

# Cross-cultural adaptation of the Paediatric Oral Health-Related Quality of Life (POQL) tool in South Africa - a pilot project

SADJ February 2020, Vol. 75 No. 1 p29 - p36

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## ABSTRACT

### Aims and objectives

To translate and adapt a paediatric oral health-related quality of life (POQL) questionnaire into the South African languages of Sepedi, IsiZulu and Afrikaans.

### Methods

The POQL-version: Parent-Report-on-child was translated twice into local languages. Translated-versions were revised and back translated into English by the different language-experts. A pre-final draft South African-version of POQL was tested on parents at the Pretoria Oral & Dental Hospital (n=94). Impact-scores were calculated, chi-squared and t-tests were used to determine construct validity. Principal component analysis was used to determine structural validity.

### Results

Responses were recorded in a 5-Likert-type scaling but could not be replicated in the manner of the original-tool. Seventy percent of responding parents were female and 53% were employed with significant differences between male (62%) and female (38%), ( $p < 0.05$ ). The male-parents were significantly older (40-yrs. vs. 35-yrs.;  $p < 0.05$ ).

Most (61%) children had consulted the hospital for 'non-emergency' care. Internal consistency in the pre-final version was good with a Cronbach  $\alpha$ -score of 0.91. Component analysis of the pre-final SA-tool, produced multiple different dimensions when compared with the 4-dimensions of the original tool in the American setting.

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## ACRONYMS

OHRQoL: Oral Health-Related Quality of Life  
POQL: Paediatric Oral Health-Related Quality of Life

## Conclusions

The piloted pre-final SA version displayed good internal consistency yet had weaknesses with content, structural and construct validity.

## Keywords

Dental health, children oral health, oral health-related quality of life, socio-dental indicators.

## INTRODUCTION

The importance of assessing oral health-related quality of life (OHRQoL) has been widely recognised in Medicine,<sup>1</sup> because the subjective patient-based quality of life measures give more insight into the effect of disease on communities. Oral health has physical, economic, social and psychological consequences for society.<sup>2</sup> The latest national children oral health survey in South Africa (SA) revealed a high caries prevalence in four, six and 12 year-olds and up to 55.1% of the caries remains untreated.<sup>3</sup> Such high prevalence of disease may add to social problems and it is thus essential that socio-dental indicators are incorporated into health surveys in South Africa.

Developing children's OHRQoL is important as children are a major focus of dental public health. Measuring children's OHRQoL allows for an evaluation of their oral health status and of treatment efficiency.<sup>4</sup> There are several validated OHRQoL tools specifically developed for children including the Paediatric oral-health-related quality of life (POQL).<sup>5</sup>

Pilot studies are often useful and are recommended to address several important aspects of research including preliminary instrument development.<sup>6</sup> Conducting a pilot study does not promise success in the main study, but it does increase the chances as it forecasts what might/might not happen.<sup>7</sup>

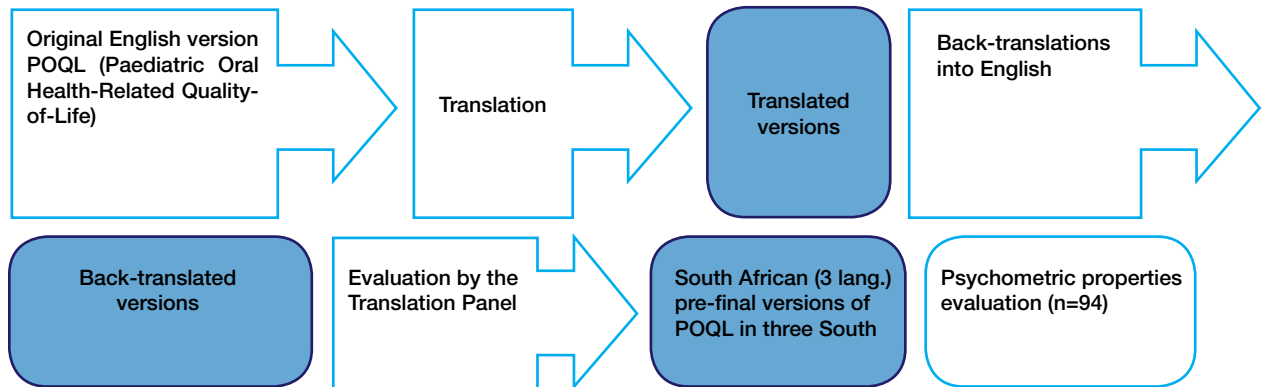
The online database search on the PubMed revealed that most of the validated tools specific to children's OHRQoL and dentistry were developed in English,<sup>5,8</sup>

and have been translated into the Portuguese<sup>9</sup>, Spanish<sup>10</sup>, Kiswahili-Tanzania<sup>11</sup>, Dutch<sup>12</sup>, Thai<sup>13</sup> and Chinese<sup>14</sup> languages. The current unavailability of children's OHRQoL tools in South African languages implies that the majority of the population would have to be excluded in any survey, resulting in systematic bias<sup>15</sup> necessitating either development of such tools or a translation with possible adaptation of the tools.

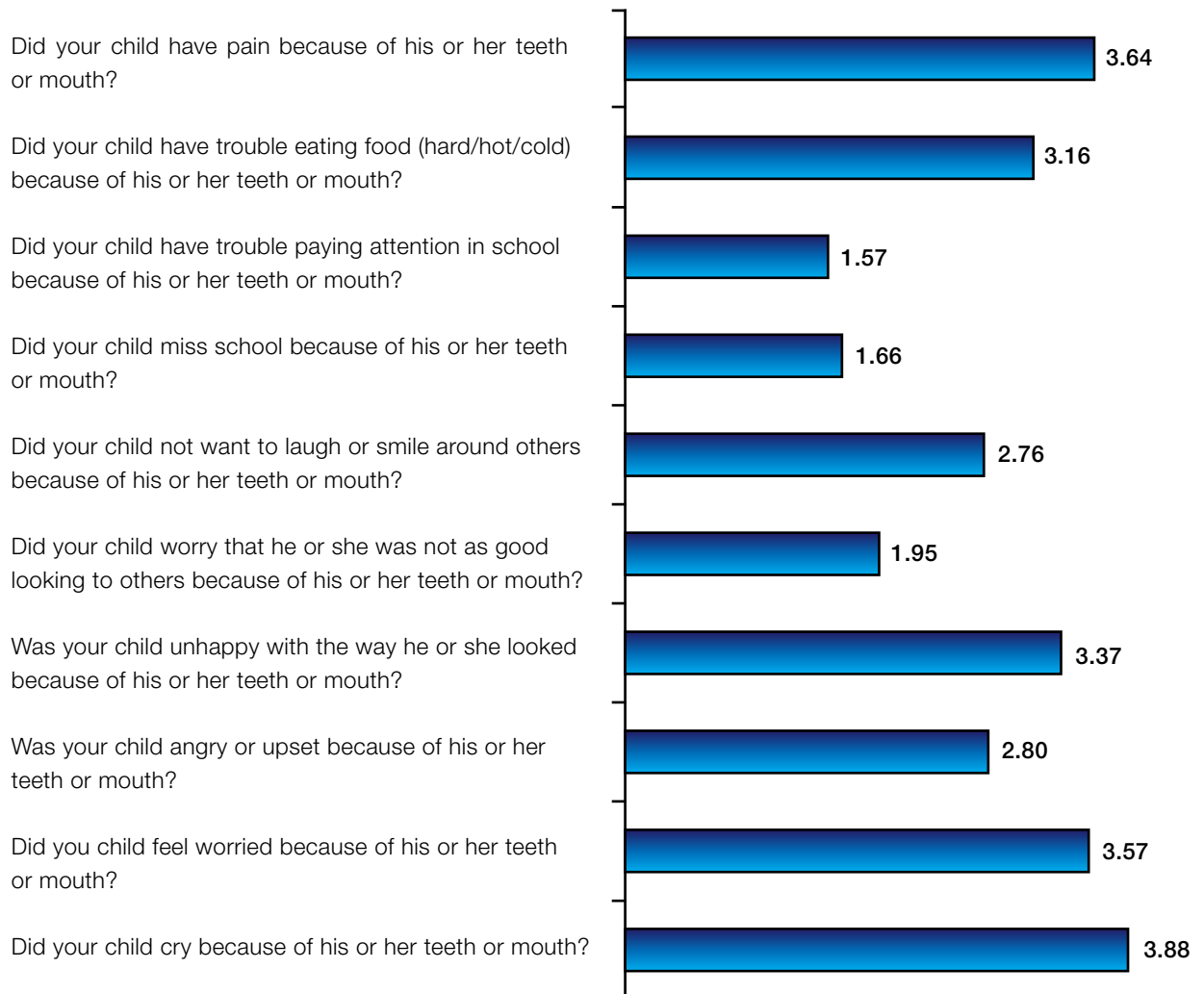
Cross-cultural adaptation is imperative when a tool is to be applied in a different culture, language and country,<sup>15</sup>

but must result in a product which maintains relevance between source and target. Therefore, the guidelines of cross-cultural adaptation prescribe that further tests should be conducted on the psychometric properties of the adapted questionnaire after translation.

The aim of the present pilot study was to translate and culturally adapt a paediatric oral health-related quality of life (POQL) measure for those South Africans who speak the Sepedi, IsiZulu and Afrikaans languages.



**Figure 1.** Schematic representation of the translation process of the pre-final version of SA POQL tool.



**Figure 2.** Impact scores for 10-item questionnaire for all languages.

## METHODS

In preparation for a broader regional study, this pilot study was undertaken to ascertain the suitability of the pre-final version instrument for this population.

### The qualitative process

#### Description of Pediatric oral health-related quality of life (POQL)

POQL is a measurement tool developed with an explicit emphasis on the experiences and views of children and parents from low-income or minority populations.<sup>5</sup>

The premise behind the conceptualization of the tool is that economic and cultural differences in oral health attitudes and beliefs are important enough to warrant a specific measure of OHRQoL applicable especially to the low-income or minority population where rates of disease are usually the highest.<sup>5</sup>

The POQL consists of two versions: Parent Report on Child version (PCR) which includes a Parent Self-Report and has 10 items, and the Child Self Report (CSR8-14 years) with 10 items.<sup>5</sup> The latter has four dimensions, namely: - Physical Functioning, Role Functioning, Social Functioning and Emotional functioning. The response choices on "How often did the event happen?" were described by a four dimensional Likert-scale: *all of the time, some of the time, once in a while and did not happen*.

The question "How bothered were you by the event?" was also asked for the same item, with five Likert-scale responses: *very bothered, somewhat bothered, bothered a little bit, never bothered and did not happen*.

The PCR and CSR versions of the POQL were found to show a strong sensitivity to change<sup>16</sup> and deemed valid and reliable for use in preschool, school-age and preteen children. Appropriate translation of the tool into other languages is the important recommended next step in testing the POQL.

#### Adaptation and translation of POQL

The two POQL versions (Parent Report on Child including Parent Self-Report and Child Self-Report) were each translated twice into the Sepedi, IsiZulu and Afrikaans languages.

Translation was performed for Afrikaans and IsiZulu by experts in the Department of Languages in the University of Pretoria and for the Sepedi questionnaire by the Department of African languages, University of South Africa.

The documents were then revised and back-translated into English by different language experts in the same departments. A committee of experts, comprised of dentists and dental specialists within the School of Dentistry who could read and write the language, together with the language experts in the previously stated departments, formed a Translation Panel to review the back-translation (Figure 1).

Two versions of the POQL in each of the three languages were obtained and were severally unified per language, leading to the pre-final versions of South African POQL documents. These translated questionnaires were tested by three groups of the parents of paediatric patients, each group speaking one of the three languages. Focus group discussions were held when they visited the Pretoria Oral and Dental Hospital.

In addition, individual interviews were conducted to solicit feedback on how well the oral health issues, initially included in the English versions, were understood by the different populations. The participants were asked to express opinions on how easy it would be for the general population speaking the specific language to understand, and feel at ease, with the translations used in the questionnaire.

During these interviews, comments on the wording, contextual meanings and format were also achieved. The resulting version of the instrument was evaluated in terms of presentation and content validity by a panel comprised of the same experts who had participated in the initial phase.

## ANALYSIS

### Psychometric evaluation

The three pre-final versions were subjected to psychometric property evaluation of the questionnaire items. The item scores were calculated by multiplying the 'how often' response (0-3) by the 'how bothered' response (0-4) to give the 'Impact score' with the possible range being from 0 to 12. Higher scores indicated poorer OHRQoL.

The questionnaires also sought responses on self-rated oral health (poor to excellent), the oral condition of the child and socio-demographic data such as age and employment status of the parent. Descriptive and factor analyses were done using SPSS version 20.

Chi square and t-tests were used to calculate the difference between variables. Construct validity was evaluated based on comparison of the total scores among groups according to categories of oral conditions (non-emergency & emergency) and one way ANOVA was used to determine the differences in the impact scores between groups.

Scale scores for the four dimensions of the POQL were created by calculating the mean scores for the questionnaire items. Categorical principal component analysis was used to determine the structural validity by identifying whether the translated tool would have dimensions the same as those originally found in the English questionnaire.

Cronbach's Alpha( $\alpha$ ) was used as a measurement of internal consistency in the responses. The measure assesses whether the set of items share enough variation to support the notion that they measure the same general construct, and produce comparable scores.<sup>26</sup> Indices of reliability are often used in the early stages of developing a multiple-item measurement, to ensure

the degree of homogeneity and to determine if all the items measure a common concept. Items are added, removed, and modified, according to whether the indices of reliability improve.

The  $\alpha$ -scores of 0.7, 0.8 and 0.9 means the reliability is acceptable, good and excellent, respectively. Very high reliabilities (0.95 or higher) are not necessarily desirable, as this indicates that the items may be entirely redundant.<sup>17</sup>

## RESULTS

### Qualitative phase

Responses were recorded in a 5-Likert-type scaling in the original English questionnaire but could not readily be transferred to the translated SA languages tool.

There were discrepancies with the local vernacular with regards to ordering of the responses from 'bothered a little bit' to 'somewhat bothered'.

These two seemed to mean the same in the local dialect. However, with regards scaling, direct translation was not critical as the aim was to write the response

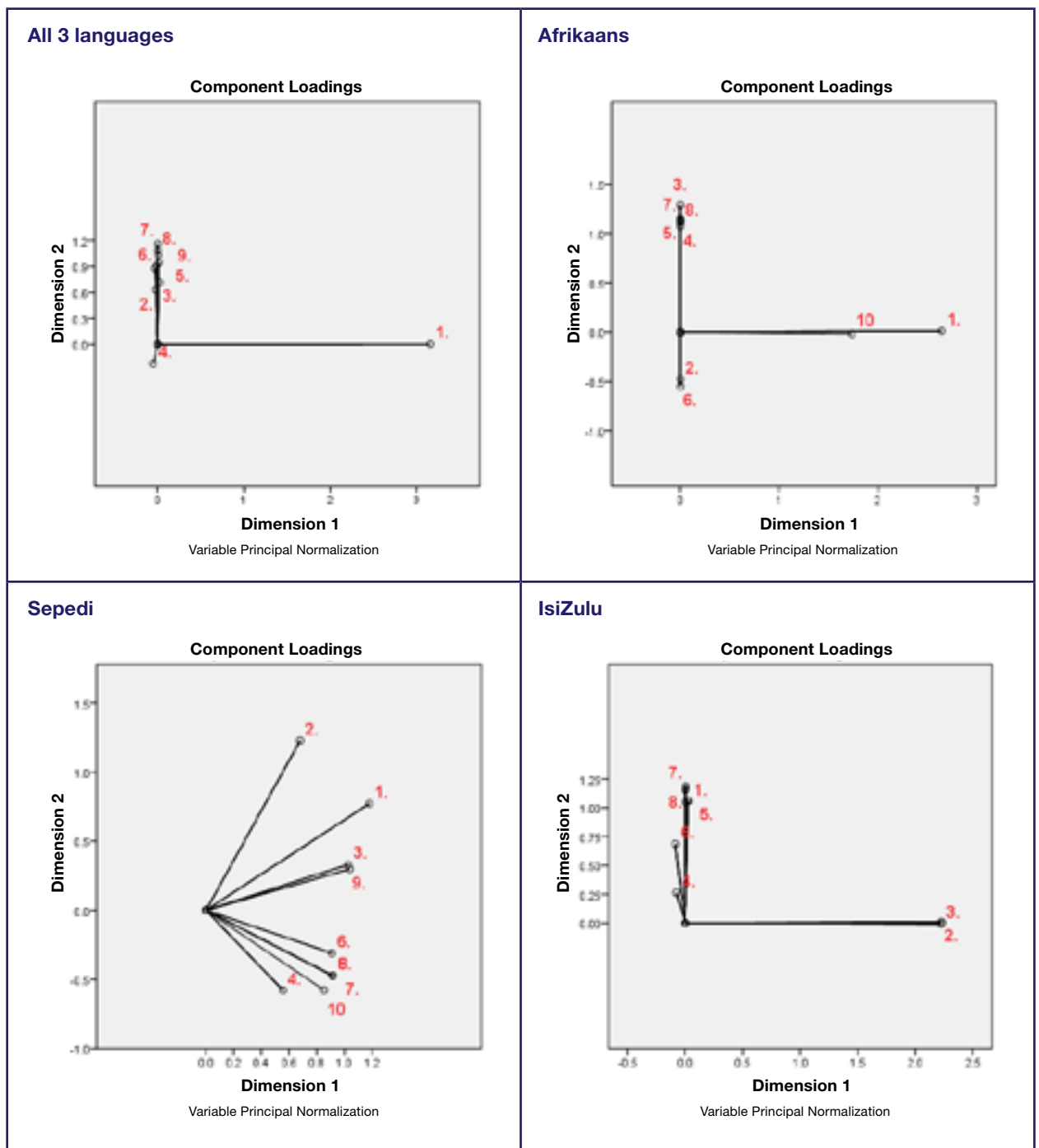


Figure 3. Categorical component analysis with different variables to the original questionnaire.

in an ordinal manner from the lowest to the highest ranking. ‘Somewhat bothered’ was left as ‘bothered’ which on the scale was less than ‘very bothered’. The Afrikaans version did not have the same challenge.

There were no single words in IsiZulu/Sepedi languages to describe some of the dental procedures e.g. root canal; crown; orthodontic braces/space maintainers; fissure sealants. An attempt was made to explain the terms in ‘phrases’ for ease of comprehension but short enough to not clutter the questionnaire.

Feedback from the Afrikaans speaking parents were that the word ‘herstelling,’ intended to mean a ‘dental filling’ was understood by others to mean ‘repair’ which might be confusing when relating to natural dentitions. It was decided that an explanation would be necessary during the interview process when applying the questionnaire to make sure it was understood.

Table 1 represents the characteristics of the pilot sample, which was composed of mostly employed female parents. All children were about 10 years old and mostly female. Most (61%) children had consulted the hospital for ‘non-emergency’ care. The ‘non-emergency’ care implied consultation for preventive and orthodontic treatment. There were significant differences in the self-rating of health between ‘very good to excellent’

and the lower ratings namely: poor-fair-good regarding items 1 and 3 in Table 2 (p<0.05).

The majority (58.5% [20.2% and 38.3%]) of parents rated their children’s oral health to be good to excellent which implied a good oral health related quality of life. This was in concord with impact scores calculated from the individual 10-item questions and the four dimensions of the PQOL scores. When the calculated score was low it indicated a good OHRQoL (1-4=good, 5-8 = average, 9-12 = poor) Table 2 & Figure 2.

Internal consistency in the pre-final version was good with the Cronbach  $\alpha$  - score of 0.91. In order to Assessment of the structural validity of the tool required that it produced the same dimensions as the original four dimension POQL namely: physical, role, social and emotional functions. After categorical component analysis the pre-final SA tool produced multiple different dimensions unlike the original setting (Figure 3). There were two (Zulu), three (Afrikaans) and more than four (Sepedi) dimensions/components and all had different item loadings (Figure 3).

Construct validity refers to whether a scale or test measures the construct adequately. Table 3 depicts the measure of construct validity where the association between POQL scores and the responses to the type of

**Table 1.** Characteristics of the pilot sample.

Parents	Subgroups							
	Afrikaans Questionnaire (AQ)		Zulu Questionnaire (ZQ)		Sepedi Questionnaire (SQ)		Total	
<b>N</b>	30		33		31		94	
<b>Employment Status, % (n)</b>								
Unemployed	70	(21)	18.2	(6)	54.8	(17)	44	(47%)
Employed	30	(9)	81.8	(27)	45.2	(14)	50	(53%)
<b>Gender, % (n)</b>								
Female	83.3	(25)	60.6	(20)	67.7	(21)	66	(70%)
Male	16.7	(5)	39.4	(13)	32.3	(10)	28	(30%)
<b>Parent Age in years, Mean (SD)</b>	38.43	(9.01)	38.39	(6.01)	35.71	(6.44)	37.52	(7.3)
Children	Coefficients		Std. Err.		p value		[95% Conf. Interval]	
<b>N</b>	30		34		31		95	
<b>Child's Age Mean (SD)</b>	11	(1.8)	10.1	(1.8)	10.1	(1.8)	10	(1.8)
<b>Child's Gender</b>								
Female	23		21		10		54 (57%)	
Male	7		13		21		41 (43%)	
<b>Child's oral condition/reason for consultation</b>								
Emergency	7		19		11		37 (39%)	
Non-Emergency	23		15		20		58 (61%)	

**Table 2.** Self-rated oral health (Parent report on child).

	Poor-Fair	Good	Very Good-Excellent	Total	p-value
1. How would you rate your child's health in general?	19 (20.2%)	21 (22.3%)	54 (57.5%)	94	<0.05
2. In general, how would you rate the health of your child's teeth and mouth?	39 (41.5)	19 (20.2)	36 (38.3)	94	>0.05
3. Compared to one year ago, how would you describe the health of your child's teeth and mouth now?	20 (21.3)	12 (12.8)	62 (66)	94	<0.05

dental condition (non-emergency or emergency) was assessed. There was no difference in the quality of life when comparing emergency and non-emergency dental conditions.

## DISCUSSION

Improvements in the systems and information on quality of life methods have been good for both clinical dental research and in the evaluation of oral health programmes.<sup>18</sup> Availability of OHRQoL tools in non-South African languages might result in the exclusion of an important part of the population... in 2001 only 9.6% of South Africans were English first-language speakers.<sup>19</sup>

Such an exclusion due to language could result in systemic bias.<sup>15</sup> The present study sought to translate and adapt a paediatric oral health-related

quality of life (POQL) questionnaire into the South African languages of Sepedi, IsiZulu and Afrikaans.

Pilot studies are often essential and are therefore endorsed by scholars for several reasons, including development of a preliminary instrument.<sup>6,7</sup> Depending of the purpose of the study, a representative sample of thirty from the population of interest is usually regarded as a rational minimum recommendation for a pilot study where the objective is preliminary instrument development<sup>6</sup> or adaptation, as is in the case in the current study .

### Translation & adaptation

Cross-cultural adaptation looks at both language and culture issues in preparing a questionnaire for another setting. Translation of the integral meaning from the original English source questionnaire was achieved

**Table 3.** Construct validity item scales associated with a dental condition of all translated pre-final tools.

Dimensions in original questionnaire	Questionnaire item	Dental condition type	N	Mean rank	Level of significance
Physical functioning	1. Did your child have pain because of his or her teeth or mouth?	Non-Emergency	49	3.7	0.9
		Emergency	46	3.6	
		Total	95	3.6	
Physical functioning	2. Did your child have trouble eating any foods (hard/hot/cold) because of his or her teeth or mouth?	Non-Emergency	49	3.3	0.64
		Emergency	46	3.0	
		Total	95	3.2	
Role functioning	3. Did your child have trouble paying attention in school because of his or her teeth or mouth?	Non-Emergency	49	1.9	0.19
		Emergency	46	1.2	
		Total	95	1.6	
Role functioning	4. Did your child miss school because of his or her teeth or mouth?	Non-Emergency	49	1.4	0.37
		Emergency	46	1.9	
		Total	95	1.7	
Social functioning	5. Did your child not want to laugh or smile around others because of his or her teeth or mouth?	Non-Emergency	49	3.3	0.11
		Emergency	46	2.2	
		Total	95	2.8	
Role functioning	6. Did your child worry that he or she was not as good looking to others because of his or her teeth or mouth?	Non-Emergency	49	2.1	0.64
		Emergency	46	1.8	
		Total	95	2.0	
Physical functioning	7. Was your child unhappy with the way he or she looked because of his or her teeth or mouth?	Non-Emergency	49	3.7	0.35
		Emergency	46	3.0	
		Total	95	3.4	
Physical functioning	8. Was your child angry or upset because of his or her teeth or mouth?	Non-Emergency	49	3.2	0.26
		Emergency	46	2.4	
		Total	95	2.8	
Role functioning	9. Did your child feel worried because of his or her teeth or mouth?	Non-Emergency	49	3.9	0.3
		Emergency	46	3.2	
		Total	95	3.6	
Role functioning	10. Did your child cry because of his or her teeth or mouth?	Non-Emergency	49	4.0	0.82
		Emergency	46	3.8	
		Total	95	3.9	

with an acceptable degree of accuracy for all three target languages.

The internal consistency was good within the three languages, as shown by a satisfactory Cronbach's alpha of 0.91. That in the original source questionnaire was 0.86.<sup>5,17</sup>

The translation of the questionnaire experienced challenges in extracting the precisely the same meaning in the Sepedi and the isiZulu languages regarding the scaling of the responses from the lower order to the higher order rankings. There were discrepancies with regards the ordering of the responses from 'bothered a little bit' and 'somewhat bothered'.

The concepts seemed the same in the local dialect. Poor translation may lead to an instrument which is not equivalent to the initial instrument.<sup>15</sup> Equivalent ranking was achieved for the present pilot as direct verbatim translation was not critical. The aim was to write the response in a scaled manner from the lowest to the highest ranking order.

In addition, semantic equivalency was achieved on other parts of the questionnaire after compromises were made in explaining original English terms like "dentures, fissure sealant, crown, orthodontic braces" in phrases in the Sepedi and the isiZulu languages as there were no single word equivalents.

Explaining terms verbally in simple language proved to be helpful when translating an equivalent tool; Oral Impacts on Daily Performances (OIDP) into Afrikaans in Western Cape, SA<sup>21</sup>. However, in the current study, participants understood what was implied by these phrases and this result was considered satisfactory.

The subsequent step after translation and adaptation is conducting a psychometric properties test. An assumption is often made that equivalency between source and target instrument will ensure psychometric properties like validity and reliability at an item or scale level, but, according to Beaton et al., this is not necessarily the case.<sup>15</sup>

The pre-final versions in the present study did not display good structural validity. Treating the variables as ordinal, two to four variables clustering along two dimensions emerged when using categorical principle components. Assessment of the structural validity of the tool required that it produced the same dimensions as in the original<sup>5</sup> four-dimension POQL, namely: physical, role, social and emotional functions. The SA tool setting in fact produced multiple different dimensions after categorical component analysis unlike the original setting.

There were two dimensions in the isiZulu, three dimensions in the Afrikaans and more than four in the Sepedi tool and all had different item loadings (Figure 3). This result, however, should be regarded with caution as it could be due to only a few components loading because of the pilot sample size. This provides hope that in the broader studies the results could be different.

Alternatively, different structural validity could be caused by inherent differences in the cultural or contextual understanding of the concepts even after equivalent translation. For instance, items 7 and 8 in the original tool were assigned to the Social Functioning dimension and yet when one looks at the content of the questions they seem to measure emotions and therefore could have been thought of, in another culture and context, as measuring the Emotional Functioning dimensions.

By examining the relationship between the type of dental condition and the OHRQoL score using an analysis of variance, it is possible to establish the existence of a relationship between the OHRQoL and the construct, in order to assess construct validity.

Parents rated the oral health of their children to be good and this might be explained by the fact that most children did not consult for pain but rather for preventive visits and for orthodontic reasons. This rating was congruent with the good OHRQoL scores. The finding renders the tool as displaying poor construct validity for this pilot phase because it failed to elicit the changes different dental conditions may have on the OHRQoL. Perhaps in a different setting where patients have consulted for pain-related conditions, the tool may have teased out the differences on POQL scores. The POQL used in a setting of low-income and minority American setting proved to have good construct validity when applied to a larger sample.<sup>16</sup>

## CONCLUSION AND RECOMMENDATION

According to the literature, pilot studies are likely to be under-discussed and under-reported due to their very nature of being small studies.<sup>20</sup> However, it is equally important to ensure that lessons learned with respect to the pilot phases are shared, otherwise tools not properly developed may be applied for research. The piloted pre-final SA version tool displayed good internal consistency and thus is conceptually equivalent to the original POQL. The tool however produced multiple different dimensions after component analysis unlike the original tool.

In addition, the tool did not show good construct validity as it failed to elicit the differences in the quality of life status when comparing emergency and non-emergency dental conditions. It is recommended that future studies should look at psychometric properties and full scale validation with reliability testing and applicability of the version in a larger sample of primary school children. Thereafter, the tool may be used and compared with similar instruments to further validate it in the SA context.

## Acknowledgement

The authors express appreciation to the parents of patients who consulted at the Pretoria Oral and Dental Hospital. Sincere gratitude for the enabling support of the School of Dentistry, University of Pretoria particularly the Department of the Community Dentistry. We are deeply indebted to Drs NR Nkambule, TK Madiba and C van Wyk of the University of Pretoria for their expert participation in language translation panel discussions.

**Declaration**

There is no conflict of interest declared.

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