ORIGINAL RESEARCH

CLINICAL FRAILTY SCALE: TRANSLATION AND CULTURAL ADAPTATION INTO THE BRAZILIAN PORTUGUESE LANGUAGE

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Abstract: *Background:* Frailty is a biological syndrome that causes adverse events in the health of older adults. However, the Clinical Frailty Scale has not yet been culturally adapted and validated into Brazilian Portuguese language. *Objectives:* Our aim was to translate, reproduce and validate the Clinical Frailty Scale (CFS) for the Brazilian Portuguese language. *Design:* An observational cross-sectional study with senior patients was conducted between Jan 2018 and Nov 2018. *Setting and Participants:* Volunteers aged >60 and living in Brazil. The translation and cultural adaptation of the CFS into the Portuguese language, the principles and good practices were followed. *Measurements:* To conduct the validation and determine the reproducibility of an inter-observer evaluation, the patients answered the scale questions in Portuguese on two occasions, delivered by two separate examiners and separated by a 10-minute interval, on their first visit; the 36-item Short Form Survey quality-of-life questionnaire (SF-36) was also applied. Seven days later, a second visit was undertaken to perform an intra-observer reproducibility assessment. *Results:* A total of 66 older individuals were enrolled (72 ± 8 years), the majority of which did not present frailty (63.6%) and reported a low physical limitation level in the SF-36. The CFS showed a significant correlation with the SF-36 quality-of-life questionnaire (r= −0.663; p<0.0001) and no statistical difference was observed between intra-rater (p=0.641) and inter-rater (p=0.350) applications, demonstrating the reproducibility and applicability of the instrument. The standard error estimate (SEE) was evaluated and there were no differences between the CFS and the SF-36 (SEE= 1.13 points). *Conclusion:* The Brazilian Portuguese language version of the CFS is a valid, reproducible and reliable instrument for evaluating the impact of frailty on the lives of senior patients.

Key words: Clinical frailty scale, ageing, frailty, translation, validation study.

Introduction (1498)

The world's ageing population is rising mainly due to constant advances in medicine and technology. Nowadays people live far longer, but ageing poses major challenges, and will be a dominant theme of research throughout the twenty-first century. According to data from the United Nations, it is estimated that by 2050, the world population of geriatric individuals will have reached almost 2 billion citizens, of which eighty per cent will live in developing countries (1, 2).

The advance of age establishes a significant relationship with frailty. Frailty is a progressive condition characterized by increased vulnerability, exposing individuals to a higher risk of falls, as well as to reduced mobility, independence and cognition, along with a higher risk of hospitalization and mortality, and may be considered a state of prior disability (3-7).

Previous studies (8) have already shown that frailty increases significantly with age. Among individuals aged 80 to 84, the percentage exhibiting frailty is 15.7% and in people over 85 years the rate is 26.1%. One of the ways to measure the individual's frailty is through the Clinical Frailty Scale (CFS), which has been used successfully in risk stratification in the seniors (7, 9, 10). It is an ordinal scale elaborated by Rockwood et al. and is composed of nine scores evaluated by the professional based on the individual's clinical data. Each increment of a score significantly increases the risks of mortality and institutionalization in the medium term (11). Given the ease of administering the CFS, this may facilitate the incorporation of frailty into routine screening and clinical decision-making algorithms (12). In addition, the CFS has been shown to be easier to apply and offers higher reliability compared to other scales (9, 13). The CFS is based on a holistic view of the patient, focussing on their overall health and ability to perform activities of daily living (ADLs). Unlike other scoring systems, this scale does not focus on issues of attitudes to health but rather on the individual's functional status. Previous studies have demonstrated that the CFS can measure the impact of adverse events on the lives of seniors, showing correlations with standard questionnaires SF-36.

A study carried out with 400 volunteers aged over 75 years showed that patients with greater frailty presented high mortality after surgery (14). Additionally, Griffiths and Mehta (15) demonstrate that the number of complications and the

length of stay in the Intensive Care Unit (ICU) increase with frailty and reduce postoperative quality of life. However, it has already been seen that frailty is a reversible condition when treated with interventions, such as physical exercise, in the early stages. These interventions are effective and can delay the transition from pre-frailty to frailty (16). Despite the CFS's worldwide use in clinical settings, it does not yet have a translated and validated version into the Portuguese language spoken in Brazil, limiting its use and applicability. Thus, the objective of the present study was to translate, culturally adapt and validate reproducibility and reliability of the Clinical Frailty Scale (CFS) into the Portuguese language spoken in Brazil.

Methods

This cross-sectional study was conducted with individuals of both genders, who were 60 years old or more, and agreed to participate in the research. Those who did not complete the protocol and who had cognitive impairment, such as speech, hearing and comprehension limitations, were excluded.

The development of this study consisted of two processes: 1) translation and cultural adaptation of the instrument into Brazilian Portuguese language; and 2) validation and determination of reproducibility of the translated and adapted instrument. To carry out the translation and cultural adaptation of the Clinical Frailty Scale into the Portuguese language, the principles and good practices suggested in Wild's study were followed (17).

After the process of translation and adaptation of the scale into the Brazilian Portuguese language, the CFS was supplied to a group of eight health professionals following a personal invitation by the researchers to participate. The entire scale was read and evaluated by the health professionals in order to analyse the clarity of each item. In order to ascertain the participants' understanding of each statement and its acceptance, a comprehension questionnaire was applied, using grades from 1 to 5, to record the clarity of each item on the scale. If the grades varied between 1 and 2, the wording of the question would be considered poor; 3–4 was considered good or very good, respectively; and 5 was excellent. Statements attracting a grade of ≤ 2 would be rewritten and statements that presented a final mark of ≥ 3 would be considered adequate for patients' understanding.

The research was approved by the Ethics Committee of the University of Fortaleza (ruling number 2,445,928, following resolution number 466/2012 of the National Health Council).

Clinical Frailty Scale (CFS)
The CFS developed by Rockwood (18) is an instrument composed of nine clinical items, where older adults can be classified as frail, pre-frail and non-frail according to the observation of a health professional and with the verification of information from the patient in question. They are considered to be without frailty when the score is ≤ 3, pre-frail if the score is 4, frail if the classification is ≥ 5 and moderately to severely frail if the score is 6–8.

SF-36
The 36-item Short Form Survey (SF-36; developed by RAND as part of the Medical Outcomes Study) was used to relate quality of life with the degree of frailty of seniors. It consists of 8 domains (functional capacity, physical aspects, pain, general state of health, vitality, social aspects, emotional aspects and mental health). Each domain score ranges from 0 to 100, with 0 being the worst health condition and 100 being the best (19).

The SF-36 instrument was used because some of its specific items are also addressed in the CFS, such as those concerning physical aspects, functional capacity and limitations. Those items could give the real aspect of the CFS compared to SF-36, which has several validations and is a worldwide recognized scale.

Validation and Reproducibility
For the evaluation of the inter-observer reproducibility of the CFS, the patients answered the questions presented in the Portuguese scale twice on their first visit – presented to them by two separate examiners with a 10-minute interval. In this first visit, the SF-36 version translated and validated for use in Brazil was also applied (19). The second visit took place seven days later, in which the same researcher applied the CFS again with the same patients in order to evaluate the intra-observer reproducibility.

Statistical analysis
The results are presented in absolute (n) and relative (%) frequencies for the qualitative and average variables and standard errors or median and interquartile range for the quantitative variables. First, the Komolgorov-Smirnov test was performed to evaluate the normality of the data. In addition, the standard error of estimate (SEE) was calculated to evaluate the reliability between the variables, and the Pearson correlation was performed between them. For all analyses, significance was set at $p < 0.05$.

Results

After evaluation of the Portuguese version of the CFS by the eight health professionals, all the questions achieved a rating of "very good" or "excellent" and thus no correction or alteration was needed in the wording of the scale in Portuguese.

Seventy-six older adults were included in the study; however, 10 volunteers did not finalize the protocol because they could not attend the second visit, so they were excluded.

The evaluated patients had a high body mass index (BMI), establishing a relationship with the main pathologies found. In addition, 84.8% of the participants used some form of medication. The majority of the individuals studied presented an absence of frailty (Table 1). Additionally, the volunteers

presented low levels of physical limitation, as assessed through the SF-36. When the SF-36 domains were separately evaluated, it was found that the lowest (worst) scores were in functional capacity and general state of health (Table 2).

Table 1
General characteristics of 66 elderly volunteers

Anthropometric/demographic data	
Female sex, n (%)	42 (63.3%)
Age, years	72 ± 8
Weight, kg	66.4 ± 12.3
Height, m	1.85 ± 0.39
BMI, kg/m^2	26.3 ± 4.7
Previous Surgeries, n (%)	42 (63.6%)
Comorbidities	
Hypertension, n (%)	47 (71.2%)
Diabetes mellitus, n (%)	19 (28.8%)
Vascular disturbance, n (%)	44 (66.7%)
Respiratory disturbances, n (%)	2 (3%)
Medications	
β-blocker, n (%)	19 (28.7%)
Antihypertensive, n (%)	46 (70.8%)
Frailty Scale	
Without frailty, n (%)	42 (63.6%)
Pre frailty, n (%)	10 (15.1%)
Frailty, n (%)	14 (21.2%)

Table 2
Results of Short Form 36 (SF-36)

SF-36 scores from scale (%)	
Functional capacity (points)	54 ± 33
Physical aspect (points)	82 ± 36
Pain (points)	59 ± 30
General state of health (points)	56 ± 17
Vitality (points)	64 ± 23
Social aspect (points)	91 ± 21
Emotional aspect (points)	87 ± 30
Mental health (points)	78 ± 18
SF-36 Component points	
SPC (%)	41 ± 9
SMC (%)	56 ± 9

Definitions of abbreviations: SPC (Summarized Physical Component); SMC (Summarized Mental Component).

During the application and reapplication of the CFS, no statistical difference was observed in the scores between the applications in either the intra-observer (p = 0.641) or the inter-observer (p = 0.350) analysis, thus demonstrating the reproducibility and applicability of the instrument.

In general, there were high and significant correlations between the SF-36 and the CFS (r = –0.663, p <0.0001), and a strong correlation of the frailty scale with two specific SF-36 domains (functional capacity r = –0.791, p = 0.001; and vitality r = 0.493, p = 0.001), but no correlation was observed between the scale and the SF-36 domain of emotional aspects (r = –0.189, p = 0.129) or the other domains of the questionnaire.

In addition, when the standard error estimate (SEE) was evaluated, there were no differences between the CFS and the SF-36 (SEE = 1.13 points), the CFS and the SF-36 functional capacity domain (SEE = 0.92 points), the CFS and the SF-36 physical aspects domain (SEE = 1.51 points) and the CFS and the SF-36 vitality domain (SEE = 1.32 points).

Discussion

The present study demonstrated that the translated and culturally adapted version of the Clinical Frailty Scale is reproducible, maintaining technical and semantic equivalence between the original and Brazilian Portuguese versions. Furthermore, it demonstrates validity against the quality-of-life questionnaire (SF-36), presenting a high level of agreement and reliability among evaluators after a short period of familiarization and training with the evaluation instrument. This is a pioneering study in the translation and validation of this questionnaire into the Brazilian Portuguese language. Frailty is associated with immune compromise in the endocrine, skeletal and neurological systems (20) and, in the seniors, it is still further associated with increased mortality, increased falls and poor disposition (6, 21). The CFS is based on a holistic view of the patient, focussing on their overall health and ability to perform activities of daily living. Unlike other scoring systems, this scale does not focus on issues of attitudes to health but rather on the individual's functional status (18, 22).

Chan (23) performed CFS validation by telephone with 67 geriatric patients in a tertiary medical centre in Taipei, Taiwan. The interview was conducted by two evaluators trained in research, and reliability was achieved between the two interviewers' assessments. Therefore, it was concluded that the CFS is a fast, reliable and valid screening tool for seniors, thus suggesting that its application is feasible in today's busy healthcare environments and in situations that need agility, such as in the care of hospitalized patients in intensive care settings. It is believed that this study has great reliability, as demonstrated by the achievement of the same results with the application of the CFS by different evaluators.

As in other validation studies, the questionnaire used was the Short Form-36, because some of its components correlate with the frailty scale – functional capacity, physical aspects, vitality

Figure 1
Brazilian-Portuguese version of the Clinical Frailty Scale
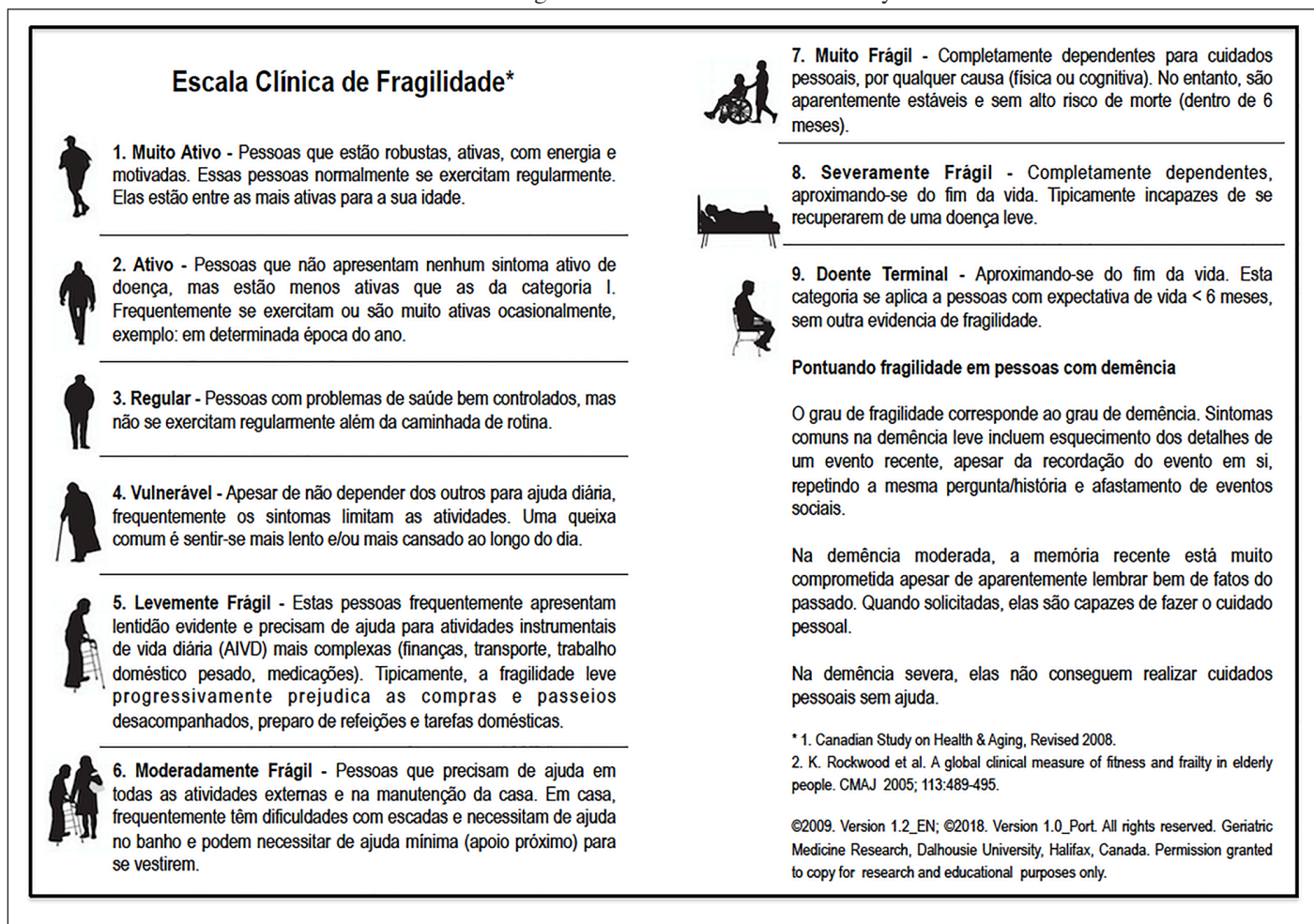
and the summarized physical component. Lin (24) mentions that changes in physical health related to frailty may be linked to a reduction in the quality of life. The author observed that among older individuals with different frailty classifications, functional capacity displays/records a greater range of scores than does the domain of emotional aspects, suggesting a greater influence of functional capacity on the degree of frailty compared to emotional aspects. This study presents similar results, since the CFS presented a strong correlation with the items of functional capacity in the SF-36 and a low correlation with the emotional aspects. Thus, the CFS is in agreement with the proposition that it evaluates the functionality of the seniors and not their emotional capacities.

In addition to providing a concise evaluation of functional capacity, the frailty score obtained through the CFS can be used as a strategy for the elaboration of specific preventive intervention programs aimed at senior patients who are considered high-risk, enabling the early identification of the individuals who are more vulnerable. It can be used as a predictor of risk in geriatric patients who are candidates for

elective and emergency surgical procedures, thus enabling the preparation of individualized proposals for preoperative, postoperative and outpatient physiotherapy (25, 26). The stratification of older individuals through the CFS allows a greater understanding of the current functional capacity of the evaluated individual, assisting in the prescription of focussed exercises for the improvement and recovery of the previous functional capacity. However, it also has an important role in the decision making for patients in terminal stages, allowing a better understanding of the indication and/or contraindication of certain adjuvant therapies in this population. Therefore it contributes effectively to the improvement of the quality of life of senior citizens.

The relevance of this research lies in the importance of checking the perspective of the statements from the Clinical Frailty Scale and their specificity from the results of the instrument responses. We can thus identify the probability of the scale being a possible predictor for the demonstration/ assessment of accompanying the patients' functional performance and their magnitude of clinical benefit through

the items evaluated, in order to show the benefits of its implementation in the programs of monitoring the patient with frailty at any level of the health sector.

The study presents some limitations that may be commented upon, such as the relatively small sample. In addition, after the application of the CFS, the patients were not followed up by a clinical protocol; however, a recent Brazilian study by Rodrigues (27) applied the CFS in a hospital setting and observed that pre-frailty patients presented a need for longer mechanical ventilation and longer time of hospitalization. This finding lends support to the position that the CFS is effective and easy to apply in the health management of older individuals, both outpatient and inpatient.

Clinical Implications

The ability to measure frailty is important at the level of both primary care policy and hospitalized patients. Knowledge of the data pertaining the different stages of frailty helps in the planning of specific programs aimed at this population and in decision-making at the bedside in the different scenarios of hospitalization. The frailty scale undoubtedly provides additional information about the functional capacity of older people, while also facilitating hospital discharge processes and a better understanding of the real needs when selecting the processes of special assistance (28).

Currently, no cultural validation of any frailty evaluation scale in Portuguese can be found. It is suggested that the translation and validation of this scale allows for greater ease of access to this type of tool for multidisciplinary teams in Portuguese-speaking counties and contexts, effectively contributing to the improvement of the quality of care directed to seniors. In addition, it makes possible a future comparative analysis between the results of studies carried out in different countries.

Additionally, the scale's facilitation of the stratification of older people at different levels of frailty allows for greater efficiency and resolution through focussed care. Predicting risk in seniors, many being candidates for surgical procedures, and understanding their greater vulnerability to stressful events common to hospitalization allows for the elaboration of individualized strategies, with a direct impact on the hospitalization time and hospital costs involved.

Finally, the use of the CFS as an assessment tool in primary care units will enable a continuous analysis based on reliable data for strategic planning for these individuals, having an important impact through the reduction of adverse events and hospitalizations.

Conclusion

It can be concluded that the Portuguese version of the Clinical Frailty Scale, after careful and rigid evaluation, was duly translated and culturally adapted and can be safely used in Portuguese-speaking countries. Our data demonstrate excellent reproducibility and reliability among the evaluators.

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