Brief Methodological Report

Brazilian Version of Cancer Fatigue Scale: Validation of the Brazilian Version of Cancer Fatigue Scale in Patients With Breast Cancer

Raciele Ivandra Guarda Korelo, PhD, Juliana Siega, BPhty, Ana Carolina Cordeiro Woloschen, BPhty, Maryelle Paula do Amaral, BPhty, Mylena Barão dos Santos Ivanski, BPhty, Juliana Carvalho Schleder, PhD, and Luiz Claudio Fernandes, PhD

Universidade Federal do Paraná (UFPR)—Prevention and Rehabilitation in Physical Therapy Department Curitiba (R.I.G.K.), Paraná; Universidade Federal do Paraná (UFPR)—Physiotherapist Post-Graduation Program in Physical Education Curitiba (J.S.), Paraná; Universidade Federal do Paraná (UFPR)—Graduate Program in Physical Therapy Curitiba (A.C.C.W., M.P.d.A., M.B.d.S.I.), Paraná; Hospital Universitário Regional dos Campos Gerais (HURCG) Ponta Grossa (J.C.S.), Paraná; and Universidade Federal do Paraná (UFPR)—Physiology Department Curitiba (L.C.F.), Paraná, Brazil

Abstract

Context. Scales to assess the fatigue in patients with cancer may help the clinical decision-making process.

Objectives. The objective of this study was to cross-culturally adapt and determine the validity of the Brazilian version of Cancer Fatigue Scale.

Methods. Translation and cross-cultural adaptation followed the recommendations of international guidelines. One hundred fifty-one women with breast cancer participated in the validity phase and they filled out the Brazilian version of another instruments (Piper Fatigue Scale Revised, Beck Depression Inventory, Verbal Numerical Rating Scale, and Karnofsky Performance Scale). The measurement properties of reliability, internal consistency, and validity were measured.

Results. The few discrepancies identified in the back-translation were solved by consensus, and the Cancer Fatigue Scale was successfully translated and cross-culturally adapted. The Brazilian version of Cancer Fatigue Scale showed good stability (test-retest reliability intraclass correlation coefficient = 0.95, 95% CI = 0.94−0.97 and interexaminer reliability intraclass correlation coefficient = 0.98, 95% CI = 0.97−0.99) and good internal consistency (Cronbach's alpha >0.70 for the three subscales/domains). The high correlation was found with Piper Fatigue Scale ($r = 0.643$) and Beck Depression Inventory ($r = 0.509$) in terms of validity. However, a reasonable correlation was found with Verbal Numerical Rating Scale ($r = 0.302$) and Karnofsky Performance Scale ($r = -0.324$).

Conclusion. Here, we validated the Cancer Fatigue Scale in breast cancer Brazilian women meaning its use for the identification and evaluation of cancer-related fatigue in patients with breast cancer. J Pain Symptom Manage 2019;57:1130−1136. © *2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.*

Key Words

Fatigue, breast cancer, symptom assessment, validation studies, reliability

Introduction

Fatigue is one of the most common and distressing symptoms of cancer. As a consequence, it significantly affects the usual activity, affects the patient's quality of life, and is difficult to treat.[1] Cancer-related fatigue (CRF) is defined as "a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning".[2]

Address correspondence to: Raciele Ivandra Guarda Korelo, PhD, Universidade Federal do Paraná Departamento de Prevenção e Reabilitação em Fisioterapia, Avenida Coronel Francisco Heráclito dos Santos, 210, 81531-980 Curitiba, Paraná, Brazil. E-mails: raciele@ufpr.br or raciele_guarda@yahoo.com.br

Accepted for publication: March 11, 2019.

© 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

0885-3924/$ - see front matter
https://doi.org/10.1016/j.jpainsymman.2019.03.011

CRF has been accepted as a diagnosis in the International Classification of Diseases, because of its prevalence and its impact of function.[3] The prevalence rates for CRF depend on the studied population, the evaluation methods, and the demographic factors.[4] During the treatment, 58% to 94% of the patients with breast cancer experience CRF.[5] Furthermore, it is estimated at an average of 30% in the cancer survivors, which continues to show the symptom after the end of the treatment.[1,3]

However, despite the current recommendations[2,6] that suggest regular investigation of CRF, this symptom has been underreported by patients and not treated adequately by health professionals.[5]

Owing to an increased interest and research of CRF, more than 40 different instruments have been developed to assess CRF and have been used for clinicians.[7,8] These instruments have strengths and weaknesses, and there exist no recommendations describing which measure is the most proper.[1] The systematic review[8] suggests only five instruments with nearly ideal psychometric properties: Functional Assessment of Cancer Therapy−Fatigue, Chalder Fatigue Scale (C-CFS), Brief Fatigue Inventory, Cancer Fatigue Scale (CFS), and Multidimensional Fatigue Symptom Inventory−Short Form. Of these five instruments, the first three were already validated for the Brazilian language.[9−11]

Therefore, we decide to translate and validate the CFS because of its compactness, it is brief, it is easy to complete,[12] and besides it is a widely used instrument for the evaluation of cancer patients, classified as an excellent tool because it contains the main domains of the fatigue with a high reliable and excellent psychometric properties.[13] The CFS was developed in Japan,[14] and the validity and reliability has been tested in Iranian language,[15] Chinese,[12] German,[13] Greek,[16] Turkish,[17] and Persian.[18]

The CFS consists of 15 items that assess fatigue in three domains: physical (seven items), affective (four items), and cognitive (four items). Each item is assessed on a five-point Likert scale (1 = no to 5 = very much), and the possible scores range from 0 to 28 for physical, 0 to 16 for affective, and 0 to 16 for cognitive domains. The sum of domains (0−60) represents the total fatigue ranging, where higher scores indicate a higher degree of fatigue.[19]

Therefore, the translation and validation of the CFS for Brazilian language is of great importance for the international understanding of the properties of its measures when used in different cultural contexts, and the use of this same questionnaire in different countries will improve the comparison of the results between different studies. Furthermore, the validation of this instrument may help the clinical decision-making process aiming at the patient's well-being and better quality of life and favoring its recovery.

The purpose of the present study was to translate, cross-culturally adapt, and determine the validity of the Brazilian version of Cancer Fatigue Scale (B-CFS) in patients with breast cancer.

Methods

This study was conducted at the Erasto Gaertner Hospital (Curitiba, Brazil) and approved by the Hospital's Research Ethics Committee (protocol: 1.289.354), and all the participants signed the informed consent. It is registered on REBEC−Brazilian Clinical Trials (RBR-39247H). Individuals (women) eligible for this study had been diagnosed with primary breast cancer, in the physiotherapeutic treatment, aged between 18 and 65 years, with preserved communication and comprehension skills. We excluded pregnant women, those with psychiatric and/or neurological disorders, those with heart disease, those with chronic respiratory insufficiency, and participants who refused to join or were unable to respond to the research questionnaire (score less than 16 in Brazilian version of Mini−Mental State Examination).[20]

Procedures involved two phases: translation and cross-cultural adaptation of CFS, and assessment of the measurement properties.

The process followed the recommendations of international guidelines[21] and authorized by the authors of the original questionnaire. The translation and cross-cultural adaptation followed five stages: translation into Brazilian Portuguese language, synthesis of translation, back translation, consensus of expert committee, and pretest of prefinal version.

Two bilingual translator's native speakers of Brazilian Portuguese translated the instrument: one is a health professional with experience in cancer and the other is not related to the health area. The translation outcomes were discussed by the translators and authors of the study, and a first version was produced. This first version was translated back to English by two native speakers, none with health professional or prior knowledge of the original version of CFS.[14] To establish consensus, a committee of experts reviewed a document containing the translations, back-translations, original versions, and a report prepared by the researcher's team including each item of the instrument, alternative answers, and instructions, with the differences found between versions. The committee's decisions aimed at ensuring semantic, idiomatic, experimental, and conceptual equivalence between versions. The prefinal version was administered to 33 eligible subjects to test for any difficulties in items' comprehension. Later, nine women were excluded.

To verify the comprehension of the instrument by participants, they were questioned about each of the items on a range of 0 (did not understand anything) to 5 (understood perfectly and has no doubt). In addition, we included three more open-ended questions answered by participants [1) What was the comprehension difficulty? 2) Do you suggest any changes? and 3) Could you explain what did you understand with your own words?]. Furthermore, we questioned the interviewer about his/her perception of the participant's level of understanding, with three options: 1—"She understood perfectly," 2—"She had some difficulty," or 3—"She does not understand." Thus, the report prepared for research team with percentage of understanding to the committee that verified that all recommended steps had been followed. Then, the final version of Brazilian Cancer Fatigue Scale was established (Fig. 1).

The psychometric properties (reliability, internal consistency, and validity) were measured. The sample size was determined according to the study by Terwee et al.,[22] which suggest at least the ratio of four to 10 participants for each items of the instrument that contains 15 questions. Then, 151 women with breast cancer participated in this phase (77 women were excluded).

After the researcher collected sociodemographic data and clinical characteristics, the B-CFS was applied three times to be self-reported for measurement properties suggested by the COSMIN initiative.[23]

The test-retest reliability assesses the consistency between the responses given by participant on different occasions and was evaluated twice by the same examiner, with 15-day interval between the assessments at the same time and after the first interview. The other examiner applied the instrument 1 hour after the first examiner evaluated the interexaminer reliability. Despite being self-administered, we performed this step because the sample consisted of individuals weakened by difficult diagnosis, where memory could be affected owing to clinical instability. Reliability

	Neste momento...	Não	Um pouco	Moderada mente	Considera velmente	Muito
1	Você fica cansado (a) facilmente?	1	2	3	4	5
2	Ao sentir fadiga/cansaço, você sente a necessidade de se deitar?	1	2	3	4	5
3	Você se sente exausto (a)?	1	2	3	4	5
4	Você acha que se tornou uma pessoa descuidada/desarrumada?	1	2	3	4	5
5	Você se sente entusiasmado (a) /animado (a)?	1	2	3	4	5
6	Você sente seu corpo pesado/sobrecarregado e cansado?	1	2	3	4	5
7	Você acha que comete mais erros/se confunde quando está falando?	1	2	3	4	5
8	Você sente interesse em fazer alguma coisa?	1	2	3	4	5
9	Você se sente de saco cheio?	1	2	3	4	5
10	Você sente que está ficando esquecido (a)?	1	2	3	4	5
11	Você consegue se concentrar em algumas coisas?	1	2	3	4	5
12	Você tem indisposição facilmente?	1	2	3	4	5
13	Você sente que seu raciocínio ficou mais lento?	1	2	3	4	5
14	Você mesmo consegue se encorajar para fazer alguma coisa?	1	2	3	4	5
15	Você sente tanta fadiga/cansaço que você não sabe o que fazer com você mesmo?	1	2	3	4	5

Método de cálculo

Some os números para cada fator

Fator 1 = (itens 1+ 2 + 3 + 6 + 9 + 12 + 15) – 7[P.] (sub-escala física)

Fator 2 = 20 – (itens 5+ 8 + 11 + 14) [P.] (sub-escala afetiva)

Fator 3 = (itens 4 + 7 + 10 + 13) – 4 [P.] (sub-escala cognitiva)

Some todos os fatores [P.] (pontuação total)

*subtraçoes ajuste para 0 para condição de 'sem fadiga'.

Fig. 1. B-CFS validated and culturally adapted to the Brazilian language. *Brazilian—Cancer Fatigue Scale* (B-CFS) Esse questionário contém perguntas sobre sensações de fadiga/cansaço que você possa estar sentindo. Para cada questão, por favor, circule apenas um número que melhor descreva sua condição atual. Tente responder baseado em sua primeira impressão, sem pensar profundamente sobre cada questão.

analyses were conducted using intraclass correlation coefficients (ICCs) with 95% CIs and agreement was analyzed by the method proposed by Bland-Altman. The following criteria[24] were used to interpret the ICC <0.40 as poor, ≤0.75 as moderate, and > 0.75 as excellent.

The suitability of the scale was initially tested by the Kaiser-Meyer-Olkin test (>0.50) and the Bartlett Sphericity Test ($P < 0.05$). The confirmatory factor analysis followed the procedure used by the instrument's founder,[14] so that the factor extraction method used was the main components with Varimax rotation, whereas the internal consistency of the subscales was measured by Cronbach's alpha. Values between 0.70 and 0.90 were considered good and greater than 0.90 were considered excellent.[22]

Finally, the participants filled out the Brazilian version of another instruments to evaluate the validity (construct, convergent, and divergent) using Pearson's correlation coefficient. The magnitude scale[25] used to interpret the correlation coefficient was considered: $r < 0.1$ = trivial; 0.1−0.29 = small; 0.30−0.49 = moderate; 0.50−0.69 = high; 0.70−0.90 = very high and $r > 0.90$ = almost perfect.

The Brazilian version of Piper Fatigue Scale−Revised[26] was used to test the construct validity. The pain intensity measured with the Verbal Numerical Rating Scale (VNRS-11)[27] and depression measured with the Brazilian version of the Beck Depression Inventory[28] were used to test the convergent validity. And finally, the Karnofsky Performance Scale[29] was used to test divergent validity of the Brazilian CFS.

Results

Translation and Cross-Cultural Adaptation

Some discrepancies between the original version and those analyzed by the committee were observed during the translation and back-translation process. These discrepancies were solved by means of strategies on how addition, omission, or word substitution in an attempt to search for semantic, conceptual, idiomatic, and experimental equivalence.

With these strategies, it was possible to generate equality in expression in Brazilian language. All the modifications were performed before pretesting with 33 participants. Less than 20% (ranging from 0% to 18.1%) of the participants demonstrated difficulties in understanding each of the questions, not further indicating the need for revision.

Reliability, Internal Consistency, and Validity

The study included 151 participants. Table 1 shows the sociodemographic and clinical characteristics of the sample.

Table 1
Characteristics of the Study Participants ($N = 151$)

Variable	*n* (%)
Marital status	
Married	78 (51.7)
Single	33 (21.9)
Divorced	14 (9.3)
Separated	12 (7.9)
Widow	8 (5.3)
Stable union	6 (4.0)
Age in yrs (mean ± standard error)	49.4 ± 9.2
Schooling	
Incomplete middle school	29 (19.2)
Complete middle school	21 (13.9)
Incomplete high school	21 (13.9)
Complete high school	51 (33.8)
Incomplete higher school	3 (2.0)
Graduated	26 (17.2)
Clinical diagnosis	
Unilateral breast cancer	129 (85.4)
Bilateral breast cancer	4 (2.6)
No diagnosis described in medical records	18 (12)
Histopathological diagnosis	
Invasive ductal carcinoma	84 (55.6)
Invasive lobular carcinoma	14 (9.3)
Invasive lobular duct	3 (2.0)
Low differentiated adenocarcinoma	3 (2.0)
Mucinous carcinoma	2 (1.3)
No diagnosis described in medical records	45 (29.9)
Diagnostic time in months (mean ± standard error)	22.1 ± 36.5

The reliability and concordance results of the intra-examiner and interexaminer tests are presented in Table 2. The results indicate high reliability (ICC = 0.95 and 0.98, respectively) and good agreement by Bland-Altman (differences close to zero).

The suitability of the scale was evaluated using a factor analysis with a Varimax rotation following the procedure used by the instrument's founder. The fit of the model was examined through the assumptions of factor analysis. Thus, the Kaiser-Meyer-Olkin value was found to be 0.867 and considered to be satisfactory. In addition, Bartlett Sphericity Test ($\chi^2 = 827.03$; g.l.: 105; $P < 0.000$) pointed to the adequacy of the data for conducting the factorial analysis. Then, the B-CFS extracted three components similar to the original fatigue scale. After the removal of an item that presented an unsatisfactory factorial load (Item 4 of the cognitive subscale),

Table 2
Results of Reliability and Concordance of Intraexaminer and Interexaminer Test ($N = 151$)

Reliability and Concordance	ICC		Bland-Altman		
	ICC	95% IC	$\overline{d}$	95% CI of $\overline{d}$	SD of $\overline{d}$
Intraexaminer	0.95	0.94, 0.97	−0.75	−1.53, 0.30	4.83
Interexaminer	0.98	0.97, 0.99	−0.13	−0.63, 0.38	3.16

ICC = intraclass correlation coefficient; $\overline{d}$ = bias difference between the two measures; SD of $\overline{d}$ = standard deviation mean difference.

the three factors presented a delimited factorial distribution, each with at least three items, with its three eigenvalues greater than 1 (see Table 3), being considered a cutoff point of 0.40 for factorial loads, both in relation to the proximity of the items in the analysis and adherence to the theory. These factors corresponded to the physical (eigenvalue = 3.915), affective (eigenvalue = 2.305), and cognitive (eigenvalue = 2.107) subscales that explained a total of 59.4% of the variance. Items 1, 2, 3, 6, 9, 12, and 15 loaded on the physical subscale exactly as the original version. The same applied to the affective subscale was constructed with Items 5, 8, 11, and 14. However, Items 7, 10, and 13 loaded on the cognitive subscale, meaning that only Item 4 was excluded. This means that three dimensions of the original fatigue scale appeared to also be present in Brazilian version. Furthermore, each subscale had a good internal consistency, with Cronbach's alpha above 0.70.

The B-CFS total and subscale scores were tested with Piper Fatigue Scale—Revised for its correlation with the construct validity (Table 4). All correlations were found to be positive and significant ($P < 0.01$) with high or moderate magnitude.

Convergent validity was demonstrated between the B-CFS scores with depression ($r = 0.590$) and high association with pain ($r = 0.302$). However, negative correlations were found with functional impairment by Karnofsky Performance Scale, which shows the divergent validity with moderate magnitude coefficient ($r = -0.324$).

Table 3
Factor Loading Pattern (Followed by Varimax Rotation) of the Cancer Fatigue Scale in Validation Phase ($N = 151$)

Item Number and Content of B-CFS	Factor Loading		
	Physical[a]	Affective[b]	Cognitive[c]
1. Do you become tired easily?	**0.765**	−0.019	0.207
2. Do you have the urge to lie down?	**0.747**	−0.094	0.209
3. Do you feel exhausted?	**0.742**	−0.051	0.292
6. Does your body feel heavy and tired?	**0.771**	−0.023	0.130
9. Do you feel fed-up?	**0.672**	−0.184	0.003
12. Do you feel reluctant?	**0.598**	−0.162	0.232
15. Do you feel such fatigue that you don't know what to do with yourself?	**0.717**	−0.203	0.123
5. Do you feel energetic?	−0.170	**0.762**	0.065
8. Do you feel interest in anything?	−0.180	**0.746**	−0.025
11. Can you concentrate on certain things?	−0.044	**0.651**	−0.300
14. Can you encourage yourself to do anything?	−0.041	**0.763**	−0.213
7. Do you feel that you more often make errors while speaking?	0.130	−0.126	**0.793**
10. Do you feel you have become forgetful?	0.387	−0.095	**0.681**
13. Do you feel that your thinking has become slower?	0.268	−0.149	**0.786**
Eigenvalues	**3.915**	**2.305**	**2.107**
Percentage of variance explained (%)	**27.96**	**18.46**	**15.05**
Cronbach's alpha coefficient	**0.87**	**0.71**	**0.75**

Bold values suggest that this item has been uploaded to the respective domain of the corresponding column.
[a]Physical aspect of fatigue.
[b]Affective aspect of fatigue.
[c]Cognitive aspect of fatigue.

Discussion

The B-CFS validation process followed strictly the steps of internationally recognized guidelines,[21] resulting in the development of a valuable tool for health care professionals who need to screen or investigate possible clinical signs of cancer. Thus, the questionnaire followed the criteria recommended by the idealizer,[14] being objective, reliable, and valid in Brazilian patients with breast cancer.

Differences were identified in the translation and cross-cultural adaptation phase, which were discussed among the translators and committee of specialists to establish solutions. Because of the cultural and linguistic discrepancy between the different countries, it was necessary to use strategies such as substitution, addition, or withdrawal of words or expressions after thorough discussion on the choice of the best term.

These adjustments may be associated with the inherent complexity of the study sample because they are characterized by low schooling and advanced age, where it was often necessary to read the questions more on time so that the participants had a clear perception of what was being questioned.

Table 4
Correlation Coefficients Between Brazilian Cancer Fatigue Scale (B-CFS) and Piper Fatigue Scale (PFS) Revised, Verbal Numerical Rating Scale, Beck Depression Inventory, and Karnofsky Performance Scale

Instrument (Rated Construct)	B-CFS			
	Physical	Affective	Cognitive	Total
Piper Fatigue Scale Revised (fatigue)	0.651[a]	0.328[a]	0.479[a]	0.643[a]
Verbal Numerical Rating Scale (pain)	0.327[a]	0.035	0.303[a]	0.302[a]
Beck Depression Inventory (depression)	0.538[a]	0.346[a]	0.506[a]	0.590[a]
Karnofsky Performance Scale (functional capacity)	−0.306[a]	−0.182[b]	−0.265[a]	−0.324[a]

[a]$P < 0.01$ Pearson correlation.
[b]$P < 0.05$ Pearson correlation.

Furthermore, emotional factors related to the health condition should also be considered because the different phases of the disease bring different perceptions and sensations of the symptoms to the individual and may affect, even if indirectly, their comprehension and response.

Therefore, these procedures have made the content of B-CFS closer to the Brazilian reality because we interpret strictly the meaning of each item associated with fatigue and adapt it to reduce the criticism regarding the cross-cultural differences as presented in other versions of different languages.

After the transcultural adjustments, the analysis resulted in a three-dimensional instrument with the physical, cognitive, and affective subscales, according to the original version.[14] In the same way, we observed strong correlations of the three subscales, indicating that fatigue is a multidimensional phenomenon requiring an enlarged view.

Similar to the original version, some B-CFS items were loaded for two factors and because of the strong correlation between physical and cognitive subscales, some aspects of these factors could overlap. Then, as the author of the scale suggests, in the score the result of Item 4 is reduced, so it can be concluded that this item does not influence the cognitive subscale.

In this way, internal consistency, retest reliability, and correlations were found and were satisfactory, similar to the original version.[14] We found positive and high correlation coefficients between the B-CFS and PFS, VNRS-11 and Beck Depression Inventory. When related to the Karnofsky Scale, there was a negative moderate correlation between fatigue and functional capacity, so that the greater the participant's fatigue, the lower his score. Overall, the Brazilian version of the CFS appeared to be a valid and reliable scale in the assessment of CRF in patients with breast cancer.

Similar results were found in validation studies of the Brazilian versions of "Fatigue Pictogram"[30] and "Piper's Fatigue Scale Revised."[26] However, PFS has a large number of assessed dimensions (temporal, intensity, cognitive, behavioral, affective, and sensory), which makes it expensive, impractical, and unfeasible to be applied in the clinical routine.[7] By contrast, B-CFS is objective, compact, brief, and easy to complete. Furthermore, the results cited here ensure that this scale provides the need to evaluate different dimensions of CRF.

Conclusion

This is the first validation study of the CFS in Brazilian version and warrants its use for the identification and evaluation of cancer-related fatigue in Brazilian patients with breast cancer.

Disclosures and Acknowledgments

The authors have no conflicts of interest to disclose. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Weis J, Tomaszewski KA, Hammerlid E, et al. EORTC quality of life Group. International psychometric validation of an EORTC quality of life Module measuring cancer related fatigue (EORTC QLQ-FA12). J Natl Cancer Inst 2017;109, https://doi.org/10.1093/jnci/djw273.

2. Berger A, Mooney K, Banerjee C, et al. Cancer-related fatigue. NCCN Clin Pract Guidel Oncol 2018;2:1–52.

3. Gerber LH. Cancer-Related Fatigue: persistent, pervasive, and problematic. Phys Med Rehabil Clin N Am 2017;28:65–88.

4. Tabrizi FM, Alizadeh S. Cancer related fatigue in breast cancer survivors: in correlation to demographic factors. Maedica (Buchar) 2017;12:106–111.

5. Ebede CC, Jang Y, Escalante CP. Cancer-related fatigue in cancer Surivorship. Med Clin N Am 2017;101:1085–1097.

6. Bower JE, Bak K, Berger A, et al. Screening, assessment, and management of fatigue in adult survivors of cancer: an American Society of Clinical Oncology clinical practice guideline adaptation. J Clin Onc 2014;32:1840–1850.

7. Minton O, Stone P. A systematic review of the scales used for the measurement of cancer-related fatigue (CRF). Ann Oncol 2009;20:17–25.

8. Seyidova-Khoshkanbi D, Davis MP, Walsh D. Review article: a systematic review of cancer-related fatigue measurement questionnaires. Am J Hosp Palliat Care 2011;28:119–129.

9. Mendoza TR, Wang XS, Cleeland CS, et al. The rapid assessment of fatigue severity in cancer patients: use of the Brief Fatigue Inventory. Cancer 1999;85:1186–1196.

10. Cho HJ, Costa E, Menezes PR, Chalder T, Bhugra D, Wessely S. Cross-cultural validation of the Chalder fatigue questionnaire in Brazilian primary care. J Psychosom Res 2007;62:301–304.

11. Ishikawa NM, Thuler LC, Giglio AG, Baldotto CSR, Andrade CJC, Derchain SF. Validation of the Portuguese version of functional assessment of cancer Therapy-fatigue (FACT-F) in Brazilian cancer patients. Support Care Cancer 2010;18:481–490.

12. Shun SC, Beck SL, Pett MA, Berry PH. Psychometric testing of three Chinese fatigue instruments in Taiwan. J Pain Symptom Manage 2006;32:155–167.

13. Kröz M, Zerm R, Reif M, et al. Validation of the German version of the cancer fatigue scale (CFS-D). Eur J Cancer Care (Engl) 2008;17:33–41.

14. Okuyama T, Akechi T, Kugaya A, et al. Development and validation of the Cancer Fatigue Scale: a brief, three-dimensional, self-rating scale for assessment of fatigue in cancer patients. J Pain Symptom Manage 2000;19:5–14.

15. Montazeri A, Haghighat S, Ebrahimi M. The Cancer Fatigue Scale (CFS): translation and validation study of the Iranian version. Qual Life Res 2005;14:2132.

16. Charalambous A, Kaite C, Constantinou M, Kouta C. Translation and validation of the Cancer-Related Fatigue Scale in Greek in a sample of patients with advanced prostate cancer. BMJ Open 2016;6:3011798.

17. Sahin S, Huri M, Aran OT, Uyanik M. Cross-cultural adaptation, reliability, and validity of the Turkish version of the Cancer Fatigue Scale in patients with breast cancer. Turk J Med Sci 2018;48:124–130.

18. Baresari ZB, Abbaszadeh A, Heydarirad G, Khabazkhoob M. The psychometrics of the Persian version of the "cancer fatigue scale" in Iran. Erasia J Biosci 2018; 12:149–156.

19. Okuyama T, Tanaka A, Akechi T, et al. Fatigue in ambulatory patients with advanced lung cancer: prevalence, correlated factors, and screening. J Pain Symptom Manage 2001;22:554–564.

20. Brucki SMD, Nitrini R, Caramelli P, Bertolucci PHF, Okamoto IH. Sugestões para o uso do mini-exame do estado mental no Brasil. Arq Neuropsiquiatr 2003;61:777–781.

21. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guideline for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976) 2000;25: 3186–3191.

22. Terwee CB, Bot SD, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007;60:34–42.

23. Mokkink LB, Prinsen CA, Bouter LM, Vet HC, Terwee CB. The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) and how to select an outcome measurement instrument. Braz J Phys Ther 2016;20:105–113.

24. Portney LG, Watkins MP. Foundations of clinical research: Applications to practice. Upper Saddle River. New York: Pearson/Prentice Hall, 2009:892. xix.

25. Hopkins WG. Measures of reliability in sports medicine and Science. Sports Med 2000;30:1–15.

26. Mota DD, Pimenta CA, Piper BF. Fatigue in Brazilian cancer patients, caregivers, and nursing students: a psychometric validation study of the Piper Fatigue Scale-Revised. Support Care Cancer 2009;17:645–652.

27. Hjermstad MJ, Fayers PM, Haugen DF, et al. European Palliative care research Collaborative (EPCRC). Studies comparing Numerical rating scales, Verbal rating scales, and Visual Analogue scales for assessment of pain intensity in adults: a systematic literature review. J Pain Symptom Manage 2011;41:1073–1093.

28. Gorenstein C, Andrade L. Validation of a Portuguese version of the Beck depression inventory and the State-Trait Anxiety inventory in Brazilian subjects. Braz J Med Biol Res 1996;29:453–457.

29. Karnofsky DA, Burchenal JH. The clinical evaluation of chemotherapyc agents in cancer. In: Mc Leod CM, ed. Evaluation of Chemoterapic Agents. New York: Columbia University Press, 1949:191–205.

30. Mota DDCF, Pimenta CAM, Fitch MI. Pictograma de Fadiga: uma alternativa para avaliação da intensidade e impacto da fadiga. Rev Esc Enferm USP 2009;43:1080–1087.