



Original Article

The Japanese Orthopedic Association Back Pain Evaluation Questionnaire: A Turkish validation study



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ARTICLE INFO

Article history:

Received 31 January 2016

Received in revised form

5 June 2016

Accepted 29 June 2016

Available online 21 July 2016

ABSTRACT

Background: The aim of this study was to apply cross-cultural adaptation and validity assessment to the Turkish translation of the Japanese Orthopedic Association Back Pain Evaluation Questionnaire applied to patients conservatively monitored for lumbar disc hernia and narrowing of the lumbar canal.

Methods: The questionnaire was translated into Turkish based on guidelines. In respect of the comprehensibility of the obtained pre-final version of the questionnaire, a pilot test was applied to 20 healthy individuals. The patients were requested to complete the final version of the questionnaire after an orthopedic and physical therapy assistant doctor (resident) had completed the diagnosis and demographic information. To evaluate the retest reliability, the test was applied a second time, 14 days (± 3 days) after the first application, again in the Orthopedics and Physical Therapy Outpatient Clinic.

Results: The study was completed with a total of 215 individuals, comprising 107 patients and 108 healthy volunteers. When Turkish version of the questionnaire scale was evaluated of the patients and healthy volunteers together, the internal consistency was determined at the levels of Cronbach's α excellent. The lowest correlations of all the questionnaire scale items with the scale sub-dimensions was at the level of $r = 0.509$, which demonstrated that there was a sufficient validity level of the Turkish translated questionnaire scale. A statistically significant direct correlation at a high level was seen between the pre and post points in all the scale sub-dimensions.

Conclusions: The results of the current study showed that Turkish version of the questionnaire had sufficient reliability and validity in the evaluation of low back pain and resulting dysfunction and disability in patients with LDH and narrowing of the lumbar canal.

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1. Introduction

Low back pain is a frequently seen health problem that very often requires medical consultation. According to the 2013 Global Burden of Disease Study, low back pain was the most significant cause of disability experienced in 1990 and 2013 [1]. Low back pain can be separated into specific and non-specific types according to the etiology. Lumbar disc hernia and narrowing of the lumbar canal are the most significant causes of specific low back pain. Dysfunction arising from the disease of low back pain leads to problems

such as loss of workforce due to the dysfunction, psychological problems and effects on social life which cannot be evaluated only in respect of the pathology of the disease.

Therefore, when treating patients with low back pain, the scale used should evaluate the patient in various dimensions of health. In addition, evaluation by the patient is a widely-accepted method of directing treatment and evaluating the results of the treatment applied [2]. For patients with low back pain, The Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ) is one of the most appropriate patient-assessed, self-reporting evaluation scales. The JOABPEQ was first developed by the Japanese Orthopaedic Association in 1986 [3]. In 2000, a working group was formed to define new criteria on 'patient-based, multi-dimensional and scientific' basic principles and subsequent studies were updated [4,5].

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The JOABPEQ has been used by researchers in Japan for many years and the only validity study that has been made was in Iranian [6]. For a patient-based assessment to be used by a population speaking another language, translation alone is not enough. According to some guidelines, there should also be cross-cultural adaptation and validity [7].

The aim of this study was to apply cross-cultural adaptation and validity assessment to the Turkish translation of the JOABPEQ applied to patients conservatively monitored for lumbar disc hernia and narrowing of the lumbar canal.

2. Materials and methods

2.1. The questionnaire

JOABPEQ is an outcome scale evaluating low back pain (LBP), dysfunction and disabilities resulting from low back disorders and the psychosocial problems arising from these disorders [4,5]. The 25 questions of the scale relate to low back pain, lumbar function, walking ability, social life function and mental health [4,5,8]. The JOABPEQ score varies between 0 and 100 with a higher score indicating a better health status [4,5,8]. After responding to all the questions, the result is automatically calculated on a prepared Excel form and is interpreted according to the guidelines [5,8]. At the end of the JOABPEQ, a visual analog scale (VAS) is applied to support the clinical evaluation [4,5,8].

2.2. Translation

First, the necessary permission for the translation of JOABPEQ into Turkish was obtained by e-mail. According to the translation criteria described in the cross-cultural adaptation guidelines, the English version of JOABPEQ was translated into Turkish by two independent Turkish translator academicians (T1, T2) [7]. Through discussion of the differences in the text translated by T1 and T2 a mutually-agreed form was obtained as the temporary JOABPEQ-TR version. A 3rd translator (T3), who was a native Turkish speaker and medical doctor experienced in the subject of translating medical literature, evaluated the JOABPEQ-TR temporary version in respect of general language use, explanations and conceptual equivalence.

A back-translated version of JOABPEQ-TR was obtained through forward-translation to English made by Translators 4 and 5, who were Turkish native speakers and sufficiently experienced in translation. The original English version of the JOABPEQ and the back-translated JOABPEQ-TR were compared in respect of conceptual equivalence by Translator 6, who was an English native speaker experienced in translation. The pre-final version of the JOABPEQ-TR was formed after review by a committee for possible modifications. In respect of the comprehensibility of the obtained pre-final version of the JOABPEQ-TR, a pilot test was applied to 20 healthy individuals. JOABPEQ user guide was translated into Turkish by T3 (Appendix 1).

2.3. Recruitment of volunteers and patients and data collection

The study was conducted on patients presenting at the Orthopaedics and Physical Therapy Polyclinics of Atatürk Training and Research Hospital, Medical Faculty, Yildirim Beyazit University. A control group was formed of healthy volunteers, demographically matched to the patients. The inclusion criteria were patients who were newly-diagnosed with LDH and lumbar canal stenosis and for whom the decision had been made for conservative follow-up. The exclusion criteria were defined as, 1) patients with psychiatric problems such as advanced dementia which would create

problems in understanding and responding to the questions, 2) professional healthcare workers, 3) patients receiving treatment for orthopaedic disorders in the pelvis or lower extremities, 4) patients reporting any change in their complaints in re-test application.

The patients were requested to complete the JOABPEQ-TR final version after an orthopaedic and physical therapy assistant doctor (resident) had completed the diagnosis and demographic information. To evaluate the retest reliability, the test was applied a second time, 14 days (± 3 days) after the first application, again in the Orthopedics and Physical Therapy Outpatient Clinic. The JOABPEQ-TR is presented in Appendix 2. **Appendix 2 can be seen by downloading the file in the Supplementary Material.**

2.4. Statistical analysis

The information obtained from the patients and healthy volunteers was input to a computer. The necessary error checks and corrections were made. Conformity of continuous data to normal distribution was tested. Age was shown with the median from normal distribution (Inter Quartile Range-IQR). Categorical variables (gender, marital status etc) were stated as number (n) and percentage (%).

The internal consistency analysis was calculated with the three different methods of Cronbach α coefficient, Guttman Split-Half coefficient and Spearman-Brown coefficient. In the interpretation of the internal consistency coefficient, values were accepted as, <0.500 “unacceptable”, 0.500–0.600 “weak”, 0.601–0.700 “questionable”, 0.701–0.800 “acceptable”, 0.801–0.900 “good” and ≥ 0.901 “excellent” [9]. For the assessment of the validity of the scale, the item-scale correlation (Pearson Product Moment Correlations Coefficient – r) and test-retest correlation methods were applied. The sub-scales of the JOABPEQ-TR were calculated over 100 points and the comparison of pre-post test values was made as explained by Fukui et al. [8]. The pre-post values of the sub-scale points were shown as median (InterQuartile Range – IQR) and were compared with the Wilcoxon Signed Ranks test. The correlations between the median pre and post JOABPEQ-TR sub-scale points were evaluated with Kendall's Tau B (τ_B) correlation coefficient. All the calculations and statistical analysis procedures were made with MS-Excel 2010 and IBM SPSS Statistics (IBM Corp, Ver 22.0) software. A value of $p < 0.05$ was accepted as statistically significant.

Written informed consent was obtained from all the study participants. Approval for the study was granted by the Local Ethics Committee and the study was conducted in accordance with the Helsinki Declaration.

3. Results

The study was started with 128 patients and 108 healthy volunteers. Within the 14-day follow-up period, 21 patients did not attend for various reasons and so were excluded from the study as the retest could not be applied. Therefore, the study was completed with a total of 215 individuals, comprising 107 patients and 108 healthy volunteers. The median age of the healthy volunteers was calculated as 30.0 years (IQR = 9.0) in a range of 22–65 years. The median age of the patients was calculated as 50.0 years (IQR = 19.0) in a range of 20–87 years. The demographic characteristics of the patient group are shown in Table 1.

When the JOABPEQ-TR scale was evaluated of the patients and healthy volunteers together, the internal consistency was determined at the levels of Cronbach's $\alpha = 0.937$ “excellent”, Guttman Split-Half coefficient = 0.748 “acceptable” and Spearman-Brown coefficient = 0.859 “good”. The Cronbach's α , Guttman Split-Half and Spearman-Brown coefficients defined according to the

Table 1
The demographic characteristics of the patient group.

Variables	N	%
Gender		
Female	49	45.8
Male	58	54.2
Education		
Primary School	20	18.7
Middle School	12	11.2
High School	47	43.9
university	28	26.2
Marital status		
Married	88	82.2
Single	19	17.8
Disease		
Lumbar Disc Herniation	70	65.4
Lumbar Canal Stenosis	37	34.6

groups are shown in Table 2. As can be seen in Table 2, the internal consistency coefficient of the JOABPEQ-TR scale assessed in all 3 methods was at least at an “acceptable” level in all the general, patient and healthy volunteer groups.

After sufficient internal consistency was seen in the general data set used as a whole of the JOABPEQ-TR scale on the patients and healthy volunteers in 3 different methods (Cronbach's α , Guttman Split-Half and Spearman-Brown), the coefficients of each subscale were examined using the most widely used method of Cronbach's α (Table 3). As seen in Table 3, the internal consistency of the subscale of Low Back Pain was at the level of “questionable” and “poor”, while the internal consistency of all the other subscales for all the groups was at least “acceptable”.

After sufficient internal consistency was seen in the patient group, the healthy volunteer group and the whole group in the JOABPEQ-TR scale and the subscales, the analysis was continued on the patient group only. To be able to determine the validity of the JOABPEQ-TR scale, the correlation of each item with the subscale was examined with the Pearson Product Moment Correlations Coefficient (Table 4). As Q3-5 were related to both Walking Ability and Social Life Function dimensions, correlations were seen with both dimensions. The lowest relationship between the scale items and the scale sub-dimensions was seen to be in Mental Health in Q5-1 at $r = 0.509$ and the highest in Social Life Function in Q4-3 at $r = 0.872$. The lowest correlations of all the JOABPEQ-TR scale items with the scale sub-dimensions was at the level of $r = 0.509$, which demonstrated that there was a sufficient validity level of the Turkish translated JOABPEQ-TR scale.

The JOABPEQ-TR scale was applied again to the patient group 14 days (± 3 days) later. The pre and post subscale points obtained from the patients are shown in Table 5. A statistically significant direct correlation at a high level ($\tau_B \geq 0.650$) was seen between the pre and post points in all the scale sub-dimensions. The sub-dimension points of the scale completed at different times by the patients were related to each other. The scale test-retest validity was found to be high (Table 5). In the Walking Ability sub-dimension of the scale, a significant increase ($p < 0.001$) was observed between the pre and post measurements. No statistically significant difference was found between the pre and post values in the other sub-dimensions ($p > 0.05$).

Table 2
The internal consistency coefficient according to the working group of the JOABPEQ-TR.

Coefficient	Total	Healthy volunteers	Patient
Cronbach's α	0.937	0.943	0.917
Guttman Split-Half	0.748	0.749	0.699
Spearman-Brown	0.859	0.896	0.813

Table 3
The internal consistency coefficient according to the working group of the JOABPEQ-TR subdimensions.

Subscales	Number of items	Total	Healthy volunteers	Patient
Low back pain	4	0.618	0.645	0.520
Lumbar function	6	0.823	0.830	0.729
Walking ability	5	0.822	0.847	0.747
Social life function	4	0.769	0.801	0.703
Mental health	7	0.882	0.889	0.871

3.1. Translation and cross-cultural adaptation

No major difficulties were encountered in respect of the Translation and Cross-Cultural Adaptation. However, for questions 1-4 and 4-1, which were to be answered in the original as 1) No or 2) Yes, in the translation to Turkish by T1 and T2, these were translated as 1) I agree- I cannot sleep and 2) I don't agree- I can sleep for question 1-4 and 1) I agree- I cannot do that and 2) I don't agree – I can do that for question 4-1. Thus, the temporary version of JOABPEQ-TR was obtained. The reason for changing these responses in this way was to facilitate understanding of the question and provide cultural adaptation according to the way that questions are answered in the Turkish language. After removal of some minor incompatibility during the first translation, no other difficulties were encountered at the other stages, the checking stage and the pilot test stage.

4. Discussion

The results of this study showed that the JOABPEQ-TR questionnaire could be used as an outcome measurement which can be applied by the patient themselves in patients with LDH and narrowing of the lumbar canal. It was seen that the internal consistency of the JOABPEQ-TR as a whole, the internal consistency of the sub-dimensions, and the correlations of the scale items with the scale sub-dimensions were sufficient and the threshold level of the acceptable test-retest reliability was high in patients with LDH and narrowing of the lumbar canal.

The threshold values seen as acceptable for the recommended internal consistency of the JOABPEQ-TR were seen to be high with 3 different methods in the patients, the healthy volunteers and the group as a whole (Cronbach's $\alpha = 0.937$, Guttman Split-Half coefficient = 0.748, Spearman-Brown coefficient = 0.859). Thus, there can be said to be internal consistency of the questionnaire as a whole. The internal consistency of the sub-dimensions of the JOABPEQ-TR scale was evaluated in the patient group using the Cronbach α , as one of the most widely used internal consistency methods, and was found to be sufficient. As a result, the questions of the JOABPEQ-TR could be defined as compatible with each other, complementary to each other and meaningful as a whole and each question was an inseparable component of the questionnaire. The internal consistency of the Low Back Pain sub-dimension was found to be at a “questionable” level according to George and Mallory and this was considered acceptable [10]. That the Cronbach α coefficient in the Low Back Pain sub-dimension was low can be considered to originate from the heterogeneous structure [11].

The face validity of a questionnaire is related not to what is actually measured but to what it seems to measure. What is written on the cover of a test with face validity is what is seen to be measured [12,13]. As a result of the evaluations related to the JOABPEQ-TR scale made by both the specialists and the participants, no problem was determined related to face validity. Content validity is the most important type of validity in the measurement tools [12,13]. Content validity is a measurement showing how much

Table 4
JOABPEQ-TR scale items correlations with subscales.^a

Item number	Low back pain	Lumbar function	Walking ability	Social life function	Mental health
Q1-1	0.508	0.241	0.167	0.118	0.246
Q1-2	0.642	0.419	0.413	0.301	0.315
Q1-3	0.713	0.367	0.296	0.399	0.476
Q1-4	0.678	0.413	0.409	0.452	0.378
Q2-1	0.469	0.531	0.344	0.388	0.257
Q2-2	0.213	0.625	0.451	0.303	0.226
Q2-3	0.389	0.689	0.508	0.367	0.325
Q2-4	0.414	0.676	0.438	0.349	0.441
Q2-5	0.392	0.700	0.547	0.505	0.343
Q2-6	0.350	0.685	0.617	0.412	0.377
Q3-1	0.485	0.585	0.731	0.502	0.414
Q3-2	0.205	0.265	0.532	0.254	0.214
Q3-3	0.292	0.580	0.655	0.394	0.337
Q3-4	0.314	0.582	0.732	0.611	0.460
Q3-5	0.483	0.621	0.857	0.699	0.571
Q4-1	0.373	0.334	0.436	0.638	0.394
Q4-2	0.460	0.570	0.726	0.866	0.654
Q4-3	0.418	0.489	0.537	0.872	0.582
Q5-1	0.304	0.355	0.345	0.374	0.509
Q5-2	0.506	0.429	0.484	0.613	0.701
Q5-3	0.339	0.302	0.354	0.518	0.821
Q5-4	0.449	0.326	0.444	0.444	0.817
Q5-5	0.444	0.393	0.411	0.495	0.806
Q5-6	0.486	0.443	0.556	0.719	0.798
Q5-7	0.428	0.442	0.440	0.484	0.764

^a Pearson Product Moment Correlation Coefficient.**Table 5**
Pre and post medians and test-retest reliability of JOABPEQ-TR subscales.

Alt Boyutlar	Pre	Post	Test-retest reliability ^a		Comparison of pre and post.	
	Median (IQR)	Median (IQR)	τ_B	p	Z	P
Low back pain	43.0 (29.0)	43.0 (29.0)	0.784	< 0.001	0.579	0.562
Lumbar function	34.0 (42.0)	34.0 (41.0)	0.769	< 0.001	1.125	0.261
Walking ability	43.0 (35.0)	50.0 (43.0)	0.729	< 0.001	4.045	< 0.001
Social life function	51.0 (27.0)	51.0 (30.0)	0.658	< 0.001	1.336	0.181
Mental health	51.0 (22.0)	51.0 (24.0)	0.732	< 0.001	1.251	0.211

^a Kendal'a Tau B (τ_B) Rank Correlation Coefficient.

the test as a whole and each item of the test serve the intended purpose of measurement. When defining the items of the original version of the JOABPEQ, a serious preparation process was conducted and at the first stage of the formation of this questionnaire, 60 selected items were reduced to 25 and it was decided that various problems originating in the lumbar region could be evaluated with these 25 items [4]. No standard method has been defined which can evaluate face and content validity. However, all necessary scientific studies were made while developing the original version of the JOABPEQ with multi-center studies including many clinicians experienced in this field and sufficient data has been presented in literature that the JOABPEQ has sufficient face and content validity [4,5,8,14].

Construct validity is used as a theoretical measurement tool in the evaluation of whether or not the structure that is to be measured is suitable for measurement. The JOABPEQ aims to evaluate the outcomes of the problems resulting from lumbar pathologies and the restriction to the patient's social life caused by these problems. In the patient group of the current study, the correlations of the JOABPEQ-TR scale items with the scale sub-dimensions were found to be at the lowest level at $r = 0.509$ and the highest at $r = 0.872$. These results demonstrate that there was a positive relationship between each item and its sub-scale and that the JOABPEQ-TR is a scale with a sufficient level of validity.

Reliability is the degree of stability in the measurement results of a measurement tool. The results of the application of the scale to

a specific group applied to the same group after a specified time under the same conditions should be the same or very close. One of the methods used for this purpose is the test-retest measurement. In the current study, to be able to determine the reliability of the JOABPEQ-TR, the questionnaire was administered to the patients twice at a 14-day interval (± 3 days). Sufficient evidence was obtained of the reliability of the JOABPEQ-TR with the finding of a high τ_B coefficient from responses to the questionnaire completed by the patients at a 14-day interval (± 3 days). When the JOABPEQ was being developed, it was applied by the researchers to each patient at 14-day intervals to test the reliability of the questionnaire [15]. With the exception of Japanese and English, the only reliability study of the JOABPEQ which has been published was in Iranian [6]. In that Iranian reliability study, the test-retest reliability method was not used.

4.1. Limitations

This study had some limitations. Although the study was conducted according to the cross-cultural adaptation and translation guidelines defined in literature, the classic test theory was used at these stages [7]. The classic test theory is focused on the total test score, and the relationship between the personal ability of the participants and the features of any item is ignored. In future studies, the use of methods similar to Rasch analysis taking into consideration personal abilities could provide a solution to this

disadvantage [16,17]. As this is the first study on this subject in Turkey and it was applied in a single center, it is questionable whether it is valid for the whole country. Further multi-center studies are required to be able to provide a more developed contribution to the adaptation of the JOABPEQ for Turkey.

5. Conclusion

In the validity and cultural adaptation study conducted of the English version of the JOABPEQ on a Turkish-speaking population, no major incompatibility was encountered. The results of the current study showed that the JOABPEQ-TR had sufficient reliability and validity in the evaluation of low back pain and resulting dysfunction and disability in patients with LDH and narrowing of the lumbar canal. This questionnaire can be recommended for use for individual evaluation of the efficacy of treatment administered to patients and the results of clinical study groups.

Conflict of interest

The authors declare that they have no conflict of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.jos.2016.06.013>.

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