Short communication

Cross-cultural validation of the Chalder Fatigue Questionnaire in Brazilian primary care

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Abstract

Objective: The Chalder Fatigue Questionnaire (CFQ) is an instrument used to measure physical and mental fatigue. We translated and adapted the questionnaire and tested its reliability and validity in a Brazilian primary care setting. **Method:** A pilot study with 204 consecutive primary care attenders in Sao Paulo, Brazil, verified the internal consistency and factor structure of the questionnaire. After some modifications through a rigorous translation, back-translation, and cross-cultural adaptation procedure, a validation study was conducted with 304 attenders, who also completed the fatigue section of the Revised Clinical Interview Schedule (CIS-R). **Results:** The internal consistency of the Brazilian CFQ slightly improved from the pilot to the validation study: Cronbach's alpha from .86 to .88. The two-factor structure (physical and mental fatigue) also improved. According to the receiver operating curve analysis with the fatigue section of the CIS-R as the standard criterion, 3/4 was chosen as the cutoff for Brazilian primary care (sensitivity 69.1% and specificity 79.4%). **Conclusion:** The Brazilian CFQ had good reliability and validity. The cutoff was determined as 3/4 and the factor structure of the English CFQ was closely reproduced.

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Introduction

Chronic fatigue syndrome (CFS) is characterized by severe physical and mental fatigue, physical and mental fatigability occurring after minimal activity, and other accompanying symptoms, which cannot be explained by any other medical condition and have persisted for at least 6 months [1]. The Chalder Fatigue Questionnaire (CFQ) has been developed and widely used either to measure the severity of fatigue or as an aid for assessing patients with CFS [2]. The original validation work reported the scale to be both reliable and valid with a high degree of internal consistency and a two-factor structure (physical and mental fatigue) [2]. The CFQ has been used in Brazil but had not been validated in that setting [3,4]. As preliminary steps for a cross-cultural study of CFS in Brazil and the United Kingdom (UK) [5], a pilot study was conducted in 2001 to verify the feasibility of the main study and provide data on the internal consistency and factor structure of the Brazilian version of the CFQ. A formal validation study for the Brazilian CFQ was conducted in July and August 2003. We report here the results of the pilot and the validation studies.

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Method

Translation, back-translation, and cross-cultural adaptation

Previous versions of the CFQ used in Brazil have not been formally validated. Hence, a properly designed validation study was conducted in 2003, following a published guideline on cross-cultural adaptation of health-related measures [6]. Two sets of translations and back-translations of the CFQ were prepared. One translator was a Brazilian psychiatrist (H.J.C.), who had translated the original English version into Portuguese for the pilot study in 2001 and improved the 2001 version according to the pilot study results. The other was a bilingual Brazilian psychologist. The two back-translators were English teachers of British origin who had been living in Brazil for many years. Except for H.J.C., all of them were unaware of the intent and the concepts underlying the material. Consequently, there were two back-translations. Each of them was compared against the original questionnaire by a native British psychiatrist, who drew attention to semantic issues. Finally, a panel of three Brazilian psychiatrists was organized to prepare the penultimate version of the questionnaire. Comprehensibility and appropriateness of the language in the Brazilian cultural context were emphasized for the translation and cross-cultural adaptation procedure. For example, it was noted that a proportion of Brazilian patients associated the word "tiredness" (cansaço) with breathlessness due to exertion. Hence, the first item of the questionnaire "Do you have problems with tiredness?" was translated into "Do you have problems with tiredness or weakness? (Você tem problema de cansaço ou fraqueza?)" in order to avoid ambiguity. The pretest involved five primary care patients in Sao Paulo in July 2003. They filled in the penultimate version and were asked probing questions such as "What do you mean by that response?" in regard to items answered affirmatively. According to the results of the pretest, the final version for the validation study was prepared.

Subjects

The pilot study comprised 207 consecutive attenders at four general practices across Sao Paulo. The age range was limited to 18–45 years because of the increasing prevalence of medically explained fatigue in older age groups. Three responders had missing data and were excluded from the analysis. The validation study involved 304 consecutive attenders at two general practices in southwest Sao Paulo aged between 18 and 45 years.

Procedure

For the 2001 pilot study, after signing a brief informed consent, the participants completed the CFQ and the 12-item General Health Questionnaire (GHQ-12) [7]. The questionnaires were read out to the illiterate and functionally illiterate participants. For the 2003 validation study, we followed the same procedure and conducted an additional interview using the fatigue section of the Revised Clinical Interview Schedule (CIS-R) [8], against which the Brazilian CFQ was validated following the method used for the original version of the CFQ [2]. The content of the CIS-R fatigue section is reasonably neutral culturally speaking, avoiding etiological assumptions or culturally biased concepts of fatigue. Hence, the use of the CIS-R fatigue section should not affect the cultural sensitivity of the interview. The Brazilian version of the CIS-R has been tested for the feasibility and recurrently used [9,10].

Analysis

From the participants of the pilot (n=204) and the validation (n=304) studies, internal consistency was measured by Cronbach's alpha [11]. A principal component analysis followed by a varimax rotation was carried out with the items of the CFQ. The sensitivity and specificity were calculated for all possible cutoff points in a receiver operating characteristic (ROC) analysis of the participants of the validation study, with the CIS-R fatigue section as the standard criterion.

Results

Internal consistency

Data from the pilot study showed a high degree of internal consistency with a Cronbach's alpha of .86 (Table 1). The same was true for the validation study (α=.88).

Principal component analyses

The principal component analysis of the pilot study data suggested a two-dimensional solution with two factors presenting an eigenvalue of 1 or more (4.59 and 1.36),

Table 1
Comparison of the internal consistency and the ROC analysis between the pilot study, the validation study, and the Chalder et al. study [2]

	Pilot study	Validation study	Chalder et al. [2]
N (participants)	204	304	100
Cronbach's alpha	.86	.88	.89
Cutoff point	–	3/4	3/4
Sensitivity	–	69.1	75.5
Specificity	–	79.4	74.5
AUROC	–	0.84	0.85
Items included	11	11	14

Table 2
Results of the principal components analysis using the CFQ (after rotation)

	Pilot study (*N*=204)		Validation study (*N*=304)	
Item	I	II	I	II
1. Do you have problems with tiredness?	0.777		0.694	
2. Do you need to rest more?	0.792		0.730	
3. Do you feel sleepy or drowsy?	0.617		0.671	
4. Do you have problems starting things?	0.447	0.447	0.701	
5. Do you lack energy?	0.670		0.779	
6. Do you have less strength in your muscles?	0.602		0.681	
7. Do you feel week?	0.738		0.748	
8. Do you have difficulty concentrating?	0.515	0.402		0.705
9. Do you make slips of the tongue when speaking?		0.796		0.836
10. Do you find it more difficult to find the correct word?		0.849		0.792
11. How is your memory?	0.487	0.478		0.690

but three items loading into both factors (Table 2). The first two principal components accounted for 54.2% of the variance. The validation data suggested the same two-dimensional solution as the original English version with all the items clearly loading into one of the two dimensions. The first principal component accounted for 46.0% of the variance and the other factors descending from 12.8% to 2.4%. Therefore, the first two components accounted for 58.8% of the variance with the eigenvalues of 5.06 and 1.41.

Criterion validity of the CFQ with the CIS-R

The results of the ROC analysis are reported in Table 1. The CFQ discriminated well between those with and without substantial fatigue in the participants of the validation study [area under the ROC curve (AUROC) in CFQ=0.84]. The optimal cutoff point was theoretically 2/3 (three or more as cases of substantial fatigue) with sensitivity of 79.1% and specificity of 69.1%. Actually, the ROC analysis gave not only 2/3 but also 3/4 (sensitivity 69.1% and specificity 79.4%) as the best compromise of sensitivity and specificity since the two values present a "mirror image" of sensitivity and specificity.

Discussion

An appropriate validation of a psychometric instrument is an essential step before carrying out any research study. It is even more so when the study is cross-cultural in nature. Hence, we went through a rigorous process of an initial pilot study, translation, back-translation, cross-cultural adaptation, and, finally, a validation study. As a result, the internal

consistency and factor structure of the Brazilian CFQ closely matched the original English version. Internal consistency measured by Cronbach's alpha improved from the pilot study (α=.86) to the validation study (α=.88). The factor structure and the AUROC from the latter showed a clear resemblance to those from the original validation work.

Concerning the cutoff score, the optimum value according to the criterion of maximum specificity without allowing it to exceed sensitivity was theoretically 2/3. The original version presented 3/4 as the best compromise for the cutoff score [2]. However, it should be noted that this cutoff resulted from the ROC analysis including 14 items. The original 14-item CFQ was refined into an 11-item version, which was found to be both reliable and valid despite its brevity. The revised 11-item version was adopted by subsequent researchers but the score 3/4 derived from the 14-item version continued to be used. The theoretical cutoff of the current study was 2/3 probably because it was derived from the 11-item version. This seems even more convincing since the score 3/4 was actually a mirror image of the 2/3 in terms of the specificity and sensitivity. We speculate that a reanalysis of the original validation work may reveal a similar result. Given this observation and also because 3/4 has been constantly used in most CFS studies, this score was chosen as the cutoff for Brazilian primary care.

The current studies are subject to several limitations. The major problem is probably the adoption of an "etic" procedure to study a non-Western society such as Brazil. However, since the objective of the main study [5] was a direct and close comparison between Brazil and the UK, an etic procedure was inevitable. Moreover, an "emic" procedure, which means development of a new scale in the Brazilian setting and its reversed validation in the UK, was not feasible under the current circumstances and would face the same problem in a reversed way. Another possible limitation is the external validity of the Brazilian CFQ since the studies were conducted only in a few general practices in Sao Paulo, which may not be representative of the primary care system either of the city or of the country. Finally, despite the existence of a feasibility study and subsequent studies using the Brazilian version of the CIS-R [9,10], we are unaware of its formal validation study and hence adopting this tool as the criterion standard is a limitation.

In conclusion, the Brazilian CFQ had good reliability and validity, which had improved during the process of transcultural adaptation and validation.

Acknowledgments

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