

Ramada JM, Serra C, Amick BC 3rd, Castaño JR, Delclos GL. Cross-cultural adaptation of the Work Role Functioning Questionnaire to Spanish spoken in Spain. J Occup Rehabil. 2013 Dec; 23(4): 566-75

CROSS-CULTURAL ADAPTATION OF THE WORK ROLE FUNCTIONING QUESTIONNAIRE TO SPANISH SPOKEN IN SPAIN

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SUMMARY

Background: The Work Role Functioning Questionnaire (WRFQ) is a tool developed in the United States to measure work disability and assess the perceived impact of health problems on worker ability to perform jobs. We translated and adapted the WRFQ to Spanish spoken in Spain and assessed preservation of its psychometric properties.

Methods: Cross-cultural adaptation of the WRFQ was performed following a systematic 5-step procedure: 1) direct translation, 2) synthesis, 3) back-translation, 4) consolidation by an expert committee and 5) pre-test. Psychometric properties were evaluated by administering the questionnaire to 40 patients with different cultural levels and health problems. Applicability, usability, readability and integrity of the WRFQ were assessed, together with its validity and reliability.

Results: Questionnaire translation, back translation and consolidation were carried out without relevant difficulties. Idiomatic issues requiring reformulation were found in the instructions, response options and in 2 items. Participants appreciated the applicability, usability, readability and integrity of the questionnaire. The results indicated good face and content validity. Internal consistency was satisfactory for all subscales (Cronbach's alpha between 0.88 and 0.96), except for social demands (Cronbach's alpha = 0.56). Test-retest reliability showed good stability, with intraclass correlation coefficients between 0.77 and 0.93 for all subscales. Construct validity was considered preserved based on the comparison of median scores for each patient group and subscale.

Conclusions: Our results indicate the cross-cultural adaptation of the WRFQ to Spanish was satisfactory and preserved its psychometric properties, except for the subscale of social demands, whose internal consistency should be interpreted with caution.

Key words: work outcome measure, work disability measurement, questionnaires, scales, health survey, cross-cultural comparison, validation studies.

INTRODUCTION

Work disability is a health problem with high prevalence and economic costs in industrialized societies^{1,2}. In Europe, the proportion of workers with a long term health problem or disability varies between 5.8% in Romania to 32.2% in Finland³. Increased life expectancy and prolongation of the retirement age are increasing the overall age of the workforce. With an older workforce, more workers are working with health problems⁴⁻⁶.

In occupational health, rehabilitation and/or accommodation programs to adapt work conditions to worker skills and health are being increasingly utilized to support an active work life and better quality of life^{6,7}.

Rehabilitation and work accommodation program effectiveness need to be assessed using outcomes measures such as work status (active, temporary disability, permanent disability), time to return to work, duration of functional disability and costs of incapacity to work⁷⁻⁹. However, these outcomes can be useful but are limited, as they mainly assess whether workers are present or absent from their jobs¹⁰. They do not offer information about the worker's participation in the job or the degree to which he or she is able to respond to the job's demands^{10,11}. To fully assess intervention effectiveness requires outcome measures that describe the extent to which people increase their ability to meet the demands of the job.

In the 1990s a series of work-role specific functioning questionnaires were developed; among these, the Work Limitations Questionnaire (WLQ), the Work Limitations-26 (WL-26) and the Work Role Functioning Questionnaire (WRFQ)^{10,12}. The WRFQ measures perceived disability in terms of work limitation to perform the job due to health problems. Work limitation is defined as the level of difficulty encountered by the worker to carry out the

demands of his/her job. Numerous studies have demonstrated the usefulness of these tools in English language-speaking health care environments¹³⁻¹⁵, but no versions have been adapted for Spanish-speaking health care environments. Due to possible cultural differences in perception of work, health and disease, these instruments should be systematically translated, adapted and validated for use in other cultures. Since its creation and validation, the WRFQ has been adapted to Canadian French¹⁶, Brazilian Portuguese¹⁷ and Dutch¹⁸.

The objectives of this study were to translate and adapt the WRFQ to Spanish spoken in Spain and evaluate its psychometric properties.

METHODS

The WRFQ is a self-administered questionnaire containing 27 items grouped into 5 subscales: work scheduling demands, output demands, physical demands, mental demands and social demands. The first two columns of Table 1 show all items and subscales of the original English version. The recall period is four weeks and each subscale is measured by the percentage of time in a working day the employee has difficulty performing those demands.

Response options vary on a five-point scale: 0=all of the time (100%), 1=most of the time, 2=half of the time (50%), 3=some of the time, 4=none of the time (0%) and 5=does not apply to my job. Option 5 enables employees to answer even though a particular demand is not part of their work.

For each subscale, item scores were summed up, divided by the number of items included in the subscale, and then multiplied by 25 to obtain percentages for each subscale, ranging from 0% (difficulty all the time) to 100% (no difficulty at any time). The same process was repeated for the global scale. The answers "does not apply to my job" were transformed to

missing values. Scales containing subscales with more than 20% missing values or "does not apply to my job" were excluded from the analysis¹⁹.

Translation and cross-cultural adaptation of the WRFQ

Translation was carried out following a systematic and standardized procedure consisting of five steps: 1) direct translation, 2) synthesis of translations, 3) back-translation, 4) consolidation of translations by a committee of experts and 5) pre-test²⁰⁻²⁴.

To complete the direct translation, three bilingual translators whose native language was Spanish spoken in Spain were selected. The first one was aware of the objectives and concepts of the WRFQ. The second one did not know them but had previous experience in technical translation of medical texts. The last translator had no previous knowledge of medicine or rehabilitation and did not know the study objectives. They worked independently and were provided with common instructions to ensure a uniform translation of the entire questionnaire. This was followed by a synthesis of translations, comparing versions and identifying discrepancies that were discussed to reach consensus between translators and researchers.

The back-translation into English was done by two bilingual translators whose native language was English spoken in the USA. They had no knowledge of medicine or rehabilitation and were unaware of the study objectives. They worked independently and were blind to the original version of the questionnaire to minimize information bias.

A multidisciplinary expert committee of bilingual professionals, consisting of an occupational risk prevention technician, an occupational physician, an occupational nurse, two linguists and a methodology expert, evaluated the process. Discrepancies between the two back-

translations were identified, and, following methodological guidelines^{20,21}, a consensus was reached on a pre-final version of the WRFQ adapted to Spanish spoken in Spain.

Finally, a pre-test study was carried out to assess the equivalence of the questionnaire, its understandability and applicability in the Spanish context. Possible mistakes were identified and it was verified that the instructions, items and answer choices were understandable. Revisions to a specific questionnaire item were felt to be in order when 15% or more of participants described difficulties with that item¹⁹.

Evaluation of the pre-final questionnaire psychometric properties.

Sample

Forty volunteer patients of both sexes, with a physical (musculoskeletal) and/or a mental (anxiety-depression) health problem with a minimum duration of one month were recruited among patients under treatment at the outpatient Services of Trauma, Rehabilitation and Psychiatry of a Public Hospital in Barcelona. Patients were between 18 and 65 years old and had different cultural levels. All spoke Spanish as a first language, were able to read and understand what they were reading and were working at least 10 hours per week in the last four weeks.

Materials

Participants were requested to fill out the Spanish version of the WRFQ on paper, and underline or mark any difficulty on the questionnaire. In addition they described difficult to understand questions during a 15 minute structured interview.

Procedure

The internal consistency of the total scale and each subscale was evaluated using Cronbach's alpha, with appropriate values ≥ 0.70 ^{25,26}. Correlations between the subscales, subscale-total, item-subscale and item-total were evaluated, with appropriate values ≥ 0.46 ²⁷.

The repeatability or stability of the instrument was assessed through test-retest reliability. The WRFQ was administered to the same group of 40 workers in two different moments, test and retest. The retest was conducted after a period ranging from 7 to 15 days. This period was considered sufficient to avoid the memory of responses and prevent variations on the observed phenomenon that could affect repeatability. The intraclass correlation coefficient (ICC) was calculated to assess the test-retest reliability. The stability or repeatability of a subscale or total scale was considered good when the ICC was above 0.70 and very good when it was above 0.90²⁶⁻²⁸.

Face validity is the extent to which a questionnaire, in the opinion of the experts and users, is a logical measure of what it intends to. Usually, it is evaluated empirically through the commentaries of the experts and users. In this study was assessed by the expert committee, analyzing the comments that all participants provided during the structured interview.

Content validity is the extent to which the tool is able to measure most of the dimensions of the construct. It was evaluated by an empirical method, based on judgments from the authors of the questionnaire in its original version who directly took part in this study, through the arguments made by the committee of experts and by conducting a qualitative analysis of the comments made by the participants during the pre-test.

We also explored the floor and ceiling effects which occur when a percentage of responses to certain questions cluster at the top or the bottom of the scale. Their presence indicates a lack of discriminative ability of the question and the absence of the questionnaire's ability to

differentiate between high and low scores. Content validity is good when floor and ceiling effects do not exceed 15%²⁸. Averages, ranges and medians of the scores were determined to further describe the distribution of the responses.

Finally, construct validity was assessed using validity analysis techniques for known groups, comparing the results of the subscales in the patient groups with physical and mental illnesses. It was hypothesized that patients with only mental illness would get lower scores (meaning more disability) for the subscales of psychological and social demands and patients with only physical illness would obtain lower scores for the subscales of work scheduling, output and physical demands. Patients with both types of illness were excluded of this comparative analysis. Since the distribution of subscale scores in both groups of patients did not follow a normal distribution, the hypothesis was evaluated by comparing the medians of each subscale in both groups of patients. The statistical significance was assessed using the U Mann Whitney non parametric test.

The contents of the protocol of this study and the informed consent document offered to the participants was reviewed and approved by the Ethics Committee of the University Pompeu Fabra of Barcelona and it respects all the principles of the Declaration of Helsinki and the Spanish legal regulations on protection of personal data.

RESULTS

The direct translation was carried out without difficulty. However, several challenges were found related to the idiomatic usage of words utilized in items 2 (*get going easily*), 11 (*sense of accomplishment*), 23 (*train of thought*) and 26 (*control your temper*), which were discussed and agreed with the translators.

On the other hand, items 3 to 6 (*start on your job, extra breaks or rests, stick to a routine, workload*), 10 (*people who judge*), 13 (*move around different locations*) and 17 (*bend*), had several translation alternatives and required consideration by the committee of experts to reach a consensus to ensure semantic and idiomatic equivalence of both versions. In item 14 the units of measure were converted from pounds to kilograms.

When the back-translation was compared with the original version, some discrepancies were found in the language equivalence of certain words contained in the instructions and various items. Items 2 (*get going easily*), 5 (*stick to a routine*), 11 (*sense of accomplishment*), 16 (*repeat some motions*), 17 (*bend, twist or reach while working*), 23 (*train of thought*), 25 (*speak with people in person*), 26 (*control your temper*), and 27 (*to get work done*) had several translation alternatives and required reconsideration by the committee of experts (table 1).

Table 1. Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item-subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
1. Work the required number of hours	WSD	3 (7,5)	9 (22,5)	1 (2,5)	19 (47,5)	8 (20,0)	0/0	2,5	0,90	0,88
2. Get going easily at the beginning of the workday §	WSD	4 (10,0)	4 (10,0)	4 (10,0)	12 (30,0)	16 (40,0)	0/0	2,8	0,88	0,83
3. Start on your job as soon as you arrive at work§	WSD	5 (12,5)	4 (10,0)	3 (7,5)	10 (25,0)	17 (42,5)	0/1	2,7	0,89	0,87
4. Do your work without stopping to take extra breaks or rests§	WSD	5 (12,5)	8 (20,0)	2 (5,0)	13 (32,5)	2 (5,0)	6/4	2,3	0,65	0,62
5. Stick to a routine or schedule§	WSD	4 (10,0)	5 (12,5)	1 (2,5)	6 (15,0)	23 (57,5)	0/1	2,9	0,76	0,69
6. Handle the workload§	OD	3 (7,5)	9 (22,5)	5 (12,5)	13 (32,5)	10 (25,0)	0/0	2,5	0,80	0,82
7. Work fast enough	OD	10 (25,0)	5 (12,5)	5 (12,5)	14 (35,0)	5 (12,5)	0/1	1,9	0,84	0,88
8. Finish work on time	OD	3 (7,5)	9 (22,5)	5 (12,5)	9 (22,5)	13 (32,5)	0/1	2,5	0,90	0,81
9. Do your work without making mistakes	OD	1 (2,5)	5 (12,5)	3 (7,5)	17 (42,5)	13 (32,5)	0/1	2,9	0,66	0,65
10. Satisfy the people who judge your work§	OD	1 (2,5)	4 (10,0)	4 (10,0)	10 (25,0)	14 (35,0)	2/5	2,5	0,78	0,77
11. Feel a sense of accomplishment in your work§	OD	2 (5,0)	5 (12,5)	8 (20,0)	10 (25,0)	15 (37,5)	0/0	2,8	0,79	0,67
12. Feel you have done what you are capable of doing	OD	5 (12,5)	4 (10,0)	6 (15,0)	11 (27,5)	14 (35,0)	0/0	2,6	0,73	0,62

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process.

(‡) Items modified after pre-test.

Table 1 (Continuation). Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item-subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
13. Walk or move around different work locations (for example, going to meetings) [§] ‡	FD	1 (2,5)	9 (22,5)	2 (5,0)	7 (17,5)	16 (40,0)	0/5	2,5	0,82	0,74
14. Lift, carry, or move objects at work weighing more than 10 pounds	FD	10 (25,0)	5 (12,5)	1 (2,5)	6 (15,0)	9 (22,5)	2/7	1,5	0,89	0,71
15. Sit, stand, or stay in one position for longer than 15 minutes while working	FD	5 (12,5)	6 (15,0)	5 (12,5)	12 (30,0)	11 (27,5)	0/1	2,4	0,93	0,83
16. Repeat the same motions over and over again while working	FD	8 (20,0)	6 (15,0)	6 (15,0)	7 (17,5)	9 (22,5)	0/4	1,9	0,95	0,82
17. Bend, twist, or reach while working [§]	FD	8 (20,0)	5 (12,5)	7 (17,5)	7 (17,5)	12 (30,0)	0/1	2,2	0,93	0,82
18. Use hand-held tools or equipment (for example, a phone, pen, keyboard, computer mouse, drill, hairdryer or sander) [‡]	FD	6 (15,0)	5 (12,5)	3 (7,5)	8 (20,0)	16 (40,0)	0/2	2,5	0,81	0,74
19. Keep your mind on your work	MD	2 (5,0)	5 (12,5)	5 (12,5)	15 (37,5)	13 (32,5)	0/0	2,8	0,92	0,79
20. Think clearly when working	MD	1 (2,5)	4 (10,0)	7 (17,5)	11 (27,5)	17 (42,5)	0/0	3,0	0,93	0,70
21. Do work carefully	MD	2 (5,0)	5 (12,5)	4 (10,0)	11 (27,5)	18 (45,0)	0/0	3,0	0,89	0,87
22. Concentrate on your work	MD	1 (2,5)	4 (10,0)	7 (17,5)	13 (32,5)	15 (37,5)	0/0	2,9	0,96	0,69
23. Work without losing your train of thought [§]	MD	4 (10,0)	2 (5,0)	3 (7,5)	18 (45,0)	12 (30,0)	0/1	2,8	0,89	0,46
24. Easily read or use your eyes when working	MD	2 (5,0)	4 (10,0)	0 (0,0)	9 (22,5)	24 (60,0)	0/1	3,2	0,87	0,75

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process.

(‡) Items modified after pre-test.

Table 1 (Continuation). Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item- subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
25. Speak with people in person, in meetings or on the phone	SD	1 (2,5)	4 (10,0)	2 (5,0)	8 (20,0)	22 (55,0)	0/3	3,0	0,84	0,61
26. Control your temper around people when working [§]	SD	1 (2,5)	3 (7,5)	6 (15,0)	14 (35,0)	16 (40,0)	0/0	3,0	0,70	0,78
27. Help other people to get work done	SD	2 (5,0)	6 (15,0)	2 (5,0)	9 (22,5)	19 (47,5)	0/2	2,8	0,70	0,57

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process

(‡) Items modified after pre-test.

Lastly, a pre-final questionnaire was consolidated in Spanish spoken in Spain, which guaranteed the semantic, idiomatic, conceptual and experiential equivalence with the original questionnaire, reaching consensus to partially reformulate the last paragraph of the instructions and wording of items 2, 11, 23, 25, 26 and 27. It was not necessary to modify or reshape the rest of the instructions, response options and other items.

The pre-final questionnaire was administered to 40 patients. Table 2 describes their socio-demographic characteristics. Comments were analyzed by the committee of experts. Most participants found no difficulty understanding the items. Nine participants (22.5%) reported the last paragraph of the instructions was ambiguous, so it was amended, emphasizing that the questions related to "working time".

Eight participants (20%) found the expression "difficult" located at the top of the column where the items were located hard to interpret. After weighing various alternatives, a decision was made to incorporate this expression in each of the possible answers as follows: 0=was difficult all the time (100%), 1=was difficult most of the time, 2=was difficult half the time (50%), 3 =was difficult part of the time, 4=never was difficult (0%). No participant expressed difficulty with the response option "does not apply to my job".

Ten participants (25%) had difficulties with item 13 and eight participants (20%) with item 18. All answered "does not apply to my job" since the examples did not fit their job. The committee of experts decided to delete the examples from these items.

Table 3 shows the average scores for each subscale; higher values indicate less disability at work. The social demands subscale scored the highest (76.9 SD=21.1) and the physical demands the lowest (59.0 SD=32.3). The items that most frequently obtained the answer "does not apply to my job" were item 14 (*lift, carry, or move objects at work weighing more*

Table 2. Participants' socio-demographic characteristics. Pre-test with the adapted version of the WRFQ* to Spanish spoken in Spain (n=40). April-May, 2012.

		Total n=40	Men n=15 (37,5%)	Women n=25 (62,5%)
Age in years, mean (SD)		49,1 (10,0)	47,9 (8,9)	49,8 (10,7)
Education level, n (%)	Low	13 (32,5)	7 (46,7)	6 (24,0)
	Middle	15 (37,5)	6 (40,0)	9 (36,0)
	High	12 (30,0)	2 (13,3)	10 (40,0)
Job type, n (%)	Manual	17 (42,5)	6 (40,0)	11 (44,0)
	Non-manual	11 (27,5)	5 (33,3)	6 (24,0)
	Mixed	12 (30,0)	4 (26,7)	8 (32,0)
Working hours/week, mean (SD)		40,23 (10,7)	46,1 (9,6)	36,7 (9,8)
Disease type, n(%)	Physical	17 (42,5)	6 (40,0)	11 (44,0)
	Mental	17 (42,5)	8 (53,3)	9 (36,0)
	Both	6 (15,0)	1 (6,7)	5 (20,0)
Disease duration in months, mean (SD)		34,68 (51,1)	23,1 (22,4)	41,6 (61,8)

*WRFQ: Work Role Functioning Questionnaire.

Table 3. Pre-test results with the Spanish version of the Work Role Functioning Questionnaire, (n=40). April-May, 2012.

	Valid n (missing/not applicable)*	Mean [§] (SD)	Range	Median	n at floor (0%) n (%)	n at ceiling (100%) n (%)	Cronbach's alpha	Subscale-total correlations
Work scheduling demands	39 (1)	67,7 (27,8)	5-100	75,0	0 (0,0)	3 (7,5)	0,88	0,95
Output demands	39 (1)	64,4 (25,8)	14,3-100	67,9	0 (0,0)	1 (2,5)	0,90	0,94
Physical demands	36 (4)	59,0 (32,3)	4,17-100	62,5	0 (0,0)	5 (12,5)	0,95	0,88
Mental demands	40 (0)	73,9 (26,1)	0-100	79,2	1 (2,5)	9 (22,5)	0,96	0,81
Social demands	35 (5)	76,9 (21,1)	25-100	83,3	0 (0,0)	5 (12,5)	0,56	0,83
Total score	40 (0)	67,6 (22,7)	21,3-98,1	74,5	0 (0,0)	0 (0,0)	0,97	-

*Subscales with more than 20% of items scoring "does not apply to my job" or missing values were excluded.

§ Each subscale is scored from 0 - 100. Higher scores indicate better work functioning: difficulties all the time 0/100; difficulties no of the time 100/100.

Table 4. Test-retest reliability. Intraclass Correlation Coefficients (ICC).
Pre-test of the Spanish version of the WRFQ*, April-May 2012.

Subscales	Test-retest CCI	IC 95%**
Work scheduling demands	0,92	(0,85-0,96)
Output demands	0,89	(0,78-0,94)
Physical demands	0,93	(0,84-0,97)
Mental demands	0,85	(0,72-0,92)
Social demands	0,77	(0,58-0,88)
Total score	0,94	(0,83-0,98)

* WRFQ: Work Role Functioning Questionnaire

** IC 95%: Interval of confidence to 95%

than 10 pounds) and item 13 (*walk or move around different work locations, for example, going to meetings*) and 10 (*satisfy the people who judge your work*).

After judging the comments made by participants during the pre-test, and resolved by consensus, the committee of experts drafted the final version of WRFQ translated and adapted to Spanish spoken in Spain (Appendix 1).

Assessing the internal consistency, the Cronbach's alpha was 0.97 for the total scale. All subscales obtained Cronbach's alpha coefficients above 0.85, except for social demands which was 0.56. Correlations between the subscales, subscale-total, item-subscale and item-total were all ≥ 0.46 and considered appropriate²⁷.

Scale ceiling effects were lowest for output demands (2.5%) and highest for mental demands (22.5%), exceeding the 15% criterion²⁸ (table 3).

Table 4 shows the results of the test-retest reliability; ICCs ranged between 0.77 and 0.93. The ICC for the total scale was 0.94.

The expert committee estimated that the face validity of the questionnaire was adequate and the participants appreciated the applicability, usability and understandability of the questionnaire. These aspects were collected in the comments made during the interviews, concluding that the questionnaire measures work disability in a logical way.

Content validity was considered adequate according to the criteria and judgment of the authors of the original version of WRFQ¹⁶⁻¹⁸, the arguments made by the committee of experts during the process of cross-cultural adaptation and the qualitative analysis of participant comments.

Table 5. Subscale description by type of health problem (mental or physical). Pre-test with the adapted version of the WRFQ* to Spanish spoken in Spain (n=40).

	Median**		Test U of Mann Whitney
	Mental health problem	Physical health problem	Asymptotic significance (bilateral)
Work scheduling demands	85,0	65,0	0,478
Output demands	78,6	82,1	0,850
Physical demands	85,0	55,0	0,007
Mental demands	75,0	95,8	0,018
Social demands	83,3	87,5	0,917

(*) Work Role Functioning Questionnaire.

(**) Each subscale is scored from 0 - 100. Higher scores indicate better work functioning: difficulties all the time 0/100; difficulties no of the time 100/100.

Construct validity was likewise reasonable. The median scores for the physical demands subscale were significantly lower (30 points) in participants with a physical (musculoskeletal) health problem and the median scores for the mental demands subscale were significantly lower (21 points) for patients with a mental (anxiety-depression) health problem (table 5), although these differences were not statistically significant.

DISCUSSION

This rigorous, stepwise procedure for translation and cross-cultural adaptation of the WRFQ led to the development of a Spanish spoken in Spain version equivalent to the original English version. Minor changes were made to maximize questionnaire understandability. It was necessary to adjust the wording of the instructions, as happened when the questionnaire was adapted into Canadian French (12), Brazilian Portuguese (13) and Dutch (14). During the adaptation to Portuguese, a decision was made to incorporate the term "difficult" within each item. In the adaptation to Spanish this has been incorporated in each of the response options to facilitate understandability.

Several items needed to be changed after the pre-test. There are similarities with the difficulties in items 2, 6 and 26 encountered by Durand¹⁶, Gallasch¹⁷ and Abma¹⁸. Like them, examples were removed for items 13 and 18 because their interpretation could be misleading.

The absence of ceiling and floor effects above 15% (with the exception of 22.5% for the ceiling effect of the mental demands subscale) indicates that the questionnaire items have acceptable discriminate ability to distinguish high and low scores, providing evidence of questionnaire content validity²⁸.

The highest frequency of the response option "does not apply to my job" was obtained for the items in the physical demands subscale, as in other cultural adaptations made of the WRFQ¹⁶⁻¹⁸. The probable cause is that these items describe movements specific to manual work and do not apply to non-manual work, which accounted for 28% of the sample. The highest ceiling effect for mental demands observed in our study is consistent with the results of Durand¹⁶, probably because musculoskeletal health problems have less impact on the ability of workers to handle the mental demands of work.

The internal consistency of the Spanish version of the WRFQ was very good for all subscales except for social demands. This result is consistent with those obtained by Durand¹⁶ and Gallasch¹⁷. All items, except 4, had higher correlations with their own subscale than with the total scale, confirming that the translation and cross-cultural adaptation did not alter the internal consistency of the questionnaire. However, we observed some variability in subject responses to the items of the social demands subscale (Cronbach's alpha of 0.56) and thus, coinciding with Durand¹⁶, believe the internal consistency of this subscale should be interpreted with caution.

The results of the test-retest reliability are very similar to those obtained by Gallasch¹⁷. The stability or repeatability of the questionnaire can be considered good for the output, mental and social demands subscales and very good for the physical and work scheduling demands subscales²⁶⁻²⁸.

The results show adequate construct validity of the WRFQ. On the one hand, the median scores obtained by participants, all of whom were patients with active health problems, for all subscales ranged between 62.5% and 83.3%, indicating important difficulties in carrying out the demands of their jobs, which is not surprising

On the other hand, as expected, the comparisons of scores between the two groups of patients indicates lower scores on the subscales of scheduling and physical demands for those with physical health problems and, conversely, lower scores on the subscales of mental and social demands for patients with a mental health problem. One limitation of this study could be the sample size of participants in the pre-test, which has conducted to a lack of statistical significance for some of these results.

In conclusion, our results confirm that the process used for translation and cross-cultural adaptation of the WRFQ was carried out successfully and indicate the existence of a good preservation of its psychometric properties.

ACKNOWLEDGMENTS:

We want to thank Concepción Gómez-Morán, Carlos Enric Delclós, M^a José Román and Cliff Grossman for their professional involvement in the direct and back translation of the WRFQ. Thanks to Julià del Prado, Josefina Pi-Sunyer and Dr. Rocío Villar for their kind participation with the translators in the Expert Committee. Also thanks to Joan Mirabent, Dr. Marta Tejero and Dr. Gemma Pidemont for their patient and generous collaboration in the recruitment process of patients. Thanks so much to Nuria González, Chelo Sancho and Carmen Sánchez, members of the Occupational Health Service at PSMAR Barcelona, for their collaboration in the distribution and collection of questionnaires. Finally, thanks so much to Ram Dulthummon, José, Borja and Ángeles Ramada for their generous collaboration creating and assessing the quality of the database.

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Table 1. Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item-subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
1. Work the required number of hours	WSD	3 (7,5)	9 (22,5)	1 (2,5)	19 (47,5)	8 (20,0)	0/0	2,5	0,90	0,88
2. Get going easily at the beginning of the workday §	WSD	4 (10,0)	4 (10,0)	4 (10,0)	12 (30,0)	16 (40,0)	0/0	2,8	0,88	0,83
3. Start on your job as soon as you arrive at work §	WSD	5 (12,5)	4 (10,0)	3 (7,5)	10 (25,0)	17 (42,5)	0/1	2,7	0,89	0,87
4. Do your work without stopping to take extra breaks or rests §	WSD	5 (12,5)	8 (20,0)	2 (5,0)	13 (32,5)	2 (5,0)	6/4	2,3	0,65	0,62
5. Stick to a routine or schedule §	WSD	4 (10,0)	5 (12,5)	1 (2,5)	6 (15,0)	23 (57,5)	0/1	2,9	0,76	0,69
6. Handle the workload §	OD	3 (7,5)	9 (22,5)	5 (12,5)	13 (32,5)	10 (25,0)	0/0	2,5	0,80	0,82
7. Work fast enough	OD	10 (25,0)	5 (12,5)	5 (12,5)	14 (35,0)	5 (12,5)	0/1	1,9	0,84	0,88
8. Finish work on time	OD	3 (7,5)	9 (22,5)	5 (12,5)	9 (22,5)	13 (32,5)	0/1	2,5	0,90	0,81
9. Do your work without making mistakes	OD	1 (2,5)	5 (12,5)	3 (7,5)	17 (42,5)	13 (32,5)	0/1	2,9	0,66	0,65
10. Satisfy the people who judge your work §	OD	1 (2,5)	4 (10,0)	4 (10,0)	10 (25,0)	14 (35,0)	2/5	2,5	0,78	0,77
11. Feel a sense of accomplishment in your work §	OD	2 (5,0)	5 (12,5)	8 (20,0)	10 (25,0)	15 (37,5)	0/0	2,8	0,79	0,67
12. Feel you have done what you are capable of doing	OD	5 (12,5)	4 (10,0)	6 (15,0)	11 (27,5)	14 (35,0)	0/0	2,6	0,73	0,62

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process.

(±) Items modified after pre-test.

Table 1 (Continuation). Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item-subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
13. Walk or move around different work locations (for example, going to meetings) ^{§‡}	FD	1 (2,5)	9 (22,5)	2 (5,0)	7 (17,5)	16 (40,0)	0/5	2,5	0,82	0,74
14. Lift, carry, or move objects at work weighing more than 10 pounds	FD	10 (25,0)	5 (12,5)	1 (2,5)	6 (15,0)	9 (22,5)	2/7	1,5	0,89	0,71
15. Sit, stand, or stay in one position for longer than 15 minutes while working	FD	5 (12,5)	6 (15,0)	5 (12,5)	12 (30,0)	11 (27,5)	0/1	2,4	0,93	0,83
16. Repeat the same motions over and over again while working	FD	8 (20,0)	6 (15,0)	6 (15,0)	7 (17,5)	9 (22,5)	0/4	1,9	0,95	0,82
17. Bend, twist, or reach while working [§]	FD	8 (20,0)	5 (12,5)	7 (17,5)	7 (17,5)	12 (30,0)	0/1	2,2	0,93	0,82
18. Use hand-held tools or equipment (for example, a phone, pen, keyboard, computer mouse, drill, hairdryer or sander) [‡]	FD	6 (15,0)	5 (12,5)	3 (7,5)	8 (20,0)	16 (40,0)	0/2	2,5	0,81	0,74
19. Keep your mind on your work	MD	2 (5,0)	5 (12,5)	5 (12,5)	15 (37,5)	13 (32,5)	0/0	2,8	0,92	0,79
20. Think clearly when working	MD	1 (2,5)	4 (10,0)	7 (17,5)	11 (27,5)	17 (42,5)	0/0	3,0	0,93	0,70
21. Do work carefully	MD	2 (5,0)	5 (12,5)	4 (10,0)	11 (27,5)	18 (45,0)	0/0	3,0	0,89	0,87
22. Concentrate on your work	MD	1 (2,5)	4 (10,0)	7 (17,5)	13 (32,5)	15 (37,5)	0/0	2,9	0,96	0,69
23. Work without losing your train of thought [§]	MD	4 (10,0)	2 (5,0)	3 (7,5)	18 (45,0)	12 (30,0)	0/1	2,8	0,89	0,46
24. Easily read or use your eyes when working	MD	2 (5,0)	4 (10,0)	0 (0,0)	9 (22,5)	24 (60,0)	0/1	3,2	0,87	0,75

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process.

(‡) Items modified after pre-test.

Table 1 (Continuation). Responses for item-level of the Spanish version of the WRFQ. Assessment of internal consistency (Cronbach's alpha) for each item-subscale and item-total scale (n=40). April-May 2012.

Items (original version)	Subscale*	Responses n (%)					n missing / 'does not apply to my job'	Mean scale 0-4	Correlations item-subscale	Correlations item-total
		0 (100%)	1	2 (50%)	3	4 (0%)				
25. Speak with people in person, in meetings or on the phone	SD	1 (2,5)	4 (10,0)	2 (5,0)	8 (20,0)	22 (55,0)	0/3	3,0	0,84	0,61
26. Control your temper around people when working [§]	SD	1 (2,5)	3 (7,5)	6 (15,0)	14 (35,0)	16 (40,0)	0/0	3,0	0,70	0,78
27. Help other people to get work done	SD	2 (5,0)	6 (15,0)	2 (5,0)	9 (22,5)	19 (47,5)	0/2	2,8	0,70	0,57

(*) WSD= work scheduling demands, OD= output demands, FD= physical demands, MD= mental demands, SD= social demands.

(§) Items with several alternatives or with difficulties in the translation process.

(‡) Items modified after pre-test.

Table 2. Participants' socio-demographic characteristics. Pre-test with the adapted version of the WRFQ* to Spanish spoken in Spain (n=40). April-May, 2012.

		Total n=40	Men n=15 (37,5%)	Women n=25 (62,5%)
Age in years, mean (SD)		49,1 (10,0)	47,9 (8,9)	49,8 (10,7)
Education level, n (%)	Low	13 (32,5)	7 (46,7)	6 (24,0)
	Middle	15 (37,5)	6 (40,0)	9 (36,0)
	High	12 (30,0)	2 (13,3)	10 (40,0)
Job type, n (%)	Manual	17 (42,5)	6 (40,0)	11 (44,0)
	Non-manual	11 (27,5)	5 (33,3)	6 (24,0)
	Mixed	12 (30,0)	4 (26,7)	8 (32,0)
Working hours/week, mean (SD)		40,23 (10,7)	46,1 (9,6)	36,7 (9,8)
Disease type, n(%)	Physical	17 (42,5)	6 (40,0)	11 (44,0)
	Mental	17 (42,5)	8 (53,3)	9 (36,0)
	Both	6 (15,0)	1 (6,7)	5 (20,0)
Disease duration in months, mean (SD)		34,68 (51,1)	23,1 (22,4)	41,6 (61,8)

*WRFQ: Work Role Functioning Questionnaire.

Table 3. Pre-test results with the Spanish version of the Work Role Functioning Questionnaire, (n=40). April-May, 2012.

	Valid n (missing/not applicable)*	Mean [§] (SD)	Range	Median	n at floor (0%) n (%)	n at ceiling (100%) n (%)	Cronbach's alpha	Subscale-total correlations
Work scheduling demands	39 (1)	67,7 (27,8)	5-100	75,0	0 (0,0)	3 (7,5)	0,88	0,95
Output demands	39 (1)	64,4 (25,8)	14,3-100	67,9	0 (0,0)	1 (2,5)	0,90	0,94
Physical demands	36 (4)	59,0 (32,3)	4,17-100	62,5	0 (0,0)	5 (12,5)	0,95	0,88
Mental demands	40 (0)	73,9 (26,1)	0-100	79,2	1 (2,5)	9 (22,5)	0,96	0,81
Social demands	35 (5)	76,9 (21,1)	25-100	83,3	0 (0,0)	5 (12,5)	0,56	0,83
Total score	40 (0)	67,6 (22,7)	21,3-98,1	74,5	0 (0,0)	0 (0,0)	0,97	

* Subscales with more than 20% of items scoring "does not apply to my job" or missing values were excluded.

§ Each subscale is scored from 0 - 100. Higher scores indicate better work functioning: difficulties all the time 0/100; difficulties no of the time 100/100.

Table 4. Test-retest reliability. Intraclass Correlation Coefficients (ICC).
Pre-test of the Spanish version of the WRFQ*, April-May 2012.

Subscales	Test-retest CCI	IC 95%**
Work scheduling demands	0,92	(0,85-0,96)
Output demands	0,89	(0,78-0,94)
Physical demands	0,93	(0,84-0,97)
Mental demands	0,85	(0,72-0,92)
Social demands	0,77	(0,58-0,88)
Total score	0,94	(0,83-0,98)

* WRFQ: Work Role Functioning Questionnaire

** IC 95%: Interval of confidence to 95%

Table 5. Subscale description by type of health problem (mental or physical). Pre-test with the adapted version of the WRFQ* to Spanish spoken in Spain (n=40).

	Median**		Test U of Mann Whitney
	Mental health problem	Physical health problem	Asymptotic significance (bilateral)
Work scheduling demands	85,0	65,0	0,478
Output demands	78,6	82,1	0,850
Physical demands	85,0	55,0	0,007
Mental demands	75,0	95,8	0,018
Social demands	83,3	87,5	0,917

(*) Work Role Functioning Questionnaire.

(**) Each subscale is scored from 0 - 100. Higher scores indicate better work functioning: difficulties all the time 0/100; difficulties no of the time 100/100.

WRFQ-27

SU TRABAJO Y SU SALUD

En las siguientes preguntas le pedimos que nos indique, **para las últimas cuatro semanas**, la cantidad de tiempo en que tuvo dificultad para realizar ciertos aspectos de su trabajo.

Marque la casilla “No Aplicable a Mi Trabajo” sólo en caso de que la pregunta se refiera a algo que **no** es parte de su trabajo.

En las **últimas 4 semanas**, ¿durante cuánto tiempo de su trabajo le fue difícil realizar las siguientes actividades por motivos de su salud física o problemas emocionales?

	Fue difícil todo el tiempo (100%)	Fue difícil la mayor parte del tiempo	Fue difícil la mitad del tiempo (50%)	Fue difícil una parte del tiempo	Nunca fue difícil (0%)	No aplicable a mi Trabajo
1. Trabajar el número de horas requeridas	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
2. Empezar la jornada de trabajo con facilidad	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
3. Ponerse a trabajar nada más llegar al trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
4. Hacer su trabajo sin parar a hacer descansos adicionales	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
5. Ajustarse a una rutina u horario	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
6. Manejar su carga de trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
7. Trabajar lo suficientemente rápido.	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
8. Acabar el trabajo a tiempo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
9. Hacer su trabajo sin cometer errores	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
10. Satisfacer a las personas que evalúan su trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
11. Tener sensación de trabajo bien hecho	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
12. Sentir que ha hecho lo que es capaz de hacer	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
13. Caminar o desplazarse a distintos lugares de trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

14. Levantar, cargar o mover objetos de <u>más de 5 kg de peso</u> , en el trabajo.	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
15. Permanecer sentado, de pie o en una misma posición <u>durante más de 15 minutos</u> , mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
16. Repetir los mismos movimientos una y otra vez mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
17. Doblarse, girarse o alcanzar un objeto mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
18. Usar equipos o herramientas de mano	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
19. Mantener la mente en su trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
20. Pensar con claridad mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
21. Hacer el trabajo con cuidado	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
22. Concentrarse en su trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
23. Trabajar sin perder el hilo (de las ideas).	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
24. Leer o usar los ojos con facilidad mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
25. Hablar con la gente cara a cara, en reuniones o por teléfono	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
26. Controlar su genio delante de otras personas mientras trabaja	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
27. Ayudar a otras personas a acabar el trabajo	<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅