ORIGINAL ARTICLE

A Brazilian Portuguese version of the Revised Fibromyalgia Impact Questionnaire (FIQR): a validation study

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Abstract The Fibromyalgia Impact Questionnaire (FIQ) was specifically developed to assess disease severity and functional ability in fibromyalgia patients. In 2009, a revised version of the FIQ was published, the FIQR; this version achieved a better balance among different domains (function, overall impact, symptoms). Here, we present the validity and reliability of the Brazilian version of the Revised Fibromyalgia Impact Questionnaire (FIQR). Female fibromyalgia patients ($n=106$) completed an online survey consisting of the Short Form 36 (SF-36) questionnaire, the original FIQ, and the Brazilian Portuguese FIQR, which was translated by a standard method. Validity was established with correlational analyses between the FIQR, FIQ, and SF-36 items. Three domains were established for the FIQR (function, overall impact, symptoms), and their contribution for the SF-36 subscales was also scrutinized. The Brazilian

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FIQR validation process showed that the questions performed in a very similar way to the original English FIQR. The new questions in the FIQR symptoms domain (memory, balance, tenderness, and environmental sensitivity) revealed a significant impact in fibromyalgia (FM) patients. The Brazilian Portuguese FIQR demonstrated excellent reliability, with a Cronbach's alpha of 0.96. There was a gain on weight of the function domain and a decrease of the symptom domain, leading to a better balance among domains. The FIQR predicted a great number of SF-36 subscales, showing good convergent validity. The Brazilian Portuguese version of the FIQR was validated and found to be a reliable, easy-to-use, and score FM-specific questionnaire that should prove useful in routine clinical practice and FM-related research.

Introduction

The Fibromyalgia Impact Questionnaire (FIQ) was first published in 1991 [1] and became one of the most widely used instruments for assessing functional capacity in fibromyalgia (FM) studies and clinical practice. It was validated in Brazilian Portuguese and Portugal Portuguese only in 2006 [2, 3], but it was available in several non-validated translations in Brazilian Portuguese since the 1990s.

After nearly 20 years of using the original FIQ, it became increasingly evident that several symptoms such as tenderness, balance, environmental sensitivity, and cognitive problems, which are now accepted as being common problems in FM subjects, were a needed addition to the FIQ. Furthermore, the first domain of the original FIQ (function) was based on the experience of researchers at Oregon Health & Science University (OHSU) in the USA, who saw mainly middle-class Caucasians. As investigators from other countries started to use the questionnaire, it became clear that the "function" domain was not relevant to many of their patients. For instance, driving a car or using a washer and dryer may not be pertinent to patients in less developed nations. These deficiencies, as well as the arcane scoring of the original FIQ, motivated the OHSU fibromyalgia research group to develop the Revised Fibromyalgia Impact Questionnaire (FIQR) that was first published in 2009 [4, 5].

The FIQR is starting to be used in contemporary FM research, and translations of the questionnaire into Moroccan and Turkish have recently been published [6, 7]. The aim of this paper is to report on the validity and reliability of the Brazilian Portuguese version of the Revised Fibromyalgia Impact Questionnaire.

Materials and methods

The main objective of this paper was to validate the FIQR for the Portuguese language, using the same methodology utilized in the original 2009 FIQR paper [4] by comparing it with the original Portuguese FIQ and with the Portuguese Short Form 36 (SF-36). The 2009 paper showed that the English version of FIQR performed as well as the original FIQ, with some advantages in scoring and weight distribution and with good discriminatory validity (it was compared using different group of patients as well as heath controls). Thus, in this paper, we have limited our analysis to the cultural and linguistic aspects of the FIQR, assuming that the new questionnaire possessed similar operating properties to the FIQ, as observed in the 2009 paper.

The English FIQR items were first translated to Portuguese by a group discussion among the authors, the FIQR was shown to be very comprehensive, and the questions were very well understood during a pilot run of 20 questionnaires. All authors are bilingual and very experienced with FM patients and with the FIQ. Questions were then sent to an American English teacher, who back-translated them into English. The resulting questions were again evaluated by the authors, and the final result was applied.

Patients were selected in FM clinics of different centers, mainly universities. As in the original FIQR paper, SurveyMonkey (Portland, OR), an online-based platform, was used to administer the questionnaires. All questions and explanations were given in Brazilian Portuguese. Patients could not move to the next page if the current page was not completed, thus ensuring completion of all questions. As this was an online survey, the subjects were entered in a random consecutive manner by the program.

The first survey pages contained the consent form, an explanation about the questionnaires and epidemiologic data. Then, the FIQR questions were presented, followed by the SF-36, and lastly the original FIQ. The SF-36 is a well-validated instrument, with a formal translation to Brazilian Portuguese [8, 9], that measures health-related quality of life [9] and was used to help in the validation of the FIQR domains.

The FIQR is composed of 21 items, divided into three domains. All questions are presented as 11-point numerical scales with boxes, from 0 to 10, with 10 being "the worst." Patients were instructed to frame the questions in the context of the last 7 days.

pt?>The first domain encompasses nine items related to *function*. Comparing to the original FIQ, there is one less question and all questions were adapted for a more general use. The subscore is the sum of the nine questions divided by 3 (range, 0 to 30).

The second domain concerns the *overall impact* of FM, and it contains two questions: "fibromyalgia prevented me from accomplishing goals for the week" and "I was completely

overwhelmed by my fibromyalgia symptoms." The subscore is the sum of the two questions (range, 0 to 20).

The third domain is composed of ten questions (vs. seven in the original FIQ), related to *symptoms* intensity. A question about work was dropped from the original FIQ, and four new questions were introduced, related to *memory*, *tenderness*, *balance*, and *environmental sensitivity*. The subscore is the sum of questions divided by 2 (range 0 to 50).

The final FIQR score is the sum of the subscores of the three domains (maximum, 30+20+50=100). The relative weights were therefore modified from the original FIQ, with 30 % for function and 50 % for symptoms compared to 10 and 70 % of the original, respectively. The weight of the general impact remained 20 % [4].

Subjects

Female patients with FM were recruited from eight different centers in Brazil. After consenting, all subjects were entered consecutively into an online database using SurveyMonkey.

Table 1 FIQR question values: means, medians, SDs, 95 % confidence intervals, correlations, and score range in 106 FM subjects

	Mean	Median	Std. Dev.	95 % CI	95 % CI	Correlation with total FIQRscore	Range
1A Escovar ou pentear os cabelos (Brush or comb your hair)	3.0	2	3.1	2.4	3.6	0.64	0–10
1B Caminhar por 20 minutos sem parar (Walk continously for 20 minutes)	5.1	5	3.7	4.4	5.8	0.73	0–10
1C Preparar uma refeição caseira (Prepare a homemade meal)	4.0	4	3.3	3.3	4.6	0.70	0–10
1D Passar o aspirador de pó ou esfregar ou varrer o chão (Vacuum. scrub or sweep floors)	6.1	7	3.5	5.4	6.7	0.73	0–10
1E Levantar e carregar uma sacola de mercado cheia (Lift and carry a bag full of groceries)	6.5	8	3.4	5.8	7.2	0.81	0–10
1F Subir um lance de escadas (Climb one flight of stairs)	5.5	6	3.6	4.8	6.2	0.78	0–10
1G Trocar a roupa de cama (Change bed sheets)	5.1	5	3.6	4.4	5.8	0.77	0–10
1H Ficar sentado(a) continuamente por 45 minutos (Sit in a chair for 45 minutes)	6.2	8	3.6	5.5	6.9	0.81	0–10
1I Sair para compras de comida ou de roupas (Go shopping for groceries)	5.7	7	3.4	5.0	6.4	0.84	0–10
Function subscore	**15.7**	**17**	**8.6**	**14.1**	**17.4**	**0.92**	**0–30**
2. Fui impedido(a) de finalizar a maioria de minhas tarefas/objetivos da semana (Fibromyalgia prevented me from accomplishing goals for the week)	5.7	6	3.5	5.0	6.3	0.86	0–10
3. Senti-me totalmente dominado(a) pelos meus sintomas de fibromialgia (I was completely overwhelmed by my fibromialgia symptoms)	6.3	7	3.3	5.7	7.0	0.87	0–10
Overall impact subscore	**12.0**	**13**	**6.4**	**10.8**	**13.2**	**0.92**	**0–20**
4. Por favor, avalie de zero a dez o seu nível de dor (Please rate your level of pain)	7.3	8	2.3	6.9	7.8	0.79	0–10
5. Por favor, avalie de zero a dez o seu grau de disposição (Please rate your level of energy)	6.5	7	2.7	6.0	7.0	0.66	0–10
6. Por favor, avalie de zero a dez a rigidez do seu corpo (Please rate your level of stiffness)	6.7	7	2.9	6.2	7.3	0.83	0–10
7. Por favor, avalie de zero a dez o seu sono (Please rate the quality of your sleep)	7.3	8	2.7	6.8	7.8	0.68	0–10
8. Por favor, avalie de zero a dez o seu nível de depressão (Please rate your level of depression)	6.2	7	3.4	5.6	6.9	0.80	0–10
9. Por favor, avalie de zero a dez o seu nível de memória (Please rate your level of memory problems)	6.4	7	2.8	5.8	6.9	0.69	0–10
10. Por favor, avalie de zero a dez seu nível de ansiedade (Please rate your level of anxiety)	7.4	8	2.6	6.9	7.9	0.73	0–10
11. Por favor, avalie de zero a dez o seu nível de sensibilidade à dor (Please rate your level of tenderness to touch)	7.5	8	2.7	7.0	8.0	0.79	0–10
12. Por favor, avalie de zero a dez o seu nível de equilíbrio (Please rate your level of balance problems)	4.9	5	3.1	4.3	5.5	0.69	0–10
13. Por favor, avalie de zero a dez o seu nível de sensibilidade, levando em consideração: ruídos altos, luzes fortes, cheiros ou o frio (Please rate your level of sensitivity to loud noises, bright lights, odors, and cold)	6.7	8	3.2	6.1	7.3	0.71	0–10
Symptom subscore	**33.5**	**36**	**11.0**	**31.3**	**35.6**	**0.96**	**0–50**
FIQR total score	**61.2**	**65**	**24.3**	**56.5**	**65.9**	**–**	**0–100**

Chronbach's alpha 0.963

The only entry criterion was FM diagnosis made by a rheumatologist according to the 1990 American College of Rheumatology criteria [10].

Data analysis

Data for 106 subjects were analyzed in *STATISTICA* (version 8, Tulsa, OK). All item analysis and questionnaire properties, including domain characteristics, were evaluated using basic statistics, reliability and item analysis, and Cronbach's alpha. The Cronbach's alpha is a test for internal consistency, with the maximum value being 1. A value ≥0.7 is considered satisfactory.

Group comparisons on the mean total FIQR scores and individual FIQR items utilized one-way ANOVA and MANOVA for single and multiple dependent variables, respectively, with Tukey's HSD post hoc analyses for unequal sample sizes comparing the significance of specific means.

FIQR validity was established using correlational analyses between the FIQR, FIQ, and SF-36 items and domains. Correlations were assessed using Pearson's product–moment correlation coefficient (*r*). Based on the English FIQR study, we already had the hypotheses that correlations between the FIQR and FIQ and FIQR domains would be different than 0 and positive (in the comparison of FIQR vs. original FIQ) or negative (in the comparison of FIQR vs. SF-36). In this study, correlation coefficients (in absolute value) which are lower than 0.35 were generally considered to represent low or weak correlations, 0.36 to 0.67 modest or moderate correlations, and 0.68 to 1.0 strong or high correlations, with *r* coefficients higher than 0.90 considered very high correlations [11].

Multiple regression was used to establish convergent validity. The three FIQR domains were entered simultaneously as predictors to determine their combined contribution of variance in SF-36 subscales. Standardized regression coefficients (*β*) were calculated to evaluate the unique contribution of the three FIQR domains to the SF-36 subscales, and the partial correlation coefficients (pr) were calculated to determine the correlation of each of the three FIQR domains to the SF-36 subscales after controlling for the other two domains.

Results

The Brazilian version of the FIQR was generally well accepted by our subjects. As it was an online questionnaire, the programming did not allow for any missing data. One hundred six subjects completed the survey. The aim was to analyze 100 subjects, and the six additional subjects were added as a security margin. As there were no problems in its completion, all 106 data sets were analyzed.

All subjects were women, and the mean age was 44.45± 12.56 years. They had fibromyalgia symptoms starting 8± 7.56 years before the survey, and a formal diagnosis of FM was made 4.73±4.28 years before filling the survey.

Table 1 shows measures of central tendency, confidence intervals, and item-total correlations for each FIQR question. The mean total score was 61.2±24.3, with a median score of 65 (95 % confidence interval 56.5 to 65.9). Each question had a maximum score of 10, and the higher the score, the higher the dysfunction or symptom severity. In the first domain, function, "lifting and carrying a bag full of groceries" (6.5±3.4) has the highest score and "sitting in a chair for 45 minutes" has the second highest score (6.2±3.6). In the second domain, overall impact, the scores were 5.7±3.5 for "can't achieve goals" and 6.3±3.3 for "feeling overwhelmed." In the symptoms domain,

Fig. 1 Correlation original FIQ and FIQR (Brazilian Portuguese translations)
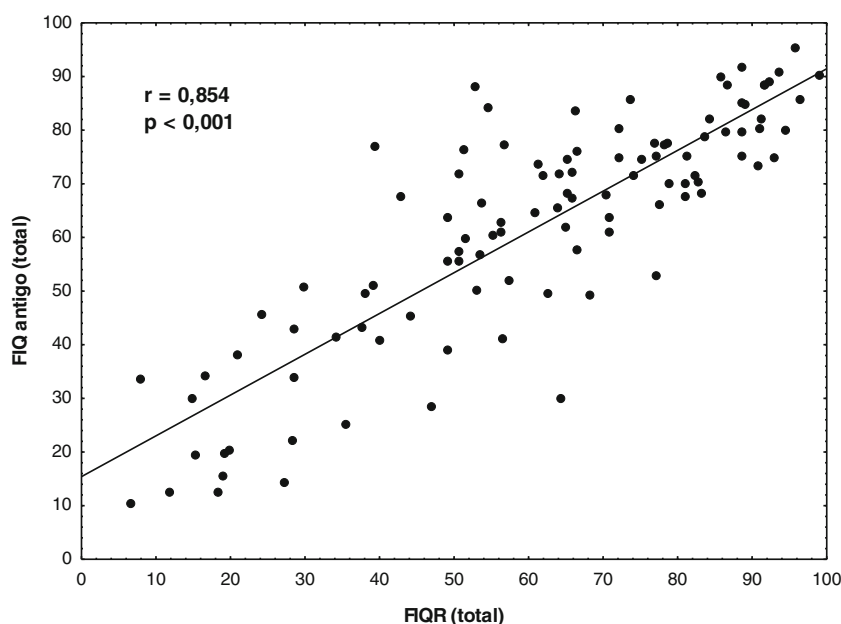
tenderness level has (7.5±2.7), followed by anxiety level (7.4± 2.6), pain level (7.3±2.3), and sleep quality (7.3±2.7). As in the original FIQR paper, the first question "difficulty for brushing or combing your hair" had the lowest score (3±3.1) and provided a baseline setting for the responses to the other questions.

In addition to tenderness (7.5±2.7), the other three new questions that also showed adequate means±SDs were memory problems (6.4±2.8), balance (4.9±3.1), and sensitivity (6.7± 3.2), indicating that these common symptoms were problematic for FM patients. Indeed, these means are strikingly similar to the original FIQR means for these symptoms: tenderness (6.9± 2.5), memory problems (5.9±2.6), balance (4.8±2.9), and sensitivity (6.2±2.9), thus providing additional validity for the inclusion of these four new items in FM assessment.

The Cronbach's alpha for the Brazilian Portuguese version of the FIQR was 0.96, which demonstrated excellent reliability. The item-total correlations ranged from 0.64 to 0.87. Each domain of the FIQR showed a good correlation with the FIQR total score: function 0.92, overall impact 0.92, and symptoms 0.96. The relative "new" questions all had a satisfactory correlation with the total FIQR score. In the first domain, the correlations were 0.64 for brushing or combing, 0.81 for carrying a bag of groceries, 0.78 for climbing a flight of stairs, and 0.81 for sitting continuously for 45 min. The four new questions in the third domain that showed the highest correlation with the total FIQR score were pain and tenderness (both 0.79), followed by environmental sensitivity (0.71) and balance and memory (both 0.69).

Compared to the original Brazilian Portuguese FIQ, the FIQR score showed a good correlation with the original FIQ score ($r=0.854$, $p<0.001$, Fig. 1). Table 2 shows the comparison of the domain weights between the FIQ and FIQR. The improvement in the function domain, a major goal of the 2009 paper, was also seen in the Brazilian version (+11.2). There was little change in the overall impact domain (2.8), and there was a decrease of the symptoms domain weight (−14.6). All of these changes led to a better balance among domains, with the Brazilian FIQR approaching the desired weights of each domain: 25.7, 19.6, and 54.7 %. Compared to the original FIQR paper, there was no difference between the FIQ and FIQR total scores (61.7 and 61.2, $p=0.5$).

Table 3 shows correlations among the three domains of the FIQ and FIQR. As the original FIQ does not have a

Table 3 Pearson correlations of major FIQ (original) domains with FIQR

	FIQ function	FIQ overall impact	FIQ symptoms
FIQR function	0.68	0.46	0.69
FIQR overall impact	0.64	0.60	0.81
FIQR symptoms	0.63	0.56	0.85

All correlations were significant at <0.001

formal overall impact domain, the sum of two questions: "How many days did you feel well?" and "How many days did you miss work?" were used. There was a strong correlation of the three domains of the FIQR. There was a weaker correlation among different domains (0.46 to 0.81).

A comparison between the Brazilian FIQR and the SF-36 scale allows estimating the FIQR convergent validity (Table 4). Note that all correlations of the FIQR with the SF-36 are negative, as the higher scores in the SF-36 indicate being in better health. In our subjects, the subscale results of the SF-36 were 45.9±23.6 for physical functioning, 21.9±35 for physical role, 32.7±40.8 for emotional role, 32.7±18.6 for vitality (energy/fatigue), 45.9±20.8 for emotional health, 43.6 ±26.4 for social functioning, 37.9±19.4 for bodily pain, and 44.3±19.5 for general health. The total FIQR score correlated best with SF-36 pain, social function, emotional health, and physical function domains ($r=-0.79$, -0.77, -0.70, and -0.68). The poorest correlation was with the emotional role subscale ($r=-0.48$). The FIQR function domain correlated well with the SF-36 physical function subscale (−0.66) and with the social function (−0.69) and bodily pain subscale (−0.68), the FIQR overall impact domain correlated best with the SF-36 bodily pain (−0.80) and social function subscales (−0.71), and the FIQR symptoms domain correlated with the SF-36 bodily pain, social function, and emotional health subscales (−0.75, −0.75, and −0.71, respectively).

Multiple regression analysis was used to analyze how well the Brazilian FIQR domain scores predict the SF-36 domains (Table 5). In contrast to the correlational analyses presented in Table 4, multiple regression analysis identified both the combined and unique variance that predictor variables contribute to a SF-36 subscale. The three FIQR domains (function, overall impact, and symptoms) were entered simultaneously into the

Table 2 Comparison of FIQR and FIQ weighting on actual and achieved domain scores. The weights in each domain were the observed (actual) means for the FIQR and FIQ domains, with the contribution of each domain presented as a percentage of the total scores

	FIQ		FIQR		Change
	Given weight	Achieved weight	Given weight	Achieved weight	
Function	10 %	4.5 (7.2 %)	30 %	15.7 (25.7 %)	11.2
Overall impact	20 %	9.2 (14.9 %)	20 %	12 (19.6 %)	2.8
Symptoms	70 %	48.1 (77.9 %)	50 %	33.5 (54.7 %)	−14.6
Total		61.8 (100 %)		61.2 (100 %)	−0.5

Table 4 FIQR Pearson correlations with SF-36 subscales

	Physical Functioning SF36	Physical role SF-36	Emotional role SF-36	Vitality (energy) SF-36	Emotional health SF-36	Social functioning SF-36	Bodily pain SF-36	General health SF-36
FIQR function								
1A Escovar ou pentear os cabelos (Brush or comb your hair)	−0.34	−0.35	−0.31	−0.37	−0.42	−0.49	−0.46	−0.30
1B Caminhar por 20 minutos sem parar (Walk continously for 20 minutes)	−0.62	−0.41	−0.30	−0.50	−0.51	−0.53	−0.52	−0.39
1C Preparar uma refeição caseira (Prepare a homemade meal)	−0.52	−0.43	−0.34	−0.41	−0.42	−0.50	−0.47	−0.33
1D Passar o aspirador de pó ou esfregar ou varrer o chão (Vacuum, scrub or sweep floors)	−0.56	−0.51	−0.35	−0.48	−0.43	−0.54	−0.57	−0.39
1E Levantar e carregar uma sacola de mercado cheia (Lift and carry a bag full of groceries)	−0.61	−0.50	−0.30	−0.51	−0.53	−0.60	−0.60	−0.45
1 F Subir um lance de escadas (Climb one flight of stairs)	−0.60	−0.39	−0.28	−0.53	−0.50	−0.55	−0.54	−0.41
1G Trocar a roupa de cama (Change bed sheets)	−0.57	−0.44	−0.20	−0.47	−0.49	−0.60	−0.61	−0.35
1H Ficar sentado(a) continuamente por 45 minutos (Sit in a chair for 45 minutes)	−0.54	−0.50	−0.31	−0.53	−0.51	−0.62	−0.65	−0.42
1 iSair para compras de comida ou de roupas (Go shopping for groceries)	−0.57	−0.56	−0.35	−0.53	−0.61	−0.69	−0.66	−0.46
Function subscore	−0.66	−0.55	−0.37	−0.58	−0.60	−0.69	−0.68	−0.47
FIQR overall impact								
2. Fui impedido(a) de finalizar a maioria de minhas tarefas/objetivos da semana (Fibromyalgia prevented me from accomplishing goals for the week)	−0.55	−0.59	−0.46	−0.58	−0.56	−0.66	−0.71	−0.38
3. Senti-me totalmente dominado(a) pelos meus sintomas de fibromialgia (I was completely overwhelmed by my fibromyalgia symptoms)	−0.52	−0.65	−0.35	−0.62	−0.64	−0.67	−0.79	−0.40
Overall impact subscore	−0.58	−0.66	−0.44	−0.64	−0.64	−0.71	−0.80	−0.42
FIQR symptoms								
4. Por favor, avalie de zero a dez o seu nível de dor (Please rate your level of pain)	−0.57	−0.54	−0.33	−0.52	−0.58	−0.55	−0.68	−0.40
5. Por favor, avalie de zero a dez o seu grau de disposição (Please rate your level of energy)	−0.43	−0.40	−0.30	−0.46	−0.44	−0.48	−0.55	−0.42
6. Por favor, avalie de zero a dez a rigidez do seu corpo (Please rate your level of stiffness)	−0.57	−0.52	−0.37	−0.52	−0.49	−0.55	−0.59	−0.43
7. Por favor, avalie de zero a dez o seu sono (Please rate the quality of your sleep)	−0.42	−0.51	−0.35	−0.53	−0.47	−0.59	−0.59	−0.26
8. Por favor, avalie de zero a dez o seu nível de depressão (Please rate your level of depression)	−0.50	−0.54	−0.51	−0.56	−0.76	−0.67	−0.61	−0.42
9. Por favor, avalie de zero a dez o seu nível de memória (Please rate your level of memory problems)	−0.51	−0.43	−0.42	−0.51	−0.53	−0.56	−0.50	−0.40
10. Por favor, avalie de zero a dez seu nível de ansiedade (Please rate your level of anxiety)	−0.42	−0.39	−0.39	−0.47	−0.56	−0.51	−0.50	−0.44
11. Por favor, avalie de zero a dez o seu nível de sensibilidade à dor (Please rate your level of tenderness to touch)	−0.63	−0.62	−0.33	−0.57	−0.60	−0.67	−0.74	−0.45
12. Por favor, avalie de zero a dez o seu nível de equilíbrio (Please rate your level of balance problems)	−0.42	−0.42	−0.37	−0.45	−0.49	−0.55	−0.46	−0.48
13. Por favor, avalie de zero a dez o seu nível de sensibilidade, levando em consideração: ruídos altos, luzes fortes, cheiros ou o frio (Please rate your level of sensitivity to loud noises, bright lights, odors, and cold)	−0.43	−0.53	−0.48	−0.51	−0.48	−0.58	−0.52	−0.36
Symptom subscore	−0.64	−0.64	−0.51	−0.67	−0.71	−0.75	−0.75	−0.53
FIQR total	−0.68	−0.66	−0.48	−0.68	−0.70	−0.77	−0.79	−0.52

All correlations were significant: $r > 0.19$, $p < 0.05$; $r > 0.25$, $p < 0.01$; $r > 0.32$, $p < 0.001$. All correlations are negative as the SF-36 scoring has an opposite direction to the FIQR

Table 5 Multiple regression analysis showing how the three FIQR domains (function, overall impact, and symptoms) predict SF-36 subscales

SF-36 subscales (dependent variable)	R and R^2 predicted by combined FIQR domains	FIQR function	FIQR overall impact	FIQR symptoms
Physical functioning	$R=0.69$§	$\beta=-0.435$‡	$\beta=0.031$	$\beta=-0.319$*
	$R^2=0.46$	pr$=-0.332$‡	pr$=0.021$	pr$=-0.203$*
Role limitation due to physical health	$R=0.68$§	$\beta=-0.010$	$\beta=-0.423$†	$\beta=-0.273$
	$R^2=0.45$	pr$=-0.008$	pr$=-0.276$†	pr$=-0.173$
Role limitation due to emotional health	$R=0.51$§	$\beta=-0.110$	$\beta=-0.033$	$\beta=-0.569$†
	$R^2=0.24$	pr$=0.075$	pr$=-0.019$	pr$=-0.299$†
Energy/fatigue	$R=0.68$§	$\beta=-0.092$	$\beta=-0.236$	$\beta=-0.396$*
	$R^2=0.45$	pr$=-0.074$	pr$=-0.159$	pr$=-0.246$*
Emotional well-being	$R=0.71$§	$\beta=-0.070$	$\beta=-0.120$	$\beta=-0.550$‡
	$R^2=0.49$	pr$=-0.058$	pr$=-0.085$	pr$=-0.347$‡
Social functioning	$R=0.77$§	$\beta=-0.212$	$\beta=-0.187$	$\beta=-0.419$†
	$R^2=0.58$	pr$=-0.191$	pr$=-0.144$	pr$=-0.296$†
Pain	$R=0.81$§	$\beta=-0.114$	$\beta=-0.560$§	$\beta=-0.177$
	$R^2=0.65$	pr$=-0.113$	pr$=-0.430$§	pr$=-0.141$
General health	$R=0.55$§	$\beta=-0.191$	$\beta=0.203$	$\beta=-0.551$†
	$R^2=0.28$	pr$=-0.133$	pr$=0.120$	pr$=-0.297$†

R multiple regression, R^2 adjusted R-square, β betas, pr partial correlations

Note: First column: Adjusted R-square×100 indicates the total variance in SF-36 subscale accounted for by the common and unique variance in FIQR function, overall impact, and symptoms domains taken together. Multiple R indicates the size of correlation between the three FIQR domains as predictors taken together with the SF-36 subscale as criterion. Columns 2, 3, and 4 present the standardized regression coefficients (β), which represent the unique contribution of the predictor variable, and the partial correlation coefficients (pr), which represents the correlation for the one (FIQR) domain with the SF-36 subscale after controlling for the other two (FIQR) domains

*$p<0.05$; †$p<0.01$; ‡$p<0.001$; §$p<0.0001$

regression equation to predict how much variance in SF-36 domains could be explained by the FIQR components. Column 1 shows the multiple R and combined variance. It is seen that all the three FIQR domains contributed collectively and uniquely to all SF-36 domains. Column 1 shows multiple correlations ranging from 0.51 to 0.81, all significant, with FIQR components collectively explaining 46 % of SF-36 physical functioning, 65 % of SF-36 pain, and 58 % of SF-36 social functioning.

Columns 2, 3, and 4 show that the FIQR domains predicted *unique* variance in SF-36 domains. Notably, the FIQR function domain best predicted SF-36 physical functioning (column 2) whereas the FIQR symptoms domain predicted six SF-36 domains, including SF-36 *physical functioning, emotional health, energy/fatigue, emotional well-being, social functioning,* and *general health* (column 4). The FIQR overall impact domain, which assesses whether fibromyalgia prevented goals from being accomplished and being overwhelmed, predicted strongly SF-36 subscales of *pain* and *role limitations due to physical health*.

Discussion

Herein, we report that the Brazilian Portuguese FIQR was a very reliable, easy-to-apply, and simple-to-score questionnaire.

We did not strictly access the time for completion of the questionnaire, but we observed that the time to complete the survey varied widely depending on subjects' characteristics, ranging from 5 to 15 min. Although most subjects found the various FIQR questions easy to understand, cognitive dysfunction in some FM patients might have conceivably affected their ability to respond to the questions, thus leading to a more prolonged completion time [12]. The questionnaire was mainly completed by patients in University Rheumatology Clinics; in Brazil, this is a population with a relatively low level of education.

The three domains (function, overall impact, and symptoms) are now more balanced, without affecting the total score when compared to the original FIQ. The *function domain* had an increased representation, with a more equal distribution between large-muscle activities of the upper and lower limbs. For Brazilian patients, the removal of gardening and visiting questions was beneficial, as these questions were sometimes skipped in the original FIQ (personal observation). Interestingly, the subjects reported that "sitting in a chair for 45 minutes" was the second most difficult of the nine functional questions. This question also ranked as one of the most symptomatic functional problems in the original FIQR report and in the Turkish translation study [4, 7]. This

is an unexpected finding that raises questions as to why sitting still should be so symptomatic in a disorder notable for aggravation by activity. The newly introduced questions performed well in Brazilian Portuguese, as they reflected difficulties commonly experienced by FM patients, like cognition problems and climbing a flight of stairs.

The *overall impact domain* was improved in the FIQR, compared with the original FIQ. The correlation level with the total score was 0.92, compared to 0.85 in the original FIQ (data not shown). Dropping the "how many days you missed work?" question and focusing on how overwhelmed patients were and their inability to do chores/attain objectives seemed to have worked well. The overall impact correlated and predicted the pain subscale and role limitation due to physical health in the SF-36 very well.

Although the *symptom domain* had its weight decreased from 70 to 50 % in the FIQR, it nevertheless uniquely predicted six of the eight SF-36 subscales, vs. one for the function domain and two for the overall impact domain.

The level of internal consistency was very high in the Brazilian FIQR (0.96) and was similar to the original FIQR paper (0.95) [4]. The Brazilian Portuguese FIQR also correlated very well with the original translated original FIQ ($r=0.854$, $p<0.001$), and this correlation, when translated to a formula (FIQR=1.73+0.96×FIQ), may enable a comparison among studies that use one or other scale. Compared with the English version of FIQR, the Brazilian FIQR showed the same good correlation for the three domains, but there were several differences in the individual question scores. For example, *sitting in a chair for 45 minutes* had a better correlation with the total FIQR score in the Brazilian FIQR than in the English FIQR (0.81 vs. 0.59), and *depression* and *anxiety* levels scored higher in Brazil (6.2, 7.4) than in the USA version (4.6, 4.5). One should keep in mind that we did not exclude patients with major depression in the current study.

There are several limitations to this study: (1) the testing was done only in women, so we do not know how the FIQR would perform in males; (2) the subjects were entered in a consecutive manner, and we did not stratify them concerning the presence of major depression or other formal psychiatric disorders; (3) no test–retest reliability was performed, as reported in the Turkish and Moroccan versions, but our results seemed very consistent with the all versions available; and (4) as in the original FIQR, we did not have longitudinal data to evaluate sensitivity to change or calculate the minimal clinical importance difference [13].

Conclusion

The Brazilian Portuguese version of the FIQR is a reliable, consistent, easy-to-score questionnaire that could be used in the clinical evaluation of FM patients. Compared to the original FIQ, the FIQR better captures the reality of the impact of FM in subjects' lives and will surely be increasingly used in clinical practice and fibromyalgia research studies.

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