

Evidence validity of the Triage Rule-Out Using High-Sensitivity Troponin Algorithm for emergency nurses in Brazil

Evidências de validade do Triage Rule-Out Using High-Sensitivity Troponin para enfermeiros de emergência no Brasil

Evidencias de validez del Triage Rule-Out Using High-Sensitivity Troponin para enfermeros de emergencia en Brasil

Thábata Larissa Agostini dos Santos^a 

Kátia Cilene Godinho Bertoncello^a 

Keyla Cristiane do Nascimento^a 

Patrícia Rezende do Prado^b 

Rita de Cássia Teixeira Rangel^c 

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ABSTRACT

Objective: To demonstrate evidence of the validity of the Triage Rule-Out Using High-Sensitivity Troponin algorithm (TRUST) for cardiac risk assessment by nurses in Brazil.

Method: A six-stage methodological study: translation; synthesis of translations; back-translation; validation by a committee of judges; pre-testing; and submission to the original author. The committee was comprised by of four bilingual translators and two specialist nurses, who assessed the translated version for semantic, idiomatic, conceptual, and cultural equivalence, as well as content validity, internal consistency and clarity. In the pre-test, 31 nurses evaluated the clarity of the algorithm. Content validity was analyzed by the Content Validity Index and reliability by internal consistency using Cronbach's Alpha.

Results: The TRUST algorithm consists of three clinical criteria: history of chest pain, electrocardiogram, and a rapid troponin test. The adapted version demonstrated content validity and good comprehensibility, with a Content Validity Index of over 0.90 and a Cronbach's alpha of 0.80. The adaptations involved technical and cultural adjustments. In the pre-test, nurses considered the algorithm to be clear and relevant.

Conclusion: The cross-cultural adaptation of the algorithm proved to be valid, being equivalent to the original, adapted to the Brazilian context and suitable for use by emergency nurses.

Descriptors: Acute coronary syndrome. Cardiovascular nursing. Translation. Cross-cultural comparison. Emergency nursing.

RESUMO

Objetivo: Demonstrar evidências de validade do algoritmo *Triage Rule-Out Using High-Sensitivity Troponin* (TRUST) para avaliação do risco cardíaco por enfermeiros no Brasil.

Método: Estudo metodológico em seis etapas: tradução; síntese das traduções; retrotradução, validação por comitê de juízes; pré-teste e submissão ao autor original. O comitê foi formado por quatro tradutores bilíngues e duas enfermeiras especialistas, que avaliaram a versão traduzida quanto às equivalências semânticas, idiomáticas, conceituais e culturais, além da validade de conteúdo, consistência interna e clareza. No pré-teste, 31 enfermeiros avaliaram a clareza do algoritmo. A validade de conteúdo foi analisada pelo Índice de Validade de Conteúdo e a confiabilidade pela consistência interna por meio do Alfa de Cronbach.

Resultados: O algoritmo TRUST é composto por três critérios clínicos: histórico da dor torácica, eletrocardiograma e teste rápido de troponina. A versão adaptada demonstrou validade de conteúdo e boa compreensibilidade, com Índice de Validade de Conteúdo superior a 0,90 e Alfa de Cronbach de 0,80. As adaptações envolveram ajustes técnicos e culturais. No pré-teste, enfermeiros consideraram o algoritmo claro e relevante.

Conclusão: A adaptação transcultural do algoritmo mostrou-se válida, sendo equivalente ao original, adaptado ao contexto brasileiro e adequado para uso por enfermeiros em emergências.

Descritores: Síndrome coronariana aguda. Enfermagem cardiovascular. Tradução. Comparação transcultural. Enfermagem de emergência.

^a Universidade Federal de Santa Catarina (UFSC). Programa de Pós-Graduação em Gestão do Cuidado em Enfermagem. Florianópolis, Santa Catarina, Brasil.

^b Universidade de São Paulo (USP). Escola de Enfermagem de Ribeirão Preto. Ribeirão Preto, São Paulo, Brasil.

^c Universidade do Vale do Itajaí (UNIVALI). Departamento de Enfermagem. Itajaí, Santa Catarina, Brasil.

RESUMEN

Objetivo: Demostrar la validez del algoritmo *Triage Rule-Out Using High-Sensitivity Troponin* (TRUST) para la evaluación del riesgo cardíaco por enfermeros en Brasil.

Método: Estudio metodológico en seis etapas: traducción; síntesis de las traducciones; retrotraducción; validación por un comité de jueces; prueba previa; y presentación al autor original. El comité estuvo formado por cuatro traductores bilingües y dos enfermeros especialistas, que evaluaron la versión traducida en cuanto a equivalencia semántica, idiomática, conceptual y cultural, así como validez de contenido, consistencia interna y claridad. En la prueba previa, 31 enfermeras evaluaron la claridad del algoritmo. La validez de contenido se analizó mediante el Índice de Validez de Contenido y la fiabilidad mediante la consistencia interna, verificada utilizando el Alfa de Cronbach.

Resultados: El algoritmo TRUST consta de tres criterios clínicos: historia de dolor torácico, electrocardiograma y prueba rápida de troponina. La versión adaptada demostró validez de contenido y buena comprensibilidad, con un Índice de Validez de Contenido superior a 0,90 y un alfa de Cronbach de 0,80. Las adaptaciones implicaron ajustes técnicos y culturales. En la prueba previa, las enfermeras consideraron que el algoritmo era claro y pertinente.

Conclusión: La adaptación transcultural del algoritmo demostró ser válida, siendo equivalente al original, adaptada al contexto brasileño y adecuada para su uso por enfermeros de urgencias.

Descriptores: Síndrome coronario agudo. Enfermería cardiovascular. Traducción. Comparación transcultural. Enfermería de urgencia.

■ INTRODUCTION

There has been a growing interest in the validation of instruments in nursing, in order to improve the quality of care and increase safety in clinical decision making by nurses⁽¹⁾. In this context, the cross-cultural adaptation of instruments that have been validated and consolidated in international practice has been a faster alternative when compared to the creation of new instruments^(2,3).

Especially in emergency services, the standardization of tools helps the nurse deal with the complexity of attention through health care protocols, flows, care lines, and evaluation instruments that guide the planning of care⁽⁴⁾. Among their main demands, thoracic pain stands out, as it is challenging to diagnose due to its many possible causes⁽⁵⁾. When it is of cardiac origin, it requires a fast and careful evaluation, as it may indicate an Acute Coronary Syndrome, a condition with a high mortality rate⁽⁶⁾.

When ACS is suspected, certain criteria are used to assess and classify cardiac risk, and guide the clinical management. Certain scales stand out, such as the *Thrombolysis In Myocardial Infarction* (TIMI), the risk score *Global Registry of Acute Coronary Events* (GRACE), and the HEART score (*History, ECG, Age, Risk factors, and Troponin*), all of which are mentioned by the Brazilian Society of

Cardiology⁽⁷⁾. Although certain instruments are recommended to evaluate thoracic pain in cases where ACS is suspected, there is a gap in Brazil with regard to instruments specifically target for nurse assessment⁽⁸⁾.

Most instruments recommended today for the evaluation of high risk patients focus on the evaluation of their prognosis. They do not, however, appropriately address patients with low-risk thoracic pain and no clear clinical evidence of ACS. Thus, the topic is constantly evolving, as new proposals emerge seeking to validate more sensible and specific scales, considering the particularities of each profile risk^(9,10).

In a setting where clinical assessment instruments are constantly improved, new combinations of clinical, laboratory, and electrocardiogram criteria give support to their application in practice. The role of nurses has stood out in this process, being widely reported by literature due to the main role these workers have in the triage and risk stratification of patients with thoracic pain^(11–13).

Evidence suggests that the work of the nurse helps identify cardiac risk earlier, reducing waiting times and length of stay in emergency services^(8–14). Thus, the availability of specific algorithms for nursing practice is a promising strategy to improve decision-making and promote a faster, safer, and better directed care^(14,15).

Thus, it is worth noting that the nurse is the first professional to get in touch with the patient and monitor them during care, showing skills that help appropriate clinical management and improve health services. Thus, the use of an instrument that can guide the evaluation of cardiac thoracic pain can help an effective management of this issue, leading to safer care and to the recognition of the importance of nurses' work⁽¹⁵⁾.

Considering the need for instruments that can evaluate cardiac risk in patients that complain of thoracic pain and can be applied by nurses, the *Triage Rule-Out Using High-Sensitivity Troponin* (TRUST) stands out. This instrument has been validated to this end and presented promising results, suggesting precise, safe decisions for immediate care⁽¹⁶⁾.

The TRUST was validated in an emergency service in the United Kingdom. At first, it was conducted with the medical team, showing a sensitivity of 98.8%. When applied by nurses, the instruments maintained a similar diagnostic precision, showing reasonable inter-rater reliability. Furthermore, when used by nurses in addition to the high-sensitivity troponin test, the TRUST showed a failure rate of only 1.1% for Major Adverse Cardiac Events (MACE) in 30 days. These results also highlight the efficacy of the instrument in clinical practice, as performed by nurses⁽¹⁷⁾.

The TRUST algorithm has three variables: the modified Goldman risk scale; the Electrocardiogram (ECG); and the high-sensitivity troponin biomarker test. When it is applied, the patient is considered "low risk" if the score of the modified Goldman risk scale is ≤ 1 ; the ECG shows no signs of ischemia, and the high-sensitivity troponin biomarker scores $< 14 \text{ ng/dL}$ (negative/non-reactive). To define the patient as "not low risk", a single one of the following conditions is sufficient: altered Goldman score (> 1); ECG with signs of ischemia; or a

high-sensitivity troponin biomarker score of $T \geq 14 \text{ ng/dL}$ (positive/reactive)⁽¹⁷⁾.

The TRUST algorithm was originally developed in English, making it essential to translate and adapt it to ensure precision in the Brazilian context. The validity of an instrument is not only based on its translation, but also on its fit in the new cultural context⁽¹⁸⁾.

Considering that the algorithm has already shown excellent psychometric properties in the English cultural environment⁽¹⁷⁾, it is essential to address potential semantic variations between English and Brazilian Portuguese. Therefore, a study to translate and cross-culturally adapt the TRUST algorithm aims to homogenize the wording of the instrument, so nurses can use it to evaluate patients with thoracic pain of cardiac origin in emergency services.

This study was developed to show the evidence of validity for the translation and cross-cultural adaptation of the TRUST algorithm for nurses to evaluate cardiac risk in Brazil.

■ METHOD

Type of study

This is a methodological study for the translation and cross-cultural adaptation of the original TRUST algorithm from British English into Brazilian Portuguese.

At first, we asked the main author of the instrument to allow us to translate and create a cross-cultural adaptation of the instrument, and he agreed⁽¹⁷⁾. The process of translation and cross-cultural adaptation was guided by a theoretical framework⁽¹⁹⁾ and included the stages shown in Figure 1: first translation; synthesis of translations; back-translation; committee of judges; pre-test; submission of the adapted version for approval by the original author.

Figure 1 – Flowchart of the methodological trajectory of for the translation and cross-cultural adaptation of the TRUST for Brazilian Portuguese. Florianópolis, Santa Catarina, Brazil, 2023

TRUST – Brasil	
<i>Avaliação do risco cardíaco em pacientes com dor torácica</i>	
Etapa 1: Escore de risco de Goldman modificado	1 ponto para cada variável presente
Dor torácica típica em repouso iniciada recentemente.	
Dor igual (semelhante) a que sentiu no seu infarto do miocárdio.	
Dor que não alivia em até 15 minutos após administração de nitrato sublingual.	
Dor com duração > 60min	
Dor torácica que ocorre com maior frequência	
Hipotensão (PA sistólica < 100 mm Hg)	
Dispneia aguda	
Dor no período de até 6 semanas após um infarto do miocárdio ou revascularização	
Total de Goldman modificado:	
Total de Goldman modificado + ECG + Teste Troponina	
Etapa 2: Desfecho TRUST	
Baixo risco* - (Adequado para alta)	
<i>Se todos os itens de 1 a 3 estiverem presentes, o paciente terá baixo risco cardíaco.</i>	
1. Escore de Goldman modificado ≤1	
2. ECG sem sinais de isquemia	
3. Na admissão, Troponina I de alta sensibilidade < 14 ng/L / (Não reagente)	
Risco moderado ou alto - (Inicia o protocolo para suspeita SCA)	
<i>Se ao menos um dos itens de 1 a 3 estiver presente, o paciente terá risco cardíaco moderado ou alto</i>	
1. Escore de Goldman modificado >1	
2. ECG com sinais de isquemia	
3. Na admissão, Troponina I de alta sensibilidade ≥ 14 ng/L / (Reagente)	
*Atenção: protocolo não validado em idade ≥ 80 anos	

*OV Eng = Original version in English; **PV1 = First version in Portuguese; ***PFV = Pre-final version; VF = Final version.

Source: Elaborated by the authors according to the recommendations from the *Guidelines for the process of cross-cultural adaptation of self-report measures* ⁽¹⁹⁾, 2024.

Study stages

The study was comprised by six stages. The first was the first translation of the original English version of the TRUST (OV ENG), which was conducted by two bilingual translators (Portuguese/English). The translators were independent, had different profiles, and were native speakers of the target audience (Translator 1 and Translator 2). Translator 1 knew the concepts assessed by the instrument, while Translator 2 had no previous knowledge about health-related topics.

The second stage was the synthesis of these two translations: translators scheduled a meeting, with mediation, to reach a synthesis of the translations (T1 and T2). They reached a consensus, which led to the first Brazilian Portuguese version (PV1).

The third stage was the back translation. Two other independent translators (Translator 3 and Translator 4) carried out the back translation of PV1, generating two independent back-translations (BT1 and BT2). Both translators were bilingual (English/Portuguese), native speakers of British English, fluent in Brazilian Portuguese, and had no training in the health field.

In the fourth stage, six members were invited to form the judge committee: two bilingual workers (Portuguese/English), both native Portuguese speakers; two other bilingual translators (English/Portuguese), both native British English speakers. These were the same translators from stages 1 (first translation) and 3 (back translation). The other members of the judge committee were two nurses selected according to their CVs in the Lattes Platform, considering their publications and their professional experience, as related to the research topic.

One of these specialists was a bilingual nurse (Portuguese/English), with substantial work in the field of urgency and emergency. The other participant was a nurse, with an MS, who was also bilingual (Portuguese/English), and experienced in the field of cardiology. Both had participated in research involving the translation and cross-cultural adaptation of instruments, which is why they were included as technical judges in the assessment of the algorithm.

Still as part of the fourth stage, the judges evaluated the semantic, idiomatic, cultural aspects of the study, the conceptual equivalence of the tools, and the clarity and relevance of the versions^(19,20). The first Portuguese version (PV1) was compared to the original English version (OV ENG) using a Likert type scale, that is, a psychometric scale to record the level of agreement or disagreement regarding a piece of information. The items could be evaluated in the scale with scores from 1 to 4, where 1 meant "translation/adaptation not equivalent at all"; 2 meant translation/adaptation almost equivalent; 3 meant equivalent translation/adaptation; and 4 meant translation/adaptation entirely equivalent. There was also a field for suggestions.

The assessment of each member was compared with that of the others. Items were evaluated using a Content Validity Index (CVI). To do so, a cutoff score of $\geq 80\%$ was used to classify agreement⁽²¹⁾.

After the evaluators assessed the versions and their agreement was evaluated, the Portuguese pre-final version (PFV1) was elaborated.

In the fifth stage, the pre-test was conducted. It consisted on the experimental evaluation of the VPF1 of the

TRUST algorithm, which was conducted by 31 nurses, selected via non-probabilistic convenience sampling. All participants invited were nurses that worked or had already worked in Primary Care Units (24/7 PCUs); had experience caring for patients in acute conditions; and worked in Intensive Care Units (ICUs) or in the Mobile Urgency Care Service (SAMU). We also invited nurses with educational experience, who worked as professors and were masters or doctors in this field. Inclusion criteria included: specialists in urgency and emergency, with clinical experience of at least three years in emergency services, or experience with patients under acute care, or with academic experience in the topic. It is worth noting that the theoretical framework we adopted suggests that the ideal number of participants in this stage is from 30 to 35⁽¹⁹⁾.

We decided to carry out the pre-test with nurses due to the recommendations from literature⁽¹⁹⁾, according to which the new instrument should be previously tested in the target population, which, in this case, is the emergency nurse who will apply the algorithm to patients feeling thoracic pain of cardiac origin. Thus, this professional is the person expected to use the instrument to evaluate the cardiac risk of the individual, not the patient himself, since the algorithm is not a questionnaire to be answered by the patient.

The nurses received, via e-mail or WhatsApp®, a Google Form® which included the consent form, the invitation, and the PFV1 of the TRUST algorithm, in addition to guidance on how to analyze the materials. This was the instrument used to collect pre-test data.

The evaluation of the 31 nurses aimed to test the clarity of each of the 17 items of the TRUST algorithm, which was divided into domain A, modified Goldman scale, domain B, and outcome. Three questions were asked, so participants could evaluate the instrument as a whole: How clear is the ENTIRE instrument in your evaluation? How clear are the structure and presentation of the ENTIRE instrument in your evaluation? How would you evaluate the TRUST as a whole, as a tool to be applied by you, nurse, for the assessment of the cardiac risk of patients with thoracic pain attended in emergency services and/or PCUs?

The assessment instrument was a four-point Likert type scale, where 1 meant not clear at all; 2, not very clear; 3, clear; and 4, completely clear. There was also a field for suggestions. We requested suggestions for any items scored one or two.

Evaluations were quantitative, using CVI validation measures and Cronbach's alpha to evaluate reliability. On-line and off-line data processing was carried out using Google Forms® and Microsoft Excel® virtual tools.

If any items did not reach a minimum 0.80 CVI and 0.75 Cronbach's alpha, they would be reviewed and sent again. No further evaluation rounds were needed. However, the suggestions made by the nurses were accepted, and a final, post-correction version was sent for approval by the judges, leading to the Final Version 1 (FV1).

In the sixth and last stage, the final version (FV1) was concluded and submitted to the author of the original, English version, for his evaluation.

Place and period of the study

In the translation stage, each translator produced a report with all information necessary about the work carried out. This methodological period lasted from January 10 to March 30, 2023.

Data analysis and treatment

The results of data collection, from the assessments of the Evaluator committee, as well as the information from the 31 nurses who participated in the pre-test, as well as their sociodemographic data collected as they answered the specific items of the instrument, were coded and typed in Excel® spreadsheets. A descriptive analysis was carried out, including frequency calculation, percentage, content validity index, and Cronbach's alpha, using the software IBM SPSS Statistics®, version 25.

Ethical aspects

This study was approved by the Ethics Committee for Research with Human Beings from Universidade Federal de Santa Catarina (CAAE: 63458222.90000.0121; Opinion: 5.757.698). It was conducted according to

ethical norms. All participants received and signed an informed consent, sometimes an electronic one, to authorize their participation in the research.

■ RESULTS

The three first stages of the translation and cross-cultural adaptation of the TRUST were conducted with the help of accredited translation companies. Translators and the main researcher came to a consensus, in virtual meetings, regarding differences involving synonyms and agreements in the structure of the sentences of the algorithm, in order to elaborate a consensus report for the Portuguese version.

After the Portuguese version was translated and elaborated, the six-rater committee evaluated semantic, idiomatic, cultural, and conceptual equivalence, in order to measure their agreement in regard to the items of the instrument, considering both the items individually and the instrument as a whole.

The instrument used to analyze their agreement in regard to the TRUST PV1, in Portuguese, include 14 items, all of which reached a satisfactory degree of agreement, as Table 1 shows. Although item 12 reached the minimum CVI level of 83% in regard to idiomatic and conceptual equivalence, the translated version was validated as a whole.

After a consensus was reached among judges, the pre-final version of the TRUST was elaborated and submitted to the pre-test stage (stage 5), which was carried out with 31 nurses. Most participants were female (74.2%), from 36 to 40 years old (35.5%). Regarding the institution where they worked, most were from public institutions (87%). As for their time in the profession, 41.9% had from 11 to 15 years of experience. In the field of urgency and emergency, 45.2% reported from 5 to 10 years of experience. It is also noteworthy that 83.9% of nurses were evaluating patients with chest pain at the time of research.

To validate their understanding of the contents in the pre-final version, with 17 items, the CVI values found were above 0.90 in the pre-test stage. The internal consistency of the instrument was confirmed as Cronbach's alpha total was = 0.80, ensuring the reliability of the results (Table 2).

Table 1 – Evaluation committee assessment, according to the content validation for semantic, idiomatic, cultural, and conceptual equivalence of the first Portuguese version of the algorithm. Florianópolis, Santa Catarina, Brazil, 2023

Item		S*	I†	C‡	Co§
7	Goldman score	1	1	1	1
2	1 score per variable present	1	1	1	1
3	Typical thoracic pain, recently started in state of rest	1	1	1	1
4	Same pain of previous myocardial infarctions	1	1	1	1
5	Pain does not reduce 15 minutes after sublingual nitrate is administered	1	1	1	1
6	Pain lasting > 60min	1	1	1	1
7	Pain has been increasing in frequency	1	1	1	1
8	Hypotension (systolic BP < 100 mm Hg)	1	1	1	1
9	Acute dyspnea	1	1	1	1
10	Pain within 6 weeks after a myocardial infarction or revascularization	1	1	1	1
11	TRUST accelerated diagnostic protocol (TRUST ADP)	1	1	1	1
12	Low risk (suitable for discharge) 1. Altered Goldman scores <1 2. No ischemia signs in ECG 3. High sensitivity troponin < 14 ng/dl at admission	1	0.83	1	0.83
13	Moderate-to-high risk 1. Altered Goldman scores >1 2. Ischemia signs in ECG 3. High sensitivity troponin ≥ 14 ng/dl at admission	1	1	1	1
14	Caution: this protocol is not validated for those > 80 years old	1	1	1	1

*Semantic † Idiomatic ‡ Cultural §Conceptual
Source: The authors, 2024.

Table 2 – Content validation using a content validity index and Cronbach's alpha in regard to the criteria of clarity of the language of the items in domains A and B, by nurses, based on the algorithm. Florianópolis, Santa Catarina, Brazil, 2023

DOMAIN A			
Item		CVI	Cronbach's alpha Cronbach
7	Typical thoracic pain, recently started in state of rest	1	0.81
2	Same pain of previous myocardial infarctions	0.94	0.81
3	Pain does not reduce 15 minutes after sublingual nitrate is administered	1	0.82
4	Pain lasting > 60min	1	0.82
5	Pain has been increasing in frequency	0.97	0.82
6	Hypotension (systolic BP < 100 mm Hg)	1	0.82
7	Acute dyspnea	1	0.80
8	Pain within 6 weeks after a myocardial infarction or revascularization	0.97	0.80
TOTAL(A)		0.98	0.81
DOMAIN B			
Item		CVI	Cronbach's alpha Cronbach
9	Low risk* (suitable for discharge)	0.90	0.80
10	Caution: this protocol is not validated for those > 80 years old	1	0.80
11	Altered Goldman scores >1.	0.97	0.80
12	No ischemia signs in ECG	1	0.80
13	High sensitivity troponin I < 14 ng/dl at admission	0.97	0.80
14	Moderate-to-high risk.	0.97	0.78
15	Altered Goldman scores >1	0.90	0.80
16	Ischemia signs in ECG	1	0.80
17	High sensitivity troponin I ≥ 14 ng/dl at admission	0.97	0.80
TOTAL(B)		0.96	0.80
TOTAL(AB)		0.97	0.80

Table 2 – Cont.

DOMAIN C			
Item		CVI	Cronbach's alpha Cronbach
7	The instrument as a whole is clear	1	0.86
2	Structure and presentation of the instrument as a whole	1	0.82
3	Cardiac risk assessment of the instrument as a whole	0.97	0.80
TOTAL(C)		0.99	0.82

Source: The authors, 2024.

Despite the strong agreement and appropriate reliability found by the nurses during the pre-test, we chose to consider their comments and suggestions carefully. These contributions were systematically listed and submitted to a second round of evaluations by the evaluator committee (Chart 1), in order to ensure that the changes proposed would preserve the original

meaning of the content translated and be culturally pertinent for the Brazilian context.

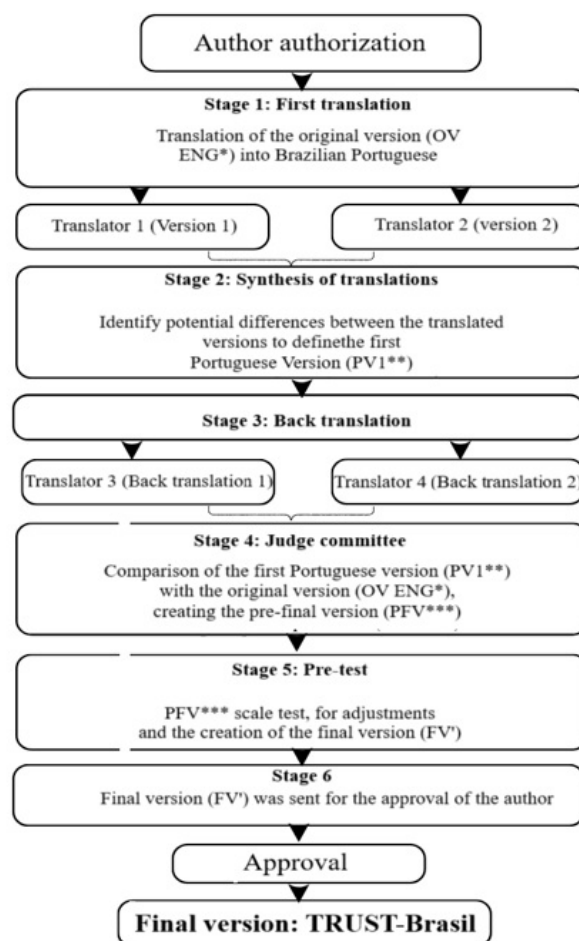
After a careful analysis and committee approval, the final version of the algorithm was approved (Figure 2). Later, it was sent to the author of the original author, so he was aware of it, and the cross-cultural adaptation process was validated.

Chart 1 – Revision of the evaluators in regard to the items that had suggestions for adaptation in the final version of the algorithm in Portuguese, during the pre-test stage. Florianópolis, Santa Catarina, Brazil, 2024

Item 1	Translation	Typical thoracic pain, recently started in state of rest.
	Adaptation suggested	Typical thoracic pain, at rest and started recently.
Item 2	Translation	Same pain of previous myocardial infarctions
	Adaptation suggested	Same pain (similar) as the one you felt on your previous myocardial infarction. infarctions
Item 3	Translation	Pain does not reduce 15 minutes after sublingual nitrate is administered
	Adaptation suggested	Pain does not reduce in up to 15 minutes after sublingual nitrate is administered.
Item 5	Translation	Pain has been increasing in frequency
	Adaptation suggested	Thoracic pain has been increasing in frequency
Item 8	Translation	Pain within 6 weeks after a myocardial infarction or revascularization
	Adaptation suggested	Pain within the period of 6 weeks after a myocardial infarction or revascularization.

Source: The authors, 2024

Figure 2 – Final version of the cross-cultural adaptation of the algorithm. Florianópolis, Santa Catarina, Brazil, 2023



Source: The authors, 2024.

■ DISCUSSION

The cross-cultural adaptation process of instruments is a legitimate procedure, that can promote the exchange of knowledge between researchers. It is also a financially accessible method that is important as it helps compare studies that use the same tool^(22,23).

The TRUST algorithm was chosen for translation and adaptation due to its characteristics, as it is a concise, short instrument, which is fast to apply, simple, and requires no elaborate calculations. Additionally, it has been validated for the stratification of cardiac risk, especially in emergency nurses, which is a justification to translate the TRUST for Brazilian nurses⁽¹⁶⁾.

Significant advancements are essential to strengthen the role of the nurse, and that implies arming these

professionals with advanced skills and competences, to prepare them to carry out work focused on clinical practice. In this regard, it is essential to provide professionals with instruments that guide nurse clinical judgment. This is in line with Resolution No. 736/2024, according to which the nursing process must be based on validated evaluation instruments of risk prediction⁽²⁴⁾.

Thus, instead of developing new instruments, the nurse must, at first, address the main questions of methodological research: Why build a new instrument? Is there a tool validated in another language that could meet this specific clinical need? The selection of an instrument must also be guided by the thing that is to be measured. This is a priority, even if the translation and cross-cultural adaptation method is a rigorous and complex work⁽²⁵⁾.

In the early stages of the translation process, carried out by bilingual translators, there were many disagreements in regard to the translation of specific terms. Thus, receiving contributions from a translator experienced in the field of health, especially in emergency and cardiology, was essential. Their expertise was essential to adjust translations, ensuring that the appropriate terms were chosen, as, depending on the translation used, different interpretations can take place⁽²⁶⁾.

In the translation we discussed, for example, the difference between translating and adapting item 2, which was translated to “Dor igual à ocorrida no infarto do miocárdio anterior” (“The same pain as the one from a previous myocardial infarction”). In Portuguese, the sentence could be ambiguous, as the term for “previous” is “anterior”, and it could be mistakenly associated with an infarction on the “anterior” wall, a cardiological event caused by the occlusion of the anterior descending coronary artery⁽⁸⁾. Thus, we came to the conclusion that the best adaptation would be to replace the word “anterior” with the word “previous”.

In addition to cardiological differences, pharmacological aspects also needed adaptations to align with Brazilian practices. For example, the item “glyceryl trinitrate spray” was adapted to “sublingual nitrate”, in accordance with the Brazilian Society of Cardiology, which recommends the sublingual administration of nitrate as its first option⁽⁸⁾. This type of adjustment shows the need for a careful and collaborative adaptation process, that goes beyond a simple literal translation.

The judge committee contributed significantly for a semantic, idiomatic, cultural, and conceptual validation of the translations. The diversity of the team, which included translators, professionals with practical and research experience, improved the process⁽²⁶⁾, ensuring that the instrument was understandable and culturally appropriate for the Brazilian context, reaching a CVI that varied from 0.83 and 1, indicating excellent agreement between judges.

The participation of 31 nurses in the pre-test stage provided an essential practical perspective for the evaluation of the TRUST. The sample was mostly comprised by nurses from public institutions with long experience in emergencies, suggests that our results reflect the needs and the context of the Brazilian health setting⁽²⁷⁾.

During the pre-test, we evaluated the clarity of the translation, and some suggestions were presented

to improve the items. These included suggestions to adapt the items 1,2,3,5, and 8, to make them more understandable and closer to the practical language of nurses. The second round of evaluations was an important stage to ensure that these adaptations were pertinent and preserved the original meaning.

Two of the items did not receive a unanimous evaluation: item 2, “The same pain as the one from a previous myocardial infarction”, and item 5, “Pain has been increasing in frequency”. There was also an important discussion in the stage of translators, but the suggestion from the nurses was found to add a clearer language to explain to the patient. Considering the clinical experience of the nurse group, this adaptation helped bring reality and professional experience closer.

The active participation of judges and nurses ensured that the final version was culturally sensible, linguistically appropriate, and clinically relevant for the Brazilian context. This involvement is essential for instruments to be useful and applicable, reflecting the particularities of nursing practice in different cultural contexts⁽²⁶⁾.

Researches involving translation and cross-cultural validation in Brazil have been generating valid instruments that are applicable to clinical practice^(3–28). Adapted to Brazilian cultural specificities, these instruments are essential for nurses, as they give support to their decision making. By integrating them into daily practices, nurses can improve their assessment of patients and the care they offer, promoting an evidence-based approach and contributing to the continuous improvement of quality in health care.

The final version of the translation and cross-cultural adaptation of the algorithm, named TRUST-Brasil, resulted in an instrument that is equivalent to the original one, culturally appropriate to the Brazilian context, and made to be applied by nurses. After the six methodological stages were concluded, it is important to highlight the relevance of continuing investigations, in order to evaluate the psychometric properties of the TRUST-Brasil in actual clinical contexts.

A limitation of this study was the fact that we did not carry out a longitudinal analysis of the psychometric properties of the algorithm, especially in regard to internal consistency, in different populations and emergency settings, in order to confirm the validity and reliability of the TRUST-Brasil over time.

This adaptation of the TRUST algorithm into the Brazilian context has the potential to provide nurses with an instrument to guide their assessment of cardiac risk in patients with thoracic pain in emergency units, enabling them to make faster and more grounded decisions, improving their efficiency and safety in clinical practice, especially in environments with a high demand, such as urgency and emergency services.

Nonetheless, it is essential to highlight that the Brazilian version of this algorithm still requires clinical validation, so in the future, the implementation of this instrument in emergency units helps standardize cardiac risk evaluation conducted by nurses.

■ CONCLUSION

The translation, adaptation, and validation resulted in the algorithm TRUST-Brasil, which was found to be valid in regard to the clarity of its content, showing high internal consistency and reliability for the use of nurses in the evaluation of patients with thoracic pain of cardiac origin in emergency services.

Further research is recommended so Brazilian nurses can use the algorithm in their clinical practice, enabling them to be faster and safer when classifying the cardiac risk of patients with Acute Coronary Syndrome attended in emergency services.

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■ Data and Materials Availability

The data can be accessed via request to the corresponding author

■ Author contributions

Conceptualization: Thábata Larissa Agostini dos Santos

Data curation: Thábata Larissa Agostini dos Santos, Kátia Cilene Godinho Bertoncello

Investigation: Thábata Larissa Agostini dos Santos

Methodology: Thábata Larissa Agostini dos Santos, Kátia Cilene Godinho Bertoncello

Supervision: Kátia Cilene Godinho Bertoncello

Validation: Kátia Cilene Godinho Bertoncello, Keyla Cristiane do Nascimento, Patrícia Rezende do Prado, Rita de Cássia Teixeira Rangel

Writing – original draft: Thábata Larissa Agostini dos Santos

Writing – review & editing: Thábata Larissa Agostini dos Santos, Kátia Cilene Godinho Bertoncello, Keyla Cristiane do Nascimento, Patrícia Rezende do Prado, Rita de Cássia Teixeira Rangel

The authors declare there is no conflict of interest

■ Corresponding author

Thábata Larissa Agostini dos Santos
santosla.thabata@gmail.com

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