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Validity and reliability of the Greek version of the Quebec Back Pain Disability Scale

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Abstract. *Objectives*: Low back pain is related to functional status and possible resulting disability. The Quebec Back Pain Disability Scale (QBPDS) has been used widely to evaluate functional disability in patients with low back pain. The purpose of this study was to assess: (a) the face and content validity, (b) the factor structure, (c) the concurrent validity, (d) the discriminant validity, (e) the internal consistency and the test-retest reliability (ICC) of the Greek version of the QBPDS.
Methods: One hundred and sixty patients with low back pain participated in the study. Face and content validity of the translated QBPDS were first investigated and afterwards exploratory factor analysis (EFA) was chosen to examine the factor structure of it. The concurrent and discriminant validity of the QBPDS was also assessed by a number of valid constructs. Finally, Cronbach α and Pearson r (ICC) were used to investigate the reliability of the instrument.
Results: The face and content validity of the QBPDS were supported and the EFA confirmed the sixth initial factor structure of the instrument. The concurrent and discriminant validity of it was confirmed by examining correlations between the QBPDS with other constructs. The Cronbach a and the ICCs indices of the instrument were acceptable.
Conclusion: The Greek translation of the QBPDS provided reliable and valid instrument for the evaluation of Greek patients with low back pain.

Keywords: Disability, low back pain, scale, validity, reliability

1. Introduction

The impact of low back pain (LBP) is strongly related to a patient's functional disability status [8,9]. LBP limits range of movement and restricts activities of daily living, such as getting dressed, sitting, standing, walking, cleaning the house, etc. Patients with LBP develop loss of function which possibly leads to a chronic syndrome of further disability [6]. Therefore, LBP has a detrimental impact on the quality of life [6, 23,25].

The need for a functional disability questionnaire for LBP patients has been underlined by various studies [5, 15]. The use of functional disability scales contributes to the evaluation and efficacy of physical therapy rehabilitation programmes. Instruments have been developed for measuring the functional status of patients with LBP for example the Roland-Morris Disability Questionnaire [33] and the Oswestry Low Back Pain Disability Questionnaire [12]. Questionnaires such as the Pain Disability Index [7] and the MOS 36-item Short Form Health Survey (SF-36) [36] measuring generalized pain and related functional status are in use, but they are not specifically developed for the patients with LBP.

Another questionnaire that measures the functional status in patients with LPB is the Quebec Back Pain Disability scale (QBPDS) [21,22]. This instrument was designed to use a conceptual approach to disability assessment and data bases methods of item development, analysis and selection. It has been translated into various languages other than the original English version and is found to be a reliable and valid instrument [3, 34,39]. QBPDS includes six factors: (a) bed/rest, (b) sit/stand, (c) ambulation, (d) handling of large/heavy objects, (e) movement, and (f) bending/stooping.

Our aim was to evaluate the validity and reliability of the Quebec Back Pain Disability Scale in the Greek population. In particular, we investigated: (a) the face

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and content validity, (b) the factor structure, (c) the concurrent validity, (c) the discriminant validity, and (d) the reliability (internal consistency and test re-test) of the QBPDS in Greek population with LBP.

2. Methods

2.1. Study population

The study population consisted of 130 participants (60 males and 70 females) with an average age of 41.05 years (SD = 11.6) with chronic low back pain lasting for at least 8 months ($M = 39.32$, SD = 37.37). Each patient was referred by a physiotherapist to a private rehabilitation and/or physiotherapy clinic and was asked to register with the study. All the patients were over 18 years old with adequate verbal ability and communication. Exclusion criteria from the study were: (a) any significant anatomical abnormalities (e.g., kyphosis/scoliosis), (b) the presence of any inflammatory or neoplastic lesion (e.g., tumor or metastasis, vertebral fractures, disc herniation requiring surgical treatment); and (c) serious psychiatric disorders (e.g., severe depression, schizophrenia). This study was approved by the first two authors' institution's research ethics board. A written informed consent was obtained from all the patients.

2.2. Measures

2.2.1. Demographics

All patients filled a brief form that described their demographic and clinical characteristics including age, gender, pain duration, education level, occupation, work absence, visit to physician, use of medication and medical treatment.

2.2.2. Quebec Back Pain Disability Scale (QBPDS)

The Quebec Back Pain Disability Scale is a 20-item self-administered instrument designed to assess the level of functional disability in individuals with back pain. The twenty items are classified into six areas: rest/bed, sit/stand, ambulation, handling of large/heavy objects, movement and bending/stooping. Each item relates to a specific activity which can be scored from 0 (no difficulty at all) to 5 (unable to do). The maximum total score is 100. The initial English/French version of QPBDS has been shown to exhibit satisfactory acceptability, excellent reliability, and good reproducibility; furthermore, its content validity and construct validity has been established in patients with back pain [21,22]. Studies also have examined the Turkish, Dutch, French and version of the QPBDS and reported satisfactory psychometric properties [3,34,39].

2.2.3. Oswestry Low Back Pain Questionnaire

The Oswestry Low Back Pain Questionnaire [4,12] evaluates the intensity of back pain and its impact on activities of daily living. The instrument consists of ten sections which can be answered by six specific statements/responses. These items are pain intensity, personal care (i.e., dressing, washing, etc.), lifting, walking, sitting, standing, sleeping, social life, travelling and employment/homemaking. For each section, the maximum score is five with the first statement marked with 0 and the last statement with 5. If all 10 sections are completed the maximum score is 50 which is then converted to a percentage. High percentage represents high functional disability. The Cronbach α value of the instrument in Greek population was 0.83. The face, content and concurrent validity of the Greek version of the instrument were satisfactory [4].

2.2.4. Roland-Morris Disability Questionnaire (RM-24)

The Roland-Morris Disability Questionnaire (RM-24) [4,33] is a self-report measure of perceived disability due to back pain. It contains 24 questions with two answer categories (yes/no), which covers a range of aspects of daily living that maybe affected by low back pain. Each statement that is ticked is worth one point, with the maximum score possible being '24' representing severe disability and the lowest score possible '0' representing no perceived disability. The Cronbach α value of the RM-24 in Greek population was 0.89. The validity of the Greek version of the RM-24 was satisfactory [4].

2.2.5. The Marlowe-Crowne Social Desirability Scale (SDS)

The Marlowe-Crowne Social Desirability Scale (SDS) [30,32] was used to assess patients' possible tendency to give socially desirable responses. The authors attempted to minimize social desirability problems by stressing the non-evaluative aspect of the QBPDS, as well as its anonymity and confidentiality. This scale includes 13 items developed on a true/false response format. The higher the total score, the higher the need for social approval. The SDS values ranged from 0 (non-socially desirable) to 13 (socially desirable). The Cronbach α value of Social Desirability Scale in Greek

population was 0.69. Furthermore, its construct and concurrent validity showed acceptable indices [28]. It has been used to examine the discriminant validity of self-report scales/questionnaires [2,13]. In the present study, social desirability is phenomenological an unrelated construct to functional ability, thus minimal relationship between these two variables may show evidence of discriminant validity of the scale.

2.3. Procedure

First, the QBPDS was translated from English to Greek by two individuals with excellent knowledge of the English language. Both of them had PhDs in physiotherapy, taught at a university level, and one of them had experience in questionnaire validation. Also, the instrument was translated from French to Greek by an excellent translator of the French language. One of the English translators and the first author compared the translations and reached a consensus. A back translation then was done by an independent, bilingual (English and Greek translator), who was physiotherapist and unaware of the original English version of the QBPDS. The final Greek version of the instrument derived after the reconciliation report was compiled by the translators.

The initial form of the translated QBPDS was first given to a group of 30 patients with low back pain to ensure that it can be fully comprehended. Their comments on difficulty in completing the scale or understanding the text were asked. Specifically, they were asked about the clarity, understanding, and the phraseology of each sentence. From this procedure, some revisions in grammar, syntax and comprehension of the instrument were made according to patients' suggestions.

Then, the QBPDS was completed by a different group of 130 patients with low back pain. The patients were contacted directly by the second author who collected the data and were informed about (a) the purpose of the study, (b) the voluntary participation, and (c) the confidentiality of the responses. Patients, who met the inclusion criteria and were interested in participating in the study, were asked to sign an informed consent document. Also, they complete the demographic questionnaire, the QBPDS, the RM-24, the Oswestry Low Back Pain Disability Questionnaire, and the SDS. The completion of these instruments took approximately 30 minutes.

2.4. Data analysis

All statistical analyses were performed using the Statistical Package for Social Science (SPSS; Version 14.0). A level of $p < 0.05$ was considered statistically significant. Descriptive statistics are reported using means (M), standard deviations (SD) and frequencies (f) for patients' demographic characteristics.

2.4.1. Face and content validity

No statistical analyses were used to examine the face and content validity of the QBPDS. Face validity is a starting point that estimates of whether a test appears to measure what we claim. The first group of 30 patients told us if the questions of the instrument appeared valid to them, i.e., whether it seemed like a good translation of the construct. Content validity evidence involves the degree to which the content of the instrument matches a content domain associated with the construct. Expert four physiotherapists,who prepared the translation of the scale, were able to comment on whether its items covered a representative sample of the construct domain, that is the functional disability.

2.4.2. Construct validity

An exploratory factor analysis (EFA) was chosen to examine the factor structure of the scale. Maximum likelihood (ML) method with direct oblimin rotation was used to determine if the QBPDS represented the six factors. The maximum likelihood method was used as the factor extraction method to examine the factor solution, which best fit the measurement variables [29]. This method provides the means to conduct significance tests and to derive confidence intervals. It examines the possibility that the correlation matrix is derived from a population in which the structure of the most dominant factor supports certain scoring of answers [18]. It also examines the statistical significance of factor loading and factor correlation [11].

Five criteria were considered in determining the number of factors rotate: (a) the scree plot test, (b) the eigenvalue-greater-than-one rule, (c) the percentage for variance accounted for by each component, (d) the percentage of total variance accounted for by the retained components, and (e) the number of interpretable components [11,18]. Also, specific criteria were employed in order to accept the factor structure of the instrument: (a) a factor-loading criterion of 0.40 [35], (b) a statistical significance of each item's factor loading [24] and (c) a criterion of 0.30 for an item's communality [19].

2.4.3. Concurrent and discriminant validity

Concurrent validity was used to assess the relationships between QBPDS scores and other established

measures (i.e., RM-24 and Qswestry Back Pain Disability Questionnaire) intended to examine same constructs that is functional disability of back pain. Discriminant validity was measured using the Social Desirability Scale. The measurement of an instrument with the same constructs will indicate high correlations, whereas low correlations among the QBPDS items and SDS will indicate that the items were not socially desirable responses, which provides evidence for the discriminant validity of the scale.

The concurrentvalidity was assessed using correlations by Spearman's Rho correlation coefficient among the QBPDS, the RM-24 and the Oswestry Back Pain Disability Questionnaire. In order to assess the discriminant validity, correlation by Spearman's Rho correlation coefficient among the QBPDS and Social Desirability Scale were examined.

2.4.4. Reliability

Reliability is evaluated first by measuring internal consistency. Internal consistency was measured by calculating item means, item variances, inter-item correlations, item-total correlations, and Cronbach's a coefficient. The Cronbach's a coefficient should be larger than a value of 0.70 in order to be accepted [33]. Secondly, intraclass correlation coefficients (ICCs) of the QBPDS and the six subscales were assessed to find the scale's response stability [24]. Intraclass correlation coefficients with a one-week interval were assessed for the QBPDS. In particular, a two-way random model was chosen to examine the ICCs.

3. Results

The main demographic and clinical data of the study sample are presented in Table 1.

3.1. Face validity

Face validity tests whether a measurement assesses the intended factors. In the present study, the translation of the scale seemed to be valid and the instrument was well accepted by all the patients. In particular, the first group of the 30 patients agreed that the scale looked like a reasonable test for evaluating the functional disability of patients with low back pain.

3.2. Content validity

A measurement is considered to have a high content validity when it samples all the aspects of the subject undergoing assessment [1]. According to Kline [20], this is the most desirable form of validity and it should be supported by concurrent validity. In the present study, translation of the instrument was examined by physiotherapists and an expert in psychometrics and the instrument was found to include necessary questions for creation of an accurate impression of the degree of functional disability, such as walking, sitting, standing, bending, lifting weights, and bed/rest.

3.3. Construct validity

The results of EFA showed that the Bartlett's test of sphericity was significant (2454.94, *df* 190, $p < 0.00$) and the value of the Kaiser-Meyer-Olkin measure of sampling adequacy (0.84) was high. Therefore, the data were appropriate to be used in a factor analysis [35, 38]. Also, values of skewness (from -0.06 to 0.94) and kurtosis (from -1.01 to 4.67) were lower than the cut-off criteria of two for skewness and seven for kurtosis, which demonstrate the normality of the variables [37].

Maximum likelihood method (ML) was the factor extraction method which has been used to analyze the factor structure of the QBPDS. ML method showed a sixth-factor solution with eigenvalues from 5.91 to 1.22, which accounted for 81.537% of the total variance. The communalities of the 20 items ranged from 0.69 to 0.99 with a mean number of 0.81. The factor loadings of the items from the pattern matrix ranged from 0.76 to 0.99 (Table 2). The first factor (*movement*), second factor, (*handling of large/heavy objects*), third factor (*bending/stooping*), fourth factor (*ambulation*), fifth factor (*sit/stand*) and sixth factor (*bed/rest*) consisted of two, five, four, three, three and three items, respectively. Inter-factor correlation between the six factors appeared to Table 3.

3.4. Concurrent and discriminant validity

In order to examine the cconcurrent validity of the QBPDS, athletes completed the RM-24 and the Oswestry Back Pain Disability Questionnaire which both has high content and concurrentvalidity and acceptable reliability indexes [4].

Concurrent validity indicated that the QBPDS factors showed high correlations with the RM-24 and the Oswestry Back Pain Disability Questionnaire (Table 4). The overall lack of significant correlations between each item of the QBPDS and SDS revealed that no socially desirable responses were supported. In particular, the items' correlations were not signifi-

Table 1
Demographic and clinical characteristics of patients ($n = 130$)

Demographic characteristics	Frequency f	Relevant frequency (%)
Men	60	46.20
Women	70	53.80
Education		
Elementary	15	11.50
High School-Lyceo	45	34.60
University	47	36.20
Superior Technological Institute	21	16.20
Master of Science	2	1.50
Profession		
Private servants	28	21.50
Public servants	27	23.90
Retired	6	4.60
Other professions (salesman, hairdresser etc)	31	23.80
Housewives	22	16.90
Manual professions /Drivers	12	9.20
Marital status		
Married	47	36.20
Non married	12	9.20
Married with children	67	51.50
Non married with children	4	3.10
Visit to physician		
Yes	119	91.50
No	11	8.50
Medication		
Yes	34	26.20
No	96	73.80

Table 2
Exploratory Factor Analysis: Factor loadings, communalities, eigenvalues and percentage of explained variance of the Quebec Back Pain Disability Scale ($n = 130$)

Quebec Back Pain Disability Scale	Factor loadings						Communalities
	1[a]	2[b]	3[c]	4[d]	5[e]	6[f]	
Item 12	0.99						0.99
Item 11	0.77						0.72
Item 20		0.99					0.95
Item 18		0.92					0.88
Item 19		0.90					0.83
Item 10		0.85					0.75
Item 17		0.79					0.73
Item 14			0.95				0.89
Item 13			0.92				0.81
Item 15			0.84				0.86
Item 16			0.80				0.81
Item 8				0.99			0.91
Item 7				0.79			0.75
Item 9				0.76			0.77
Item 4					0.91		0.85
Item 5					0.90		0.85
Item 6					0.80		0.73
Item 2						0.89	0.76
Item 3						0.83	0.77
Item 1						0.82	0.69
Eigenvalues	3.13	5.91	2.42	2.15	1.48	1.22	
% explained variance	15.66	45.19	57.28	68.03	75.42	81.53	

[a]Movement, [b]Handling of large/heavy objects, [c]Bending/stooping, [d]Ambulation, [e]Sit/stand, [f]Bed/rest.

Table 3
Inter-factor correlations of the Quebec Back Pain Disability Scale ($n = 130$)

Quebec Back Pain Disability Scale	1[a]	2[b]	3[c]	4[d]	5[e]	6[f]
1[a]	1.00	0.17	0.44	0.23	−0.24	0.26
2[b]	0.17	1.00	0.34	0.32	−0.37	0.30
3[c]	0.44	0.34	1.00	0.09	−0.32	0.38
4[d]	0.23	0.32	0.09	1.00	−0.38	0.32
5[e]	−0.24	−0.37	−0.32	−0.38	1.00	−0.26
6[f]	0.26	0.30	0.38	0.32	−0.26	1.00

[a]Movement, [b]Handling of large/heavy objects, [c]Bending/stooping, [d]Ambulation, [e]Sit/stand, [f]Bed/rest.

Table 4

Quebec Back Pain Disability Scale	Oswestry Low Back Pain Questionnaire											Roland-Morris Disability Questionnaire
	Pain intensity	Personal care	Lifting	Walking	Sitting	Standing	Sleeping	Sex life	Social life	Traveling	Total	
Bed/rest	0.26**	0.36**	0.12	0.26**	0.29**	0.37**	0.38**	0.41**	0.22*	0.26**	0.44**	0.50(**)
Sit/stand	0.26**	0.40**	0.39**	0.42**	0.47**	0.44**	0.18*	0.42**	0.33**	0.33**	0.56**	0.47(**)
Ambulation	0.28**	0.41**	0.27**	0.62**	0.25**	0.50**	0.18*	0.29**	0.30**	0.32**	0.54**	0.46(**)
Handling large/heavy objects	0.50**	0.47**	0.51**	0.39**	0.20*	0.37**	0.16*	0.33**	0.46**	0.35**	0.60**	0.51(**)
Movement	0.27**	0.47**	0.38**	0.39**	0.28**	0.33**	0.17*	0.32**	0.38**	0.26**	0.47**	0.45(**)
Bending/ stooping	0.26**	0.48**	0.28**	0.29**	0.33**	0.29**	0.18*	0.45**	0.32**	0.26**	0.45**	0.42(**)
Total	0.48**	0.63**	0.52**	0.58**	0.42**	0.56**	0.20*	0.54**	0.51**	0.43**	0.78**	0.70(**)

Correlations among the Factors of the Quebec Back Pain Disability Scale, the Roland-Morris Disability Questionnaire and the Oswestry Low Back Pain Questionnaire ($n = 130$).
$^{**}p < 0.01$, $^{*}p < 0.05$.

cant, ranging from −0.16 to 0.11, indicating that the items were not affected by social desirability responses. Non-significant correlations were also revealed between SDS total score and bed/rest ($r = -0.04$), sit/stand ($r = -0.05$), ambulation ($r = 0.01$), handling large/heavy objects ($r = -0.07$), movement ($r = -0.12$), bending/stooping ($r = -0.16$), and the total QPBDS ($r = -0.15$).

3.5. Reliability

Both, Cronbach's a internal consistency coefficients and intraclass correlation coefficients (ICCs) for the total of QBPDS and each subscale were acceptable. The item means, the item variances, the inter-item correlations, the item-total correlations, and the internal consistency coefficients of the QBPDS factors are summarized in Table 5. The reliability coefficients for the six factors were high. In particular, the intraclass correlation coefficient (ICC) for the total QBPDS was 0.92 (95% C.I.: $0.89 \leqslant \text{ICC} \leqslant 0.94$) and for the first factor (*handling of large/heavy objects*)was 0.97 (95% C.I.: $0.95 \leqslant \text{ICC} \leqslant 0.98$), for the second factor (*movement*) was 0.90 (95% C.I.: $0.85 \leqslant \text{ICC} \leqslant 0.93$), for the third factor (*bending/stooping*) was 0.96 (95% C.I.: $0.94 \leqslant \text{ICC} \leqslant 0.97$), for the forth factor (*ambulation*) was 0.95 (95% C.I.: $0.93 \leqslant \text{ICC} \leqslant 0.97$), for the fifth factor (*sit/stand*) was 0.95 (95% C.I.: $0.93 \leqslant \text{ICC} \leqslant 0.96$), and for the sixth factor (*bed/rest*) was 0.96 (95% C.I.: $0.94 \leqslant \text{ICC} \leqslant 0.97$).

4. Discussion

Specific instruments capable of examining disability are necessary in patients with low back pain. One of the most widely used specific scales is the QBPDS which is short, easily comprehended and simple to complete. Most of the low back pain studies in Greece lack reliable and valid assessment instruments. Our aim was to test the validity and reliability of the QBPDS in Greek population.

Forward and back translators prepared the Greek scale and a committee consisting of expert translators and one author produced the final version. The selection of the items represents the construct domain of the scale which is the functional ability of the low back pain patients. The Greek speaking patients made some minor remarks about the item's phraseologyand comprehension, but they agreed that the scale appeared to be a good measure of their functional ability. In this way, face and content validity of the translated scale was re-

Table 5
Internal Consistency Indices (Mean, Minimum Value, Maximum Value) for the 20-item Quebec Back Pain Disability Scale ($n = 130$)

Quebec Back Pain Disability Scale	Item means (Min-Max)	Item variances (Min-Max)	Inter-item correlations (Min-Max)	Item-total correlations (Min-Max)	a Cronbach
Bed/rest	1.16 (1.00–1.39)	0.99 (0.88–1.15)	0.73 (0.71–0.75)	0.78 (0.77–0.80)	0.89
Sit/stand	2.05 (1.85–2.21)	1.52 (1.47–1.59)	0.78 (0.73–0.84)	0.83 (0.78–0.87)	0.91
Ampulation	1.55 (1.40–1.79)	1.47 (1.41–1.52)	0.78 (0.74–0.81)	0.83 (0.81–0.86)	0.91
Handling large/heavy objects	2.17 (1.84–2.75)	1.52 (1.41–1.73)	0.82 (0.77–0.91)	0.88 (0.84–0.93)	0.96
Movement	1.86 (1.69–2.03)	1.76 (1.75–2.17)	0.80 (0.78–0.83)	0.83 (0.83–0.83)	0.91
Bending/stooping	1.66 (1.25–2.02)	1.56 (1.32–1.70)	0.82 (0.75–0.86)	0.88 (0.85–0.90)	0.95

ΚΛΙΜΑΚΑ ΑΝΙΚΑΝΟΤΗΤΑΣ ΠΟΝΟΥ ΟΣΦΥΟΣ-ΚΕΜΠΕΚ

ΟΔΗΓΙΕΣ: Η κλίμακα αυτή αφορά τον τρόπο που ο πόνος στη μέση επηρεάζει την καθημερινή σας ζωή. Άτομα με προβλήματα στη μέση μπορεί να δυσκολεύονται στην εκτέλεση μερικών καθημερινών δραστηριοτήτων τους. Θα θέλαμε να μάθουμε εάν βρίσκετε δυσκολία στην εκτέλεση κάποιας από τις ακόλουθες δραστηριότητες εξαιτίας της μέσης σας. Για κάθε μια δραστηριότητα υπάρχει μια κλίμακα από το 0 (καθόλου δύσκολη) έως το 5 (δεν μπορώ να το κάνω). Παρακαλώ επιλέξτε μια απάντηση για κάθε δραστηριότητα (χωρίς να παραλείψετε κάποια) και βάλτε σε κύκλο το αντίστοιχο νούμερο. Δεν υπάρχουν σωστές ή λανθασμένες απαντήσεις. Μη δίνετε πολύ χρόνο στην απάντησή σας. Απαντήστε αυθόρμητα και ειλικρινά. Οι απαντήσεις είναι απολύτως εμπιστευτικές.

Καθόλου δύσκολη	**Ελάχιστα δύσκολη**	**Κάπως δύσκολη**	**Αρκετά δύσκολη**	**Πολύ δύσκολη**	**Δεν μπορώ να το κάνω**
⓪	①	②	③	④	⑤

Σήμερα, βρίσκετε δύσκολη την εκτέλεση των παρακάτω δραστηριοτήτων εξαιτίας της μέσης σας;

1. Να σηκωθείτε από το κρεβάτι	0 1 2 3 4 5
2. Να κοιμηθείτε καθ' όλη τη διάρκεια της νύχτας	0 1 2 3 4 5
3. Να στριφογυρίσετε στο κρεβάτι	0 1 2 3 4 5
4. Να ταξιδέψετε με το αυτοκίνητο	0 1 2 3 4 5
5. Να σταθείτε όρθιοι για 20-30 λεπτά	0 1 2 3 4 5
6. Να καθίσετε σε μια καρέκλα για αρκετές ώρες	0 1 2 3 4 5
7. Να ανεβείτε ένα όροφο από σκάλες	0 1 2 3 4 5
8. Να περπατήσετε μερικά τετράγωνα (300-400 μέτρα)	0 1 2 3 4 5
9. Να περπατήσετε μερικά χιλιόμετρα	0 1 2 3 4 5
10. Να φτάσετε ψηλά ράφια	0 1 2 3 4 5
11. Να πετάξετε μια μπάλα	0 1 2 3 4 5
12. Να τρέξετε ένα τετράγωνο (100 μέτρα)	0 1 2 3 4 5
13. Να βγάλετε φαγητό από το ψυγείο	0 1 2 3 4 5
14. Να στρώσετε το κρεβάτι σας	0 1 2 3 4 5
15. Να βάλετε τις κάλτσες σας (καλσόν)	0 1 2 3 4 5
16. Να σκύψετε να καθαρίσετε την μπανιέρα	0 1 2 3 4 5
17. Να μετακινήσετε μια καρέκλα	0 1 2 3 4 5
18. Να τραβήξετε ή να σπρώξετε βαριές πόρτες	0 1 2 3 4 5
19. Να κουβαλήσετε δύο τσάντες με τρόφιμα	0 1 2 3 4 5
20. Να σηκώσετε και να κουβαλήσετε μια βαριά βαλίτσα	0 1 2 3 4 5

Βεβαιωθείτε ότι απαντήσατε σε όλες τις ερωτήσεις
Ευχαριστώ για τη συνεργασία

garded satisfactory for the patient population with low back pain.

Afterwards, an exploratory factor analysis (EFA) was conducted to investigate the factorial structure of the instrument. Factor analysis has a long tradition in classical measurement theory [25] and has been used in scale development research as well as a tool to assess test-score validity [16,39]. In particular, the primary goal of EFA is to explore how many factors exist among a set of variables and the degree to which the variables are related to the factors [18]. The results of the EFA yielded a sixth factor solution, namely bed/rest, sit/stand, ambulation, handling large/heavy objects, movement, and bending/stooping. This factor structure is similar to Kopec et al.'s [21,22] initial structure. Although the present EFA confirms the initial structure of the scale, further examination is needed as some patients are asked for more specific instructions when completing the QBPDS. In particular, in question 4 "travel by car" of the sit/stand factor most of the patients reported that "the actual travelling by car is not as difficult as in getting in and out of the car". Further research is needed to examine the psychometric properties of the scale after question 4's wording modification in order to give a more explicit explanation of the word "travel". With regards to question 11 "throwing a ball" of the ambulation factor, patients questioned the size of the ball (i.e., ball of basketball or tennis ball). A possible explanation of this query could be that the half of the patients had a sedentary life style.

The size of the sample of our study for examining the factor structure of the QBPDS ($n = 130$) was larger than other studies [3,34] and quite similar with Yvanes-Thomas et al.'s study [39] ($n = 120$). The age distribution of the sample population was similar to those in other studies that used QBPDS [3,34,39]. However, the sex ratio of our study group was different with the previous studies. The ratio of higher education was 53.90% in our sample. Furthermore, the half of the patients had a sedentary life style (public/private servants or retired from public companies) ($n = 50.00\%$), whereas the 49.90% of the patients had a non-sedentary life style (housewives, drivers, and other professions). These results are inconsistent with other studies which showed that low back pain was less likely in subjects with a higher educational background or sedentary life style [3,27,28]. A reason for this finding could be that the sample with sedentary life style did not follow ergonomic positions during their work on their company's office. Another possible explanation for this finding is the social characteristics of Greeks to their job preference. Additionally, only 9.20% of the subjects were not married, thus the family obligations may be a cause of the low back pain.

There are many instruments that can be used to assess the functional ability of patients with low back pain. It is not clear yet which instrument is the best choice for examining the level of disability in performance of different kind of activities. The RM-21 and the Oswestry Low Back Pain Questionnaire are used frequently to examine the subjective experience of disability in low back pain [17]. In order to examine the concurrent validity of QBDS, Spearman's rank correlation coefficients were used to evaluate relations between QBPDS and RM-21 and Oswestry Low Back Pain Questionnaire. These questionnaires are well established and reliable tools in assessing disability in patients with low back pain in the Greek population [4]. The results of the present study showed high correlations with the RM-21 which confirmed findings from previous studies [21,34]. Furthermore, our results showed high correlation between the QBPDS and the Oswestry Low Back Pain Questionnaire which is in agreement with previous studies [10,17,21,31]. Regarding the discriminant validity of the QPBDS, no correlations have been found between the QBPDS and the Social Desirability Scale, therefore confirming the high discriminant validity of the former.

Although, the results showed high correlations between the QBPDS with the RM-24 and the Oswestry Low Back Pain Questionnaire, there are some minor differences between them. The latter questionnaires examine the general level of disability in daily activities such as walking, sitting and standing and lifting objects [14]. Furthermore, the Oswestry Low Back Pain Questionnaire is probably better at assessing patients with permanent limited functional disabilities. On the other hand, the QBPDS examines the disability in specific activities of daily living, e.g., throwing a ball or moving a chair and its responses are not affected by the general health status of the subjects [3]. Additionally, QBPDS is more appropriate for subjects with less permanent disability. It also measures the level of disability at the exact time that the subject answers the questionnaire by specifically stating "today", while the Oswestry Low Back Pain Questionnaire is not specific for time. This time constraint possibly increases the variability of the responses for the QBPDS [10].

To examine the reliability of the Greek version of the QBPDS, first the internal consistency was calculated from 130 patients using Cronbach's alpha coefficients. The scores measured in the QPBDS factors

(Table 5) were statistically significant ($p < 0.001$) and showed that the translated version is reliable with low standard error of measurement. These scores are similar to those reported by other authors who used the original (English) version [21] and the Dutch and Turkish version [3,34]. The item-total correlations which reflect the strength of the relationship between a single question and the QBPDS sum score were acceptable. Furthermore, the test-retest reliability (reproducibility) with a time interval of 1 week appeared to be high, particularly above ICC = 0.90. The test-retest reliability coefficients of the scale in the present study confirmed the initial version of Kopec et al.'s scale [20] and of Schoppink et al.'s Dutch version of the scale [34]. At last, no correlations were appeared with the SDS which indicated that the QBPDS has high discriminant validity.

The QBPDS can be used by rehabilitation staff, particularly physiotherapists, to identify those patients who are extremely disabled due to back pain. If athletes are feeling disabled, they should follow a physiotherapy program to increase their ability to perform activities of daily living. As a result QBPDS can be safely used in the assessment of Greek patients' disability with chronic low back pain, which will further improve current rehabilitation programs in this patient population group in Greece. Finally, QPBDS has few items, thus it takes little time to complete.

A limitation of this study is the absence of examining any correlation between QBPDS and the pain and/or psychological status of our patients. In particular, psychological characteristics are related to long-term pain and disability [26]. Thus, future investigations should correlate the QBPDS with other questionnaires/scales such as Visual Analogue Scale, Dallas Pain Questionnaire, McGill Pain Questionnaire, Hospital Anxiety and Depression Scale. Future studies should examine the relationship between the intensity of pain and different levels of disability of Greek patients with low back pain.

Another limitation is that the present study did not evaluate any longitudinal change in an individual or a group (i.e., the evaluation of the progress of patients in practice). Therefore, longitudinal construct validity assessments should be taken into consideration to estimate the magnitude of longitudinal difference between an individual and study over time. Finally, further research is required to establish the validity of QPDS examining any differences between sex, social-economical status or duration of pain in patients with low back pain.

5. Conclusion

The Greek version of the Quebec Back Pain Disability Scale is a psychometric instrument that examines the functional disability of patients with low back pain. Globally, the QBPDS shows good factorial structure, test retest and internal consistency properties and it can be used both for clinical and research purposes. Future studies in Greeceshould examine the correlations between the QBPDS and other patients' characteristics, such as pain, quality of life, self-confidence, etc.

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