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HEALTH SERVICES RESEARCH

Cross-cultural Adaptation and Validation of the Quebec Back Pain Disability Scale to European Portuguese Language

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Study Design. Cross-cultural adaptation and psychometric testing.
Objective. To conduct the cross-cultural adaptation of the Quebec Back Pain Disability Scale (QBPDS) and investigate its reliability and validity in patients with chronic low back pain (CLBP).
Summary of Background Data. The QBPDS is one of the most commonly used scales to evaluate functional incapacity resulting from low back pain. Although measuring disability is an important outcome in physiotherapy care, there is no previous research relating to the cultural adaptation and psychometric testing of the QBPDS in the Portuguese-speaking population.
Methods. The questionnaire was first translated and back-translated in accordance with the published guidelines. The Portuguese version of the QBPDS was then pilot tested in a Portuguese sample of 40 patients with CLBP. Psychometric properties were evaluated in a new sample of 132 patients with CLBP. Exploratory factor analysis was performed to confirm its unidimensionality. Reliability was evaluated through internal consistency and reproducibility, using the Cronbach α and intraclass correlation coefficient, respectively. Construct validity was assessed with correlations between the QBPDS and the Roland-Morris Disability Questionnaire and between the QBPDS and the visual analogue pain scale for convergent validity and pain localization for discriminative validity, using the Spearman correlation analysis and the Mann-Whitney test.
Results. Exploratory factor analysis revealed the existence of one major factor that explains 52.1% of the variance. One-week test-retest reliability was 0.7, and internal consistency was 0.95. The QBPDS correlated strongly with the Roland-Morris Disability Questionnaire (0.62; $P < 0.001$), moderately with pain (0.38; $P < 0.001$), and shows capability to discriminate between patients with localized and referred pain ($U = 1218$; $P < 0.0005$).
Conclusion. The reliability and construct validity of the Portuguese version of the QBPDS are acceptable to assess functional status of Portuguese-speaking patients with CLBP.
Key words: QBPDS, outcome measures, CLBP, disability.
Level of Evidence: N/A
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Low back pain (LBP) is an extremely commonly health condition.[1,2] It is a musculoskeletal complaint affecting most people at some point in their lives[3] and the consequent health care, community, and personal costs are considerable.[4–9] The clinical course of acute LBP has been described as initially favorable; however, beyond 6 weeks, only very small reductions in mean pain and disability seem to occur.[6] According to a recent meta-analysis[6] individuals with persistent LBP are expected to have moderate levels of pain and disability. In these individuals, pain can fluctuate over time with recurrences or exacerbations[10–12] and has a major impact on their functionality.[12–14]

In the majority of the situations (85%), chronic LBP (CLBP) could not be assigned to a recognizable, known, specific pathology[15,16] and it is most accurately labeled as nonspecific CLBP (NSCLBP).[16,17] Individuals with NSCLBP are commonly referred to physiotherapy services,[17] where reducing pain and disability are the main treatment goals and outcomes.[18–20] The *Quebec Back Pain Disability Scale* (QBPDS) is one of the most recommended questionnaires to assess functional disability associated with LBP.[18,21] It was developed as a measure of "functional disability," which was defined by the authors as "perceived difficulty associated with simple physical activities."[22] It is a self-administered, 20-item questionnaire where patients are asked to rate their degree of difficulty in performing a specific activity from 0 ("not difficult at all") to 5 ("unable to do") in each item. The QBPDS score ranges from 0 to 100, with high values indicating higher levels of disability.[23] The QBPDS has been extensively

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tested and is generally acknowledged to have good validity, reliability, and responsiveness.[23–27] It has been translated and culturally adapted into different languages, including Portuguese from Brazil.[26] However, the cultural and linguistic differences between the European Portuguese and the Brazilian Portuguese languages inhibit the use of the Brazilian version among Portuguese people.[28,29]

Therefore, the aim of this study was to conduct the cross-cultural adaptation of the Portuguese version of the QBPDS and investigate its reliability and validity in patients with CLBP. This article is part of a larger research project aiming to validate tools with clinical relevance.

MATERIALS AND METHODS

This study was carried out in 2 stages: the first stage included the translation into the Portuguese language and cultural adaptation of the QBPDS; the second stage was a validation study to determine the psychometric characteristics of the QBPDS. The study was approved by the Ethics Committee of the School of Health Care, Institute Polytechnic of Setúbal. All patients gave their written informed consent after receiving written and oral information about the study.

Phase 1: Cross-cultural Adaptation Process

The translation and cultural adaptation process followed the previously published guidelines.[30,31] The whole translation process was reviewed by an expert committee, which consisted of the translators, the researchers, and 3 other external advisors. In addition, the original author was consulted.

Consensus in terms of semantic, idiomatic, experiential, and conceptual equivalence was reached, and a prefinal version of the QBPDS was obtained. This version was then piloted in a sample of Portuguese patients with CLBP. A heterogeneous group of 40 patients with CLBP completed the questionnaire to determine the comprehensibility and adequacy of the Portuguese version.

Phase 2: Assessment of the Reliability and Validity of the QBPDS-PT

The final Portuguese version of the QBPDS (QBPDS-PT) was applied to an independent sample of patients with CLBP. Between November 2011 and May 2012, a group of 132 consecutive patients were recruited from the waiting lists of 16 outpatient clinics from 7 different regions in Portugal. Local physiotherapists carried out patient recruitment in accordance with a standardized recruitment protocol. Participants were considered eligible if they had LBP, with or without leg pain for at least 3 months,[17] were aged between 18 and 65 years, and were able to read and speak the Portuguese language. Eligible participants were screened for evidence of serious LBP pathology. They were excluded if they had clinical signs of infection, tumor, osteoporosis, fracture, structural deformity, inflammatory disorder (*e.g.*, ankylosing spondylitis), radicular syndrome, or cauda equine syndrome or if they had undergone back surgery or conservative treatment in the prior 6 and 3 months, respectively. To ensure a sufficient number of patients, the sample size was established at 150, with a minimum of 100.[32]

All the participants completed a questionnaire containing a Sociodemographic Questionnaire, the Portuguese version of the QBPDS, a 0 to 10 visual analogue scale (VAS) for back/leg pain intensity in the last week, and the Portuguese versions of the Patient Global Improvement Change (PGIC)[33] and Roland-Morris Disability Questionnaire (RMDQ).[34]

Reliability

For test-retest reliability, the QBPDS was administered twice within a period of 1 week, with no treatment being given.[35] In the second assessment, participants were asked to rate their overall change in LBP status since completion of the initial survey, using the 7 points of the PGIC scale.[36] Participants who self-reported their condition as "about the same" or only "a little better" (0–4) were considered to have remained stable regarding their functional status.[18,37] A paired *t* test was also used to test the hypothesis that the questionnaire scores for the "unchanged" group on both occasions were not statistically different ($P < 0.05$).

Validity

To assess the construct validity, the relation between the QBPDS and the RMDQ and between the QBPDS and the VAS was examined for convergent validity. It was hypothesized that the disability assessed by the QBPDS and the RMDQ (summary scores) would be strongly correlated (0.60–0.90). Second, because the questionnaires were constructed to assess pain-related disability, it was hypothesized that the sum scores would be moderately correlated with pain intensity.[35] For discriminative validity, this study hypothesized that participants with leg pain would have higher scores on the QBPDS than other participants without this condition.[1,23]

Instruments

The RMDQ was developed to measure self-rated disability due to LBP. The questionnaire consists of 24 items related to activities of daily living. Each answer can be scored "0" or "1," thus leaving a range of scores from 0 to 24, with higher scores indicating higher disability. The RMDQ has shown good validity and test-retest reliability, with reported intraclass correlation coefficients (ICCs) of 0.8 or more.[34,38,39]

The VAS is a self-reported measurement that provides a score for the level of pain intensity that has been proven reliable, showing high ICC (0.71–0.99).[40–43] The PGIC scale is a 7-point transition scale described by Jaeschke *et al*[44] and Hurst and Bolton,[45] designed to assess the patients' perception of overall change in their back condition. The PGIC scale ranged from 1 ("no change" or "condition has got worse") to 7 ("a great deal better" and "a considerable improvement that has made all the difference").

Statistical Analysis

The psychometric properties of the QBPDS-PT were analyzed using SPSS (version 20.0; IBM, Chicago, IL). The unidimensionality was first explored through principal component

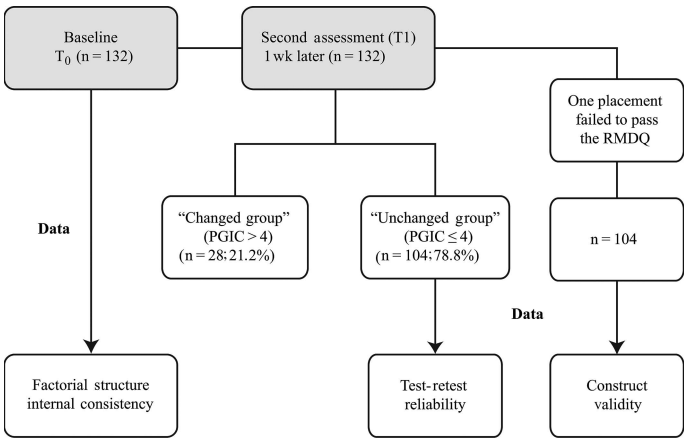

Figure 1. Data collection flowchart. PGIC indicates Patient Global Improvement Change; RMDQ, Roland-Morris Disability Questionnaire.

factor analysis.[46] An eigenvalue criterion of 1.0 and a scree plot analysis were used to select relevant factors. The results were given in terms of the percentage of variance in the scale score explained by the principal factor. Items were accepted on the final factors if they had a load of more than 0.50 on the corresponding factor.

Floor and ceiling effects were determined by calculating the number of patients obtaining the lowest or the highest possible QBPDS-PT scores. The internal consistency was estimated using the Cronbach α coefficient. A Cronbach α coefficient of 0.70 or more is generally considered to be acceptable.[47] Data from item-item and item-total were used to complement the analysis.

Test-retest reliability was determined using $ICC_{2,1}$ with 95% confidence interval in participants who remained stable on LBP functional status between the initial and the second assessments, based on the PGIC scale score. An ICC value of 0.70 or more is considered acceptable for test-retest reliability.[47]

To test convergent construct validity, the correlation between the QBPDS-PT and the RMDQ and between the QBPDS-PT and the VAS was measured using the Spearman correlation coefficient. Discriminative construct validity was determined by comparing the results of the QBPDS-PT and pain localization, using the Mann-Whitney test. The level of significance adopted for the statistical tests was set at $P < 0.05$.

RESULTS

Cross-cultural Adaptation of the QBPDS

The Portuguese version of the QBPDS is shown in the Appendix (see Supplemental Digital Content, available at http://links.lww.com/BRS/A797). Minor difficulties arose during its development. The only change made to the prefinal version was related to the translation of the walk distances (items 8 and 12). Because the term "blocks" is not a common measure in the Portuguese language and culture, it was decided to maintain only the distance values. In item 8, "Walk a few blocks (300–400 m)" was replaced by "Walk 300 to 400 m." In item 12, "Run one block (about 100 m)," was replaced by "Run about 100 m." The prefinal version of the QBPDS-PT was then sent to the original author for verification. No further corrections were made.

In the pretest, the large majority of the patients (93%) reported that they were able to complete the questionnaires without help. The mean time to complete the QBPDS-PT was about 5 minutes.

TABLE 1. Demographic and Clinical Characteristics of the Study Participants (N = 132)

Variables	
Age, mean (SD), yr	46.58 (12.67)
Sex	
Male	36 (27.3)
Female	96 (72.7)
Educational level	
Primary education	33 (25)
Basic education	47 (35.6)
High school	21 (15.9)
University	31 (23.5)
Working status	
Employed	87 (65.9)
Unemployed	15 (11.4)
Retired	16 (12,1)
Missing	14 (10.6)
Duration of pain	
3–6 mo	18 (13.6)
6–12 mo	12 (9.1)
12–24 mo	15 (11.4)
>24 mo	87 (65.9)
Pain localization	
Without leg pain	62 (47)
Pain referred to the leg	70 (53)

The values given are number (percentage) unless otherwise indicated.

Reliability and Validity Study

A total of 132 native Portuguese-speaking patients with NSCLBP were enrolled in this study. All the participants completed the second assessment (1 wk later). The percentage of missing items for the QBPDS-PT was 2%. Of the 132 respondents, 11 patients (8.3%) failed to answer item 12, "Run about 100 m," and 9 patients did not answer the item "Ride in a car." The percentage of missing items for the RMDQ and the VAS was 0.57% and 0.7%, respectively. Missing data were treated as follows: 1 or 2 missing values were substituted

TABLE 2. Total Variance Explained—Eigenvalues Iniciais

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	10.428	52.138	52.138	10.428	52.138	52.138	5.326	26.632	26.632
2	1.481	7.404	59.542	1.481	7.404	59.542	3.371	16.853	43.485
3	1.083	5.416	64.959	1.083	5.416	64.959	3.133	15.664	59.149
4	1.036	5.180	70.139	1.036	5.180	70.139	2.198	10.990	70.139
5	0.823	4.114	74.253						
6	0.635	3.173	77.425						
7	0.622	3.112	80.538						
8	0.547	2.737	83.275						
9	0.490	2.448	85.723						
10	0.417	2.084	87.807						
11	0.356	1.782	89.589						
12	0.334	1.668	91.257						
13	0.328	1.642	92.899						
14	0.306	1.531	94.429						
15	0.258	1.290	95.720						
16	0.228	1.142	96.862						
17	0.205	1.024	97.885						
18	0.180	0.900	98.785						
19	0.143	0.717	99.503						
20	0.099	0.497	100.000						

Extraction method: principal component analysis.

with the average value for that subscale; if more than 2 items were omitted, the response was considered invalid and no score was evaluated.

In the second assessment, 104 of the 132 participants were classified as stable and their data were used for test-retest purposes (PGIC scale scores between 0 and 4). Regarding evaluation of the construct validity, of the 16 clinics involved in the data collection, 1 clinic failed to have patients who completed the RMDQ. The final sample to assess the construct validity involved 104 participants (Figure 1).

The scores for the group were normally distributed, and there were no floor or ceiling effects. All QBPDS-PT items had answers distributed across all categories, except items 1, 3, 4, and 13 (no answers in item 5). The lowest observed score was 4 (rated by 1 patient, 0.76% of the 132 subjects participating in the study), and the highest one was 95 (rated by 1 patient, 0.76%). The mean summary score of the QBPDS-PT was 35.75 (SD = 18.24).

Table 1 summarizes the demographic and clinical characteristics of the study population. A total of 132 subjects participated in the study, with a mean age of 46.6 years (SD = 12.67). Most of the participants were female (72.7%) and worked on a full-time basis (60.6%). Furthermore, the majority of the participants had a pain duration of more than 24 months (65.9%).

Factorial Analysis (n = 132)

The Bartlett test of sphericity was statistically significant ($P < 0.0005$), and the value founded for Kaiser-Meyer-Oklin measure of sampling adequacy was 0.917. Both results showed an excellent recommendation level to conduct further exploratory factor analysis. Exploratory factor analysis revealed the existence of one dominant factor that explained 52.1% of the variance.

Using the eigenvalue criteria, 4 factors were retained. However, 3 additional factors led only to a moderate improvement in the explained variance because each of them explained only 7.5% of the QBPDS variance in the unrotated model. This result suggests that the relational structure of QBPDS-PT items is explained by a predominant common factor and reflects the unidimensionality of the scale.[48]

TABLE 3. Summary of Studies Addressing Psychometrics of the Quebec Back Pain Disability Questionnaire

Reference	n	Dimensionality Studied?	Consistency (Cronbach α)	Reliability	Time Interval	Convergent Validity
Kopec *et al*[22,23]	242	Yes	0.95 (English version)	ICC = 0.92	1–14 d (median 3.89)	QBPDS-RMDQ (r = 0.72)
						QBPDS-Pain scale (r = 0.51)
Schoppink *et al*[35]	120	No	0.95	ICC = 0.90	1 wk	QBPDS-RMDQ (r = 0.80)
						QBPDS-Pain Severity scale (r = 0.74)
Yvanes-Thomas *et al*[55]	32	No	Item-total correlations (0.44–0.76)	ICC = 0.55	4 wk	QBPDS-DPQ (ρ = 0. 75)
						QBPDS-VAS (ρ = 0.45)
Mousavi *et al*[24]	100	No	0.92	ICC = 0.86	1 d	QBPDS-PF SF-36 (r = −0.69)
						QBPDS-VAS (r = 0.46)
Melikoglu *et al*[25]	100	No	0.94	ICC = 0.92	1 d	QBPDS-VAS (r = 0.37)
Rodrigues *et al*[26]	54	No	0.97	ICC = 0.93	3–4 d	QBPDS-RMDQ (r = 0.85)
						QBPDS-VAS (r = 0.75)
Bendeddouche *et al*[50]	64	No	0.98	ICC = 0.96	3 d	QBPDS-RMDQ (r = 0.64)
						QBPDS-VAS ($P > 0.05$)
Suh *et al*[51]	80	No	0.92	ICC = 0.91	2 wk	QBPDS-ODI (r = 0.72)
						QBPDS-VAS (r = 0.65)
						QBPDS-PF SF-36 (r = −0.64)

DPQ indicates Dallas Pain Questionnaire; ICC, intraclass correlation coefficient; ODI, Oswestry Disability Questionnaire; PF SF-36, Physical Functioning scale of the SF-36; QBPDS, Quebec Back Pain Disability Questionnaire; RMDQ, Roland-Morris Disability Questionnaire; VAS, visual analogue scale.

Reliability

The Cronbach α of QBPDS-PT was 0.95, indicating excellent internal consistency of the scale. The item-total correlation of the individual QBPDS-PT items with the total scale ranged from 0.47 ("Sit in a chair for several hours") to 0.79 ("Carry two bags of groceries"), showing consistently significant correlations of the single items with the total scale. The test-retest reliability of the QBPDS was satisfactory ($ICC_{2,1}$ = 0.696; 95% confidence interval, 0.581–0.783).

Convergent and Discriminative Validity (n = 104)

The assessment of the convergent validity confirmed significant correlations in the expected directions (Table 2). The QBPDS-PT correlated highly with the RMDQ (ρ = 0.62; $P < 0.001$) and moderately with the VAS (ρ = 0.38; $P < 0.001$) and showed capability to discriminate between subgroups of patients with and without leg pain (U = 1218; $P < 0.0005$).

DISCUSSION

The aim of this study was to cross-culturally adapt the English version of the QBPDS for use with Portuguese patients with CLBP and to examine its psychometric properties. In this study, no major cultural differences were noted during the translation process. Only minor modifications to the initial translation were required after the back-translations and after testing the prefinal version. On the contrary, semantic, syntactic, and lexical differences between the Brazilian Portuguese and European Portuguese versions of the QBPDS-PT are evident.[49] Of 20 items on the scale, only 5 have the same grammatical construction. Differences in the construction of phrases and sentences (*e.g.*, the European Portuguese language do not use gerunds) or in current vocabulary (use of words with different meanings or without equivalence to the European Portuguese language) justify the need for the European Portuguese version of the QBPDS.

Floor and ceiling effects were not a concern for the QBPDS-PT and indicated that the instrument could assess the full range of functional disability and be used in the clinical practice settings. The factor analysis resulted in a predominant common factor for the QBPDS-PT, identified as functional disability, which explains 52.1% of the variance (*eigenvalue* = 10.428). The analysis of the factorial structure of the QBPDS is limited to the study of Kopec *et al*.[22] Accordingly, this study's findings support the results reported in the original study of the scale, suggesting that the factorial structure of the scale is acceptable and approximately reflects the unidimensionality of the QBPDS.[46]

Considering its reliability, the results showed that the QBPDS-PT has an excellent internal consistency (Cronbach α = 0.95) and a reasonable test-retest reproducibility ($ICC_{2,1}$ = 0.696). The α value obtained was high, thus suggesting the presence of item redundancy. However, the value is comparable with those observed in similar studies.[23–26,35] In

all these studies, the Cronbach α was more than 0.90. According to Kopec *et al*,[22] item redundancy is present if 2 or more items correlate above 0.80. In the present study, there were only 2 items (items 19 and 20) with a correlation above 0.80 (0.802). The item-total correlations were moderate to strong, varying from 0.474 to 0.791, suggesting that all the items measure some common particularity of the construct (functional disability) but they all measure other aspects that are different from the other items.[48] Besides that, the elimination of any question did not significantly change the Cronbach α value.

Although the measurement properties of the QBPDS have been extensively examined using classical test theory methods,[23–26,35,50,51] the assumption of underlying dimensionality of the instrument and the extent to which individual items contribute to the construct of functional disability resulting from LBP needs further research using other methodological approaches (*e.g.*, the Rasch model).[52] With these kind of approaches, new insights into the factorial structure of the QBPDS, including response category functioning, could help researchers and clinicians to improve the precision and responsiveness of this measurement.[53]

The ICC observed in this study (0.696) was lower than the value reported in other studies that used similar test-retest periods, such as the Brazilian Portuguese version (ICC = 0.93) or the Dutch version (ICC = 0.90)[26,35] (Table 3). However, and in contrast to these studies, stability of the functional status of the participants in the second assessment was controlled through the PGIC scale scores. Because the ICC score is strongly affected by the variation between the patients in a sample, the ICC can be decreased by limiting the variability of the sample.[54] Therefore, the method used to guarantee stability of the functional condition in this study has decreased the value for test-retest reliability because it reduced the variance in patients' scores.

The results of the validity analysis confirmed the *a priori* hypothesis. There was a strong positive correlation with the RMDQ ($r = 0.618$; $P < 0.001$) and a moderate correlation with the VAS ($r = 0.377$; $P < 0.001$). Moreover, the results also confirmed the ability of the QBPDS-PT to discriminate between patients with different levels of pain disability severity. These results were similar to the values reported in similar studies, demonstrating that the QBPDS-PT showed convergent validity compared with a well-known and valid instrument, such as the RMDQ (Table 3).[23,26,50] The moderate correlation founded in this study between the QBPDS and the VAS was similar to the values reported in other studies,[24,25,55] and slightly less than that reported in the original version of the QBPDS.[23]

CONCLUSION

This study has developed a European Portuguese version of the QBPDS. It seems that the QBPDS-PT is a simple and comprehensible questionnaire that is quite easy to fill in and score and has good reliability and construct validity. Therefore, its use can be recommended in a clinical setting and in future outcome studies with Portuguese-speaking patients with CLBP in Portugal. Future research is needed to evaluate the responsiveness of the QBPDS-PT in the population of patients with CLBP.

➢ Key Points

- ❑ A successful cross-cultural adaptation of the QBPDS for the European Portuguese language was carried out and the QBPDS-PT was obtained.
- ❑ The Portuguese version of the QBPDS has good comprehensibility, internal consistency, and reliability and is a valid instrument to assess disability associated with CLBP in the Portuguese-speaking population.
- ❑ The use of the QBPDS is recommended in a clinical setting and in future outcome studies in Portuguese-speaking patients with NSCLBP in Portugal.

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