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Cross-cultural adaptation and content validation of the Multidimensional Fatigue Inventory–10 into Brazilian Portuguese

Adaptação transcultural e validade de conteúdo do Multidimensional Fatigue Inventory–10 para o português do Brasil

Adaptación transcultural y validez de contenido del Multidimensional Fatigue Inventory –10 al portugués brasileño

Rodrigo de Oliveira Andrade[I] *; Franciane Silva Luiz*[I] *; Geovana Brandão Santana Almeida*[I] *; Isabel Cristina Gonçalves Leite*[I] *; Angélica da Conceição Oliveira Coelho*[I] *; Fábio da Costa Carbogim*[I]

[I]*Universidade Federal de Juiz de Fora. Juiz de Fora, Brazil*

ABSTRACT

Objective: to describe the process of cross-cultural adaptation of the Multidimensional Fatigue Inventory-10 for patients undergoing cancer treatment in Brazil, and to evaluate content validity evidence. **Method:** this psychometric study involved application of a five-step cross-cultural adaptation protocol comprising initial translation, synthesis of translations, back-translation, expert committee and pre-test. Content validity evidence was evaluated using the Content Validity Ratio. **Result:** the instrument was translated and adapted culturally, retaining semantic, idiomatic, experimental and conceptual equivalence. The judges analyses of equivalence resulted in agreement greater than 80%. The final version scored a content validity coefficient of 0.94, with items varying from 0.87 to 1.0. **Conclusion:** the cultural adaptation of the Multidimensional Fatigue Inventory-10 into Brazilian Portuguese allowed the instrument to be adapted to the Brazilian context for application to cancer patients.
Descriptors: Nursing; Nursing Assessment; Fatigue; Medical Oncology; Psychometrics.

RESUMO

Objetivo: descrever o processo de adaptação transcultural do *Multidimensional Fatigue Inventory*-10 para paciente em tratamento oncológico, no contexto brasileiro e avaliar suas evidências de validade de conteúdo. **Método**: estudo psicométrico, com aplicação de protocolo caracterizado por cinco etapas para adaptação transcultural, incluindo tradução inicial, síntese das traduções, retrotradução, comitê de especialistas e pré-teste. As evidências de validade de conteúdo foram analisadas por meio do *Content Validity Ratio*. **Resultados**: o instrumento foi traduzido e adaptado de forma cultural, mantendo-se as equivalências semântica, idiomática, experimental e conceitual. A análise das equivalências entre os juízes resultou numa taxa de concordância superior a 80%. A versão final obteve coeficiente de validade de conteúdo de 0,94, com variação entre 0,87 e 1,0 para os itens. **Conclusão**: a adaptação cultural do *Multidimensional Fatigue Inventory*-10 para o português do Brasil permitiu a adequação do instrumento ao contexto brasileiro, com aplicabilidade aos pacientes oncológicos.
Descritores: Enfermagem**;** Avaliação em Enfermagem; Fadiga; Oncologia; Psicometria.

RESUMEN

Objetivo: describir el proceso de adaptación transcultural del *Multidimensional Fatigue Inventory*-10 para pacientes en tratamiento oncológico, en el contexto brasileño, y evaluar sus evidencias de validez de contenido. **Método:** estudio psicométrico en el que se aplicó un protocolo caracterizado por cinco etapas para la adaptación transcultural, incluyendo traducción inicial, síntesis de las traducciones, retrotraducción, comité de expertos y prueba preliminar (pretest). Las evidencias de validez de contenido se evaluaron mediante el *Content Validity Ratio*. **Resultado:** el instrumento fue traducido y adaptado de forma cultural, manteniendo las equivalencias semántica, idiomática, experimental y conceptual. El análisis de las equivalencias entre los jueces resultó en una tasa de coincidencia superior al 80%. La versión final obtuvo un coeficiente de validez de contenido de 0,94, con una variación entre 0,87 y 1,0 en cuanto a los ítems. **Conclusión:** la adaptación cultural del *Multidimensional Fatigue Inventory*-10 *al portugués brasileño* permitió adecuar el instrumento al contexto brasileño, con aplicabilidad a los pacientes oncológicos.
Descriptores: Enfermería; Evaluación en Enfermería; Fatiga; Oncología Médica; Psicometría.

INTRODUCTION

Fatigue is defined as a subjective and persistent feeling of tiredness, physical, emotional and/or cognitive exhaustion, disproportionate to recent activity that does not improve with rest and sleep[1]. This manifestation can be acute or chronic and directly interferes with activities of daily living[1,2].

In cancer patients, fatigue is one of the most prevalent symptoms, affecting between 14.03-100% of cases, depending on the group of patients studied[3-5]. Although the high prevalence is recognized, this manifestation is not

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Corresponding author: Fábio da Costa Carbogim. E-mail: fabio.carbogim@ufjf.br
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always accurately tracked in oncology[5]. Studies indicate that given the subjectivity and difficulty of patients in reporting symptoms, fatigue is underreported by health professionals[1,4,5].

In this sense, understanding fatigue becomes a challenge for nurses, both in the identification and establishment of the nursing diagnosis, and in the implementation of measures that can promote the quality of life of cancer patients[3,6].

Some risk factors for fatigue in cancer patients were identified in a systematic review[6], namely: poor performance status, chemotherapy/radiotherapy, insomnia, pain, neuroticism, depression and female sex. Even though these findings can contribute to the screening of vulnerable patients, it is important to develop measurement tools that allow identifying the stage or degree of fatigue[6,7].

The literature presents instruments used to assess fatigue, but for the most part, they are not specific for cancer patients[8-11]. In addition, some instruments are not adapted to the cultural context in which they will be used, limiting the accuracy of data collected[12,13].

Scales that assess fatigue in cancer patients are not rare in the international literature. This was shown in a systematic review[13] in which 14 exclusive inventories for assessment of fatigue in cancer patients were identified. Of these, five with a unidimensional approach and nine with a multidimensional approach. In the Brazilian literature, three inventories aimed at cancer patients were identified: the Fatigue Pictogram[14], the Revised Piper Fatigue Scale[15] and the Functional Assessment of Cancer Therapy fatigue scale v.4[16]. Although the Fatigue Pictogram[14] is a concise instrument, making it more practical, it only assesses the intensity and impact of fatigue as dimensions. The Revised Piper Fatigue Scale[15] and the Functional Assessment of Cancer Therapy fatigue v.4[16] are extensive instruments with 27 and 40 items, respectively.

The Multidimensional Fatigue Inventory – 10 (MFI-10)[17] is among the available assessment instruments with assessment of its psychometric properties. This instrument is the reduced version of the Multidimensional Fatigue Inventory created in 1995, with 20 items[18]. It was published in English, maintaining good psychometric properties, with the aim of accurately and quickly identifying fatigue in cancer patients in the physical, emotional and cognitive dimensions[17].

In this logic, the MFI-10 was chosen for validation in Brazilian Portuguese given its capacity for multidimensional identification of fatigue, its solid psychometric property, as well as easy and quick application in cancer patients[17].

The relevance of the instrument for nursing/health practice and the lack of a practical instrument in Brazil for assessment of cancer fatigue in three dimensions justify the development of this study. It is aimed at describing the process of cross-cultural adaptation of the MFI-10 for patients undergoing cancer treatment in the Brazilian context.

METHOD

This is a psychometric study of cross-cultural adaptation of the MFI-10 to Brazilian Portuguese. Both the cross-cultural adaptation and the use of the MFI-10 were authorized by the author of the scale[17].

The MFI-10 is a multidimensional instrument that assesses fatigue through three factors and ten items. Factor one consists of four items (1, 2, 3 and 4) assessing physical fatigue, factor two consists of four items (5, 6, 7 and 8) assessing emotional fatigue, and factor three consists of two items (9 and 10) assessing cognitive fatigue. The items are arranged on a Likert scale and answers range from 1 to 4 points, values corresponding, respectively, to the terms “Strongly Disagree, Disagree, Agree and Totally Agree”. Item scores are added to create a total score ranging from 1 (best condition) to 4 (worst condition); higher scores indicate more fatigue.

The study was developed in five steps (Figure 1), as proposed by Beaton[19] with theoretical support from the Patient-Reported Outcomes Measurement Information System (PROMIS®, 2013)[20]. The process of fulfilling the five steps took place between August 2020 and January 2021.

In step I, initial translation, the instrument was translated independently by two professionals, Portuguese native speakers with command of the English language. Note that translator 1, unlike translator 2, was aware of the concepts to be examined and had access to the article on the MFI-10[17].

In step II, synthesis, the two translations into Brazilian Portuguese (T1 and T2) were compared by the two translators and one of the researchers, who produced the synthesis version in Portuguese in a synthetic and consensual way.

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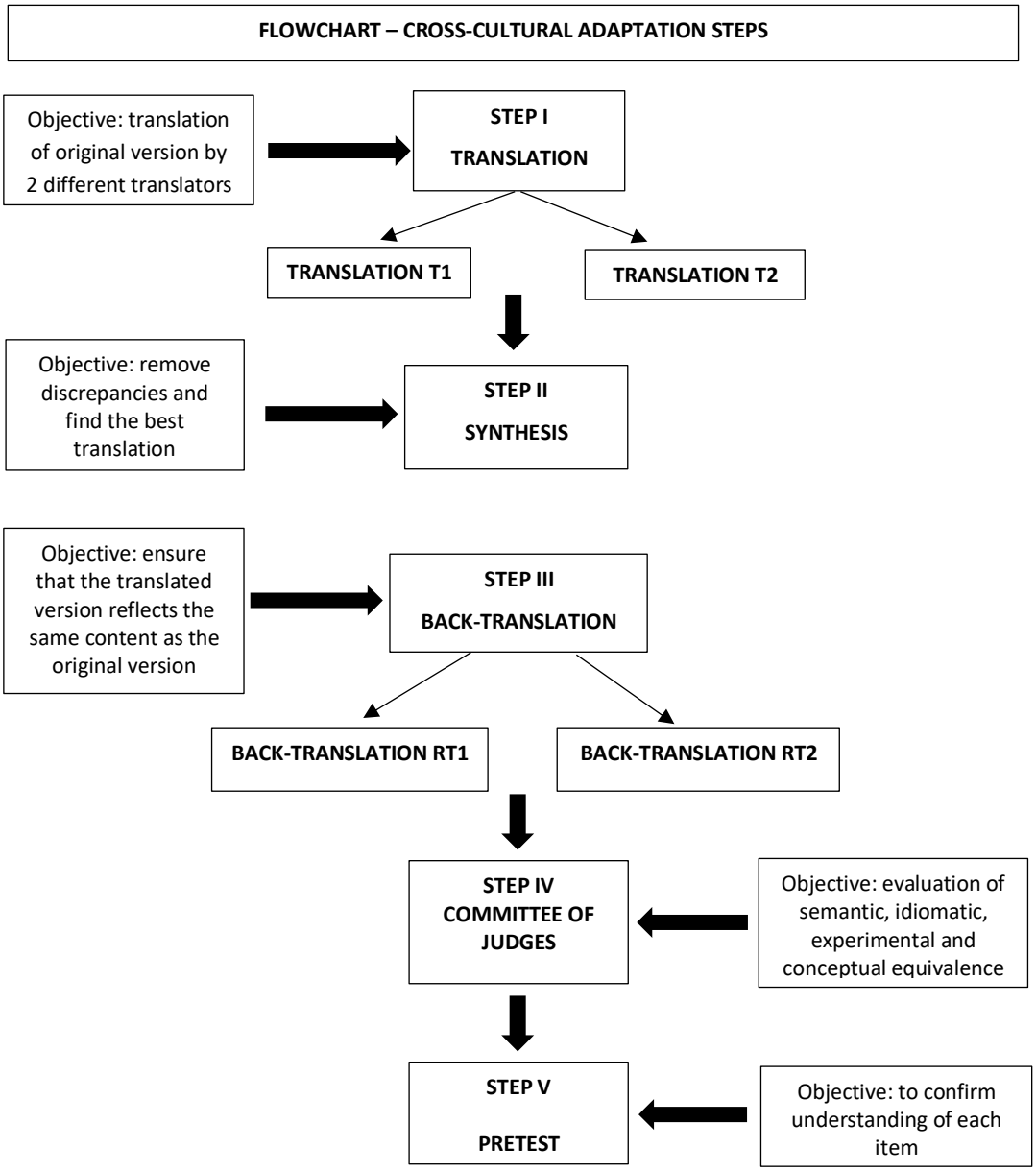

FIGURE 1: Flowchart of steps of translation of the Multidimensional Fatigue Inventory – 10 (MFI-10) into Brazilian Portuguese. Juiz de Fora, MG, Brazil, 2021.

In step III, back-translation, the MFI-10 was back-translated into the original language blindly and independently by two native English-speaking professionals with mastery of Portuguese, creating the back-translations (RT1 and RT2).

Subsequently, in step IV, the original version of the instrument in English, each translation from English to Portuguese (T1 and T2), the synthesis version and the back-translations from Portuguese to English (RT1 and RT2) were analyzed by a committee of six experts, resulting in a consensus of translations (T1-2) that constituted the version used in the pre-test (step V).

For the composition of the expert committee, and considering the multifactorial dimension of the MFI-10, two physicians, two nurses, a physical therapist and a psychologist participated in the study. These professionals were invited by e-mail and recruitment was based on the specialty and care experience of over five years in the field of oncology. Two professors with specific knowledge in the field of oncology and scientific publications in the field of psychometry were also part of the group of experts.

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The dynamics of access to the expert committee occurred in three remote meetings through the videoconferencing platform Google Meet, considering that the study was developed during the COVID-19 pandemic. The first meeting was individualized, between the researcher and the specialist, when the objective of the study was presented, the informed consent was applied and doubts were clarified. Afterwards, the translated and back-translated instrument was evaluated, and the specialist was responsible for evaluating the semantic, idiomatic, conceptual and experimental equivalences in a questionnaire, indicating a score between 1 and 4, being: 1 I did not understand; 2 I partially understood; 3 I understood almost everything, but had some doubts; 4: I understood perfectly and have no doubts. In case the specialists did not understand or had doubts, they could present suggestions for changes or adjustments in a specific space in the questionnaire. The second and third meetings were between the researcher and the committee, so the group could discuss and synthesize an instrument of better understanding and applicability.

In the pretest phase, the main focus was to seek the degree of understanding of translated items. We sought similarity with the profile of patients who would be worked on in the test phase. The choice was to apply the translated and adapted questionnaire to cancer patients undergoing chemotherapy and/or radiotherapy. Patients aged 18 years or less were excluded.

A questionnaire with sociodemographic data about age, sex, race, profession, years of profession, professional experience and experience with instrument validation was used for data collection with the judges. Another questionnaire was applied to patients who participated in the pretest, with information on sex, race, education, employment status, cancer diagnosis, stage, time, type of treatment and time of diagnosis.

Data obtained through the collection instruments were managed in Microsoft Office Excel 2010, and the Statistical Package for the Social Sciences (SPSS) version 23.0 was used for the statistics of results. Descriptive statistics were performed on the variables sex, race, education, employment status, diagnosis, stage of the disease, time of diagnosis, and type of treatment, analyzing simple and relative frequency (when categorical) and standard deviation (when continuous).

The index of agreement between judges was used to analyze the equivalences. They had the opportunity to demonstrate agreement or not with the previously translated and back-translated items and the types of equivalence existing in the expressions. The equivalences explored were: semantic equivalence (meaning of words, or the correct translation of items and concepts), idiomatic equivalence (colloquial or idiomatic expressions present in other cultures), experimental equivalence (coherence between the daily experiences of the country or culture of origin of the instrument with those of the country or culture for which the instrument is being adapted) and conceptual equivalence (if words or expressions have similar conceptual meaning or if they have the same importance in different cultures).

The Content Validity Coefficient (CVC) was used in the content validity analysis performed by the Committee of Judges in the pretest phase; a minimum CVC of 0.80 was considered acceptable and preferably, greater than 0.90[20-22]. The CVC score was calculated by adding the agreement of items with a score of "3" or "4" divided by the number of participants[20-22]. This calculation was applied to both experts and patients who participated in the pretest. Items that received a score of "1" or "2" were revised, as suggested.

All steps of the study were conducted in accordance with Resolution 466/2012 of the National Health Council for research involving human beings. The project was approved by the local Research Ethics Committee and participants, after being informed about the study and signing the Informed Consent form.

RESULTS

As a result of the initial stage (I), two versions of the questionnaire were created (T1 and T2). The differences found between T1 and T2 and suggestions for adjustments were discussed among researchers and the decisions were taken by consensus, thus producing the synthesis version T1-2 (step II).

Regarding back-translations (RT1 and RT2) produced from the T1-2 version (step III), there were no significant differences between them and the original instrument. Although some items did not contain the same words as the original instrument, the conceptual content and ideas were similar to continue with the cultural adaptation (Figure 2).

In step IV, a review was performed by a committee of eight judges aged between 37 and 64 years, average of 42.3 years. Of these, four (50%) were female, eight (100%) declared themselves to be white and resident in the state of Minas Gerais. As for education, four (50%) had a PhD, two (25%) a master's and two (25%) had a specialist title. Considering experience, six (75%) had experience of more than five years in the field of oncology and two (25%) fit in the aspect of domain of the cultural adaptation method.

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Original	T1	T2	Synthesis	RT1	RT2
Physically I feel only able to do a little	Fisicamente eu só consigo fazer pouco	Fisicamente eu me sinto capaz de fazer somente um pouco	Fisicamente eu sinto capaz de fazer pouca coisa	Physically I'm not able to do very much	Phisicaly, I only feel capable of getting a little done
I feel tired	Me sinto cansado	Eu me sinto cansado	Eu me sinto cansado	I feel tired.	I feel tired
Physically I feel I'm in a bad condition	Eu estou mal fisicamente	Fisicamente eu me sinto em uma condição ruim	Fisicamente eu sinto que estou em uma condição ruim	Physically I feel like I'm in bad condition.	Phisically, I feel in poor condition/don't feel well
I tire easily	Me canso facilmente	Eu me canso facilmente	Eu canso facilmente	I get tired easily	I get tired easily
I dread having to do things	Eu temo ter que fazer tarefas	Eu temo ter que fazer coisas	Eu tenho medo de fazer as coisas	I'm afraid of doing things.	I fear having things to get done
I think I do very little in a day	Eu acho que faço pouco por dia	Eu sinto que eu faço muito pouco em um dia	Eu acho que faço muito pouco em um dia	I think that I do very little in a day.	I feel I don't accomplish much during the day
I get little done	Eu consigo fazer pouco	Eu faço poucas coisas	Eu faço poucas coisas	I don't do much.	I get few things done / I can do very little
I don't feel like doing anything	Eu não sinto Vontade de fazer nada	Eu não tenho vontade de fazer nada	Eu não sinto vontade de fazer nada.	I don't have the desire to do anything.	I don't want to do anything
It takes a lot of effort to concentrate on things	Me toma muito esforço para me concentrar em algo	É preciso muito esforço para concentrar nas coisas	É preciso muito esforço para me concentrar nas coisas.	It takes a lot of effort for me to concentrate on things.	I need a lot of effort to concentrate
My thoughts easily wander	Fico disperso facilmente	Meus pensamentos facilmente se perdem.	Meus pensamentos vagam facilmente.	My thoughts easily wander.	I get distracted very easily

T: tradução; RT: retrotradução.

FIGURE 2: Process of translation, synthesis and back-translation of the Multidimensional Fatigue Inventory – 10. Juiz de Fora, MG, Brazil, 2021.

In the review step by the committee of judges, the agreement rate per item was analyzed in relation to semantic, idiomatic, experimental and conceptual equivalence. The average agreement rate for the ten items was 100% for semantic equivalence, 98.75% for idiomatic equivalence, 96.25% for experimental equivalence and 97.5% for conceptual equivalence.

Although most elements evaluated had an acceptable level of agreement, in the second evaluation moment, the need for grammatical changes, word inversion and/or replacement of some terms by synonyms was identified. Two items of the translated version were changed. In the first item, for better linguistic understanding, the sentence "*Fisicamente, eu me sinto capaz de fazer pouca coisa*" (Physically I feel only able to do a little) was adjusted to *"Eu não me sinto capaz de fazer muitas coisas"* (I do not feel capable of doing many things). Likewise, in the third item, the sentence *"Fisicamente eu sinto que estou em uma condição ruim"* (Physically I feel I'm in a bad condition) was adjusted to *"Eu sinto que fisicamente não estou bem"* (I feel that I am physically unwell).

The overall CVC of the MFI-10 was 0.94 and the value per item ranged from 0.87 to 1.00, as shown in Table 1.

In pretest, the pre-final version (agreed upon by judges) was randomly applied and analyzed by a population of 30 cancer patients. Of these, 20 (66.6%) were female, 22 (73.4%) declared themselves white, 16 (53.4%) had high school level, 20 (66.6%) were retired, aged ranged from 36 to 78 years, mean of 64.1 years. Regarding the type of cancer, 13 (43.3%) were diagnosed with breast tumor, four (13.3%) lung tumor, three (10%) bowel cancer, three (10%) metastasis and seven (43 .3%) other types of tumors. The average time taken to answer the inventory was of 17.6 minutes.

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TABLE 1: Content validity coefficient (CVC) of the consensus version (T1-2) of the Multidimensional Fatigue Inventory–10. Juiz de Fora, MG, Brazil, 2021.

Item	CVC item
1-Eu não me sinto capaz de fazer muitas coisas	0.87
2-Eu me sinto cansado	1.00
3-Eu sinto que fisicamente não estou bem	1.00
4-Eu me canso facilmente	0.93
5-Eu tenho medo de fazer as coisas	0.87
6-Eu acho que faço muito pouco em um dia	0.87
7-Eu faço poucas coisas	0.93
8-Eu não sinto vontade de fazer nada	1.00
9-É preciso muito esforço para me concentrar nas coisas	1.00
10-Meus pensamentos vagam facilmente	0.93
Overall CVC of the scale	**0.94**

As for understanding the questionnaire, 26 (87%) patients considered the first nine items to be perfectly understandable. Item ten, *"Meus pensamentos vagam facilmente"* (My thoughts easily wander) was rated as not very understandable by three (10%) patients. Although a small part of participants mentioned little understanding, there was a need for adjustment. Therefore, the sentence *"Meus pensamentos vagam facilmente"* (My thoughts easily wander), was adapted to *"Eu me disperso com facilidade"* (I disperse easily).

In the pretest, all items analyzed on a Likert scale obtained an average greater than 3.5 points (scale from 1 to 4 points) in terms of clarity. Therefore, patients considered the Brazilian version of the MFI-10 clear for the evaluation and detection of cancer-related fatigue.

DISCUSSION

Assessing fatigue and its progression in cancer patients is a decisive and fundamental factor for the development of interventions and planning of nursing care[23]. As these signs and symptoms go beyond the physical manifestation and also involve psychological and social aspects, the detection of fatigue becomes complex, and the use of instruments that help in the identification is opportune[17].

The importance of obtaining a psychometric instrument that tracks the subjective symptoms of fatigue requires a construct with valid and reliable results, and practical application[16]. In addition, it helps in clinical judgment for the choice of pharmacological or nonpharmacological interventions[23,24]. Furthermore, the use of scales guarantees the accurate detection of fatigue or even its clinical exclusion, facilitating therapeutic methods and procedures[14,15].

Although the profile of the committee of judges in the present study is similar to the sociodemographic characteristics of other studies[23-25], these participants share the same geographic region, which may not include regional and/or cultural variations in the cross-cultural adaptation process.

Regarding pretest participants, demographic data related to age, marital status and education level are similar to those of a study that evaluated the psychometric properties of the MFI-10 in China[25]. In relation to sex, employment status and stage of the disease, characteristics are similar to those of the French study that developed the MFI-10[17]. On the other hand, in the present study, the variability of the type of cancer in the sample of patients was greater than that in the Chinese and French studies[17,25].

The process of cross-cultural adaptation in this study was performed with methodological rigor, based on five steps[19] that allowed the successful achievement of the Brazilian version of the Multidimensional Fatigue Inventory – 10 (MFI-10Br).

The results suggest that both the judges in the cross-cultural validation process and patients in the pretest satisfactorily evaluated, understood and accepted the instrument.

As a contribution, the cross-cultural adaptation of the MFI-10Br favors nursing care in the early identification of fatigue in oncological patients, indicating possible changes that may be subject to interventions aimed at relieving and/or reducing symptoms. The identification of fatigue and the definition of possible related factors are considered essential for clinical judgment and decision-making in the care of cancer patients[26-29].

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Note that the CVC used in the present investigation to assess the content-related validity evidence is one of the steps inherent to cross-cultural adaptation. In this process, it is also necessary to evaluate the validity of the construct and criterion, as well as reliability indices, frequently evaluated by: stability (performing the test-retest), internal consistency (to assess homogeneity) and equivalence (to assess inter-rater reliability)[21,22,30].

The cross-cultural adaptation of the MFI-10 into Brazilian Portuguese was limited in terms of the sample size of the expert committee, as well as the regional profile of this evaluation group. In addition, the CVC, an indicator used to assess content-related validity evidence, may overestimate the results found.

CONCLUSION

The cultural adaptation of the Multidimensional Fatigue Inventory – 10 allowed the adaptation of the instrument to the Brazilian context. Based on methodological rigor in five steps, the semantic, experimental, idiomatic and conceptual equivalence of the instrument were guaranteed. From the evaluation process of the Brazilian version of the Multidimensional Fatigue Inventory – 10, the content-related validity evidence of the instrument was considered satisfactory.

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