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Cross-cultural adaptation, reliability, and validity of the St. Thomas's Falls Risk Assessment Tool in Older Adults (STRATIFY)

Adaptação transcultural, confiabilidade e validade da St. Thomas's Falls Risk Assessment Tool in Older Adults (STRATIFY)

Adaptación transcultural, confiabilidad y validez de St. Thomas's Falls Risk Assessment Tool in Older Adults (STRATIFY)

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Abstract

Introduction: Falls are an important adverse event among older adults. The St. Thomas's Falls Risk Assessment Tool in Older Adults (STRATIFY) is a tool to assess the risk of falls; however, it is not translated and adapted to Portuguese. **Objective:** To translate and perform a cross-cultural adaptation of STRATIFY in Brazilian Portuguese, as well as to test the reliability and validity of the instrument. **Method:** The cross-cultural adaptation process was carried out in six stages: A) T1 and T2 translations; B) synthesis of translations (T12); C) T12 back translations (RT1 and RT2); D) expert committee review; E) pretesting of the version approved by the committee; F) adapted version of STRATIFY for Brazilian Portuguese. Inter-rater and test-retest reliability were performed using the intraclass correlation coefficient (ICC) and 95% confidence interval (CI). Validity was assessed by the Spearman's correlation coefficient of the STRATIFY with the Morse Fall Scale (MFS). Data analysis was performed by the Microsoft Office Excel 2016 (translation and adaptation) and by the IBM SPSS

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Statistics 20.0 (reliability and validity). We used a level of significance of $p<0.05$. **Results:** Data were presented about the perception of 33 health professionals on the adapted version of STRATIFY. The following ICC and CI were found for inter-rater and test-retest reliability, respectively: ICC=0.729; CI=0.525-0.845 and ICC=0.876; CI=0.781-0.929. STRATIFY and MFS showed a moderate but significant correlation (ρ=0.50, $p<0.001$). **Conclusion:** The translated and adapted version of the STRATIFY presented moderate inter-rater reliability and good test-retest reliability, in addition to a moderate correlation to the MFS.

Keywords: Accidental Falls. Translations. Risk Assessment. Hospitalization.

Resumo

Introdução: *A queda entre idosos é um fator adverso importante. Um instrumento de avaliação para risco de queda é a St. Thomas's Risk Assessment Tool in Falling Elderly Inpatients (STRATIFY), porém não é traduzida e adaptada para o português.* ***Objetivo:*** *Realizar tradução e adaptação transcultural do instrumento STRATIFY para o idioma português (Brasil), bem como testar a confiabilidade e validade do instrumento.* ***Método:*** *O processo de adaptação ocorreu em 6 etapas: a) traduções T1 e T2; b) síntese das traduções (T12); c) retrotraduções de T12 (RT1 e RT2); d) comissão de especialistas; e) pré-teste da versão aprovada pelo comitê; f) versão adaptada da STRATIFY para o português. A confiabilidade inter-avaliador e teste-reteste foi realizada utilizando-se o coeficiente de correlação intraclasse (CCI) e intervalo de confiança (IC) de 95%. A validade foi avaliada pelo coeficiente de correlação de Spearman da STRATIFY com a Escala de Morse (EM). A análise de dados ocorreu pelo software Microsoft Office Excel 2016 (tradução e adaptação) e pelo programa IBM SPSS Statistics 20.0 (confiabilidade e validade). O nível de significância adotado foi de p<0,05.* ***Resultados:*** *Foram apresentados dados sobre a percepção de 33 profissionais da saúde sobre a versão adaptada da STRATIFY. E foram encontrados os seguintes CCI e IC para a confiabilidade inter-avaliador e teste-reteste, respectivamente: CCI=0,729; IC=0,525-0,845 e CCI=0,876; IC=0,781-0,929. A STRATIFY e a EM apresentaram moderada correlação, porém significativa (ρ=0,50; p<0,001).* ***Conclusão:*** *A versão traduzida e adaptada da STRATIFY apresentou moderada confiabilidade inter-avaliador e boa confiabilidade teste-reteste, além de correlacionar-se moderadamente à EM.*

Palavras-chave*: Acidentes por Quedas. Tradução. Avaliação de Risco. Hospitalização.*

Resumen

Introducción: *La caída entre ancianos es un factor adverso importante. Un instrumento de evaluación para riesgo de caída es la St. Thomas's Risk Assessment Tool in Falling Elderly Inpatients (STRATIFY), pero no es traducida y adaptada para el portugués.* ***Objetivo:*** *Realizar traducción y adaptación transcultural del instrumento STRATIFY para el idioma portugués (Brasil), así como probar la confiabilidad y validez del instrumento.* ***Método:*** *El proceso de adaptación ocurrió en 6 etapas: a) traducciones T1 y T2; b) síntesis de las traducciones (T12); c) retroacciones de T12 (RT1 y RT2); d) comisión de expertos; e) pre-prueba de la versión aprobada por el comité; f) versión adaptada de STRATIFY al portugués. La confiabilidad inter-evaluadora y prueba-reprueba se probó utilizando el coeficiente de correlación intraclase (CCI) y el intervalo de confianza (IC) del 95%. La validez fue evaluada por el coeficiente de correlación de Spearman de la STRATIFY con la Escala de Morse (EM). El análisis de datos se produjo por el software Microsoft Office Excel 2016 (traducción y adaptación) y el programa IBM SPSS Statistics 20.0 (confiabilidad y validez). El nivel de significancia adoptado fue de p<0,05.* ***Resultados:*** *Se presentaron datos sobre la percepción de 33 profesionales de la salud sobre la versión adaptada de STRATIFY. Se encontraron los siguientes CCI e IC para la confiabilidad inter-evaluadora y prueba-reprueba, respectivamente: CCI=0,729; IC=0,525-0,845 y CCI=0,876; IC=0,781-0,929. La STRATIFY y la EM presentaron una moderada correlación, pero significativa (ρ=0,50; p<0,001).* ***Conclusión:*** *La versión traducida y adaptada de STRATIFY presentó moderada confiabilidad inter-evaluadora y buena confiabilidad prueba-reprueba, además de correlacionarse moderadamente a la EM.*

Palabras clave*: Accidentes por Caídas. Traducción. Medición de Riesgo. Hospitalización.*

Introduction

The occurrence of falls in older adults is a significant adverse event[1], which can lead to several complications for the individual, such as fractures, bruises, cranium traumas or even death [2-5]. In addition, falls are responsible for two-thirds of trauma deaths/injuries in older adults [6] and are considered the main cause of death related to trauma [7]. Because of these complications, the individual may present functional limitations and disabilities, such as hospitalizations, increased hospitalization time (if the patient is already hospitalized) or admission in nursing homes (NH) [8-10], as well as the worsening of the quality of life [11].

According to the World Health Organization (WHO) [12], about 28 to 35% of individuals over 65 years of age suffer a fall every year. In addition, approximately half of these older adults who have already suffered at least one fall are recurrent fallers [13]. In the hospital environment, studies indicate that the rate of falls in developed countries is three to five falls per 1,000 patients per day. The rate varies according to the hospital unit and is higher in units that have a higher concentration of older patients [14].

Institutionalization and hospitalization, besides being factors related to the fall, may characterize a risk factor for falls [15, 16], since the patients are in a different environment than they are habituated, with the presence of a team of professionals to assist them in using medications or therapies that may affect the postural control [15, 17, 18]. Older adults in NH and in hospitals are more susceptible to functional dependence and frequently affected by chronic or acute conditions when compared with the older adults who live in the community [18, 19]. All of these factors differentiate hospitalized and residents in NH older adults from those who live in the community [14]. The WHO launched in 2004 the World Alliance for Patient Safety, instituting fall prevention as the 6th International Safety Target [2]. In 2013, the Brazilian Ministry of Health, and the *Agência Nacional de Vigilância Sanitária* (National Health Surveillance Agency) created the *Programa Nacional de Segurança do Paciente* (National Patient Safety Program) to improve patient safety assisted by the country's health system [20].

The MS advises that the risk assessment should be used in the institution in order to track patients at risk and prevent the occurrence of falls. The *Programa Nacional de Segurança do Paciente* (National Patient Safety Program) recommends that the institution should employ an appropriate scale to the profile of its patients and perform the assessment at the time of admission and repeat it every day until discharge [20].

Many risk factors are related to the increased number of falls in a hospital environment, which has favored the creation of several instruments to assess the risk of falls, making clinical practice difficult to choose the appropriate instrument [21-30].

In an analytical review, Lee et al. [31] described several scales for assessing the risk of falling used in surgical and medical units. The scale found in eight validation studies was the St. Thomas's Risk of Assessment Tool in Falling Elderly Inpatients (STRATIFY).

STRATIFY is a tool that evaluated five items: the medical record of falls, agitation, visual impairment, need to use the restroom frequently, transfer and mobility. For each item there is a "yes" or "no" question [21]. In addition, it is a scale of easy application and frequently used in Brazil [20, 32], but it is not adapted to the Portuguese language.

Several studies have used STRATIFY recently [33-40], some studies favoring the use of the instrument [21, 33], others with discussions about whether the instrument is suitable or not for some sectors [36, 38, 40].

Although there is much criticism in the literature for the use of STRATIFY, the instrument is widely used and recommended by the Brazilian Ministry of Health to be implemented in fall prevention programs for older adults [20].

Therefore, the objective of our study was to perform the transcultural translation and adaptation of the STRATIFY instrument to the Portuguese language (Brazil), as well as to test the reliability and validity of the instrument.

Methods

Before the translation and cross-cultural adaptation process of STRATIFY, we sent an e-mail to the STRATIFY's author asking for his permission for all process. After permission was granted, the cross-cultural adaptation process occurs according to the guidelines by Beaton et al. [41]. Six steps were conducted, which can be observed in Figure 1. Follow the six detailed steps:

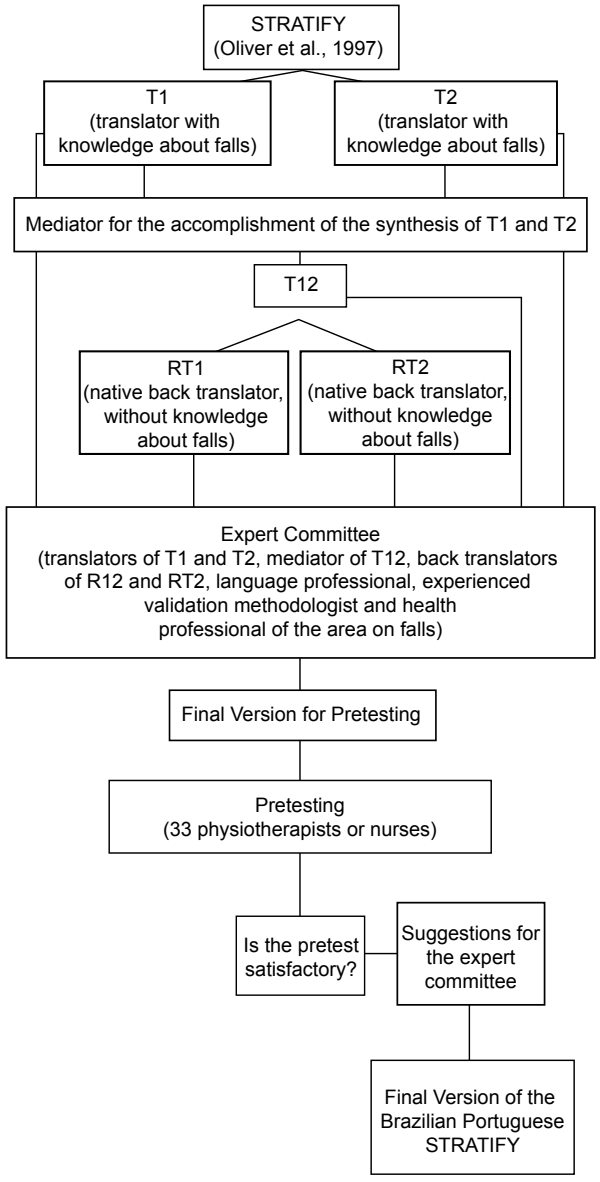

Figure 1 – Flowchart of the stages of the translation and cross-cultural adaptation process.

a) *Translations (T1 and T2)*

Two translations of STRATIFY were performed for the Brazilian Portuguese by two independent translators, who possessed semantic, conceptual and cultural knowledge of the English language. One of the translators knew about the basic objectives of the tool and was from the area of study on falls, but the other was not connected to the area. The translators were instructed to use simple language, which could be understood by the general population.

b) *Synthesis of the translations (T12)*

A third person met with the two translators (T1 and T2) and was responsible for resolving any discrepancies and organizing the consensus version of translations (T12).

c) *Back Translations of T12 (RT1 and RT2)*

Two native individuals from the country of the original STRATIFY were responsible to perform the back translation of T12. None of the back translators had knowledge about the topic covered by the evaluation tool (important to know whether the T12 matched the original content).

d) *Expert Committee*

All the material generated in the previous stages (T1, T2, T12, RT1 and RT2) were submitted to an expert committee composed of all the participants already described, including a language professional, an experienced validation methodologist and a health professional. All the notes made in each step were taken to the committee, along with all the material produced, so that the pre-test version was produced. The pre-test version should be understood by a 12-year-old child and be equivalent to the original instrument in four aspects: semantic, experimental, idiomatic and conceptual. The committee could modify or reject the format and items and add new items. Since the original STRATIFY has no instructions to the evaluators and depends entirely on their perception, instructions for the adapted version have been created in this step.

e) *Pretesting of the version approved by the committee*

As mentioned in the previous step, STRATIFY is an evaluation tool that depends on the evaluator's observation. Thus, with the pre-test version established by the expert committee, the STRATIFY pre-test was performed with 33 health professionals (nurses and physiotherapists) who had at least 1 year of experience in Gerontology in

order to verify the understanding of the items of the tool. The health professionals were recruited from the researchers' contacts and colleagues, and those who agreed to participate signed the Free and Informed Consent Form, approved by the Research Ethics Committee of the Medical School of the University of Sao Paulo (CEP-FMUSP) (number – 1.818.309; CAAE – 53540716.3.0000.0065). The health professionals, who participated in the study, completed an assessment sheet about the pre-test version of the STRATIFY for clarity, comprehension and application (for each item on the STRATIFY, they should indicate "clear," "partially clear" or "unclear" and justify their answers if they chose "partially clear" or "unclear"). If there was any doubt or difficulty about the application, the professional could propose sentences or terms more understandable and compatible with reality.

f) *Adapted version of STRATIFY in Brazilian Portuguese*

The suggestions made in the pretesting were taken to the expert committee again, who rediscovered the adapted version, reformulated the necessary items and defined the final version of the Brazilian Portuguese STRATIFY.

After the translation and adaptation process, the reliability and validity of STRATIFY were tested. Two physiotherapists attended a nonprofit NH, located in the south of the city of Sao Paulo, and applied the evaluation instrument to 50 older residents of the institution, who agreed to participate in the study and signed the consent form.

For the inter-rater reliability, on the same day, each physiotherapist performed an evaluation of STRATIFY with all the older adults, but independently and at different times, so that one was not aware of the other's score. For test-retest reliability, all the older adults were evaluated again by one of the physiotherapists after two days. The order and conditions for the evaluation were the same as the first evaluation.

The Morse Fall Scale (MFS) was also applied to all study participants in order to verify the validity of STRATIFY. The MFS is a scale for assessing the risk of falls in inpatients, used by the nursing team at the admission of the patient. This scale was developed by Morse [42], originally published in English and adapted and validated for the Portuguese language by Urbanetto et al. [24]. It is easy to apply and simple in its six items of evaluation: Medical record of Falls, Secondary Diagnosis, Aid in Ambulation, Intravenous Therapy / Salinized or heparinized endovenous device, Gait and Mental State. Each item is scored from 0 to 30 points. The sum of all items constitutes a risk score for fall, with the following classification: low risk, from 0 to 24 points; medium risk, from 25 to 44 and high risk, equal to or greater than 45 points.

The characteristics of the sample, sex and age were presented by means of descriptive statistics, relative percentage for sex and measures of position and variability for age. The inter-rater and test-retest reliability were analyzed by the intraclass correlation coefficient [CCI(2,1)] [43, 44] and confidence interval (CI) of 95%. The inter-rater reliability was analyzed using the scores obtained by the two physiotherapists in the first evaluation, and the test-retest reliability was analyzed using the scores of a physiotherapist in the first and second evaluations. The ICC was interpreted as poor (< 0.5), moderate (0.5-0.75), good (0.75-0.9), or excellent (> 0.90) [45].

We used descriptive statistics analysis for data of the translation and cross-cultural adaptation of STRATIFY with the Microsoft Office Excel 2016 for Windows, Brazil. For data analysis of reliability and validity, we used the statistical software IBM SPSS Statistics for Windows, version 20.0 [46], adopting a level of significance of $p < 0.05$.

Results

Table 1 shows the steps of the translation and cross-cultural adaptation process of the STRATFIY, until the development of the pre-test version.

Table 1 – Steps of the translation and adaptation of the STRATIFY process

Items of the STRATIFY	Translation English to Portuguese (T1 and T2)	T12	Back Translation Portuguese to English (RT1 and RT2)	Comments of the Expert Committee	Pre-test Version
1	*T1: O paciente deu entrada no hospital com queda, ou caiu durante a internação?* *T2: O paciente se apresentou ao hospital com alguma queda ou ele ou ela tenha caído na ala hospitalar desde sua admissão?*	*T12: O paciente deu entrada no hospital com queda, ou caiu durante a internação?*	RT1: Was the patient admitted to the hospital due to a fall, or did he/she fall after admission? RT2: Did the patient enter the hospital after suffering a fall, or did he/she fall during his/her stay?	Expert 1: The translation is adequate, but when it comes to interpretation of what you are asking, I believe it would be worthwhile to put instructions of punctuation, for example: consider score 1 if the patient was referred to the hospital due to a fall (reason for hospitalization) or if due to the period of hospitalization (due to another reason without being fall) the patient fell.	*Instruções para o avaliador: Analise o histórico do paciente ao ser admitido na unidade hospitalar. Ele deu entrada no Hospital devido à uma queda? Se sim, assinale a opção "sim". Se não, considere se o paciente apresentou alguma queda durante todo o período de internação até o momento. Em caso afirmativo, assinale a opção "sim".* *1) O paciente deu entrada no Hospital com queda ou caiu durante a internação?* *(1) Sim (0) Não*
2	*T1: Você acha que o paciente está agitado?* *T2: Você acha que o paciente está agitado?*	*T12: Você acha que o paciente está agitado?*	RT1: Do you think the patient was nervous? RT2: Do you think the patient is agitated?	No comments.	*Instruções para o avaliador: Analise se o paciente se encontra agitado no momento da avaliação.* *2) Você acha que o paciente está agitado?* *(1) Sim (0) Não*
3	*T1: Você acha que o paciente tem comprometimento visual que afeta as atividades diárias?* *T2: Você acha que o paciente está visualmente debilitado na medida em que as funções do cotidiano são afetadas?*	*T12: Você acha que o paciente está visualmente comprometido, à medida em que as atividades diárias são afetadas?*	RT1: Do you think the patient was visually impaired, to an extent that daily activities were affected? RT2: Do you think the patient is visually compromised, to the extent day to day activities are affected?	Expert 2: Here is the margin to interpret in two ways: The way the item is or: "*Apresenta alteração visual que afeta as atividades diárias*"; probably this item tries to evaluate if the patient has or not important visual impairment, since the visual system is directly related to the postural control. Expert 3: *"Está visualmente comprometido"*: could be presented as "*apresenta comprometimento visual*". I suggest this change because it is the closest expression of Portuguese within the health area – we want to know if the older adult presents problems and difficulties, if it is possible to perceive. In addition, the " be" as "*apresenta*" is not uncommon. "A medida em que as atividades diárias são afetadas": change by "*a ponto de afetar as tarefas diárias*". As the original text is "to an extent that daily activities were affected?", what the question seeks to investigate is the degree of commitment of the daily activities and not the commitment during the activities. In this case, the current translation can greatly modify the original concept.	*Instruções para o avaliador: Observe se o paciente apresenta comprometimento visual. Por conta desse comprometimento, ele apresenta alguma dificuldade em suas atividades diárias?* *3) Você acha que o paciente apresenta comprometimento visual, a ponto de afetar as atividades diárias?* *(1) Sim (0) Não*

(To be continued)

(Conclusion)

Items of the STRATIFY	Translation English to Portuguese (T1 and T2)	T12	Back Translation Portuguese to English (RT1 and RT2)	Comments of the Expert Committee	Pre-test Version
4	*T1: Você acha que o paciente necessita de idas frequentes ao banheiro?* *T2: Você acha que o paciente está com necessidade frequente de ir especialmente ao banheiro?*	*T12: Você acha que o paciente necessita de idas frequentes ao banheiro?*	RT1: Do you think the patient needed to go to the bathroom frequently? RT2: Do you think the patient needs to go frequently to the bathroom?	No comments.	*Instruções para o avaliador: Analise se o paciente necessita de idas frequentes ao banheiro.* *4) Você acha que o paciente necessita de idas frequentes ao banheiro?* *(1) Sim (0) Não*
5	*T1: Você acha que o paciente tem escores 3 ou 4 para transferência e mobilidade? Escore de 2 ou mais indica alto risco de quedas.* *Escore de transferência: 0=incapaz, 1= precisa de ajuda grande (uma ou duas pessoas, auxílio físico), 2= ajuda pequena (verbal ou física), 3= independente.* *Escore de mobilidade: 0= imóvel, 1= independente com cadeira de rodas, 2= anda com auxílio de uma pessoa, 3= independente.* *T2: Você acha que o paciente tem pontuação de 3 ou 4* para transferência e mobilidade?* *Pontuação de 2 ou superior indicam um alto risco de quedas.* ** Pontuação de transferência: 0 = incapaz; 1 = maior ajuda necessária (uma ou duas pessoas, auxílio físico); 2 = menor ajuda (verbal ou física); 3 = independente.* ** Pontuação de mobilidade: 0 = imóvel; 1 = independente com auxílio de cadeira de rodas; 2 = anda com a ajuda de uma pessoa; 3 = independente.*	*T12: Você acha que o paciente tem pontuações 3 ou 4* para transferência e mobilidade?* **Pontuação de transferência:* *0 = incapaz* *1 = precisa de ajuda grande (uma ou duas pessoas, auxílio físico)* *2 = ajuda pequena (verbal ou física)* *3 = independente* **Pontuação de mobilidade:* *0 = imóvel* *1 = independente com auxílio de cadeira de rodas* *2 = anda com auxílio de uma pessoa* *3 = independente* *Pontuação de 2 ou mais indica alto risco de quedas.*	RT1: Do you think the patient scored 3 or 4* for transfers or mobility? *Transfer Score: 0 = incapable; 1 = needed much assistance, one or two people, physical aide; 2 = little assistance (verbal or physical); 3 = independent *Mobility score: 0 = immobile; 1 = independent with aide of wheelchair; 2 = assistance by one person; 4 = independent. A score of 2 or more indicates a high risk of falling. RT2: Do you think the patient have ratings of 3 to 4 for transfer and mobility? *Transfer ratings: 0 = Not capable; 1 = Needs a lot of help (one or two people, physical help); 2 = Little help (verbal or physical); 3 = Independent *Mobility ratings: 0 = Not mobile; 1 = Independent with help of a wheel chair; 2 = Walks with the help of a person; 3 = Independent. Score of 2 or more indicates high risk of fall.	Expert 1: It is necessary instructions of punctuation. Expert 2: Transfer score, change "*ajuda grande'* for "*muita ajuda*"; change "*auxílio físico*" for "*dispositivo auxiliar*"; and change "*ajuda pequena*" for "*pouca ajuda*". Expert 3: "*Grande ajuda*": change for "*muita ajuda*". Considering the concept employed in this context and the natural way in which we use the word "*ajuda*" in Portuguese, when we refer to the amount of help, we use "*muita*", and not "*grande*". "*Pequena ajuda":* change for "*pouca ajuda*". As in the previous comment, when we use the word "*ajuda*", we use "*pouca ajuda*".	*Instruções para o avaliador: Observe como o paciente realiza transferências. Peça para ele se levantar da cama ou de uma cadeira. Utilize os critérios de avaliação da transferência para pontuar. Neste mesmo item, verifique a mobilidade do paciente: Ele anda sozinho? Necessita do auxílio de uma pessoa ou dispositivo auxiliar? Utiliza cadeira de rodas sozinho? É acamado? Considere a pontuação de mobilidade. Para pontuar o item 5, some as pontuações de transferência e mobilidade, se a pontuação for 3 ou 4, pontue 1 para o item 5, caso contrário, a pontuação para o item 5 é 0.* *5) Você acha que o paciente tem pontuações 3 ou 4* para transferência e mobilidade?* *(1) Sim (0) Não* **Pontuação de Transferência: 0 = incapaz; 1 = precisa de muita ajuda (uma ou duas pessoas, uso de dispositivo auxiliar); 2 = pouca ajuda (verbal ou física); 3 = independente. *Pontuação de Mobilidade: 0 = imóvel; 1 = independente com auxílio de cadeira de rodas; 2 = anda com auxílio de uma pessoa ou dispositivo auxiliar; 3 = independente.* *Pontuação Transferência + Mobilidade =* _____

A total of 33 health professionals participated in the pre-test, 63.6% (n = 21) physiotherapists and 36.4% (n = 12) nurses, with 97% women (n = 32) and mean of age 33 ± 7 years. Table 2 shows the data regarding the academic education, time of graduate and place of performance of the professionals participating in the pre-test.

Table 3 shows data on the clarity of each item of the STRATIFY pre-test version. Regarding the comments and suggestions of the final version, health professionals highlighted the following points for each item: Item 1 – better understanding when changing *com queda* for *devido a uma queda*; Item 2 – the criterion for determining what is stirred is unclear. Is the criterion for determining what is agitated related to symptoms and signs presented by the patient, or medical diagnosis, for example?; Item 3 – how to determine if the patient has visual impairment? By consulting the medical record? By asking the patient? Change *apresenta alguma dificuldade em suas atividades diárias"* for *"apresenta alguma dificuldade para realizar atividades diárias*; Item 4 – how to determine if the patient needs frequent bathroom visits? By consulting the medical record? By asking the patient?; Item 5 – leave punctuation instruction clearer, put the punctuation instructions after the item to be evaluated along with the explanation, show more clearly that the score of item 5 is the sum of the mobility and transfer score; Total Score – confusion of how to perform total score, confusion in classifying the patient at high risk of falling.

Figure 2 shows the final version of Brazilian Portuguese STRATIFY after adjustments and discussions in the expert committee.

Table 2 – Data about the academic formation and practice of the professionals participating in the pre-test

Professionals n = 33	Academic Education n (%)		Time of the Graduation (years) mean ± SD	Current Practice Location n (%)		Practice Time in Gerontology (years) mean ± SD
Physiotherapists n = 21 (63.6%)	Graduation	4 (19.5)	7.1 ± 6.2	Hospital	7 (33.3)	5.8 ± 5.3
	Postgraduate Education *Lato Sensu*	11 (52.4)		Ambulatory	7 (33.3)	
	Master's Degree	5 (23.8)		Homecare	4 (19.5)	
	Doctorate	1 (4.3)		Nursing Home Research/Academic	1 (4.3) 2 (9.6)	
Nurses n = 12 (36.4%)	Graduation	3 (25.0)	10.6 ± 7.4	Hospital	8 (66.7)	4.3 ± 2.7
	Postgraduate Education *Lato Sensu*	7 (58.3)		Homecare	1 (8.3)	
	Master's Degree	2 (16.7)		Nursing Home	2 (16.7)	
	Doctorate	0		Research/Academic	1 (8.3)	

Table 3 – Clarity of items of the adapted version of STRATIFY, evaluated by physiotherapists and nurses

Clarity regarding the instructions and items of STRATIFY	Item 1 n(%)	Item 2 n(%)	Item 3 n(%)	Item 4 n(%)	Item 5 n(%)	Total Score
Clear	24 (72.7)	30 (90.9)	29 (87.9)	30 (90.9)	18 (54.5)	30 (90.9)
Partially Clear	8 (24.3)	2 (6.1)	4 (12.1)	3 (9.1)	13 (39.4)	2 (6.1)
Unclear	1 (3.0)	1 (3.0)	0	0	2 (6.1)	1 (3.0)

STRATIFY - Instrumento de avaliação do risco de queda

Este instrumento de avaliação foi desenvolvido para a identificação de fatores de risco de quedas em pacientes hospitalizados. A pontuação total pode ser usada para ajudar a identificar o risco de quedas em idosos. Este instrumento de avaliação depende da **OBSERVAÇÃO DO AVALIADOR** em relação ao paciente. Para cada item, considere as instruções e orientações para a pontuação deste instrumento.

	Sim	Não
1) O paciente deu entrada no Hospital devido a uma queda ou caiu durante a internação?	**1**	**0**
Instruções para o avaliador: Analise o histórico do paciente ao ser admitido na unidade hospitalar. Ele deu entrada no Hospital devido à uma queda? Se sim, assinale a opção "sim". Se mão, verifique se o paciente apresentou alguma queda durante todo o período de internação até o momento. Se sim, assinale a opção "sim". Caso contrário, assinale "não".		
Você acha que o paciente (questões 2-5):	**1**	**0**
2) Está agitado?		
Instruções para o avaliador: Analise, por meio da sua experiência clínica, se o paciente se encontra agitado no momento da avaliação.		
3) Apresenta comprometimento visual, a ponto de afetar as atividades diárias?	**1**	**0**
Instruções para o avaliador: Observe, de acordo com a sua experiência clínica, se o paciente apresenta comprometimento visual. Por conta desse comprometimento, ele apresenta alguma dificuldade para realizar suas atividades de vida diárias?		
4) Necessita de idas frequentes ao banheiro?	**1**	**0**
Instruções para o avaliador: Analise, de acordo com a sua experiência clínica, se o paciente necessita de idas frequentes ao banheiro.		

5) Tem pontuações 3 ou 4 para transferência e mobilidade?

Instruções para o avaliador: Neste item você deverá verificar se o paciente tem pontuações 3 ou 4 para a SOMA da pontuação de transferência com a pontuação de mobilidade.

Para isso, avalie primeiramente a pontuação de transferência e mobilidade separadamente, para depois somá-las e assinalar "sim" ou "não" para o item 5.

Para avaliar a TRANSFERÊNCIA, peça para ele se levantar da cama ou de uma cadeira, observe e pontue de acordo com as opções abaixo:

0 = incapaz
1 = precisa de muita ajuda (uma ou duas pessoas, uso de dispositivo auxiliar)
2 = pouca ajuda (verbal ou física)
3 = independente

Para avaliar a MOBILIDADE, verifique como o paciente deambula. Ele anda sozinho? Necessita do auxílio de uma pessoa ou dispositivo auxiliar? Utiliza cadeira de rodas sozinho? É acamado? Pontue de acordo com as opções abaixo:

0 = imóvel
1 = independente com auxílio de cadeira de rodas
2 = anda com auxílio de uma pessoa ou dispositivo auxiliar
3 = independente

Agora SOME as pontuações de transferência e mobilidade. Se a SOMA for 3 ou 4, pontue 1 para o item 5, caso contrário a pontuação para o item 5 é 0.

PONTUAÇÃO TOTAL DA STRATIFY: _____

Instruções para o avaliador: Para realizar a pontuação total do STRATIFY, some todas as respostas "sim" e assinale no local indicado acima. A pontuação final do paciente deve ser entre 0 e 5. O risco de queda do paciente será classificado da seguinte forma:

0 = sem risco/risco baixo
1 = risco moderado
2 ou mais = risco alto

Figure 2 – Final version of the STRATIFY translated and adapted to Portuguese.

For the reliability and validity analyses, a convenience sample of 50 older adults who live in NH participated in the study, 35 women (70%) and 15 men (30%), with a mean age of 79.5 years (SD ± 8.3 years). The interrater reliability of STRATIFY was considered moderate, with ICC = 0.729 (95% CI = 0.525-0.845). Test-retest reliability was good, with ICC = 0.876 (95% CI = 0.781-0.929). STRATIFY and MFS presented moderate but significant correlation ($\rho = 0.50$, $p < 0.001$).

Discussion

Throughout the process of translation and cross-cultural adaptation of STRATIFY to the Brazilian Portuguese language, we found some details for modification and inclusion in the final version presented in this study. Overall, items translated and adapted were clear to health professionals, except for item 5, which generated more doubts among professionals (39.4% considered the item "partially clear" and 6.1% "unclear").

In item 1, nine professionals did not consider clear the question *O paciente deu entrada no Hospital com queda ou caiu durante a internação*?, suggesting a change to *O paciente deu entrada no Hospital devido a uma queda ou caiu durante a internação*?. The term *com queda* was considered confusing, since the patient is admitted to the hospital because of a fall and not with a fall.

Regarding items 2, 3 and 4, some professionals questioned the criteria for determining whether a patient is agitated, if they have visual impairment, and frequently need to go to the bathroom. The justification for these questions was that the evaluation is very subjective, made according to the judgment of the professional. However, STRATIFY was developed to be an easy and agile application,

precisely considering only the perception of the professional in relation to the patient. Therefore, we chose to include an explanatory text before the evaluation instrument, with the information that the evaluation depends on the evaluator's observation. In addition, we have included in the instructions that the evaluators should analyze the issues according to their clinical experience.

In item 5, many professionals questioned the text layout of the instructions and scores. Since STRATIFY has no instructions to the evaluator, in its original English version, we consider the creation of guidelines for professionals who will use the instrument in clinical practice important. With this, we assume that in the pre-test version the text could provide doubts to the evaluator. Therefore, we reformulated this item, describing it step by step, according to the observation necessary to the patient and scores. In the same way, we clearly put the instructions for the final score, since three professionals found it difficult to understand.

In this study, we performed the entire cross-cultural translation and adaptation process of STRATIFY and tested some psychometric properties through inter-rater and test-retest reliability and validity of the assessment tool. We verified moderate inter-rater reliability and good test-retest reliability, as well as moderate and significant correlation of STRATIFY with MFS, showing that the instrument analyzed in this study may be applied to older adults who live in NH. However, future studies may assess the instrument's ability to predict falls. In the literature, the variety of instruments for evaluating the risk of falling is enormous and many instruments do not have well established values of sensitivity and specificity to actually predict the occurrence of falls [31].

Similarly, Oliver et al. [14] warn of the use of evaluation tools that predict falls, since they do not have good sensitivity and specificity combined. In addition, they emphasize that falls involve a deeper study and that predicting them involves a specific judgment of the team of professionals involved in patient care, especially nurses (in the case of hospitalized patients). Oliver et al. [14] also confirm that one of the most used instruments in the literature to predict fall is STRATIFY.

Since STRATIFY depends on the judgment of the professional applying it, the variety of responses may be very large, which we could verify in this study, since the reliability of the inter-rater instrument was moderate, different from when the same evaluator reappears with the same subject at another time. In this case, the reliability is good, considering that the same person has a small variation of judgment between one evaluation and another.

In the literature, there are many options to evaluate the risk of falling, in addition to instruments based on the clinical judgment of the professional who evaluates the patient. Some of these options are the performance of postural control, such as the Berg Balance Scale [47] and the Balance Evaluation Systems Test (BESTest) [48], which evaluate the relationship of the motor part through balance and functional activities, as well as the interference of the cognitive task (present in BESTest). Future studies could compare the psychometric properties of subjective instruments with those of performance.

Although there is no consensus in the literature regarding the prediction of falls, as well as the lack of evidence regarding the sensitivity and specificity of the instruments, it is known that, in clinical practice, the use of these instruments is very common and recommended by fall prevention programs. In addition to using an appropriate assessment of the risk of falls for this purpose, hospital institutions are evaluated for the quality of the service provided, and falls prevention is a quality criterion.

Conclusion

We conclude the final version of STRATIFY adapted to Portuguese and to the Brazilian population after following the stages of translation and cross-cultural adaptation process. In addition, STRATIFY presented moderate and good inter-rater reliability and test-retest, respectively. Regarding the validity of the instrument, this tool was moderately correlated to the Morse Fall Scale.

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