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Translation, adaptation, and preliminary psychometric evaluation of the PoSSe scale into brazilian portuguese

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This study aimed to cross-culturally adapt the PoSSe scale to Brazilian Portuguese and conduct a preliminary evaluation of its content validity, internal consistency, reliability, and reproducibility. A methodological and observational study was conducted following a five-stage protocol for scale adaptation. The sample consisted of 48 patients who underwent lower third molar surgery, with a mean age of 24.06 years (SD = 6.73), predominantly female (60.4%), recruited from the School of Dentistry at the Federal University of Ceará. The patients completed the translated version of the PoSSe scale and were interviewed to assess item comprehension. Data analysis included descriptive statistics, internal consistency (Cronbach's alpha), item-total correlation, and exploratory factor analysis. The translation and back-translation processes were consistent, with minor discrepancies resolved. Interviews confirmed the clarity of the items, requiring no further adjustments. The scale demonstrated adequate internal consistency (Cronbach's alpha: D2 = 0.856, D3 = 0.883, and D7 = 0.910) across different assessment periods. Factor analysis reduced the number of factors to four domains. The PoSSe scale domain scores showed a positive correlation with the overall scale, except for the "sensation" domain on the second day (p = 0.792). In conclusion, the PoSSe scale was successfully translated and adapted to Brazilian Portuguese, demonstrating preliminary evidence of content validity, internal consistency, and reliability. However, further studies with more diverse samples are needed to assess its psychometric properties fully.

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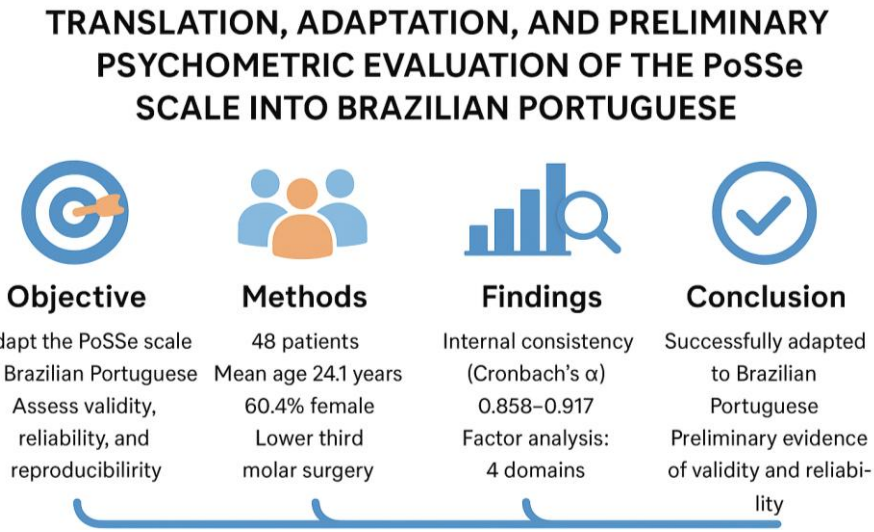

Introduction

Oral surgery includes procedures involving the removal of soft tissues, bone structures, and teeth, often resulting in lesions that compromise anatomical integrity and trigger an inflammatory response (1). The extraction of third molars, a standard dental procedure, has a variable rate of post-operative complications, ranging from 6.9% to 30.9% (2,3,4). The most common complications, such as pain, inflammation, trismus, hemorrhage, and injury to the inferior alveolar nerve, are influenced by factors such as smoking, surgical time, degree of tooth impaction, and the surgeon's skill, negatively impacting post-operative quality of life (2,3,5,6).

Oral health-related quality of life (OHRQoL) reflects patients' perceptions of the impact of oral conditions on their functional and psychosocial lives. Unlike normative clinical indicators, OHRQoL measures assess the impact of oral conditions from the patients' perspective (7). Various questionnaires have been developed for this assessment, focusing on functional, psychological, and social aspects, with broad application in research and clinical practice (8). Among them, the Post-operative Symptom Severity (PoSSe) scale stands out. Developed by researchers at the University of Dundee, it measures the impact of third molar surgery on post-operative quality of life, evaluating aspects such as self-esteem, absence from work, and general health—factors traditionally underestimated or considered inevitable (9). The PoSSe comprises 15 items distributed across seven subscales that cover the main adverse effects reported by patients, providing an accurate assessment of the surgery's impact (9).

Although the PoSSe has some evidence of validation and reliability (10), it has not yet been translated and adapted for Brazilian Portuguese, which underscores the need for its use to specifically and accurately assess the quality of life of Brazilian patients undergoing this surgery. This study aims to translate and culturally adapt the PoSSe scale for Brazilian Portuguese and to provide a preliminary validation of its content validity, internal consistency, reliability, and reproducibility.

Materials and methods

This study was approved by the Ethics Committee (CEP) for Research Involving Human Subjects at the Federal University of Ceará (UFC), under protocol number 6.652.274. The research was conducted in accordance with the guidelines of the Declaration of Helsinki. All participants were informed about the study's objectives, risks, and benefits, and signed the Informed Consent Form before data collection.

Study Design

This is a methodological, observational study with a longitudinal and prospective design, aimed at validating the PoSSe instrument for the Brazilian version. The cross-cultural adaptation (CCA) and reliability assessment were carried out in accordance with the recommendations of the COSMIN checklist (Consensus-based Standards for the selection of health Measurement Instruments) (11) for validation studies.

To ensure the preservation of equivalence during adaptation, the guidelines by Beaton et al. (12) and Herdman et al. (13) were followed, and a team of researchers conducted the cross-cultural adaptation process of the instrument experienced in instrument validation, following the following steps:

Stage I: Initial Translation

Before starting the translation process, the translators received a statement confirming that they were aware of the study's objectives, risks, benefits, and purpose. Two independent translations of the instrument were made from English to Brazilian Portuguese by bilingual translators with different profiles, whose native language is Brazilian Portuguese. One of the translators was a healthcare professional, familiar with the concepts evaluated in the questionnaire, ensuring a translation with a clinical perspective. The other translator, not from the healthcare field and lacking prior knowledge of the questionnaire's concepts, provided a translation that reflected the language used by the target population. At the end of this stage, two versions were obtained, referred to as "translation one" (T1) and "translation two" (T2).

Stage II: Synthesis of the Translations

A committee of experts, consisting of two methodologists experienced in validation and cross-cultural adaptation of questionnaires, two oral and maxillofacial surgeons, a linguistics professional, and the two translators, met to synthesize the information from the two translations (producing a standard translation T-12). The discrepancies between the translations were discussed, and a consensus was reached, resulting in the first consolidated version of the instrument translated into Brazilian Portuguese (T-12). A report was prepared, documenting the synthesis process in detail, addressing each issue raised and how they were resolved..

Stage III: Back-Translation

Before initiating the back-translation process, the translators were given a detailed explanation of the objectives, risks, benefits, and purpose of the procedure, along with a consent statement. Two independent back-translations were performed from the T-12 version of the PoSSe questionnaire by translators without medical training. Both were bilingual, with English as their native language, and fluent in Brazilian Portuguese, and had no prior knowledge of the original questionnaire. Each produced a back-translation (BT1 and BT2). This approach aimed to mitigate any information bias and identify unforeseen meanings in the translated questionnaire items (T-12), increasing the likelihood of detecting imperfections. The purpose of back-translation is to verify validity by highlighting significant inconsistencies or conceptual errors in the translation, ensuring that the translated version retains the duplicate content as the original versions. This stage typically reveals unclear words or terms in the translations.

Stage IV: Review by the Expert Committee

The expert committee, together with the translators (initial translators and back-translators), met again to review all available material, including the original questionnaire and each of the translations (T1, T2, T-12, BT1, and BT2) and the respective explanatory reports of the decisions made in the previous stages. The goal was to evaluate the semantic, idiomatic, experiential (cultural), and conceptual equivalences between the Brazilian Portuguese version of the PoSSe and the original English version, as proposed by Guillemin et al. (14). Discrepancies were discussed, and consensus was reached to produce the pre-final version of the questionnaire, ensuring it adequately reflected the content and intent of the original version.

Stage V: Pilot Study

In the final stage of the cross-cultural adaptation process, a pilot study was conducted with the pre-final version of the PoSSe questionnaire, translated into Brazilian Portuguese. The pre-final version was administered to a representative sample of target patients to evaluate the effectiveness of data collection, identify potential issues, and make necessary adjustments before the final testing phase. This stage aimed to understand the meaning of the items for the patients, analyze their responses, and assess the relevance of each PoSSe questionnaire item to the patients' experience following third molar extraction.

The pre-final version was administered to 48 volunteers, as recommended by Beaton et al. (12), including a 20% margin of error to account for potential losses during follow-up. An independent observer verbally explained the questionnaire, and the patients completed it independently at three different time points: two days, three days, and seven days after surgery. The questionnaires were returned on the seventh day, after suture removal. The same observer interviewed each patient to assess their understanding of each item or response, asking the following questions:

Did you have any difficulty answering the questions?
Was there any word that was difficult to understand?
Would you phrase the questions differently?
Are the items included in this questionnaire relevant to your condition?
Was there any question with a double meaning?

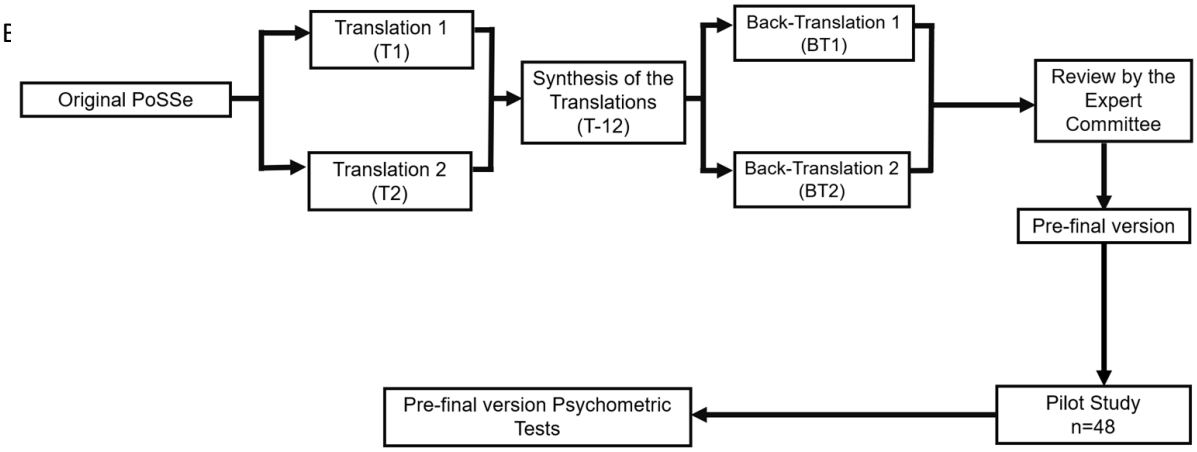

Figure 1. Flowchart of the Translation and Cross-Cultural Adaptation Process

Patient Inclusion and Exclusion Criteria

The inclusion criteria encompassed patients seeking specialized care in Oral and Maxillofacial Surgery at the Dentistry Course of the School of Pharmacy, Dentistry, and Nursing of the Federal University of Ceará for the removal of lower third molars, either left or right, regardless of the degree of root formation. Healthy individuals (classified as ASA 1 by the American Society of Anesthesiologists), of both sexes, aged 18 years or older, and native speakers of Brazilian Portuguese, were considered. Exclusion criteria included pregnant or lactating patients, a history of pre-existing cognitive impairments, and the presence of signs/symptoms related to preoperative inflammatory or infectious processes. Additionally, patients who did not fully complete the questionnaire were excluded from the analysis.

Outcome Measures

The primary outcome measure was the translation and cross-cultural adaptation of the PoSSe Scale to the Brazilian version. The PoSSe Scale includes seven subscales: eating, speech, sensation, appearance, pain, sickness, and interference to assess the quality of life after the removal of lower third molars (M3M). The PoSSe Scale score was calculated from the items on the self-reported questionnaire as follows:

Total PoSSe score = eating scores + speech scores + sensation scores + appearance scores + pain scores + discomfort scores + interference scores.

The score ranges from 0 to 100, with 0 indicating no adverse effects and higher total scores representing greater severity of post-operative symptoms.

Instruments Used for Data Collection

A complete medical history was obtained, and an oral examination was conducted using a perioperative characterization instrument, which collected the following information: age, sex, race, education level, reason for the removal of the lower third molars, and pre-surgical respiratory and pulse rates. Radiographic evaluation of the impacted mandibular third molars was performed using panoramic radiography (orthopantomography) to determine the angulation and position of the third molars (Pell and Gregory and Winter classifications). Postoperatively, PoSSe scale scores were recorded at 2, 3, and 7 days after surgery, with results returned when the sutures were removed, 7 days after the procedure.

Operative Procedure

During the preoperative consultation, all patients who consented to participate in the study were thoroughly informed by an independent observer about the process of completing the questionnaire. Subsequently, data were collected regarding sex, age, race, reasons for the removal of lower third molars, and general health status. Panoramic radiographs were also requested, from

which the following data were collected: degree of impaction of the lower third molars and their position according to the Pell & Gregory and Winter classifications. All patients underwent a standardized surgical technique supported by scientific evidence, performed in an outpatient setting under local anesthesia.

Patients received the usual post-operative instructions immediately after surgery. Antibiotics and anti-inflammatory medications were prescribed (typically amoxicillin 500 mg three times a day for seven days and ibuprofen 600 mg three times a day for three days). Additionally, Dipyrone (metamizole) was prescribed at a dose of 500 mg four times a day for three days, to be taken as needed for pain relief, with a maximum of 4 tablets per day.

Post-operative Evaluation

After the surgical procedure, each patient received three copies of the PoSSe scale translated into Brazilian Portuguese, to be completed two days, three days, and one week after surgery. The questionnaires were returned to the researcher on the day of suture removal (seventh post-operative day). The observer who explained the questionnaire during the preoperative period contacted the patients two days, three days, and one week after surgery to remind them to complete the questionnaire. Patients who did not return the questionnaires were contacted and asked to return them, and were subsequently interviewed by phone regarding their understanding of the questionnaire.

Statistical analysis

During the analysis of responses on a question-by-question and domain-by-domain basis, we used absolute and percentage frequency expressions, as well as the mean ± standard deviation and median of each response/domain. The internal validity of the question-by-question and domain-by-domain responses was calculated using Cronbach's alpha, and each response/domain was correlated with the final score using Spearman's correlation, the Kaiser-Meyer-Olkin test, and Bartlett's test of sphericity. We performed Fisher's exact test, Pearson's chi-square test, Student's t-test, and the Friedman/Dunn test. Scores were compared between days 2, 3, and 7 post-surgery and between tooth types (38 vs 48). All analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows, adopting a 95% confidence interval.

Results

During the translation and transcultural adaptation process, the initial translation and back-translation demonstrated a high degree of consistency, with only minor discrepancies that were resolved through minimal adjustments. Interviews conducted with 48 patients confirmed that the questions were clear and easily understandable, without eliciting reluctance or hesitation from the participants. Consequently, no further modifications were necessary to enhance question comprehension following the interviews. The finalized questionnaire, translated and culturally adapted into Brazilian Portuguese, is available in Supplementary Material 1.

In the pre-test phase, the sample consisted of 48 patients who fully completed the 15-item questionnaire, resulting in a response rate of 100%. The majority of the participants were single (n=40, 83.3%), with a mean age of 24.06 ± 6.73 years. The predominant race was brown (n=41, 85.4%), and the most frequent sex was female (n=29, 60.4%). Most patients had completed secondary education (n=35, 72.9%), and pain was the most frequent reason for seeking removal of the third molars (n=29, 60.4%). The average pulse and respiratory rate pre-surgery were within normal ranges (60.77 ± 2.30 and 12.65 ± 1.00, respectively), and 45 patients had one third molar removed. In contrast, three (6.2%) had two third molars removed in the same surgical procedure (Table 1).

Table 1. Patient Demographics

	Descriptive Statistics
Marital Status	
Single	40 (83.3%)
Married/Stable Union	6 (12.5%)
Widowed/Divorced	2 (4.2%)
Age	24.06 SD=6.73
Race	
Write	4 (8.3%)
Black	3 (6.3%)
Mixed	41 (85.4%)
Gender	
Male	19 (39.6%)
Female	29 (60.4%)
Education	
High School	35 (72.9%)
Undergraduate	13 (27.1%)
Reason for Consultation	
Pain	29 (60.4%)
Pericoronitis	1 (2.1%)
Orthodontics	2 (4.2%)
Other	16 (33.3%)
Pulse (bpm)	60.77 SD=2.30
Respiratory Rate	12.65 SD=1.00
Extraction of Both Third Molars	3 (6.2%)

Data is presented as absolute frequency and percentage, or as mean and standard deviation.

Most of the extracted teeth were semi-erupted, with classification I or II relative to the mandibular ramus (Pell and Gregory classification) and mesioangulated or vertical relative to the long axis of the lower second molar (Winter classification). Osteotomy and odontotomy were used in more than half of the sample, and most patients required two local anesthetic injections. On average, the surgeries took between 21.27 ± 12.39 and 24.52 ± 23.71 minutes. No difference was observed between the right and left lower molars (Table 2).

Analysis of the PoSSe scale revealed a mean score of 27.83 ± 7.28 on Day 2, 28.60 ± 8.03 on Day 3, and 28.63 ± 9.73 on Day 7. In all assessment periods, there was excellent internal consistency with Cronbach's α values of 0.856, 0.883, and 0.910, respectively. Removal of any item did not reduce the Cronbach's α value to levels below 0.800 (Table 3).

Table 2. Clinical and surgical characteristics

Variable	Removed Tooth		p-value
	38	48	
Degree of Eruption			
Totally Erupted	6(27.3%)	4(13.8%)	0.451
Semi-Erupted	13(59.1%)	19(65.5%)	
Intraosseous	3(13.6%)	6(20.7%)	
Relation to Ramus			
I	10(45.5%)	7(24.1%)	0.118
II	8(36.4%)	19(65.5%)	
III	4(18.2%)	3(10.3%)	
Relation to Second Molar			
A	11(50.0%)	14(48.3%)	0.490
B	9(40.9%)	9(31.0%)	
C	2(9.1%)	6(20.7%)	
Angulation			
Mesio	6(27.3%)	12(41.4%)	0.614
Vertical	10(45.5%)	10(34.5%)	
Horizontal	4(18.2%)	6(20.7%)	
Disto	2(9.1%)	1(3.4%)	
Osteotomy			
No	10(45.5%)	10(34.5%)	0.427
Yes	12(54.5%)	19(65.5%)	
Odontosection			
No	12(54.5%)	14(48.3%)	0.657
Yes	10(45.5%)	15(51.7%)	
Number of Tubes			
1.000	2(9.1%)	0(0.0%)	0.162
2.000	18(81.8%)	21(72.4%)	
3.000	2(9.1%)	7(14.6%)	
>3	0(0.0%)	1(2.1%)	
Duration (minutes)	21.27SD=12.39	24.52SD=23.71	0.562

*p<0.05, Fisher's exact test or Pearson's chi-square test (n, %) or Student's t-test (mean SD).

All items on the PoSSe scale showed low scores and low frequencies across all assessment periods. On Day 2, the lowest scores were for the questions "In the past week, for how many days did you vomit or feel nauseous?" (1.25 ± 0.76) and "On the worst day of the past week, how many times did you vomit or feel nauseous?" (1.23 ± 0.78). The highest scores were for the questions "In the past week, did the surgery prevent you from performing work and other daily activities?" (3.48 ± 1.07) and "In the past week, were your leisure activities affected by the surgery? (including sports, hobbies, and social life)" (3.04 ± 1.11). All items showed a significant direct correlation with the PoSSe scale, except for the items "In the past week, for how many days did your lips or tongue have a tingling sensation due to the surgery?" (p=0.822) and "In the past week, for how many days did your lips or tongue feel numb due to the surgery?" (p=0.796).

On Day 3, the lowest scores were again for "In the past week, for how many days did you vomit or feel nauseous?" (1.27 ± 0.82) and "On the worst day of the past week, how many times did you vomit or feel nauseous?" (1.27 ± 0.87). The highest scores were for "In the past week, did the surgery prevent you from performing work and other daily activities?" (3.42 ± 1.16) and "In the past week, were your leisure activities affected by the surgery? (including sports, hobbies, and social life)" (3.04 ± 1.11). All items showed a significant direct correlation with the PoSSe scale, except for the item "In the past week, for how many days did your lips or tongue have a tingling sensation due to the surgery?" (p=0.068).

Table 3. Correlation with the POSSE total score.

		Correlation with the		Likert Scale				
	Mean±SD	**POSSE total score**	**Cronbach's α**	**1**	**2**	3	4	5
POSSE								
D2	27.83±7.28		0.856					
Eating 1	2.23±0.72	*p<0.001(r=0.698)*	0.844	8 (16.7%)	21 (43.8%)	19 (39.6%)	0 (0.0%)	0 (0.0%)
Eating 2	2.13±0.79	*p<0.001(r=0.531)*	0.841	8 (16.7%)	29 (60.4%)	9 (18.8%)	1 (2.1%)	1 (2.1%)
Speech 1	1.56±0.74	*p<0.001(r=0.498)*	0.845	25 (52.1%)	21 (43.8%)	1 (2.1%)	0 (0.0%)	1 (2.1%)
Speech 2	1.96±0.74	*p<0.001(r=0.519)*	0.854	13 (27.1%)	25 (52.1%)	9 (18.8%)	1 (2.1%)	0 (0.0%)
Sensation 1	1.46±0.50	p=0.822(r=0.033)	0.863	26 (54.2%)	22 (45.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Sensation 2	1.58±0.50	p=0.796(r=0.038)	0.863	20 (41.7%)	28 (58.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Appearance 1	2.10±1.19	*p<0.001(r=0.753)*	0.833	15 (31.3%)	24 (50.0%)	3 (6.3%)	1 (2.1%)	5 (10.4%)
Appearance 2	2.29±1.11	*p<0.001(r=0.724)*	0.838	10 (20.8%)	24 (50.0%)	8 (16.7%)	2 (4.2%)	4 (8.3%)
Pain 1	2.31±1.01	*p<0.001(r=0.571)*	0.837	6 (12.5%)	30 (62.5%)	7 (14.6%)	1 (2.1%)	4 (8.3%)
Pain 2	2.60±0.89	*p<0.001(r=0.678)*	0.837	6 (12.5%)	12 (25.0%)	27 (56.3%)	1 (2.1%)	2 (4.2%)
Sickness 1	1.25±0.76	*p=0.001(r=0.483)*	0.842	41 (85.4%)	5 (10.4%)	0 (0.0%)	1 (2.1%)	1 (2.1%)
Sickness 2	1.23±0.78	*p=0.002(r=0.436)*	0.847	43 (89.6%)	2 (4.2%)	1 (2.1%)	1 (2.1%)	1 (2.1%)
Interference 1	3.48±1.07	*p=0.043(r=0.293)*	0.862	5 (10.4%)	4 (8.3%)	4 (8.3%)	33 (68.8%)	2 (4.2%)
Interference 2	3.04±1.11	*p<0.001(r=0.552)*	0.853	2 (4.2%)	15 (31.3%)	17 (35.4%)	7 (14.6%)	7 (14.6%)
Interference 3	2.00±0.99	*p<0.001(r=0.716)*	0.838	18 (37.5%)	17 (35.4%)	8 (16.7%)	5 (10.4%)	0 (0.0%)
D3	28.60±8.03		0.883					
Eating 1	1.96±0.65	*p<0.001(r=0.706)*	0.874	11 (22.9%)	28 (58.3%)	9 (18.8%)	0 (0.0%)	0 (0.0%)
Eating 2	2.44±0.94	*p<0.001(r=0.493)*	0.877	9 (18.8%)	14 (29.2%)	21 (43.8%)	3 (6.3%)	1 (2.1%)
Speech 1	1.60±0.79	*p<0.001(r=0.504)*	0.876	25 (52.1%)	19 (39.6%)	3 (6.3%)	0 (0.0%)	1 (2.1%)
Speech 2	1.90±0.81	*p<0.001(r=0.660)*	0.877	16 (33.3%)	23 (47.9%)	7 (14.6%)	2 (4.2%)	0 (0.0%)
Sensation 1	1.33±0.52	p=0.068(r=0.266)	0.885	33 (68.8%)	14 (29.2%)	1 (2.1%)	0 (0.0%)	0 (0.0%)
Sensation 2	1.44±0.58	*p=0.016(r=0.345)*	0.884	29 (60.4%)	17 (35.4%)	2 (4.2%)	0 (0.0%)	0 (0.0%)
Appearance 1	2.48±1.22	*p<0.001(r=0.760)*	0.868	13 (27.1%)	10 (20.8%)	19 (39.6%)	1 (2.1%)	5 (10.4%)
Appearance 2	2.60±1.18	*p<0.001(r=0.690)*	0.874	12 (25.0%)	6 (12.5%)	23 (47.9%)	3 (6.3%)	4 (8.3%)
Pain 1	2.60±1.05	*p<0.001(r=0.650)*	0.870	7 (14.6%)	14 (29.2%)	22 (45.8%)	1 (2.1%)	4 (8.3%)
Pain 2	2.48±0.90	*p<0.001(r=0.692)*	0.869	6 (12.5%)	18 (37.5%)	21 (43.8%)	1 (2.1%)	2 (4.2%)
Sickness 1	1.27±0.82	*p<0.001(r=0.556)*	0.874	42 (87.5%)	2 (4.2%)	2 (4.2%)	1 (2.1%)	1 (2.1%)
Sickness 2	1.27±0.87	*p<0.001(r=0.501)*	0.877	43 (89.6%)	1 (2.1%)	1 (2.1%)	2 (4.2%)	1 (2.1%)
Interference 1	3.42±1.16	*p<0.001(r=0.535)*	0.882	7 (14.6%)	3 (6.3%)	3 (6.3%)	33 (68.8%)	2 (4.2%)
Interference 2	3.04±1.11	*p<0.001(r=0.657)*	0.877	2 (4.2%)	14 (29.2%)	20 (41.7%)	4 (8.3%)	8 (16.7%)
Interference 3	2.10±0.97	*p<0.001(r=0.772)*	0.869	14 (29.2%)	21 (43.8%)	7 (14.6%)	6 (12.5%)	0 (0.0%)
D7	28.63±9.73		0.910					
Eating 1	1.73±0.71	*p<0.001(r=0.716)*	0.903	20 (41.7%)	21 (43.8%)	7 (14.6%)	0 (0.0%)	0 (0.0%)
Eating 2	2.50±1.24	*p<0.001(r=0.638)*	0.905	10 (20.8%)	18 (37.5%)	12 (25.0%)	2 (4.2%)	6 (12.5%)
Speech 1	1.63±0.84	*p<0.001(r=0.649)*	0.904	26 (54.2%)	16 (33.3%)	5 (10.4%)	0 (0.0%)	1 (2.1%)
Speech 2	1.73±0.68	*p<0.001(r=0.563)*	0.908	19 (39.6%)	23 (47.9%)	6 (12.5%)	0 (0.0%)	0 (0.0%)
Sensation 1	1.38±0.70	*p=0.032(r=0.310)*	0.913	33 (68.8%)	14 (29.2%)	0 (0.0%)	0 (0.0%)	1 (2.1%)
Sensation 2	1.54±0.87	*p<0.001(r=0.532)*	0.912	28 (58.3%)	18 (37.5%)	0 (0.0%)	0 (0.0%)	2 (4.2%)
Appearance 1	2.71±1.46	*p<0.001(r=0.862)*	0.898	14 (29.2%)	8 (16.7%)	13 (27.1%)	4 (8.3%)	9 (18.8%)
Appearance 2	2.83±1.52	*p<0.001(r=0.863)*	0.899	15 (31.3%)	4 (8.3%)	13 (27.1%)	6 (12.5%)	10 (20.8%)
Pain 1	2.65±1.30	*p<0.001(r=0.829)*	0.895	10 (20.8%)	14 (29.2%)	14 (29.2%)	3 (6.3%)	7 (14.6%)
Pain 2	2.42±0.94	*p<0.001(r=0.793)*	0.899	8 (16.7%)	17 (35.4%)	20 (41.7%)	1 (2.1%)	2 (4.2%)
Sickness 1	1.19±0.67	*p<0.001(r=0.516)*	0.907	43 (89.6%)	3 (6.3%)	1 (2.1%)	0 (0.0%)	1 (2.1%)
Sickness 2	1.21±0.77	*p=0.001(r=0.475)*	0.907	44 (91.7%)	1 (2.1%)	1 (2.1%)	1 (2.1%)	1 (2.1%)
Interference 1	3.31±1.34	*p<0.001(r=0.661)*	0.904	10 (20.8%)	3 (6.3%)	1 (2.1%)	30 (62.5%)	4 (8.3%)
Interference 2	2.88±1.23	*p<0.001(r=0.712)*	0.903	7 (14.6%)	11 (22.9%)	18 (37.5%)	5 (10.4%)	7 (14.6%)
Interference 3	2.17±0.95	*p<0.001(r=0.681)*	0.902	13 (27.1%)	19 (39.6%)	11 (22.9%)	5 (10.4%)	0 (0.0%)

Day 7, the lowest scores were again for "In the past week, for how many days did you vo mit or feel nauseous?" (1.19 ± 0.67) and "On the worst day of the past week, how many times did you vomit or feel nauseous?" (1.21 ± 0.77). The highest scores were for "In the past week, did the surgery prevent you from performing work and other daily activities?" (3.31 ± 1.34) and "In the past week, were your leisure activities affected by the surgery? (including sports, hobbies, and social life)" (2.88 ± 1.23). All items showed a significant direct correlation with the PoSSe scale (Table 3).

Factor analysis reduced the factors to four domains. In the factor analysis, the domains of "eating" and "speech" merged into the same domain, as did "appearance" and "pain," and "illness" and "interference." The KMO coefficients were 0.698, 0.715, and 0.766 on Day 2, Day 3, and Day 7, respectively. Bartlett's test of sphericity was significant in all three periods (p<0.001) (Table 4).

Table 4. The analysis of the factor loadings of the PoSSe scale components.

		Component Matrix (D2)					Component Matrix (D3)					Component Matrix (D7)			
Communalities	**Extraction**	**1**	**2**	**3**	**4**	**Extraction**	**1**	**2**	**3**	**4**	**Extraction**	**1**	**2**	**3**	**4**
Eating_1	0,631	0,642	-0,097	0,457	*0,017*	0,669	0,705	-0,031	-0,227	*-0,345*	0,710	0,753	-0,128	-0,255	*0,248*
Eating_2	0,526	0,711	-0,027	-0,028	*-0,139*	0,424	0,579	0,014	0,218	*-0,203*	0,741	0,689	-0,333	-0,256	*0,299*
Speech_1	0,647	0,593	0,442	0,234	*-0,211*	0,605	0,621	0,226	0,383	*-0,149*	0,813	0,728	-0,383	0,288	*0,232*
Speech_2	0,674	0,383	0,240	0,663	*-0,172*	0,667	0,582	0,255	0,420	*-0,296*	0,708	0,566	-0,262	-0,013	*0,564*
Sensation_1	0,805	-0,002	*0,830*	-0,258	0,222	0,746	0,297	*0,645*	0,105	0,480	0,827	0,258	*0,638*	0,557	0,209
Sensation_2	0,831	-0,023	*0,849*	-0,139	0,299	0,813	0,312	*0,724*	0,113	0,423	0,787	0,338	*0,661*	0,428	0,229
Appearance_1	0,794	*0,799*	-0,266	-0,186	0,226	0,775	*0,749*	-0,060	-0,326	0,323	0,706	*0,799*	0,197	-0,008	-0,169
Appearance_2	0,812	*0,728*	-0,220	-0,295	0,383	0,725	*0,663*	-0,103	-0,410	0,327	0,743	*0,792*	0,184	-0,229	-0,168
Pain_1	0,835	*0,754*	-0,151	-0,418	0,262	0,805	*0,736*	-0,304	-0,353	0,215	0,869	*0,865*	0,101	-0,083	-0,322
Pain_2	0,597	*0,749*	0,036	-0,023	0,184	0,675	*0,767*	-0,159	-0,238	-0,065	0,784	*0,817*	0,144	-0,095	-0,293
Sickness_1	0,869	0,734	0,119	-0,338	-0,449	0,891	0,691	-0,374	*0,469*	0,230	0,887	0,645	-0,379	*0,537*	-0,199
Sickness_2	0,794	0,609	0,255	-0,096	-0,590	0,870	0,611	-0,352	*0,572*	0,216	0,857	0,613	-0,411	*0,538*	-0,155
Interference_1	0,688	0,271	0,141	0,524	0,566	0,716	0,496	0,512	-0,363	*-0,277*	0,712	0,664	0,423	-0,302	*0,035*
Interference_2	0,536	0,484	-0,139	0,530	0,030	0,693	0,606	0,220	-0,027	*-0,526*	0,637	0,685	0,173	-0,232	*0,289*
Interference_3	0,550	0,736	-0,008	-0,090	0,019	0,628	0,765	-0,192	-0,044	*-0,066*	0,674	0,751	-0,063	-0,134	*-0,298*

The KMO coefficient was KMO=0.698, KMO=0.715, and KMO=0.766 in D2, D3, and D7, respectively. Bartlett's test of sphericity was significant in all three periods (p<0.001).

D2: two days after surgery; D3: three days after surgery; D7: seven days after surgery.

Regarding the average values of the PoSSe scale, there was no significant variation from Day 2 to Day 3 and Day 7 (p=0.056), nor within the domains of eating (p=0.205), speech (p=0.160), pain (p=0.131), illness (p=0.662), and interference (p=0.599). The domains of sensation (p=0.013) and

appearance (p=0.001) showed a significant reduction on Day 3 and an increase on Day 7, respectively. When the scores for the domains were analyzed, all demonstrated satisfactory Cronbach's α on Day 2 (α=0.790), Day 3 (α=0.774), and Day 7 (α=0.851). All domains showed a positive correlation with the PoSSe scale on all days of evaluation, except for the sensation domain on Day 2 (p=0.792) (Table 5).

Table 5. Evaluation of the variations in the mean values of the PoSSe scale across different assessment points

	Day PO				Correlation with the POSSE sum		
	D2	**D3**	**D7**	**p-Valor**	**D2**	**D3**	**D7**
POSSE	27.83±7.28	28.60±8.03	28.63±9.73	0.056			
Domains							
Eating	4.35±1.23	4.40±1.33	4.23±1.75	0.205	*p<0.001(r=0.760)*	*p<0.001(r=0.677)*	*p<0.001(r=0.756)*
Speech	3.52±1.25	3.50±1.40	3.35±1.36	0.160	*p<0.001(r=0.589)*	*p<0.001(r=0.656)*	*p<0.001(r=0.655)*
Sensation	3.04±0.92	2.77±0.99*	2.92±1.43†	*0.013*	p=0.792(r=0.039)	*p=0.015(r=0.349)*	*p<0.001(r=0.485)*
Appearance	4.40±2.22	5.08±2.28*	5.54±2.83†	*0.001*	*p<0.001(r=0.792)*	*p<0.001(r=0.779)*	*p<0.001(r=0.906)*
Pain	4.92±1.70	5.08±1.80*	5.06±2.14*	0.131	*p<0.001(r=0.713)*	*p<0.001(r=0.726)*	*p<0.001(r=0.851)*
Sickness	2.48±1.44	2.54±1.65	2.40±1.40	0.662	*p<0.001(r=0.485)*	*p<0.001(r=0.556)*	*p<0.001(r=0.517)*
Interference	5.13±1.81	5.23±1.93	5.13±2.03	0.599	*p<0.001(r=0.767)*	*p<0.001(r=0.810)*	*p<0.001(r=0.801)*
Cronbach's α					0.790	0.774	0.851

*p<0.05 versus D2. †p<0.05 versus D3 (mean±SD); Friedman/Dunn test.
PO: post-operative; D2: two days after surgery; D3: three days after surgery; D7: seven days after surgery.

Discussion

This study focused on the translation and adaptation of the PoSSe scale into Brazilian Portuguese, prioritizing internal validation to ensure structural coherence and reliability. Confirming internal consistency is essential prior to advanced psychometric analyses, as premature external validation may compromise the quality of the adaptation and the interpretation of results. This process goes beyond mere linguistic translation, encompassing cultural adjustments to ensure content validity across different settings (12). Adapting previously validated questionnaires is preferable to creating new instruments, as it is more time-efficient and cost-effective, and aims to produce equivalent measures (12,15). The adaptation of the PoSSe scale followed the guidelines proposed by Beaton et al. (12) and Herdman et al. (13), and the translation and back-translation process did not present significant difficulties.

The reliability of the PoSSe scale was assessed through internal consistency using Cronbach's alpha coefficients. The scale demonstrated excellent internal consistency at all three time points, as supported in the literature (16,17), confirming the instrument's reliability and its ability to measure what it is intended to assess consistently. In other words, the PoSSe scale proved reliable for assessing OHRQoL following mandibular third molar surgery in the Brazilian population. The high internal consistency observed in this study is consistent with findings from the original instrument (10), although the values were slightly lower at all time points. The high Cronbach's alpha value found supports the use of the PoSSe scale in both comparative research and clinical studies, as recommended in the literature (17). It is worth noting that the sample size used in this study aligns with Beaton et al.'s recommendations for the pre-testing stage and content validation of cross-culturally adapted instruments. However, it does not allow for complete psychometric validation procedures, such as confirmatory factor analysis.

All items of the PoSSe scale presented low scores and frequencies across all assessment periods, indicating that patients reported a low adverse impact in relation to the severity of post-operative symptoms during the study period. Score reductions were observed on post-operative days two, three, and seven for the items "Thinking about the past week, how many days did you vomit or feel nauseous?" and "On the worst day in the past week, how many times did you vomit or feel nauseous?", suggesting that these symptoms were infrequently reported by patients undergoing mandibular third molar surgery, as corroborated by previous studies (18).

Conversely, the highest scores were recorded for the items "In the past week, did the surgery prevent you from working or performing daily activities?" and "In the past week, were your leisure activities affected by the surgery? (including sports, hobbies, and social life)", consistent with previous findings (10,19,20). These results suggest that the primary clinical alteration perceived by patients involves limitations in daily and leisure activities. Such findings may be attributed to the fact that mandibular third molar surgery is frequently associated with significant post-operative morbidity, including pain, edema, and trismus, resulting from the inflammatory response to surgical trauma to bone and soft tissues, which in turn leads to functional impairment affecting patients' quality of life.

Although the study sample, composed primarily of young adults from a single public university in northeastern Brazil, may not reflect the full linguistic, cultural, and socioeconomic diversity of the Brazilian population, we believe it was appropriate for this initial stage of cross-cultural adaptation and preliminary psychometric evaluation. The instrument was well understood by participants, supporting its clarity and cultural relevance in this context. Nonetheless, we acknowledge that future studies should include more heterogeneous samples across different regions and healthcare contexts, such as private dental offices, rural communities, and public primary care services, to enhance generalizability.

Factor analysis reduced the number of factors to four domains. In this analysis, the eating and speech domains clustered into a single domain, as did the appearance and pain domains, and the illness and interference domains. These results differ from those reported by Ruta et al. (10), who identified five relevant factors corresponding to the seven original subscales of the PoSSe scale, namely: eating, speech, sensation, appearance, pain, illness, and interference with daily activities.

The convergence of domains observed in this factor analysis likely reflects culturally influenced ways of interpreting post-operative symptoms in the Brazilian context. The grouping of items related to eating and speaking, pain and appearance, and illness and interference suggests that recovery may be perceived as an integrated experience rather than discrete functional domains. These findings underscore the relevance of cultural factors in psychometric assessments and point to the need for further validation in more diverse populations.

The emergence of a four-factor model, diverging from the five-domain structure proposed by Ruta et al., calls for a more interpretative approach. Rather than indicating psychometric shortcomings, these domain mergers may reflect structural validity shaped by cultural salience. The clustering of eating and speaking, for instance, may signal a shared construct of orofacial functionality, particularly relevant to third molar surgery. Likewise, the link between pain and appearance could reflect the cultural weight of facial aesthetics on perceived suffering. At the same time, the overlap between illness and interference may echo societal expectations regarding productivity and the disruptive role of discomfort. These findings underscore the importance of conceptualizing factorial invariance not as a rigid psychometric criterion, but as a flexible, context-sensitive feature of cross-cultural adaptation. While deviations from the original model may raise concerns about comparability, they simultaneously reinforce the ecological validity and cultural relevance of the adapted instrument. Still, these interpretations are preliminary and require further investigation in larger and more demographically diverse Brazilian samples to assess the stability and generalizability of the observed factor structure.

In addition to the factor analysis, the instrument's reproducibility was assessed using test-retest reliability, as recommended in the literature (10,21). The instrument was applied at three distinct time points during the post-operative period to assess the stability and consistency of responses over time. The results indicated no significant variation in mean PoSSe scale scores across the three time points, nor in the domains of eating, speech, pain, illness, and interference with daily activities, demonstrating strong agreement and response stability, thereby suggesting good reliability.

However, the “sensation” and “appearance” domains showed significant temporal variation. This does not reflect issues with the instrument’s stability but is likely due to the involvement of local anatomical structures during mandibular third molar surgery, which triggers an inflammatory response resulting in ipsilateral facial edema. This edema tends to subside over time

(22), while sensory changes are generally perceived by patients approximately one week after surgery (23), which may explain the increased perception of sensory alteration over time.

Analysis of the PoSSe subscales showed that all subscales were strongly and directly correlated with the total scale scores at all time points, except for the "sensation" subscale, which presented the weakest direct correlation with the total PoSSe score on post-operative days two and three. This finding may be explained by the fact that sensory alterations resulting from mandibular third molar surgery are less frequent post-operative complications and are considered intermediate rather than immediate outcomes compared to other common complications associated with this type of surgery (24). However, our findings contrast with those reported by Amer (25), in which the "sensation" subscale had a significant impact on the total PoSSe score. This discrepancy may be due to the use of techniques such as lingual flap elevation and lingual split procedures in Amer's study (25), which increase the risk of injury to the inferior alveolar and lingual nerves (24).

All items were significantly and positively correlated with the total PoSSe scale score. This strong association suggests that the PoSSe scale captures a substantial proportion of non-random variation in symptom severity and its impact on perceived health, corroborating the findings reported by Ruta et al. (10). The PoSSe scale is particularly attractive and suitable for clinical studies due to its small number of items, which facilitates its application in large samples or in research settings with limited time. Furthermore, its brevity allows for efficient assessment of short-term surgical outcomes, making it useful for comparative clinical trials.

The main limitation of this study lies in the use of a self-administered questionnaire, a subjective measure that may be prone to information and recall biases, especially considering that data were collected at different post-operative time points. Although the Brazilian version of the PoSSe scale demonstrated strong content validity, reliability, and reproducibility, further analyses—such as construct and criterion validity, as well as external reproducibility—are needed to confirm its broader applicability. Despite these limitations, this is the first study to translate and culturally adapt the PoSSe scale into Brazilian Portuguese, representing a relevant contribution to the field. Future studies should also investigate the scale's performance in other dental surgical contexts (e.g., multiple extractions, periodontal procedures) and across diverse healthcare settings, including public health systems and private practices, to strengthen its external validity and clinical utility.

Conclusion

In conclusion, the PoSSe scale was successfully translated and culturally adapted for the Brazilian context, demonstrating preliminary evidence of content validity, sensitivity to post-operative symptom severity following third molar extraction, good internal consistency, and excellent reliability. However, this study represents an early stage in the psychometric validation process. Additional studies are required to examine further its construct validity, criterion validity, and external validity, as well as to confirm its applicability across broader clinical and demographic settings in Brazil.

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Conflict of Interest
The authors declare that there is no conflict of interest.

Data availability
The research data are available within the article.

Resumo

Este estudo teve como objetivo adaptar transculturalmente a escala PoSSe para o português brasileiro e conduzir uma avaliação preliminar de sua validade de conteúdo, consistência interna, confiabilidade e reprodutibilidade. Foi realizado um estudo metodológico e observacional seguindo um protocolo de cinco etapas para a adaptação da escala. A amostra consistiu de 48 pacientes que se submeteram à cirurgia do terceiro molar inferior, com idade média de 24,06 anos (DP = 6,73), predominantemente do sexo feminino (60,4%), recrutados na Faculdade de Odontologia da Universidade Federal do Ceará. Os pacientes preencheram a versão traduzida da escala PoSSe e foram entrevistados para avaliar a compreensão dos itens. A análise dos dados incluiu estatísticas descritivas, consistência interna (alfa de Cronbach), correlação item-total e análise fatorial exploratória. Os processos de tradução e retrotradução foram consistentes, com pequenas discrepâncias resolvidas. As entrevistas confirmaram a clareza dos itens, sem necessidade de ajustes adicionais. A escala demonstrou consistência interna adequada (alfa de Cronbach: D2 = 0,856, D3 = 0,883 e D7 = 0,910) em diferentes períodos de avaliação. A análise fatorial reduziu o número de fatores para quatro domínios. Os escores dos domínios da escala PoSSe mostraram correlação positiva com a escala geral, exceto para o domínio "sensação" no segundo dia (p = 0,792). Em conclusão, a escala PoSSe foi traduzida e adaptada com sucesso para o português brasileiro, demonstrando evidência preliminar de validade de conteúdo, consistência interna e confiabilidade. No entanto, estudos adicionais com amostras mais diversas são necessários para avaliar completamente suas propriedades psicométricas.

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