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RESEARCH ARTICLE

Translation, cross-cultural adaptation and validation of the Quebec back pain disability scale to urdu language

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ABSTRACT

Background: Back pain is one of most prevalent health issues. The Quebec Back Pain Disability Scale (QBPDS) is a frequently used tool for back pain. Quebec Back Pain Disability Scale was translated into Urdu so that Urdu speaking population can appropriately report their back pain experience.

Objectives: To translate and across cultural adapt QBPDS into Urdu (QBPDS-U) as well as to evaluate QBPDS-U's psychometric properties in patients having non-specific low back pain (NLPB).

Methods: The ethical approval obtained had reference number SN/73/19. The QBPDS was forward and backward translated and culturally modified into Urdu, according to Mapi Research Trust Guidelines. To assess the psychometric properties, there were 200 NLPB patients and 50 healthy individuals recruited for the study. The QBPDS-U, Oswestry Disability Index (ODI), visual analogue scale for pain (VAS_{pain}), and Visual Analogue Scale for disability ($VAS_{disability}$) were used. Patients responded to all questionnaires, as well as the global rating of change scale (GROC), after three weeks of physical therapy. Reliability, factor analysis, validity, and responsiveness were examined.

Results: The QBPDS-U showed high internal consistency (Cronbach's alpha=0.96) and excellent test-retest reliability (intra-class correlation coefficient=0.93). Factor analysis of QBPDS-U retained single factor structure. The QBPDS-U correlated moderately with $VAS_{disability}$ and VAS_{pain} [(r=0.65), P<0.001], but strongly with ODI [(r=0.73), P<0.001]. Discriminative validity was confirmed by significant differences in QBPDS-U total scores between healthy individuals and patients (P<0.001). The responsiveness of the QBPDS-U was verified by a significant difference in change scores between the stable and better groups (P<0.001).

Conclusion: The QBPDS-U is a valid, reliable, and responsive tool for measuring disability in NLBP patients who speak Urdu.

Keywords: Low back pain, Psychometrics, QBPDS, Responsiveness, Translation, Validity

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Introduction:

Low Back Pain (LBP) is a debilitating health condition that has a significant impact on quality of life and imposes significant financial burdens on individuals, families, and organizations.(1) In the Global Burden of Disease Study 2019, LBP is defined as "pain on the posterior side of the body that is localized from the lower edge of 12th ribs to lower gluteal fold with/without involving legs and pain should last for at least one day". (2) LBP is considered having the highest incidence of disease related to years lived with disability (YLDs) globally. In 2019, the prevalence of LBP was estimated to be 568.4 million people, and LBP was the leading cause of YLDs, accounting for 63.7 million of total YLDs.(2) Recent studies have assessed the prevalence of LBP in Pakistan. The majority of these studies were conducted with specific groups, and the prevalence of LBP among bankers, undergraduate students, office workers, teachers, traffic police wardens, and health care professionals was reported to be 52.4%, 45.9%, 29.45%, 32.8%, 65.7%, and 51%, respectively.(3-8)A significant number of people with LBP may not have any known or anatomic factors causing LBP, which is why these patients are referred to as having non-specific LBP (NLBP).(9)

The Quebec Back Pain Disability Scale (QBPDS)

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consists of 20-items which are used to measure the functional disability status of patients with LBP. It was created in 1995 by Kopec et al., and research has demonstrated that it has good psychometric qualities.(10) The QBPDS is short, comprehensive, and acceptable to both practitioners and patients.(11) This tool has been adapted and validated into Arabic(12,13), Brazilian Portuguese(14), Chinese(15), Dutch(16), European Portuguese(17), French(18), German(19), Greek(20), Hindi(21), Iranian(22), Italian(23), Korean(24), Moroccan(25), Polish(26), and Turkish(27).

This tool's reliability and validity has been demonstrated by all of its previous versions. The Hindi version showed four factors, but the Italian and Portuguese versions showed a one-factor structure. None of the earlier research examined responsiveness of this questionnaire.

The QBPDS hasn't yet been translated into Urdu. It is essential to translate the Quebec Back Pain Disability Scale into Urdu because Urdu is the national language of Pakistan, spoken and understood by the majority of its population. Given that, many Pakistanis have limited proficiency in English, an Urdu translation ensures that patients can accurately and comfortably report their back pain experiences. This translation enhances patient participation, leads to more precise assessments, and improves the quality of healthcare provided. The objective of the current study was to translate the QBPDS in Urdu (QBPDS-U), adapt it for use across cultures, and examine the psychometric features of the QBPDS-U in NLBP patients.

Methods:

The translation and cross-cultural adaptation were based on guidelines of Clinical Outcome Assessment (COA) provided by Mapi Research Trust. This study involved psychometric assessment following standard recommendations for psychometric testing. A sample size of ten subjects was taken into account for each instrument item.(28) Because the QBPDS comprises of 20 elements, the sample size was computed to be 200. Through convenience sampling technique, male and female patients between the ages of 18 and 65 who had NLBP and could read Urdu, were sought out from three hospitals in Islamabad and Rawalpindi, Pakistan. Patients who suffered from back pain brought on by a spinal fracture, myelopathy, back surgery, pregnancy, inflammatory or infectious disorders, neurological impairments, tumors, caudaequina syndrome, stenosis, or other systemic illnesses were excluded from the study. Additionally excluded were patients with recognized psychological problems. In addition, fifty healthy individuals aged 18-65 years with no prior history of backache or back pathology were selected from the students and employees of the Margalla Institute of Health Sciences, Rawalpindi. The research was carried out between August 2019 and February, 2021. Firstly, demographic data were collected through a self-structured questionnaire. On the first day, both patients and healthy subjects were requested to complete the QBPDS-U, ODI, VAS_{pain}, and $VAS_{disability}$ questionnaires. Later, out of 200 patients, 46 were chosen at random and instructed to complete the QBPDS-U again after 48 hours. After 3 weeks of physical therapy treatment, patients were asked to fill the aforementioned scales along with GROC. We requested signed informed consent from participants. The Margalla Institute of Health Sciences in Rawalpindi's ethics review committee gave its approval to this project (ERC Ref No: SN/73/19). Formal permission was taken from Mapi Research Trust, an authorizing organization that has distribution rights for QBPDS.

According to Mapi Research Trust guidelines, the whole process consisted of four basic phases. In Phase 1, a bilingual professional translator and a physical therapist made two translations of QBPDS from English to Urdu independently. In cooperation with a local coordinator (a physical therapist), both translated versions were screened and compared to each other. In this phase, only minor disagreements occurred in the two translations, and after discussion, they reached a consensus and agreed on a reconciled version (1st Version). During 2nd phase, backward translation was done by a professional translator. The local coordinator compared the backward version with the original instrument, to look for and correct possible differences in meaning or inaccuracies that could exist between them, by discussing it with the backward translator. After reaching an agreement with the backward translator, a few changes were made and 2nd version was finalized. Then 2nd version of the questionnaire was tested on 40 NLBP patients during the third phase. The patients were questioned about clarity and comprehension of all items. A few participants commented on inapplicability of few items. Following discussion, these items were replaced with more familiar words/activities. A 3rd version was composed and 15 patients with NLBP were interviewed again. At this stage, no difficulty was reported by any of the participants. In the last phase, the proofreading of 3rd version of the questionnaire was done by a proofreader, and final Urdu language version was produced.

The QBPDS is used to assess the functional

disability level of patients having back pain.(10) The QBPDS consists of 20 items that are related to activities of daily life. The overall score is calculated as the sum of all item scores, with a higher score signifying more disability.(10) The psychometric analysis of QBPDS has been proven good.(11)

The ODI is a condition-specific valid and reliable outcome tool composed of 10 sections that evaluate pain and disability in patients presenting with LBP.(29) Each section is graded from 0 to 5, with the highest possible score of 50.(29,30)

The VAS pain is a pain measurement instrument that is typically displayed as a 100-mm horizontal line with a cross between the extremes of "no pain at all" and "worst pain imaginable" indicating the patient's pain intensity. Its validity and reliability make it an optimal tool for evaluating pain intensity.(31)

The VAS disability is a reliable and valid instrument that consists of a 100-mm horizontal line with a cross between the extreme ends of "no restriction" and "worst possible restriction" representing the patient's disability degree.(32)

The GROC scale is primarily used to evaluate a subject's improvement and decline over time because of its high repeatability and sensitivity to change. Patients are asked to mark a number that depicts their state on a scale ranging from -7 ("a very much worse") to +7 ("a very much better") to determine the results.

The Statistical Product and Service Solution (SPSS) version 26 was used to analyze the data. The level of significance was set at 0.05.The internal consistency and test-retest reliability of the QBPDS-U were analyzed to determine its reliability.(33) To assess test-retest reliability, 46 randomly selected patients completed the QBPDS-U a second time, with a 48-hour gap between each test to reduce the possibility of memory lapses and alterations in clinical condition. For estimating test-retest reliability, the Intraclass Correlation Coefficient (ICC) was applied.(33-35) ICC scores range from 0.00 to 1.00, with 0.60 and 0.80 being considered good and 0.80 and above being excellent reliability.(36) Internal consistency was estimated using Cronbach's alpha. (37,38) Internal consistency is regarded to be high if Cronbach's alpha values exist within the range from 0.70 to 0.95.(39)

The completeness of question responses, score distribution, and the extent of the ceiling and floor effects were all examined as part of the content validity process.(40) If more than 15% of respondents scored the greatest or lowest possible score, floor and ceiling effects were considered present.(34,39)

To evaluate the dimensionality of the questionnaire items, exploratory factor analysis was examined. The factor analysis was checked using the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy and Bartlett's Test of sphericity. The number of components maintained was decided by applying Kaiser's Criteria (Eigenvalue more than 1), variance greater than 10%, and scree plot.(28)

Construct validity was assessed by calculating the correlation between the QBPDS-U and the ODI, VASpain, and VASdisability using Pearson's Correlation Coefficients (convergent validity). Correlation Coefficients of 0.00 to 0.09, 0.10-0.39, 0.40-0.69, 0.70-0.89, and 0.90-1.00 suggest an insignificant, weak, moderate, strong, or extremely strong association, respectively.(41)

An independent t-test was used to examine the difference in overall QBPDS-U score between patients and healthy subjects. (Discriminative validity).

Patients were divided into better (GROC score greater than or equal to 3) and stable groups (GROC less than 3 to greater than -3) using the GROC scale. (34) An independent t-test was used to distinguish change scores of QBPDS-U between stable and better groups to analyze responsiveness and by correlating change scores of QBPDS-U with change scores of ODI, $VAS_{pain,}$ and $VAS_{disability}$ through Pearson's correlation coefficients.(34,40)

Results:

Some changes were made to the original QBPDS after consensus to finalize QBPDS-U for better comprehension during translation phases. For example, item 11, "Throw a ball" was replaced by "throw a ball or any other object" as throwing a ball is not a usual activity for Pakistani patients. Similarly, item 16, "Bend over to clean the bathtub", was replaced with "Bend over for any activity (e.g. cleaning, washing clothes, offering prayers, etc.)" because bathtubs are not commonly used in Pakistani homes, so it was replaced by most common activities added in bracket adapted by our people for a clear concept. Table 1 displays the demographic and clinical characteristics of respondents.

Good to excellent test-retest reliability was found for each item ($ICC_{2, 1}$ = 0.69 – 0.93) and overall scores ($ICC_{2, 1}$ = 0.93) of QBPDS-U. The Cronbach's alpha of QBPDS-U was 0.96, indicating that the tool has high internal consistency. The mean and test-retest reliability values of each item as well as overall QBPDS-U scores are mentioned in Table 2.

It took less than ten minutes to complete the

Table 1: Respondents characteristics

Variables	Patients (n = 200)		Healthy Participants (n = 50)	
	Mean ± SD	n (%)	Mean ± SD	n (%)
Age (years)	34.58 ± 12.71		32.42 ± 10.76	
Sex				
Male		80 (40)		21 (42)
Female		120 (60)		29 (58)
BMI	26 ± 5.25		23.95 ± 3.95	
Educational level				
Primary		33 (16.5)		-
Secondary		27 (13.5)		12 (24)
Intermediate		49 (24.5)		16 (32)
Graduate		72 (36)		19 (38)
Post Graduate		19 (9.5)		3 (6)
Occupation				
Unemployed		104 (48)		26 (52)
Employed		96 (52)		24 (48)
Marital status				
Married		121 (60.5)		25 (50)
Single		73 (36.5)		24 (48)
Divorced		3 (1.5)		1 (2)
Widowed		3 (1.5)		-
Duration of pain in months	35.45 ± 54.91		N/A	
QBPDS-U (0-100)	37.60 ± 18.02		0	
ODI (0-50)	13.31 ± 7.87		0	
VAS_{pain} (0-10)	4.02 ± 1.88		0	
$VAS_{disability}$ (0-10)	3.68 ± 2.22		0	

questionnaire. No missing responses or multiple answers were noticed. There were no floor or ceiling effects on the total QBPDS-U score. KMO was 0.94, and the sphericity test of Bartlett's resulted in a significant result ($p < 0.001$). Principal component analysis revealed a single-factor solution with eigenvalues greater than one, accounting for 58.60% of total variance. Figure 1 displays a scree plot exhibiting single factor structure.

The QBPDS-U had moderate correlation with $VAS_{disability}$ [($r = 0.66$), $P < 0.001$] and VAS_{pain} [($r = 0.65$), $P < 0.001$], and strong correlation with ODI [($r = 0.73$), $P < 0.001$]. The results demonstrated significant difference between two groups, i.e., patients and healthy participants in QBPDS-U overall scores ($P < 0.001$).

The difference in QBPDS-U change scores between better and stable groups was statistically significant (32.76 ± 17.34 in better group, n = 125; 45.66 ± 16.23 in stable group, n = 75; $P < 0.001$). The QBPDS-U change score correlated moderately with ODI [($r = 0.55$), $P < 0.001$], VAS_{pain} [($r = 0.59$), $P < 0.001$] and $VAS_{disability}$ change scores [($r = 0.55$), $P < 0.001$].

Discussion:

In this project, QBPDS was initially translated and cross culturally adapted into Urdu and then psychometric analysis was conducted. The issues faced during the adaption phase were resolved with consensus and the use of common words. A few changes were made during this process, including changing item 11 "throw a ball" to "throw a ball or any other object" because throwing a ball was not a common activity for most patients. Similarly, item 16, "bend over to clean the bathtub" was changed too because bathtubs are not commonly used in

Table 2: Mean and test-retest reliability values of QBPDS-U (n = 46)

QBPDS-U	1st Measurement Mean ± SD	2nd Measurement Mean ± SD	$ICC_{2,1}$	95% CI
QBPDS-U 1	1.53 ± 1.16	1.58 ± 0.99	0.87	0.78 – 0.93
QBPDS-U 2	1.39 ± 1.02	1.19 ± 0.98	0.89	0.81 – 0.94
QBPDS-U 3	1.60 ± 1.06	1.51 ± 1.05	0.89	0.80 – 0.94
QBPDS-U 4	2.19 ± 1.36	2.21 ± 1.08	0.76	0.60 – 0.86
QBPDS-U 5	2.14 ± 1.21	2.19 ± 1.07	0.79	0.64 – 0.88
QBPDS-U 6	2.85 ± 1.19	2.63 ± 1.08	0.91	0.84 – 0.95
QBPDS-U 7	1.90 ± 1.37	1.65 ± 1.29	0.84	0.73 – 0.91
QBPDS-U 8	1.51 ± 0.95	1.51 ± 0.84	0.72	0.53 – 0.84
QBPDS-U 9	2.80 ± 1.26	2.56 ± 1.16	0.83	0.70 – 0.90
QBPDS-U 10	1.58 ± 1.26	1.39 ± 1.11	0.85	0.74 – 0.92
QBPDS-U 11	1.04 ± 1.16	1.04 ± 1.02	0.91	0.84 – 0.95
QBPDS-U 12	2.41 ± 1.58	2.39 ± 1.49	0.91	0.83 – 0.95
QBPDS-U 13	1.09 ± 0.99	1.00 ± 0.83	0.82	0.70 – 0.90
QBPDS-U 14	0.92 ± 0.95	0.78 ± 0.79	0.78	0.63 – 0.88
QBPDS-U 15	1.43 ± 1.30	1.26 ± 1.11	0.88	0.79 – 0.93
QBPDS-U 16	2.56 ± 1.37	2.53 ± 1.26	0.92	0.85 – 0.95
QBPDS-U 17	1.07 ± 1.03	1.09 ± 1.01	0.87	0.76 – 0.92
QBPDS-U 18	1.80 ± 1.38	1.85 ± 1.33	0.87	0.78 – 0.93
QBPDS-U 19	2.21 ± 1.40	1.78 ± 1.40	0.69	0.50 – 0.82
QBPDS-U 20	3.36 ± 1.44	3.21 ± 1.55	0.93	0.88 – 0.96
Total (0-100)	37.51 ± 19.02	35.43 ± 17.37	0.93	0.88 – 0.96

Pakistani homes. Thus, item 16 was changed to "bend over to perform any activity (cleaning, laundry, praying, etc.)" to culturally adapt the questionnaire. The change to item 16 was also found in the Hindi version of QBPDS. (21) They changed it to "bend over for brooming". This resemblance could be due to cultural similarities between India and Pakistan. Similarly, in the Moroccan version, a synonym was used for bathtub.(25)

Females outnumbered males in the current study (60%) to 40%. This is in line with earlier study findings, which found that more females were enrolled. (53-73%) (14,17,19,20,25) but differ from Dutch, French, and Italian versions, which enrolled males greater than females (16, 18, 23). The patients in the current study had a mean age of 34.5 years, which is comparable to previous studies 29-40 years(16, 21, 22), whereas other studies reported participants with higher mean age (42-53 years).(18,19,23,25,27)

In this investigation, the QBPDS-U revealed excellent test-retest reliability, which is similar to findings from earlier studies (0.92-0.98). (10,14,16,17,19,21,23-27) The QBPDS-U had high internal consistency having Cronbach's alpha value of 0.96, as matched with previous versions (0.92-0.98). (10,14-21,23-25,27)

This study found no missing responses, as did QBPDS Italian(23) and Hindi(21) versions, but Riecke et al.(19) Found 0.33% missing data in QBPDS German version. The total QBPDS-U score did not display any floor or ceiling effects, which is consistent with prior findings.(17,21,23,25)

In this study, one-factor structure was discovered. Despite discovery of two-factor components with Eigenvalues > 1.0, only one of the factors had variance

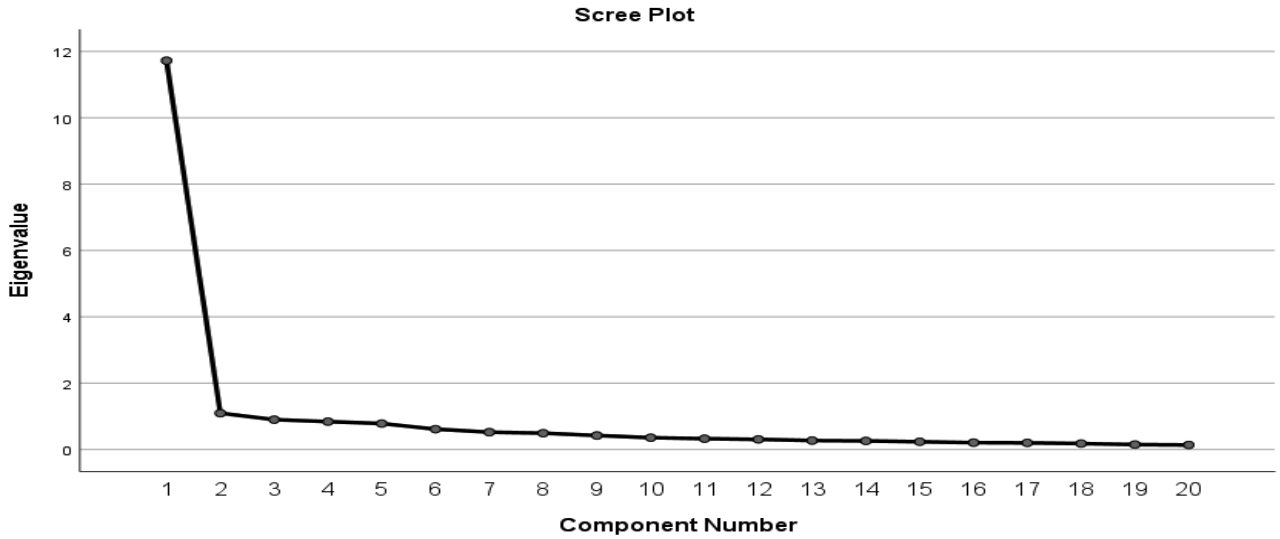

Figure 1: Scree plot confirmed single factor structure of QBPDS-U

Table 3: Shows correlations among QBPDS-U, ODI, VASpain, and VASdisability

INSTRUMENTS	QBPDS-U r	P- value
ODI	0.73	
VAS_{pain}	0.65	<0.001
$VAS_{disability}$	0.66	

greater than 10%, accounting for 58.60% of variation and matching to elbow of the Scree plot. Thus, it was determined that one factor existed. This result is comparable to the Italian version, which also revealed two factors but they concluded the existence of one dominant factor that explained 54.7% of the variance because the second factor explained less than 10% of variance.(23) Similarly, the European Portuguese version revealed a four-factor structure, but three factors explained less than 10% of variance, so the authors retained a one-factor structure.(17) In other studies, factor analysis revealed 4-6 factor solutions, with Hindi and German versions having four factors and Greek having six.(19-21) This variation in outcomes could be linked to cultural views about disability, which influence daily living activities.

The QBPDS-U depicted a strong correlation with ODI (r = 0.73) and a moderate correlation with VAS_{pain} (r = 0.64) and $VAS_{disability}$ (r = 0.65). The correlation between QBPDS-U and ODI is in line with previous existing versions (r = 0.67 - 0.78) (12, 20, 27), higher than that of the Italian version (r = 0.48) (23) but lower than that of the Chinese version (r = 0.91) .(15) The correlation between QBPDS-U and pain intensity is consistent with Arabic, Hindi and Korean versions (r = 0.61-0.68) (12, 21, 24) while higher than French, Moroccan, Iranian, Dutch, Portuguese, and German versions (r = 0.44 - 0.46) (17-19, 22, 25), and lower than Brazilian (r = 0.75), Chinese (r = 0.77), and Dutch (r = 0.75) versions.(14-16) Furthermore, the results of this study confirmed a significant difference in QBPDS-U total score between healthy subjects and patients (P < 0.001), which is matched with results of QBPDS Hindi and Portuguese translations.(17,21)

According to the findings of this study, the QBPDS-U is a good tool in terms of responsiveness. The difference in QBPDS-U change scores between better and stable groups was statistically significant. The QBPDS-U change score correlated moderately with ODI, VAS_{pain}, and $VAS_{disability}$ change scores. This finding is consistent with the Dutch version, which found a moderate correlation between QBPDS and Roland disability questionnaire change score.(16)

The study's limitation is that it only included patients with NLBP, and it's not obvious whether the findings of this study can be applied to patients with specific causes of LBP, such as disc herniation, stenosis, and so on. The study's strength is that, to

best of the authors' knowledge, this is the first study in which responsiveness of QBPDS-U was determined by gauging the correlation between QBPDS-U, ODI, VAS_{pain}, and $VAS_{disability}$ change scores.

Conclusion:

The QBPDS-U has been determined to be a reliable, valid, and responsive tool for evaluating functional disability in patients with NLBP who speak Urdu. Its reliability ensures consistent and accurate measurement, its validity confirms its effectiveness in assessing disability, and its responsiveness indicates its ability to detect meaningful changes in disability over time. This makes it valuable for both clinical practice and research involving Urdu speaking NLBP patients.

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Conflict of Interest: None to declare

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