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Validation of the Turkish Version of the Quebec Back Pain Disability Scale for Patients With Low Back Pain

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Study Design. A reliability and validity study of a translated, culturally adapted questionnaire.

Objective. The aims of the present study were to translate the Quebec Back Pain Disability Scale (QDS) into Turkish, to perform its cross-cultural adaptation for Turkish patients with LBP, and to investigate its validity and test-retest reliability.

Summary of Background Data. As a widely used scale in the evaluation of patients with low back pain (LBP), the QDS awaits formal translation and validation into Turkish to achieve an equivalent questionnaire and to allow comparability of data.

Methods. The translation and cross-cultural adaptation of the original questionnaire were performed in accordance with published guidelines. Translation and retranslation of the English version of the QDS was performed blindly and independently by 4 different individuals, and adapted by a team. Hundred patients with LBP were included in our study. The physical examinations were evaluated and the Schober test was assessed for a mobility measurement of the spine. The patients were asked to complete a questionnaire booklet containing the Turkish versions of the modified Oswestry Disability Index (ODI) and QDS, and Visual Analog Scale (VAS) measure of pain. All assessments were repeated 24 hours later for all of the patients. Reliability was evaluated using internal consistency and the intraclass correlation coefficient (ICC). Concurrent validity was measured by comparing the Turkish version of the QDS results to VAS and the Schober test scores. Also, for construct validity, the results of the scale were compared with the Turkish version of modified ODI.

Results. The QDS showed excellent test-retest reliability as evidenced by the high ICC for 2 test occasions (ICC = 0.9221, $P < 0.000$). Also, internal consistency was found to be adequate at both assessments with Cronbach's alpha (0.9405 and 0.9537 at day 0 and 1, respectively). There was a positive correlation between QDS and VAS both for day 0 (r = 0.368; $P < 0.000$) and for day 1 (r = 0.441; $P < 0.000$). There was no correlation determined in the comparison of the QDS sum scores with Schober testing for day 0; however, significant negative correlations in these parameters were observed for day 1 (r = −0.249 P = 0.014). Also significantly positive correlations were determined between the Turkish version of the QDS and the Turkish version of the modified ODI for both day 0 and day 1 (r = 0.666, $P < 0.000$, r = 0.681; $P < 0.000$, respectively).

Conclusion. The results of our study show that QDS as a functional status questionnaire has been translated into Turkish without losing the psychometric properties of the original version. The Turkish version of the QDS has good comprehensibility, internal consistency, and validity and is an adequate and useful instrument for the evaluation of disability in patients with LBP.

Key words: low back pain, Quebec Back Pain Disability Scale, Turkish version, reliability, validity. **Spine 2009;34: E219–E224**

Low back pain (LBP) continues to be a major health problem, which is commonly encountered by the physician. Its lifetime prevalence has been reported to range from 60 to 90% in general population.[1] Similarly, the prevalence studies from Turkey have demonstrated that LBP can affect nearly half of the population.[2,3] Also it can have a profound impact on the functional activity level of the patient and it has been reported that LBP is the major cause of disability in people younger than 45 years of age and the third cause of disability in those older than 45 years of age.[4–6] Besides its high prevalence, the socioeconomic impact of LBP made this condition a major health problem that has to be evaluated by reliable methods. Also equivalent measurements are needed to allow comparability of data in patients with LBP as a widely encountered condition.

To evaluate a patient's functional ability and determine the success of a treatment protocol, it is necessary to use measurement tools that accurately help to assess and monitor the patient.[7] Traditionally, physiologic measures such as spine mobility and muscle strength have been widely used to assess the patient with LBP in clinical settings and researches.[8] However, it has been reported that such measures were poorly associated with some outcomes such as symptom relief, daily functional ability, and work status in many cases.[9,10] This leads to a trend to supplement objective assessment of spine with subjective measurements of functional status, using validated questionnaires in patients with LBP.

Standardized self-report questionnaires have been used as an outcome measure for people with LBP.[11] These questionnaires can provide a convenient method of collecting and synthesizing a large amount of information on activity limitation.[12,13] The importance of these measures as an outcome in the evaluation of the

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patient with LBP has been emphasized in several studies.[9,12] In clinical settings, beside their role in the functional status assessment, the scales can be used also for monitoring the patients with LBP. The scales designed to assess the magnitude of change in patients over time are expected to possess high levels of reliability.[14] Reliability requires that scales show little variability in repeated measurements of patients whose clinical status has not changed.[12]

For these purposes, several disability scales have been developed for the clinical evaluation of patients with LBP. Three commonly used questionnaires for assessing disability in patients with LBP are the Roland-Morris Disability Questionnaire (RMQ), the Oswestry Disability Index (ODI), and the Quebec Back Pain Disability Scale (QDS). Although RMQ[15] and ODI were translated into Turkish,[16] till date no Turkish version of the QDS has been validated. The QDS is a condition-specific measure of disability that was described by Kopec *et al*.[17] The items' final set of the QDS were chosen from a larger pool of items by examining the test-retest reliability, item-total correlations, and responsiveness of individual items, and by using techniques of factor analysis and item response theory.[17,18] In the original description of the QDS, the developers presented the data indicating that this method was likely to produce a scale with measurement properties superior to those of older scales, with a more intuitive approach to item selection. The scale contains 20 daily activities and asks the patient to rate his or her degree of difficulty in performing each activity from 0 ("not difficult at all") to 5 ("unable to do"). The item scores were summed for a total score between 0 and 100, with higher numbers representing greater levels of disability.

As a widely used scale in the evaluation of patients with LBP, the QDS awaits formal translation and validation into Turkish to achieve an equivalent questionnaire and to allow comparability of data. The aims of the present study were to translate the QDS into Turkish, to perform its cross-cultural adaptation for Turkish patients with LBP, and to investigate its test-retest reliability.

■ Materials and Methods

Translations and Cultural Adaptation

The QDS was created by Kopec *et al* and was published in 1995.[17] After the permission of the author and the publisher, the translation and cross-cultural adaptation of the original questionnaire were performed in accordance with recently published guidelines.[19] First, 2 translations of QDS from English to Turkish were performed by 2 native Turkish speakers. One of the translators was aware of the process and familiar with the concept of the questionnaires and the other was uninformed of translation objective to keep the language easy for individuals without the knowledge of technical terminology. Both Turkish translations were then compared with each other and original English version for inconsistencies. After discussing possible discrepancies, a consensus was reached by the synthesis of 2 translations. Also 2 back translations of the questionnaire's Turkish version into English were performed by 2 different translators blindly and independently. All reports of translations were then reviewed to develop a consensus on any discrepancy and to achieve equivalence between the source and target versions. Also, the Turkish version was detected for errors and nuances that might have been missed and it was reviewed to assess the necessity of performing a cultural adaptation for Turkish patients. After a careful review and cultural adaptation, few changes have been made, and the prefinal Turkish version of the questionnaires was provided.

The final stage of adaptation process was the test of the prefinal version (face validity). The aim of this stage was to establish whether this version could be understood and seemed to be assessing the intended parameters. Thirty patients with LBP completed the prefinal Turkish version of the QDS and they were interviewed to probe about their general comments on difficulty in the questionnaire or understanding the text. Most of the patients correctly understood the questionnaires. All findings from this phase of the adaptation process were evaluated before the final Turkish version of the QDS and this stage was finalized after slight changes were made by consensus.

In the translation process, because of special cultural circumstances and linguistic characteristics of Turkish, some modifications of the translations were performed. "Walk a few blocks" was changed as "walk several alleys," and "run one block" was changed as "run one alley" to refer to a similar distance in the Turkish. Because the distance described in the original version in terms of "several miles" is unfamiliar with Turkish people, it was converted to "several kilometers," which is the familiar method of distance measurement in Turkey.

Patients

A total of 100 consecutive native Turkish-speaking patients who were referred to Akdeniz University Medical Faculty Physical Medicine and Rehabilitation department with LBP of at least 3 weeks duration were included in the study after their informed consent was obtained. All patients were investigated to identify the causes of LBP with physical and neurologic examinations, spine radiographs, and laboratory tests (complete blood count, erythrocyte sedimentation rate, C-reactive protein, blood biochemistry, and urinary analysis). Patients with nonmechanical causes of LBP and patients having any neuropathic pain were not included in the study. Also patients having neurologic deficits were recorded.

Reliability

Test-retest reliability and internal consistency have been considered as 2 common forms of reliability.[16,20] Test-retest reliability evaluates stability over time, by administering the same test to the same individuals at 2 points in time. The appropriate length of the interval depends on the stability of the variables and in this study it was measured by comparing the results of the first (day 0) and second administrations (day 1) separated by a time interval of 24 hours. In the present study, the subjects were not informed whether they would be asked to complete the questionnaire again to prevent them from recognition of the first responses. In the present study, the responses from 2 administrations were collected for data analysis, and intraclass correlation coefficient (ICC) was used to evaluate test-retest reliability. Higher coefficient value reflects higher reliability and lower standard error of measurement. It has been defined that ICCs can vary from 0.00 to 1.00, where values of 0.60 to 0.80 are regarded as evidence of good reliability and with those above 0.80 indicating excellent reliability.[21] Also it has been reported that reliability should exceed 0.90 to ensure reason-

able validity for most clinical measurements and values below the acceptable level can indicate that the measure has a high level of random measurement error.[22] The scale's internal consistency that relates to its homogeneity was also analyzed in our study. For internal consistency, values equal or more than 0.70 were considered as satisfactory,[23] and it is suggested that the value of alpha should be above 0.80 for acceptance as high internal consistency.[24]

Validity

To assess the concurrent and construct validity of the questionnaire, the patients were asked to complete a questionnaire booklet, which contained the Turkish versions of the modified ODI, QDS, and Visual Analog Scale (VAS) measure of pain. Concurrent validity was measured by comparing the QDS responses with other measurements performed at the same time. For this purpose; a VAS measure of pain, with a 100-mm length horizontal line, was used as an internal criteria (0 mm, no pain; and 100 mm, worst pain possible), and patients selected the point on the line that best represents his/her perception of pain level. Also as external criteria, the Schober test that has been commonly used for mobility measurement of the spine was evaluated. Two points were marked 5 cm below and 10 cm above at the level of Venus dimples joining line over spine while the patient is standing. The distance between these marks was measured in the maximally forward bending position. All assessments were repeated 24 hours later by the same clinician.

Also, for construct validity, the instrument can be compared with other measures in which there would be an expected level of agreement (convergent validity) or disagreement (divergent validity).[25] Convergent and discriminant validity are considered as 2 forms of construct validity. The scores on similar measures are expected to be correlated with each other in convergent[24] and scales that measure dissimilar constructs are found to be unrelated in discriminant validity.[26] In this study, to assess construct validity, the results of the scale were compared with another measure, modified ODI. The construct validity coefficients were accepted as: $r \geq 0.81$ to 1.0, excellent; 0.61 to 0.80, very good; 0.41 to 0.60, good; 0.21 to 0.40, fair; and 0 to 0.20, poor.[27]

Statistical Analysis

The means and standard deviations were determined to describe the demographic data of the patients. All statistical analyses were performed with SPSS 11.0 for Windows. In the present study, ICC that can vary from 0.00 to 1.00 was used to evaluate test-retest reliability and the coefficient of internal consistency was assessed with the Cronbach's alpha that can range from 0 to 1. Concurrent and construct validity were measured by the Pearson correlation coefficient. A probability value of $P < 0.05$ was considered as significant.

■ Results

Patient Characteristics

A total of 100 native Turkish-speaking patients with LBP participated in the evaluation part of the study. The mean age of the participants was 45.44 ± 15.05 years and 74 of the 100 patients were women. Twenty-one patients were recorded as having neurologic deficits. Mean duration of LBP was 50.89 ± 50.25 months. All subjects attended to follow-up assessment and completed the Turkish version of the QDS after 24 hours.

Table 1. The Demographic and Clinical Characteristics of the Study Population (Mean ± SD)

Total Patient n	100	
Female	74	
Male	26	
Patient having neurologic deficits	21	
Age(yr)	45.44 ± 15.05	
Disease duration (mo)	50.89 ± 50.25	
	Day 0	Day 1
VAS (mm)	60.22 ± 20.20	50.80 ± 20.22
Schober (cm)	4.37 ± 1.13	4.45 ± 0.99
Mod. ODI (%)	31.78 ± 16.47	30.62 ± 15.87
QDS	37.39 ± 18.81	35.35 ± 17.84

Reported pain at baseline was 6.22 ± 2.20 and it was 5.80 ± 2.22 on the second clinical evaluation. Mean spinal movement (Schober) was 4.37 ± 1.13 cm at baseline and 4.45 ± 0.99 cm in the second assessment. Table 1 summarizes the demographic and clinical characteristics of the study population.

Reliability

The QDS showed excellent test-retest reliability as evidenced by the high ICC for 2 test occasions (ICC = 0.9221, $P < 0.000$). Also, internal consistency was found to be adequate at both assessments with Cronbach's alpha (0.9405 and 0.9537 at day 0 and 1, respectively).

Validity

Concurrent validity was evaluated by comparing the responses to the QDS with the results of VAS and mobility of the spine (Schober test) by using the Pearson correlation coefficient. There was a positive correlation between QDS and VAS, both for day 0 ($r = 0.368$; $P < 0.000$) and for day 1 ($r = 0.441$; $P < 0.000$). There was no correlation determined in comparison with the QDS sum scores with Schober testing for day 0 ($r = -0.154$, $P = 0.128$); however, Pearson correlation coefficients showed statistically significant negative correlations in these parameters for day 1 ($r = -0.249$ $P = 0.014$). Also the correlation between the Turkish version of the QDS and the Turkish version of the modified ODI was used to test the construct validity and significantly positive correlations were determined between these evaluations for both day 0 and day 1 ($r = 0.666$, $P < 0.000$, $r = 0681$; $P < 0.000$, respectively). The relationship between the clinical parameters and the questionnaires are shown in Table 2.

■ Discussion

The impact of LBP is strongly related to a patient's functional status.[11] Instruments, such as scales, for measuring functional status are commonly used to evaluate the patient's condition and the effectiveness of therapeutic maneuvers and rehabilitation program.[17] Most of these standard questionnaires have been developed for English-speaking patients. There is a need for measures designed to be used in non-English-speaking countries because cultural groups may vary in disease expression and the growing number of large multicenter multicountry

Table 2. The Correlations Between the Clinical Parameters and the Questionnaires (Pearson Correlation Coefficient)

	Day 0		Day 1	
	r	*P*	r	*P*
QDS				
VAS	0.368	0.000*	0.441	0.000*
Schober	−0.154	0.128	−0.249	0.014*
Mod. ODI	0.666	0.000*	0.681	0.000*
Mod. ODI				
VAS	0.330	0.001*	0.422	0.000*
Schober	−0.080	0.431	−0.108	0.294

*Significant correlations between parameters.

trials can be estimated. It is clear that a scale cannot be transferred directly from one culture to another by a simple direct translation of a questionnaire without being revalidated for the new conditions.[28] The sequential process of measures' adaptation for use in different cultures is well documented[19,29] and it is well known that the translation must be validated to achieve an equivalent scale and to allow comparability of data. With this study, the adaptation of the QDS for the Turkish language has produced an instrument that demonstrates its reliability and validity.

Test-retest reliability and internal consistency were investigated for the Turkish version of the scale in this study. For self-rated tests, the test-retest reproducibility has been recommended to be assessed by administering the scale on 2 occasions, separated by a time interval that is sufficiently short to assume that the variable being measured has not changed.[30] From the literature review, this time interval was determined to be ranged between 20 and 30 minutes to 7 days in the studies evaluating test-retest reliability of scales about LBP.[13,20,31,32] A 24-hour period was selected for test-retest reliability evaluation in the present study because this period was recommended by most of the studies and it was considered as an admissible interval in the concern of the similarity of functional status.[20,32,33] With this test-retest interval, our ICC result showed excellent test-retest reliability and was in accordance with other versions of the questionnaire.[13,17,20]

For internal consistency, our results suggested that the Turkish version of the questionnaire has satisfactory internal consistency and the Cronbach-alpha for the Turkish version of the QDS was similar to the results of the developers of the scale in addition to the results of the Dutch and Persian versions.[13,17,20,24]

In the analysis for concurrent validity, significant positive correlation was found between the QDS summary scores and VAS measure of pain in the present study. The correlation between the Turkish version of QDS and VAS was found to be similar to French and Persian versions[20,34] and slightly lesser than English version of QDS.[17]

In the present study, there was no significant correlation between QDS and mobility of the spine on the first examination, and a negative weak correlation was determined between these parameters on the second clinical evaluation. As a part of validation procedure, no other study evaluating the possible correlation between QDS and spine mobility was available for purpose of comparison. However, in the validation of the French language version of QDS, range of forward bending assessment was used as a parameter of clinical evaluation and weak correlations were presented between the scale's results and impairment scores.[34] The absence of significant correlation between lumbar spine flexion and functional disability was in accordance with previous data obtained using the modified ODI.[16] Similarly, weak associations between strength, range of motion and flexibility, and functional status were found in the previous studies evaluating the association between physical measurements and disability.[35–37] It may be due to discriminant validity because it is accepted that parameters that assess dissimilar constructs such as disability and mobility can found to be unrelated.[16] In the determination of construct validity, the disability scales, modified ODI and QDS, correlated well with each other in our study and this result was consistent with other researches evaluating the correlation between these parameters.[17,20]

The results of our study show that QDS as a functional status questionnaire has been translated into Turkish without losing the psychometric properties of the original English version. Our study suggests that the Turkish version of the QDS has good comprehensibility, internal consistency, and validity and is an adequate and useful instrument for the evaluation of disability in Turkish patients with LBP. The use of it can be recommended in clinical settings and future outcome studies in Turkish-speaking patients with LBP.

■ Key Points

- QDS as a functional status questionnaire was translated and cross-culturally adapted into Turkish without losing the psychometric properties of the original version.
- Besides VAS and the Schober test assessments, patients with LBP were asked to complete the Turkish versions of the QDS and modified ODI and all assessments were repeated 24 hours later for all of the participants.
- The Turkish version of the QDS has good comprehensibility, internal consistency, and validity, and is an adequate and useful instrument for the evaluation of disability in patients with LBP.

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■ Appendix 1

Turkish Version of the QDS

QUEBEC BEL AĞRISI DİSABİLİTE ÖLÇEĞİ

Bu anket bel ağrınızın günlük hayatınızı etkileme biçimi hakkındadır. Bel problemleri olan kişiler günlük faaliyetlerinin bazılarını gerçekleştirmekte zorlanabilirler. Bel ağrınız yüzünden aşağıda belirtilen faaliyetlerin herhangi birini yapmayı zor bulup bulmadığınızı bilmek istiyoruz. Her bir faaliyet için 0 (hiç zor değil) ile 5 (yapmak mümkün değil) arasında değişen bir derecelendirme bulunmaktadır. Lütfen her bir faaliyet için şu anki durumunuzu en iyi tanımlayan tek bir cevap seçiniz ve uygun kutuyu işaretleyiniz. Lütfen soruların tamamını cevaplayınız.

Bel problemleriniz nedeniyle, bugün şunları yapmayı ne kadar zor buldunuz...	Hiç Zor değil	Hafif zor	Orta derecede zor	Oldukça zor	Çok zor	Yapmak mümkün değil
Yataktan kalkmak?						
Gece boyunca uyumak?						
Yatakta dönmek?						
Bir arabaya binmek?						
20- 30 dakika ayakta durmak?						
Birkaç saat bir sandalyede oturmak						
Bir kat merdiven çıkmak						
Birkaç sokak yürümek						
Birkaç kilometre yürümek						
Yüksek raflara uzanmak						
Bir topu atmak						
Bir sokak koşmak						
Buzdolabından yiyecek çıkarmak						
Yatağınızı toplamak						
Çorap veya kilotlu çorap giymek						
Küveti temizlemek için eğilmek						
Bir sandalyenin yerini değiştirmek						
Ağır kapıları itmek veya çekmek						
İki torba yiyecek taşımak						
Ağır bir bavulu kaldırmak ve taşımak						