The Reliability and Cross-Cultured Adaptation of the Boston Questionnaire; in Turkish Illiterate Patients

Okur Yazar Olmayan Hastalarda; Boston Sorgulama Ölçeğinin Türkçe'ye Uyarlanması ve Güvenilirliği

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Abstract

Objective: In Turkey, the illiterate patients may not be able to complete many self-administered questionnaires. The aim of this study was to adapt the self-administered Boston questionnaire (BQ) for the assessment of the severity of symptoms and functional status (BQ-SS, BQ-F) in carpal tunnel syndrome to the illiterate Turkish population and investigate the reliability of the cross cultured adaptation.

Material and Methods: A total of 120 outpatients with carpal tunnel syndrome (60 literate, 60 illiterate) were assessed using this Turkish version of BQ. Translation/back-translation of the English version BQ was done by using blinded method and independently by four different individuals, and adapted by a team. For illiterate people, the term "writing" was changed as "crocheting" and the statement "holding a book while reading" was modified as "holding the Holy Quran while reading". Reliability was investigated by the reproducibility and internal consistency.

Results: Cronbach's alpha was calculated at 0.914 for BQ-SS scale, 0.94 for BQ-F scale in the illiterate group and at 0.971 for BQ-SS scale, 0.96 for BQ-F scale in the literate group, respectively. The intraclass correlation coefficients were excellent and range between 0.89 and 0.96 for BQ-SS and BQ-F in the illiterate and the literate patients.

Conclusion: This adapted version of BQ provides a reliable tool in iliterate Turkish patients with carpal tunnel syndrome. For application of self-administered questionnaire, some conceptual modifications should be required for accommodation of the different educational levels.

(Turk J Rheumatol 2009; 24: 10-6)

Key words: Adaptation, reliability, illiterate patients, questionnaire

Received: 03.10.2007 **Accepted:** 22.01.2008

Özet

Amaç: Türkiyede okuma yazma bilmeyen hastalar birçok sorgulama formunu kendi kendine tamamlayamamaktadır. Bu çalışmanın amacı; okuma yazma bilmeyen, karpal tünel sendromlu Türk hastalara, Boston semptom şiddet (BSÖ-SŞ) ve fonksiyonel durumu (BSÖ-F) sorgulama ölçeğini uyarlamak ve güvenilirliğini incelemekti.

Yöntem ve Gereçler: Çalışmaya 60 okur yazar olmayan, 60 eğitimli 120 hasta katıldı. Boston sorgulama ölçeği (BSÖ) İngilizce versiyonu Türkçe'ye bağımsız dört kişilik ekip tarafından; tercüme/geri tercüme kör yöntemle uyarlandı. Okur yazar olmayan hastalarda ''yazı yazmak'',''tığ işi yapmak'' ve ''okurken kitabı tutmak'' ''kuran okumak'' olarak değiştirildi. BSÖ Türkçe versiyonunun güvenilirliği, tekrarlanabilirliği ve iç tutarlılığı araştırıldı.

Bulgular: Cronbach alpha değeri sırasıyla okur yazar olmayan grup için BSÖ-SŞ=0.914, BSÖ-F=0.94 ve okur yazar için BSÖ-SŞ=0.971, BSÖ-F=0.96 olarak hesaplandı. Grup içi ilişki katsayısı, okur yazar olmayan ve olan hasta gruplarında mükemmeldi BSÖ-SŞ ve BSÖ-F için 0.89-0.96-aralığındaydı.

Sonuç: BSÖ formu Türkçe'ye uyarlanmış bu haliyle karpal tünel sendromlu okur yazar olmayan hastalara güvenle uygulanabilir. Farklı eğitim düzeylerinde, kendi kendine yapılan soru formlarını uygularken bazı kavramsal değişikler yapılması gerekli olabilir.

(Turk J Rheumatol 2009; 24: 10-6)

Anahtar sözcükler: Uyarlama, güvenirlilik, okur yazar olmayan hastalar, soru formu

Alındığı Tarih: 03.10.2007 **Kabul Tarihi:** 22.01.2008

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Introduction

Carpal tunnel syndrome (CTS) is the most frequent entrapment neuropathy of the median nerve and uniformly affects approximately 2-3% of the general population according to several epidemiological studies (1-3). Symptoms of CTS include pain, paresthesia and numbness or tingling involving the fingers innervated by the median nerve. Symptoms are worst at night and often wake the patients (4). CTS can limit the activities of sufferers and has negative effects on their quality of life (QoL) and work activity (5). Thus, it is a significant health issue. Reliable and valid indicators sensitive to changes are needed to assess functional limitations and severity of symptoms in patients with CTS. Hence, Levine et al. developed a questionnaire for the evaluation of severity of symptoms and hand function. The Boston Questionnaire (BQ) is a self-administered and well-recognized, validated outcome instrument specific for CTS (6). It has been developed to study English-speaking patients only. It has been compared with many different outcome measures and has also been validated in other languages (5, 7, 8).

As patients, adults with low literacy may not be able to complete many self-administered written questionnaires (9). Up to 25% of adults in Turkey have difficulty with reading tasks (10). The illiterate patients may not be able to complete a self-administered questionnaire. Furthermore, BQ includes questions like "writing" and "holding a book while reading" prepared for literate people. Therefore, the main purpose of this study was to present the cross-cultural adaptation process of the BQ and evaluate its reliability among both illiterate and literate Turkish patients with CTS.

Materials and Methods

Translation

For the translation process, we used the guideline for cross-cultural adaptation (11). First, the English version of the BQ was translated into Turkish by two different and independent translators whose native language was Turkish, allowing detection of errors and divergent interpretation of items with ambiguous meaning in the original instrument. One of the translators was aware of the purpose of the procedure and the concepts involved in the instrument, in order to obtain a better idiomatic and conceptual rather than literal equivalence between the two versions of the questionnaire, and to render the intended measurement more reliable. The other translator was unaware of the translation's objective, and this was useful in eliciting unexpected meanings from the original tool. Both Turkish translations were then compared for inconsistencies. The two translations were then back-translated, also in a blinded fashion and independently, into English by two native English speakers. Each English translation was then compared with the original English BQ and checked for inconsistencies.

The Turkish version was then jointly reviewed by a bilingual team, including the four translators, two physiatrists and two public health physicians, to assess the necessity of performing a cultural adaptation and to fine-tune for use among Turkish patients. They again compared the Turkish version with the original English version to detect errors of interpretation and nuances that might have been missed. The final stage of the adaptation process was to test the prefinal version. Thirty-one different illiterate and literate patients were tested in the pilot study. This ensured that the adapted version still retained its equivalence in an applied situation. For those illiterate, the term "writing" in the first question was replaced with "crocheting" and the statement "holding a book while reading" in the third question was modified to read "holding the Holy Quran while reading". Since the test of the prefinal version did not include reliability evaluation, the patients were not recalled 7 days later. After minor changes were made with consensus, this version was finalized.

Patients

The inclusion criterion of this study was the existence of unilateral CTS in the dominant hand only. Diagnosis of CTS was based on the American Academy of Physical Medicine and Rehabilitation, American Academy of Neurology, and American Association of Electrodiagnostic Medicine clinical and electrodiagnostic criteria (12, 13). Nerve conduction studies and clinical evaluation were made by a physiatrist and a neurologist. The exclusion criteria consisted of (i) history of wrist trauma, rheumatic disease, acromegaly, hypothyroidism, pregnancy, or prominent orthopedic abnormalities; (ii) the absence of motor or sensory potentials of the median nerve; and (iii) various other disorders resembling CTS such as cervical radiculopathy, brachial plexopathy, pronator teres syndrome and polyneuropathy. Patients with bilateral CTS were not included.

One hundred and twenty outpatients with idiopathic CTS were included in the reliability evaluation for internal consistency. Forty-two of the 120 patients also participated in a test-retest evaluation. Patients consisted of literate and illiterate individuals. All of the illiterate and literate subjects were female, but were able to crochet or to read the Holy Quran written in Arabic. Patients were recruited from the Physical Medicine and Rehabilitation Department of Harran University Hospital in Sanliurfa, Turkey, between November 2005 and September 2006. All subjects were informed of the study procedures and participated on a voluntary basis. A detailed and careful clinical history was obtained and a clinical examination was performed in all subjects by two physiatrists and a neurologist. Demographic and socio-economic information (age, gender, education level, occupation, etc.) were recorded on the basis of the interview held with subjects.

Assessments

Boston Questionnaire: Symptom severity and functional status of the patients and controls were assessed using the

Turkish version of the BQ. The Boston symptom severity scale (BQ-SS) (11 items) concerns severity and frequency of symptoms (night and daytime numbness, tingling, pain, weakness). The Boston functional status scale (BQ-F) (8 items) concerns difficulties in performing specified activities (writing, holding a book, buttoning clothes, gripping the telephone handset, opening jars, doing household chores, carrying a grocery bag, bathing, and dressing). Each question was rated on a 1-to-5 point scale, where 1 indicates no symptom and 5 indicates severe symptoms. The overall symptom-severity score was calculated as the mean of the scores for the eleven individual items. The overall score for functional status was calculated as the mean of eight items. A high mean score showed that the subject had severe symptoms and/or insufficient functional capacity (6). BQ was self-completed by literate patients. For illiterate patients, the questionnaire was administered reading aloud face-to-face by the observer.

Electrophysiological examination: Motor and sensory nerve conduction studies were performed using standard techniques of supramaximal percutaneous stimulation and surface electrode recording by same the neurophysiologist. Nerve conductions were measured using the methods described by Delisa et al. by electromyography (Dantec, Keypoint v. 2.02 Skovlunde, Denmark) (14). The electrophysiologic criteria for the diagnosis of CTS was either distal motor latency (DML) greater than 4.3 ms at a distance of 6 cm or a sensory nerve conduction velocity (SNCV) lower than 44.2 m/s at the segment of palm to the wrist at a distance of 6 cm with orthodromic technique. These were the norms adapted in our electrophysiology laboratory [Normal values for DML: 3.6±0.34 (mean±SD). upper limit of normal value: 4.3 ms; Normal values for SNCV: 59.5±7.1 (mean±SD), lower limit of normal value: 44.2 m/s]. The skin temperature was above 31°C in all subjects and was usually between 31°-34°C.

Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL) 11.0 for Windows. Before analyzing the data, normal distribution was ascertained by the Lilliefors test and the Kolmogorov-Smirnov test. The results showed normal distribution. χ^2 and independent sample t test were used to compare demographic characteristic values of the patient groups.

The reliability of the Turkish version of the BQ was tested by internal consistency and test-retest reliability. Test-retest reliability measures stability over time, by administering the same test to the same subjects at two points in time. The appropriate length of the interval depends on the stability of the variables that causally determine that which was measured. We used intraclass correlation coefficient (ICC) to evaluate test-retest reliability. ICC may vary from 0.00 to 1.00, where values of 0.60 to 0.80 are regarded as an evidence of good reliability and those above 0.80 indicate excellent reliability (15). The BQ was repeated in 42 patients (22 illiterate, 20 literate) after a mean interval of 7 days (range 5-8) to evaluate test-retest reliability. Correlation of the total scores between two successive administrations was measured with the Pearson correlation coefficients. The internal consistency of a scale relates to its homogeneity. The coefficient of internal consistency is mainly assessed with Cronbach's alpha (16). It is suggested that the value of alpha should be above 0.80 for a high internal consistency. A Cronbach alpha of 0.80 is considered good and a value of 0.90 is regarded as excellent (6, 17). Item-total correlation was calculated by Pearson's correlation coefficients. Statistical significance was set at 0.05 for all tests performed and 95% confidence intervals (CIs) were used for all cases, when reported.

Table 1. Demographic and clinical characteristics of study population

		Literate group	İlliterate group
Age (years)		49.3±12.1 (22-77)	47.3±10.7 (21-68)
BMI (kg/cm²)		29±4.3	29.6±5.6
Occupation n (%)			
	Housewife	19 (31.6)	44 (83.3)
	Farmer	5 (8.3)	6 (10)
	Officer	15 (25)	
	Retired	13 (21.6)	1(1.6)
	Unrestricted	8 (13.3)	9 (15)
Duration of symptoms (months)		2.1±1.6 (1-10)	1.98±1.5 (2-12)
BQ-SS scores (mean, SD)		2.83±0.239	2.75±0.393
BQ-F scores (mean, SD)		2.38±0.187	2.44±0.194

BMI: Body mass index, BQ-SS:Boston Symptom Severity Scale, BQ-F: Boston Functional Status Scale, SD: Standard deviation

Results

Characteristics of the patients: One hundred and twenty female patients with CTS (60 illiterate, 60 literate) participated in the study, with mean ages of 47.3±10.7 (range: 21-68) and 49.3±12.1 (range: 22-77) in the illiterate and literate patient groups, respectively. There were no differences in terms of age, sex and duration of symptoms between the groups (p>0.05) (Table 1). None of the patients had treatment such as medication, rehabilitation or orthosis during the consecutive visits and were readministered the BQ 1 or 2 weeks later. No patient had difficulty completing the BQ. Mean values for BQ-SS in the illiterate and literate patient groups were 2.75±0.39 and 2.83±0.23, and mean values for BQ-F in the illiterate and literate patient groups were 2.44±0.19 and 2.38±0.18, respectively.

Reliability: Internal consistency was also found adequate at both assessments with Cronbach's alpha of 0.914 for BQ-SS scale and 0.94 for BQ-F scale for the illiterate group. These values were 0.971 for the BQ-SS scale and 0.96 for the BQ-F scale in the literate group. These Cronbach values are considered excellent. The ICCs were excellent and ranged between 0.89 and 0.96 for BQ-SS and BQ-F in illiterate and literate patients. Test-retest reliability was adequate for BQ-SS scale (ICC=0.948; p<0.001) and for BQ-F scale (ICC=0.896; p<0.001) in the illiterate patient group. Test-retest reliability was also adequate for the overall BQ-SS scale (ICC=0.964; p<0.001) and BQ-F scale (ICC=0.961; p<0.001) in the literate patient group (6, 15, 16, 17). The reproducibility of the Turkish version was excellent, with Pearson's correlation coefficients of 0.91 (BQ-SS) and 0.89 (BQ-F) for the illiterate patients and 0.94 (BQ-SS) and 0.92 (BQ-F) for the literate patients.

Discussion

Although the cross-cultured adaptation of a health status self-administered questionnaire guideline has been produced for use in a new country, there is not yet clear consensus on the most appropriate approach (11). In Turkey, some conceptual modifications were required, and language had to be adjusted to accommodate the wide educational levels found in the Turkish population. In this study, the Turkish adaptation of the BQ was performed on illiterate and literate patients since 63.2% of females and 39.4% of males are illiterate in the southeastern part of Turkey (10). Half of our patient groups consisted of illiterate individuals. In Kucukdeveci et al.'s study to test the validity of the Turkish version of the self-completed Roland-Morris Disability Questionnaire in patients with back pain, the questionnaires were administered by an observer for patients who were illiterate (18). Reading BQ aloud face-to-face would not be sufficient for illiterate subjects in our study because BQ-F includes questions like "writing" and "holding a book while reading" prepared for literate people. We would not get answers to those questions. For these reasons, for illiterate patients, "writing" was replaced with "crocheting" and "holding a book while reading" was modified as "holding the Holy Quran while reading". In the our study, this adaptation of the Turkish BQ-SS and BQ-F scales was administered among illiterate and literate patients successfully, demonstrating that BQ is also reliable in illiterate patients when administered face-to-face.

Clinicians need indicators that are easy to use, reliable, valid and sensitive to changes in order to monitor the natural evolution of diseases and the functional limitations of patients (19). Disease-specific instruments can be very sensitive for evaluating health changes related to specific upper extremity diseases (5). CTS is the most frequent entrapment neuropathy of the median nerve in the population (1-3). BQ was developed for English-speaking patients with CTS by Levine et al. (6). It has been translated and adapted to various languages (7, 20). Heybeli et al. translated and administered the BQ before and after treatment in 15 patients with CTS who had been treated with open surgical neurolysis. However, they did not test its reliability and did not perform a cross-cultural adaptation (21). In a similar study, Sezgin et al. administered the BQ only to literate patients to determine its reliability and validity (22). In our study, BQ was administered to patients with CTS following a cross-cultural adaptation in illiterate and literate patients and it was found reliable. Adaptation of the BQ for use in Turkey was successful. Our results seem to support previous findings of the English version, indicating that it is valid and reliable.

A measurement is useless unless it is precise and reproducible. The quality of measurements depends upon reliability and validity. The reliability measurement indicates whether it will give the same result on different occasions. There are two main aspects of reliability (test-retest and internal consistency) and these have already been established as a measure of a patient's evaluation (23). Higher internal consistency is generally associated with lower error variance or greater precision (6, 24). In our study, two main aspects of reliability were applied. The internal consistencies of the BQ-SS and the BQ-F (Cronbach alpha 0.89 and 0.91 for the literate patient group; 0.87 and 0.89 for the illiterate patient group, respectively) were very good. Similar results for internal consistency have been reported for the Swedish, Spanish, Portuguese and the original version of the BQ (0.80-0.87, 0.90-0.91, 0.83-0.90 and 0.89-0.91) (6, 7, 20, 25). Reproducibility reflects whether the same result is obtained on repeated administrations, assuming no clinical change (6, 26). The reproducibility of the Turkish version was excellent, with Pearson's correlation coefficients of 0.89 (BQ-F) and 0.91(BQ-SS) in illiterate patients and 0.92 (BQ-F) and 0.94 (BQ-SS) in literate patients, and this was comparable with Swedish, Spanish and Portuguese versions (0.64-0.71, 0.87-0.85, 0.60-0.55, respectively) (7, 20, 25). The reproducibility of the English original version was 0.90 for BQ-SS and 0.93 for BQ-F (6). In our study, the different results from the illiterate

BOSTON KARPAL TÜNEL SORGULAMASI

Semptom Şiddeti Skalası

Aşağıdaki sorular tipik olarak sizin geçen son iki haftalık dönemdeki belirtilerinizi göstermektedir. (her soru için uygun şıkkı daire içine alınız.)

-Geceleri el veya el bileğinizdeki ağrının şiddeti nasıl?

1 geceleri el veya el bileğimde ağrı yok
2 hafif bir ağrı var
3 orta şiddette bir ağrı var
4 şiddetli bir ağrı var
5 çok şiddetli bir ağrı var

-Son iki hafta içinde, olağan bir gece boyunca; el ve el bileğindeki ağrı nedeniyle ne sıklıkta uyandın?

1 hiç
2 birkez
3 iki veya üç defa
4 dört veya beş defa
5 beş defadan fazla

-Olağan gün boyunca el veya el bileğinizde ağrı var mı?

1 benim gün boyunca hiç ağrım yok
2 benim gün boyunca hafif bir ağrım var
3 benim gün boyunca orta derecede ağrım var
4 benim gün boyunca şiddetli ağrım var
5 benim gün boyunca çok şiddetli ağrım var

-Gün boyunca el veya el bileğinizdeki ağrının sıklığı nasıl?

1 hiç yok
2 günde iki veya üç kez
3 günde üç veya dört kez
4 günde dört defadan fazla
5 ağrım sürekli

-Son olarak gün boyunca aralıklarla olan ağrın, yaklaşık ne kadar sürdü?

1 gün boyunca hiç ağrım yoktu.
2 on dakikadan az
3 on dakikadan altmış dakikaya kadar
4 bir saatten fazla
5 ağrı gün boyunca sürekliydi.

-Ellerinde uyuşma var mı? (his kaybı)

1 hayır
2 hafif uyuşukluk var
3 orta derecede uyuşukluk var
4 şiddetli uyuşukluk var
5 çok şiddetli uyuşukluğum var

-El veya el bileğinde güçsüzlük var mı?

1 güçsüzlük yok
2 hafif güçsüzlük var
3 orta derecede güçsüzlük var
4 şiddetli güçsüzlük var
5 çok şiddetli güçsüzlük var

-Elinde karıncalanma oluyor mu?

1 karıncalanmam yok
2 hafif karıncalanma oluyor
3 orta derecede karıncalanma oluyor
4 şiddetli karıncalanma oluyor
5 çok şiddetli karıncalanma oluyor

-Geceleri uyuşukluk (his kaybı) veya karıncalanmanın şiddeti nasıl?

1 geceleri uyuşukluk veya karıncalanma yok
2 hafif
3 orta şiddette
4 şiddetl
5 çok şiddetli

-Geçtiğimiz iki hafta boyunca, olağan bir gecede el uyuşması veya karıncalanma nedeniyle ne sıklıkta uyandın?

1 uyanmadım
2 birkez
3 iki veya üç kez
4 dört veya beş kez
5 beş defadan fazla

-Anahtar veya kalem gibi ufak cisimleri tutarken veya kullanırken zorlanıyor musun?

1 zorlanmıyorum
2 hafif zorlanıyorum
3 orta derecede zorlanıyorum
4 oldukça zorlanıyorum
5 çok zorlanıyorum

Fonksiyonel Durum skalası

Geçen iki hafta boyunca, olağan bir günde el veya el bileğindeki şikayetler aşağıdaki faaliyetlerde hiç zorluğa neden oldu mu? Lütfen faaliyetleri yapabilme gücünüzü en iyi gösteren sayıyı daire içine alınız.

Yazı yazmak (tığ işi yapmak)	1	2	3	4	5
Giyeceklerin düğmeleri iliklemek	1	2	3	4	5
Okurken kitabı(Kuranı) tutmak	1	2	3	4	5
Telefonun ahizesini tutmak	1	2	3	4	5
Kavanozu açmak	1	2	3	4	5
Ev işleri yapmak	1	2	3	4	5
Yiyecek torbalarını taşımak	1	2	3	4	5
Banyo yapmak ve giyinmek	1	2	3	4	5

1-Hiç zorlanmadım
2-hafif zorlandım
3-orta derecede zorlandım
4-çok zorlandım
5-oldukça çok zorlandım

patient group may be due to administration of the Turkish version twice within seven days and the patient education levels compared to the English subjects.

In conclusion, our data showed that the BQ score was successfully translated and adapted into the Turkish language for illiterate and literate patients. Some conceptual modifications were applied to accommodate the low educational levels found in the Turkish population. This Turkish version of the BQ score is a reliable instrument for use in clinical trials in illiterate and literate patients with CTS. Future adaptation of the process should include accommodations for the different educational levels of the Turkish population.

Acknowledgement

The authors thank the members of the committee (Joyce Beachy, English teacher and Tevfik Atilgan, English teacher) for their cooperation.

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