.8780	0.8673	0.80 (0.72–0.85)
Has it ever been hard for you to drink because of your teeth?	0.5699	0.9029	0.86 (0.81–0.90)
Has it ever been hard for you to speak because of your teeth?	0.5773	0.9044	0.89 (0.85–0.92)
Has it ever been hard for you to play because of your teeth?	0.9135	0.8622	0.86 (0.81–0.90)
Have you ever not smiled because your teeth were hurting?	0.9436	0.8574	0.75 (0.69–0.80)
Have you ever not smiled because of how your teeth look?	0.8269	0.8737	0.85 (0.80–0.89)
Has it ever been hard for you to sleep because of your teeth?	0.2696	0.9234	0.60 (0.46–0.71)
Total	–	0.9023	0.91 (0.89–0.94)

*$p < 0.05$ considered to be statistically significant

Table 3: Construct validity for SOHO-5T

	Satisfaction with oral health		*Presence of dental cavities*	
Questions	*r**	*p-value*	*r**	*p-value*
Has it ever been hard for you to eat because of your teeth?	0.796	0.0001*	0.845	0.0001*
Has it ever been hard for you to drink because of your teeth?	0.783	0.0001*	0.814	0.0001*
Has it ever been hard for you to speak because of your teeth?	0.631	0.0001*	0.699	0.0001*
Has it ever been hard for you to play because of your teeth?	0.610	0.0001*	0.644	0.0001*
Have you ever not smiled because your teeth were hurting?	0.715	0.0001*	0.776	0.0001*
Have you ever not smiled because of how your teeth look?	0.742	0.0001*	0.802	0.0001*
Has it ever been hard for you to sleep because of your teeth?	0.690	0.0001*	0.677	0.0001*
Total	0.791	0.0001*	0.823	0.0001*

*$p < 0.05$ considered to be statistically significant

Table 4: Discriminant validity for SOHO-5T

	Caries absent		*Caries present*		
Questions	*Mean ± SD*	*Median*	*Mean ± SD*	*Median*	*p-value*
Has it ever been hard for you to eat because of your teeth?	0.03 ± 0.23	0.00	1.80 ± 0.56	2.00	0.0001*
Has it ever been hard for you to drink because of your teeth?	0.03 ± 0.19	0.00	1.62 ± 0.63	2.00	0.0001*
Has it ever been hard for you to speak because of your teeth?	0.01 ± 0.10	0.00	0.80 ± 0.60	1.00	0.0001*
Has it ever been hard for you to play because of your teeth?	0.02 ± 0.17	0.00	0.96 ± 0.81	1.00	0.0001*
Have you ever not smiled because your teeth were hurting?	0.02 ± 0.20	0.00	1.62 ± 0.71	2.00	0.0001*
Have you ever not smiled because of how your teeth look?	0.01 ± 0.15	0.00	1.52 ± 0.71	2.00	0.0001*
Has it ever been hard for you to sleep because of your teeth?	0.01 ± 0.10	0.00	1.10 ± 0.90	1.00	0.0001*
Total	0.14 ± 1.01	0.00	9.43 ± 3.10	10.00	0.0001*

*$p < 0.05$ considered to be statistically significant

Discussion

This study aimed to translate, validate, and analyze the psychometric properties of the Telugu version of SOHO-5T. The results provide strong evidence of good psychometric properties for the Telugu version of SOHO-5T.

Quantifying oral health and QoL are key for evaluating oral health programs. Several OHRQoL measures are currently available for children older than 6 years.[24–26] Nevertheless, the development of OHRQoL measures for young children is challenging due to their developing cognitive, psychosocial, and linguistic abilities. Individual perceptions of OHRQoL by children and parents can vary. As reported by Gao et al.[27] among Chinese children, more than half of the children (55%) had at least one negative oral health-related impact due to their teeth, whereas less than half of the parents (42%) agreed. Thus, the subjects themselves, that is, children's reports, should be considered to assess their OHRQoL.

The original SOHO-5 questionnaire was developed for 5-year-old children; the present study included this age-group. This study adapted the standard procedure for the translation of the Telugu version of SOHO-5.[21] A pilot study helped us draft the questionnaire, addressing potential difficulties, which the children responded to appropriately later.

The Cronbach's α value of 0.90 for SOHO-5T is higher compared to the Chinese version[27] (0.71) and Brazilian version[28] (0.77) of SOHO-5. This higher value may be due to the ease in understanding the questions, as we considered only Telugu-speaking children in this study, indicating good internal consistency. Similarly, the Indonesian version of SOHO-5[29] had a good internal consistency (0.89).

The ICC coefficient value (0.91) of the SOHO-5T presented a high degree of agreement between the scores at different times, demonstrating excellent test-retest reliability. Similarly, the SOHO-5 showed a high degree of agreement when translated into other

languages, such as the Myanmar version[30] in Burmese (ICC = 0.90) and Chinese version (ICC = 0.85). This could be because SOHO-5T is a simple questionnaire.

Global oral health rating questions, such as satisfaction with oral health and the presence of dental cavities, used to evaluate construct validity, showed a significant association with all the items in SOHO-5T. The discriminant nature of SOHO-5T was also well depicted, as children with dental caries had significantly higher mean SOHO-5T scores (9.43 ± 3.10) compared to children without dental caries (0.14 ± 1.01).

The mean OHRQoL score of SOHO-5T was 4.7 ± 5, which was higher than the score reported by Abanto et al.[28] among Brazilian children in Portuguese, which was 3.32 ± 3.2. The Brazilian version of SOHO-5 included 5-6-year-olds, whereas the present study predominantly included 5-year-olds. This is consistent with the original design of SOHO-5, which targeted a population of 5-year-olds with a high prevalence of dental caries.[31]

Our study has a few limitations. We used dental caries as the only oral health condition to assess discriminant validity, as it is the most significant dental disease. However, the severity of caries was not considered, which might impact OHRQoL. Utilizing indices like pufa could provide further details on how the severity of dental caries affects OHRQoL. Furthermore, as caries was highly prevalent and strongly associated with poor OHRQoL, effective interventions should be planned to decrease the prevalence and ensure early treatment of dental caries in children to enhance their OHRQoL.

Conclusion

This study demonstrates that the SOHO-5T has good reliability and validity, making it a suitable OHRQoL measure for clinical practice and research involving 5-year-old Telugu-speaking children.

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