Cross-cultural adaptation of the CALCULATE instrument into Brazilian Portuguese: pressure injury in intensive care

Adaptação transcultural do instrumento CALCULATE para o português brasileiro: lesão por pressão em terapia intensiva

Adaptación transcultural del instrumento CALCULATE al portugués brasileño: lesión por presión en cuidados intensivos

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ABSTRACT

Objective: To perform the cross-cultural adaptation of CALCULATE for Brazilian Portuguese.

Method: A methodological study conducted from January to December 2021, divided into six stages: translation, synthesis, back-translation, expert committee with the application of the content validity index, pre-testing in 40 adult patients, and submission to the authors. The study took place in the intensive care units of a public tertiary teaching hospital in the interior of the state of São Paulo, Brazil. The original CALCULATE has eight risk assessment items and is stratified with a score of 0-3 (high risk) and 4-8 (very high risk).

Results: After expert evaluation, the final content validity was 0.9. They suggested words and phrases that should undergo changes regarding textual equivalences, as well as definitions of acronyms and terminologies. In the pre-test, the items were assessed as suitable for understanding; only one item required additional explanation for adequacy.

Conclusion: The cross-cultural adaptation of CALCULATE for Brazilian Portuguese was successfully performed, revealing a good content validity index, confirming the relevance and appropriateness of its items. CALCULATE is suitable for use in intensive care units and research and teaching centers.

Descriptors: Pressure ulcer. Intensive care units. Risk assessment. Translating. Cross-cultural comparison. Nursing methodology research.

RESUMO

Objetivo: Realizar a adaptação transcultural do CALCULATE para o português brasileiro.

Método: Estudo metodológico, desenvolvido de janeiro a dezembro de 2021 e dividido em seis etapas: tradução, síntese, retrotradução, comitê de especialistas com aplicação de índice de validade de conteúdo, pré-teste em 40 pacientes adultos e envio às autoras. O estudo ocorreu nas unidades de terapia intensiva em hospital público de ensino de nível terciário no interior do estado de São Paulo, Brasil. O CALCULATE original tem oito itens de avaliação (fatores de risco) e é estratificado com escore 0-3 (alto risco) e 4-8 (risco muito alto).

Resultados: Após avaliação dos especialistas, a validade de conteúdo final foi de 0,9. Eles sugeriram palavras e frases que deveriam sofrer alterações quanto às equivalências textuais, assim como definições de siglas e terminologias. No pré-teste, os itens foram avaliados como adequados na compreensão; apenas um item precisou de explicação complementar para adequação.

Conclusão: Foi realizada a adaptação transcultural do CALCULATE para o português do Brasil, a qual revelou ter bom índice de validade de conteúdo, sendo verificada a pertinência e relevância de seus itens. O CALCULATE está adequado para utilização em unidades de terapia intensiva e centros de pesquisa e ensino.

Descritores: Úlcera por pressão. Unidades de terapia intensiva. Medição de risco. Tradução. Comparação transcultural. Pesquisa metodológica em enfermagem.

RESUMEN

Objetivo: Realizar la adaptación transcultural de CALCULATE al portugués brasileño.

Método: Un estudio metodológico llevado a cabo de enero a diciembre de 2021, dividido en seis etapas: traducción, síntesis, retrotraducción, comité de expertos con aplicación del índice de validez de contenido, preprueba en 40 pacientes adultos y envío a las autoras. El estudio se realizó en las unidades de cuidados intensivos de un hospital público de enseñanza terciaria en el interior del estado de São Paulo, Brasil. El CALCULATE original tiene ocho ítems de evaluación (factores de riesgo) y se estratifica con un puntaje de 0-3 (alto riesgo) y 4-8 (riesgo muy alto).

Resultados: Después de la evaluación de los expertos, la validez de contenido final fue de 0,9. Sugirieron palabras y frases que debían cambiar en cuanto a equivalencias textuales, así como definiciones de siglas y terminologías. En la preprueba, los ítems se evaluaron como adecuados para la comprensión; solo un ítem requirió una explicación adicional para su adecuación.

Conclusión: Se realizó con éxito la adaptación transcultural de CALCULATE al portugués brasileño, revelando un buen índice de validez de contenido, confirmando la relevancia y adecuación de sus ítems. CALCULATE es adecuado para su uso en unidades de cuidados intensivos y centros de investigación y enseñanza.

Descriptores: Úlcera por presión. Unidades de cuidados intensivos. Medición de riesgo. Traducción. Comparación transcultural. Investigación metodológica en enfermería.

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■ INTRODUCTION

Pressure injuries (PI) are a general concern as they are considered a problem in the health care process[1]. When they occur after hospital admission, they are considered a potentially avoidable adverse event and an indicator of the quality of healthcare[2]. In addition to the negative impact on patients and their families, they cause pain, delay functional recovery and lead to infections, resulting in prolonged hospitalizations, higher costs for health institutions and increased morbidity and mortality[3].

Intensive care patients are at greater risk of developing PI[4]. Several risk factors are associated with the greater susceptibility of this patient profile, such as old age, longer hospital stay, mechanical ventilation, immobility, reduced perfusion, diabetes mellitus[4], longer stay in the intensive care unit (ICU), excess body weight, artificial nutrition[5] and use of vasopressors, mainly noradrenaline[6].

For a holistic understanding, it is necessary to evaluate and understand the potential risk factors, aiming at an adequate risk stratification of PI for critically ill patients in the ICU and a complete assessment focused on prevention[4]. In this context, the administration of instruments that determine the assessment of each patient's risk score is essential, as they identify important predictors of the development of PI, with the aim of predicting its occurrence[2].

The most used scale for predicting PI in the ICU is the Braden scale[7], but it was not developed specifically for critically ill patients, which raises questions about its accuracy. A systematic review that evaluated the predictive power of the Braden scale reported greater accuracy in general wards and lower accuracy in ICU patients, as risk factors for critically ill patients — including emergency settings, sedation, vasoactive drugs, mechanical ventilation, incontinence and edema — are not included in this scale[8].

A systematic review of the Cochrane was carried out with the aim of verifying whether the use of structured and systematic PI risk assessment tools, in any healthcare environment, reduces the incidence of PI. Two randomized controlled clinical trials that compared risk assessment instruments with the absence of structured assessment were included. Based on evidence from one study, it was uncertain whether the Braden scale made any difference in the incidence of PI compared to clinical judgment[9]. This nurse's judgment must be based on nursing diagnoses, such as, for example, Risk of Pressure Ulcer, which considers risk factors, populations at risk, associated conditions and clinical examination of the entire skin[11]. From this perspective, the instruments should be used in conjunction with the critical assessment of nurses, mainly for the adequate implementation of prevention measures aimed at patients at higher risk[4], through a holistic approach and taking into account the risk factors[11].

Examples of prevention measures for patients after PI risk stratification include skin hydration, application of barrier cream to areas exposed to moisture, use of urinary catheters, and fecal management when indicated; early mobilization and repositioning; and use of multilayer silicone foam dressings in areas of bony prominences[11], including the possibility of creating PI care bundles[12].

With the aim of building a new specific instrument to assess the risk of developing PI in patients receiving critical care, researchers carried out a systematic review of the literature in order to find the main risk factors related to these patients[13]. Seven critical points were identified: 1) mechanical ventilation (any modality); 2) impaired circulation (vascular disease, intravenous inotropic drugs and diabetes mellitus); 3) dialysis (hemodialysis and peritoneal dialysis); 4) long surgery or cardiac arrest (surgeries lasting more than 4 hours in the last 24 hours or cardiac arrest); 5) fecal incontinence (diarrhea types 5, 6 or 7); 6) low protein level (serum albumin < 35g/l and/or poor nutritional status); and 7) instability when patient is turned (resuscitation, active bleeding, severe arrhythmias, abnormal hemodynamic parameters that cannot be brought to the normal range after 10 minutes of position change — item that classifies the patient as being at very high risk, independently[13].

Based on these risk factors, the CALCULATE instrument (Critical Care Pressure Ulcer Assessment Tool made Easy)[13] was developed in 2015, in the United Kingdom, which was subsequently validated by a group of nurses specialized in critical care, according to national and international guidelines. After its implementation, the seven-item scale was revised, and the eighth item, immobility (secondary to neuromuscular disease or sedation/paralysis or weakness of limbs preventing independent movement in bed or chair) was added. The eight items stratify the risk of PI in the ICU as high risk (from 0 to 3 points) and very high risk (from 4 to 8 points)[14].

It should be mentioned that Brazil lacks a specific instrument for intensive care patients. In this context, the present study aims to carry out the cross-cultural adaptation of the CALCULATE instrument into Brazilian Portuguese.

■ METHOD

Type of Study

This is a methodological study of cross-cultural adaptation of the original CALCULATE instrument[13,14]. To create the Portuguese version, a cross-cultural adaptation process was

carried out guided by Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures[15], which is the most used and reliable reference for adaptation studies[16]. The process was structured according to the recommendations and guidelines of the COSMIN guide (Consensus-based Standards for the selection of health Measurement Instruments) from the EQUATOR Network.

Content validation was carried out in which it is assessed whether the items of a test are representative of the sample of items of the construct. This validity is measured by judges and experts who verify the representativeness of the tool[17].

The methodological steps are described in Figure 1.

Study steps

1st Step – Translation of the original version (OV) of the CALCULATE[13,14], considered a direct translation. This step was carried out by two bilingual Brazilian translators (English/Portuguese): one of them was aware of the objective of the study and the other was not (as required by the methodology). Each translator translated the tool from English into Portuguese, generating instruments T1 and T2.
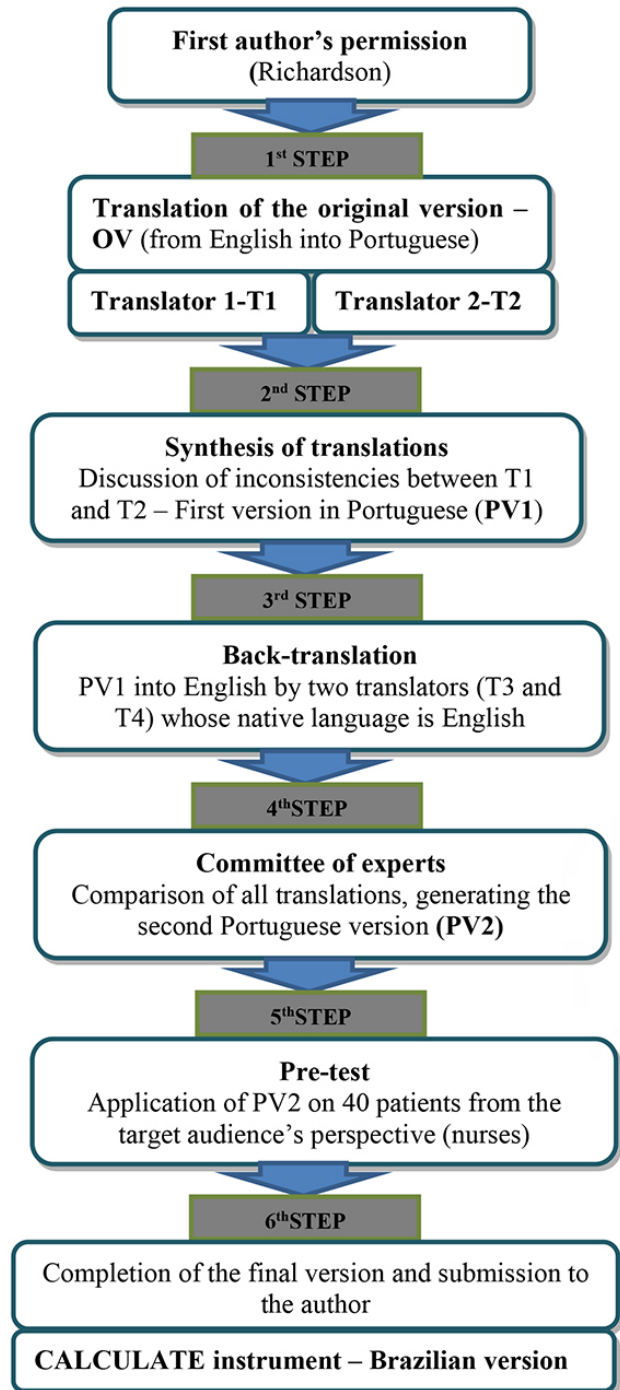
2nd Step – Synthesis of translations. The two independent translators (Translator 1 and Translator 2) discussed possible semantic inconsistencies between the versions generated and, thus, reached a consensus to create the first version in Portuguese (PV1).

3rd Step – Back-translation. Two other bilingual translators (Translator 3 and Translator 4), whose mother tongue is English, without knowledge of the original instrument, back-translated PV1, generating the English instruments BT1 and BT2. Back-translation allows for the quality and consistency of the translation, evaluating whether the source language maintains the same meanings.

4th Step – Expert Committee. According to the methodology used[15], in addition to the translators involved in the translation processes, there is a minimal need for health professionals, methodologists, that is, specialists with experience in methodological studies and who master both languages of adaptation. There is no consensus in the literature regarding the number of judges. However, five is considered a sufficient number for this step[17,18], as the final decision on the number of experts needed for a content validation panel depends on the desired expertise and the breadth of representation of the committee[19].

The committee was composed of experts who met the following criteria: doctors in nursing with knowledge

Figure 1 – Flowchart of the methodological path developed in the cross-cultural adaptation of the CALCULATE for the Brazilian context. São Paulo, Brazil, 2021

of intensive care and risk prediction scales, methodology, linguistics and command of both languages (English and Portuguese)[19]. The committee members were pre-selected based on their knowledge of scientific work already published in the area of intensive care and by analyzing the Curriculum Lattes, to verify whether they met the previously mentioned selection criteria. The experts came from other educational institutions in São Paulo and only one of them completed PhD at the same institution as the authors, but without any current connection.

Five experts were selected who fully met all the criteria. After this phase, the selected experts were invited by email to participate in the committee. Everyone accepted and signed a Free and Informed Consent Form (ICF).

The committee brought together all versions of the instrument (OV, T1, T2, PV1, BT1, BT2) and evaluated each of the eight CALCULATE items, to verify whether all questions were answered appropriately, or not, in relation to the following equivalences described methodologically: semantic, idiomatic, conceptual and experimental. Expert agreement was assessed using the content validity index (CVI). After the committee's evaluation, the research team met with experts to prepare the second Portuguese version (PV2) of the CALCULATE.

5th Step – Pre-test. According to the methodology used[15], a sample of 30 to 40 patients is recommended for this step. PV2 was applied to a sample of 40 ICU patients by ten intensive care nurses with at least one year of experience in intensive care, who were invited, voluntarily signed the informed consent form, received instructions on what the instrument is like and how they would apply it once in a patient. The nurses were selected by convenience sample, and after they returned their evaluations, a decision was made about the need to select more participants. When all suggestions were received, compliance with all items was observed, with data saturation, and, therefore, expanding the sample of nurses was unnecessary.

Patients were selected by nurses who were providing nursing care on duty; then, informed consent was provided to patients/guardians. The pre-test is an important step, which allows the instrument to be assessed by the target audience, detecting possible difficulties in application, clarity and objectivity for each PV2 item. Thus, nurses assessed each item of the instrument as understandable/appropriate (yes or no) with Google Forms® using a Tablet and were able to make suggestions.

6th Step – Completion of the final version and submission to the author. After the pre-test was completed, the authors and the committee of experts evaluated the nurses' considerations and generated the final version of CALCULATE. All steps taken and documents were submitted to the authors of the original version.

Study site and period

The study, including all stages and translations, was carried out from January 15, 2021 to December 10, 2021. The pre-test stage was carried out in adult ICUs of a public teaching hospital in the inland of the state of São Paulo, Brazil, from May 18, 2021 to June 21, 2021.

Data collection

Data collection from experts was carried out via email, using a form developed to collect personal and academic data, as well as a form for collecting evaluations and suggestions on the translated version of the CALCULATE. The experts' suggestions were grouped and discussed regarding their suitability between the researchers and the expert committee itself to generate PV2.

For the nurses to apply the instrument in the pre-test, the Google Forms® form was used to record the responses, which was later converted into Excel spreadsheets for analysis. Nurses were also able to make suggestions for each item on Google Forms®, which were taken to the committee of experts and researchers for discussions and the development of the final version.

Data analysis and processing

Professional information about experts, nurses and patients was coded and entered into Excel spreadsheets, Descriptive statistics with frequency and percentage for categorical variables, as well as mean, standard deviation (SD), median, minimum and maximum for quantitative variables. Data normality was assessed using the Shapiro-Wilk test.

For the analysis of data from the assessment carried out by experts, the average agreement between participants was calculated using the CVI, which measures the proportion or percentage of experts in agreement on certain aspects of the instrument and its items[17]. The main advantage of the CVI is to allow the analysis of each item individually and then of the instrument as a whole[20]. To calculate the CVI, a Likert scale was used for each of the eight items evaluated, using the following classification by points: 1 – not clear; 2 – requires major revision; 3 – requires minor revision; and 4 – very clear.

It is recommended to first calculate the CVI for each item, counting the number of experts who classified the item as 3 or 4. Then, this number is divided by the total number of experts, resulting in the proportion of experts who considered the item as valid content. To check the validity of new instruments in general, most authors suggest a minimum CVI agreement of 0.8[20].

In the pre-test analysis, each nurse applied the CALCULATE once to four different patients, assessing each item as appropriate or not appropriate and agreeing on adequacy (%) at the end for each item.

Ethical aspects

For the cross-cultural adaptation of the CALCULATE[13,14], permission was requested by email from the authors (Annette Richardson and Isabel Barrow, United Kingdom), who authorized the study. The project was approved by the Research Ethics Committee of the same public educational institution to which the researchers belong, in compliance with the standards of Resolution no 466/12 of the National Health Council, pursuant Opinion CAAE no 30366320.3.0000.5411. The translators, committee of experts, patients (or responsible family member) and intensive care nurses signed the Informed Consent Form (ICF).

■ RESULTS

The direct translations into Portuguese (1st step) were carried out by the two translators, and the first consensual version in Portuguese (PV1 – 2nd step) was back-translated by two other native translators (3rd step). There were no significant differences in these steps: the existing differences were more related to the multiple semantics of some translated words, such as move, in English, being translated as "virar", "mover" and "movimentar", with experts adapting them to the terminology in the study area, in this case, using the word "reposicionar".

The main characteristics of the committee composed of five experts (4th step) were: female gender (100%), aged 32-58 years (±11.7), length of professional experience as nurses from 11 to 34 years (±10.4), doctoral degree (60%), postdoc (40%), four came from public educational institutions in the state and inland of São Paulo (80%) and one from a private institution (20%). The specialists had experience in intensive care, as well as knowledge about risk scales that predict PI; and carefully analyzed all translated versions, regarding semantic, idiomatic, conceptual and cultural equivalence. They made suggestions and classified each item according to its representativeness and need for revision (Table 1).

Table 1 – Analysis of each item of the first Portuguese version (PV1) of the CALCULATE by the committee of experts using content validity index (CVI). São Paulo, Brazil, 2021

Items CALCULATE	Assessment by the five experts					CVI/item
	1st	2nd	3rd	4th	5th	
Item 1	3	3	4	3	2	0.80
Item 2	3	2	4	3	4	0.80
Item 3	4	3	4	3	3	1.00
Item 4	3	3	4	3	4	1.00
Item 5	3	3	4	3	3	1.00
Item 6	2	3	4	3	3	0.80
Item 7	3	2	4	3	3	0.80
Item 8	2	3	3	4	4	0.80
Total CVI	0.75	0.75	1.00	1.00	1.00	0.90

Source: Elaborated by the authors, 2021.

After gathering information from the five experts, the authors developed a post-committee version, the second Portuguese version (PV2), approved by the experts to carry out the pre-test.

The pre-test (5th step) was applied by ten intensive care nurses, who had an average age of 32 years (±3.7), the time elapsed since graduation as nurses was five years (±2.9), 34.4 months experience in the ICU (±29.2) (±29.2) and time spent in the ICU of 30.8 months (±28.5). All nurses (100%) knew and used only the Braden scale. CALCULATE was applied mainly at the beginning of the shift by seven nurses (70%), and the others applied it after carrying out the documentation with patient's progress (20%) and at the end of the shift (10%).

The nurses applied the instrument to four patients each and assessed whether or not each item was suitable for understanding the instrument, indicating revision and suggestions for improving the item if necessary.

In Table 2, which refers to the assessment of intensive care nurses, item 7 proved to be inadequate especially in the first assessment of nurses, with a final adequacy of this item of 47.5%. In PV2, item 7 appears as "Low serum albumin levels (albumin below 3.5 g/dL) and/or poor nutritional status". The difficulty reported by nurses in this item was knowing the value of protein in the nurse's routine assessment, as well as classifying poor nutritional status.

After discussion among the researchers and consultation with nutritionists specialized in critically ill patients, item 7 was maintained as it was in VP2, but with the addition of an explanation of this item in the footnote of the CALCULATE. The note clarifies that "poor nutritional status" is one in which there is a low rate of enteral diet infusion, low food intake or fasting, recent weight loss; low body mass index (BMI); edema; loss of subcutaneous fat and muscle mass.

All suggestions and adjustments for each step are in Chart 1.

After adaptation of the definition of item 7, the tool was returned to the intensive care nurses and the expert committee. After approval, the final version (FV) of the CALCULATE was generated (Figure 2) and sent to the authors of the original version (6th step).

Table 2 – Assessment and agreement of CALCULATE items by ten intensive care nurses. São Paulo, Brazil, 2021

Item	Nurse assessment of each patient				Final agreement of the item %
	Number of responses considered appropriate				
	1st assessment	2nd assessment	3rd assessment	4th assessment	
1- Very unstable to reposition on the bed	10	10	10	10	100%
2-Impaired circulation	10	10	10	10	100%
3-Hemodialysis	9	10	10	10	97.5%
4-Mechanical ventilation	10	10	10	10	100%
5-Immobility	10	10	10	10	100%
6-Long surgery or cardiac arrestin the last 24 hours	10	10	10	10	100%
7-Low protein level	2	6	6	5	47.5%
8-Fecal incontinence	10	10	10	10	100%

Source: Elaborated by the authors, 2021.

Chart 1 – Suggestions from the expert committee and intensive care nurses in each version of the CALCULATE adaptation. São Paulo, Brazil, 2021

Items	Translation of item (PV1)	Translation of specifications (PV1)	Main suggestions from the expert committee	Post-committee adequacy (PV2)	Pre-test suggestions	Adequaçy (FV)
Item 1	Too unstable to move	· Automatically includes in the very high-risk group. · Active hydration, active bleeding, development of life-threatening arrhythmias, abnormal hemodynamic parameters that are not brought to normal ranges within 10 minutes after changes in position.	Reposition on bed Exchange active hydration for volume resuscitation	· Automatically includes in the very high-risk group· · **Volume resuscitation,**active bleeding, development of **life-**threatening arrhythmias, **abnormal** hemodynamic parameters that arenot brought to normal ranges of values within 10 minutes after **repositioning**.	Adequate item	Maintained as PV2
Item 2	Weakened circulation	Includes: history of vascular disease, intravenous inotropes, diabetes.	Impaired circulation	· Includes: history of vascular disease,**use of** intravenous inotropes and diabetes *mellitus.*	Adequate item	Maintained as PV2
Item 3	Dialysis	· Intermittent hemodialysis (HDI) or continuous replacement renal therapy (CRRT) such as CVVH.	Hemodialysis Acronyms spelled out	· Intermittent hemodialysis (IHD), **continuous renal replacement therapy**(CRRT), such as **continuous veno-venous hemofiltration**(CVVH).	Adequate item	Maintained as PV2
Item 4	Mechanical ventilation	· Any type of mechanical ventilation including CPAP.	CPAP spelled out	· · Any type of ventilation including CPAP **(continuous positive airway pressure).**	Adequate item	Maintained as PV2

Chart 1 – Cont.

Items	Translation of item (PV1)	Translation of specifications (PV1)	Main suggestions from the expert committee	Post-committee adequacy (PV2)	Pre-test suggestions	Adequaçy (FV)
Item 5	Immobility	· Secondary to: a) neuromuscular disease (definition: severe spinal cord injury MG/GBS/CIPN) or b) sedation/paralysis (definition – RASS Scale[21] – from 3 to 5 or paralyzed) or c) weakness of the limb preventing movement or turning around in bed or in a chair.	RASS without the negative symbol(-) Acronyms spelled out	· Secondary to: (a) neuromuscular disease (definition: **myasthenia gravis / Guillain-Barré syndrome /chemotherapy-induced peripheral neuropathy** and **spinal cord injury** or b) sedation/paralysis (definition: RASS from -3 a -5* or paralyzed) or c) **weakness of limbs preventing self-movement/ turning over** in bed or chair.	Adequate item	Maintained as PV2
Item 6	Long surgery/ Cardiac arrest	· Duration of surgery: more than 4 hours in the last 24 hours or cardiac arrest while admitted to this hospital.	Cardiac arrest in this hospitalization	· Duration of surgery > 4 hours in the last 24 hours or a cardiac arrest **in this hospitalization**.	Adequate item	Maintained as PV2
Item 7	Low Protein level	· Low protein or serum albumin levels (albumin below 35gr/l) or poor nutritional status).	Albumin in Brazil: 3.5 mg/dl and not 35 g/l. Impaired/poor nutritional status	· Low protein and serum albumin (**albumin below 3.5 g/dL**) and/or **poor nutritional status**.	Difficulty in understanding the definition of poor nutritional status	Added description of definition in caption
Item 8	Fecal incontinence	Diarrhea: type 5, 6 or 7.	Add caption with definition	· Diarrhea: type 5 or 6 or 7** **A caption of the Bristol scale was added.**	Adequate item	Maintained as PV2

Source: Elaborated by the authors, 2021.

* RASS – Richmond Agitation-Sedation Scale[21]

Figure 2 – Final version of transcultural adaptation of CALCULATE. São Paulo, Brazil, 2021

Source: Elaborated by the authors, 2021.

*RASS (Richmond Agitation-Sedation Scale)[21]: -3 (Sedado): moderado movimento ou abertura dos olhos, mas sem contato ocular com o examinador; -4 (Sedado profundamente): sem resposta ao estímulo verbal, mas tem movimentos ou abertura ocular ao estímulo tátil/físico; -5 (Coma): Sem resposta aos estímulos verbais ou exame físico;

†Pobre Estado Nutricional: baixa taxa de infusão de dieta enteral, baixa ingesta alimentar ou jejum, perda ponderal de peso recente; baixo índice de massa corporal (IMC); edema; perda de gordura subcutânea e de massa muscular;

‡Escala de Bristol[22]: 5 – fezes com pedaços macios e separados com bordas bem definidas (fáceis de sair); 6 – massa pastosa e fofa, com bordas irregulares; e 7 – totalmente líquida sem pedaços sólidos.

Avaliação do risco: O escore de 0 a 3 classifica como risco alto e de 4 a 8 como muito alto para desenvolvimento de LP. Cada item presente na avaliação recebe um ponto, entretanto quando o paciente apresenta o item 1 (muito estável para reposicionar no leito) ele é classificado independentemente como risco muito alto.

■ DISCUSSION

The cross-cultural adaptation of the CALCULATE was carried out into Brazilian Portuguese using a thorough and valid methodological process, aiming to ensure the consistency and quality of the adapted instrument. In all steps of this study, an attempt was made to adjust the instrument to the target population, and efforts were directed so that the adapted CALCULATE can be applied in all hospital institutions in Brazil.

Content validity was used in the adaptation process. A good index was obtained, ensuring that the instrument's items were relevant, clear and culturally appropriate for the target population. This is crucial to ensure that the instrument measures what it is intended to measure in the new culture, in addition to maintaining conceptual consistency with the original instrument. Therefore, by performing content validity as part of the cross-cultural adaptation process, researchers seek to confirm that the instrument is appropriate for clinical use in the new population, ensuring that cultural and linguistic nuances are properly considered. This increases confidence in the clinical applicability of the adapted tool[23].

The CALCULATE was developed according to the recommendations of the European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel (EPUAP & NPUAP) and the National Institute for Clinical Excellence (NICE). Its original version underwent face validity and content validity tests with a consensus group made up of nursing experts, which included a consultant nurse in intensive care, senior nurses and nurses from four critical care hospitals. No subsequent validation studies were carried out by the authors of the instrument themselves. However, other studies were carried out comparing the Braden scale with the CALCULATE in its original version[24–26]. Two of these studies were carried out in Brazil and assessed the internal consistency and accuracy of the CALCULATE[25,26], however no cultural adaptation

was made for Brazil. Although it is an instrument with clinical criteria, adaptation was needed, because free translation into Portuguese could generate different interpretations of the criteria assessed. Therefore, the adaptation of CALCULATE went beyond mere translation, as the methodology of translation, back-translation, evaluation of items by a committee of experts and pre-testing by intensive care nurses was used. In Chart 1, in the fifth column, post-committee changes are shown, in bold. It can be seen that several terms were adapted to increase clarity and understanding of the tool. Adjustments were made in the translation and synthesis steps for words that had similar meanings in Brazil. In back-translation, there was a high level of combination between the versions, and the differences found were in words considered synonymous.

CVI assessment, with a final average score of 0.9, showed that the translation and cross-cultural adaptation stages of CALCULTE were adequately completed, according to the experts[17]. In the committee's analysis, the members suggested words and/or phrases that should undergo changes regarding textual equivalences and recommended spelling out acronyms and inserting definitions of terminologies that were not present in the original version. All recommendations regarding the textual content for creating the second version in Portuguese to be used in the pre-test were accepted.

In the pre-test step, concerning the ten nurses that administered the tool, the prevailing average age was 32 years, time elapsed since graduation as nurses was 5 years and have been working in ICU for approximately 34 months. These data show that the prevalent population in this sector still has little experience. However, these professionals made a careful assessment of the administration of the CALCULATE, which is proven by the contributions made to adapting the tool. Evidence suggests that trained nurses with knowledge about PI within the unit improve other nurses' adherence to preventive initiatives and can help determine the standard of practice[12].

The nurses in the pre-test only had knowledge about the Braden scale. It is the most used today, including in ICUs, but studies indicate lower prediction and accuracy for critical patients when compared to specific scales developed to evaluate patients in ICUs, such as CALCULATE itself and EVARUCI[8,25,26]. This is justified by the risk factors and particularities of this population, which are sometimes not included in generic scales[27], such as abnormal peripheral perfusion, mechanical ventilation, hypotension, hemodynamic instability[28], sedation and use of vasopressors[29]. Therefore, the CALCULATE proved to be an easily applicable instrument, with higher accuracy, as demonstrated in studies[24–26].

Brazilian studies were carried out that compared the CALCULATE tool with the gold standard, which is the Braden scale. A study published in 2022 compared the application of the Braden scale with that of the CALCULATE in 100 ICU patients and demonstrated that both analyze different points of PI risk assessment, but that the CALCULATE showed better accuracy in terms of its reproduction and prediction of PI compared to the Braden scale, with an area under the curve (AUC) of 0.74 (CI 95%, 0.64-0.83) and 0.61 (CI 95%, 0.50-0.72), respectively[25]. Another Brazilian study compared the CALCULATE with the Braden scale in 51 patients and proved its greater accuracy for critically ill patients[26]. Both studies were conducted without carrying out a cross-cultural adaptation of the CALCULATE for the Brazilian context.

A study also carried out in the ICUs of a tertiary hospital in Thailand compared the predictive validity of the CALCULATE with that of three other scales (Braden, Braden [ALB] and COMMON index) in 288 adult critical patients, hospitalized for at least 24 hours. It was found that the CALCULATE had better AUC (0.71) than COMMON index (0.67) and Braden (0.61), but lower than Braden [ALB] (0.74), which has still being little investigated. In the same study, the CALCULATE had better sensitivity (68.75%) than the Braden scale (ALB) (65.62%), that is, it proved to be better at identifying patients with a real risk of developing PI[24].

More recently, a 2023 scoping review carried out a systematic search on the use of PI scales in ICUs, identifying studies carried out with the CALCULATE, as well as the performance indicators for each tool. Regarding performance, the authors found that the best instruments are EVARUCI and CALCULATE; and according to the appreciation of the nurses who use them, CALCULATE came first, EVARUCI second and RAPS-ICU third. This review also mentions that the CALCULATE is the newest instrument in the literature and that due to its ease of application, translation into other languages was not necessary[30].

The adapted version of the CALCULATE will allow the development of new studies in Brazil on the identification of the risk of PI in critically ill patients using a specific tool for ICUs. Such studies can be very useful in developing strategies to prevent and control the occurrence of PI.

A limitation of the study is that no psychometric validation of the adapted CALCULATE was made through comparison with other instruments. Another limitation is its unicentric nature. However, as it is a specific instrument for critically ill patients and because its items cover any intensive care context, whether clinical or surgical, the tool has the potential to be implemented regardless of the level of complexity and scenario.

The CALCULATE can provide a significant contribution both to the nursing process, by predicting the risk of patients developing PI, and to the construction of nursing diagnoses

related to loss of tissue integrity. Using the instrument provides support for implementing prevention measures and planning care for intensive care patients.

◼ CONCLUSION

The development of this study made it possible to cross-culturally adapt the CALCULATE to the Brazilian Portuguese version, with semantic, idiomatic, conceptual and experimental equivalence. The final version was evaluated and approved by the committee of experts and the target audience (specialist nurses) regarding clarity and care practice.

The tool showed high content validity, which attests that the instrument's items were relevant, clear and culturally appropriate for the target population. This indicates that the CALCULATE was adapted reliably for use in critically ill patients in Brazilian ICUs and research and teaching centers with the purpose of estimating the risk of patients developing PI.

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