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Turkish Version, Validity and Reliability of the Lumbar Spine Instability Questionnaire

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ABSTRACT

AIM: To reveal the reliability and validity of the Turkish Lumbar Spine Instability Questionnaire for evaluating patients with lumbar instability and low back pain.

MATERIAL and METHODS: A total of 100 patients with low back pain participated in the study. Test-retest and internal consistency analyses were used to assess the reliability of the questionnaire, and correlation analysis was used to determine its validity. For correlation analysis, the total scores of the Lumbar Spine Instability Questionnaire, Visual Analog Scale, Bournemouth Questionnaire, Tampa Scale of Kinesiophobia, and Roland Morris Disability Questionnaire were compared.

RESULTS: Reliability analysis showed that the internal consistency value of the questionnaire was 0.818, and the intraclass correlation coefficient (ICC) value was 0.839. Pearson correlation analysis showed that the questionnaire had a good correlation with the Tampa Scale of Kinesiophobia (0.520) and a stronger correlation with the Visual Analog Scale (0.702), Roland Morris Disability Questionnaire (0.767), and Bournemouth Questionnaire (0.667).

CONCLUSION: Our results confirmed that the Turkish version of the Lumbar Spine Instability Questionnaire is reliable and valid.

KEYWORDS: Low back pain, Questionnaires, Spine, Outcome measurements

ABBREVIATIONS: LSIQ: Lumbar spine instability questionnaire, **VAS:** Visual analog scale, **BQ:** Bournemouth questionnaire, **TSK:** Tampa scale of kinesiophobia, **RMDQ:** Roland morris disability questionnaire, **ICC:** Intraclass correlation coefficient

INTRODUCTION

Low back pain is one of the leading causes of disability in both developed and developing countries. Currently, it is in the sixth place in terms of disease burden (22), and it was found that 60%–90% of the population suffers from low back pain during some part of their life (17). Low back pain can lead to the loss of the ability to work, causing a serious economic burden for individuals with low back pain (28).

Generally, low back pain is categorized as specific and nonspecific, and the latter is the most common type. However, nonspecific low back pain is described as a heterogeneous group. It has been suggested that different treatment approaches should be developed for each group for more effective treatment. To develop such approaches, a specific definition of low back pain is clinically important (30). In nonspecific low back pain, lumbar instability, with prevalence between 12% and 57%, holds great importance (1,2,16,27).

Lumbar spinal instability is defined in the literature in two ways: radiological and clinical instability. Radiological instability can be easily diagnosed in the clinic with radiological techniques. However, the diagnosis of clinical instability that can occur under physiological load is not easy (25,30). Although a few tests have been developed for its diagnosis, the validity and reliability of these tests are unclear (10). Further, delayed diagnosis remains a major problem. Loss of time in the

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diagnosis of lumbar instability can lead to the need for invasive interventions for treatment (8,13). Cook et al. developed the Lumbar Spine Instability Questionnaire (LSIQ) for evaluating lumbar instability as well as low back pain in an effective and timely manner (10).

The LSIQ is a patient-based outcome measurement consisting of 15 yes/no questions. LSIQ assesses the symptoms of pain, spinal movement, fear of movement, and trauma history, and a high LSIQ score indicates a high level of disability (10). Besides the original English version of the questionnaire, there are Brazilian-Portuguese (4) and Thai (9) versions. However, no Turkish language adaptation of the questionnaire was found in the literature review. Therefore, the aim of this study was to assess the reliability and validity of the Turkish version of the LSIQ.

MATERIAL and METHODS

This study was conducted as a methodological design. To conduct this study, the necessary permission was obtained from the Ethics Committee of the Adnan Menderes University (number, 92340882-050.04.04; protocol number, 2020/40). The study was conducted in accordance with the Declaration of Helsinki, and written consent of the participants was obtained.

Participants

Individuals who applied to Isparta City Hospital's Orthopedics and Traumatology service were included in this study. Among the eligible individuals with low back pain, volunteers who were over the age of 18 and signed the consent form were included, whereas those who were pregnant or had systemic and neurologic diseases were omitted from the study. Consequently, the study was completed with 100 participants who met the inclusion criteria and the targeted number of participants was reached (3). Forty (40%) patients refilled the LSIQ for the test-retest analysis.

Translation and Cultural Adaptation

Language adaptation stages of the Turkish version of the LSIQ were carried out according to the guidelines of Beaton et al. (5). First, the original version of the questionnaire was translated into Turkish by two native Turkish speakers fluent in English. Second, the two Turkish versions of the questionnaire were converted into a single translation by consensus by the translators. The first Turkish version of the questionnaire was translated back into English by two bilingual translators. After the translation, the team checked all the translations. The second version of the questionnaire was sent to a Turkish linguist, and the pretest version of the scale was created.

This version of the questionnaire was given to 15 patients with low back pain for clarity, and the Turkish version of the questionnaire was finalized without making any changes during this stage, in line with the feedback received from the participants.

Patient-Based Outcome Measurements

The participants in this research first completed the LSIQ and then the Visual Analog Scale (VAS), Bournemouth Questionnaire (BQ), Tampa Scale of Kinesiophobia (TSK), and Roland Morris Disability Questionnaire (RMDQ) to complete the reliability and validity stages of the questionnaire. Forty participants filled the LSIQ again 48 hours later to perform the test-retest analysis of the questionnaire.

LSIQ

The LSIQ was derived from a Delphi survey by Cook et al. (10). This questionnaire has been shown to evaluate lumbar instability as well as low back pain (8). The LSIQ consists of 15 yes/no questions on topics such as pain, trauma history, and fear of movement. The maximum score that can be obtained from the questionnaire is 15, and a high score indicates high disability (10,21).

BQ

The BQ was created by Bolton and Breen for the evaluation of low back pain. It consists of seven questions that evaluate characteristics such as pain, daily social life, depression and anxiety, and fear-avoidance behaviors. The total score is 70, with a high score indicating high disability (6). The validity and reliability of the questionnaire in the Turkish population has been established previously (18).

RMDQ

The RMDQ consists of 24 questions and evaluates physical function in patients with low back pain. The scale has yes/no questions, and high scores indicate high disability. A revised version of the questionnaire was published in 2000 (29). A Turkish RMDQ study was previously performed, and the questionnaire was found to be reliable and valid (20).

TSK

The TSK consists of 17 questions that assess the parameters of injury and fear avoidance in work-related activities. It is answered with a 4-point Likert scale from strongly disagree to strongly agree. The questionnaire has scores between 17 and 68, and high scores indicate high fear-avoidance behavior (32). A study of the validity and reliability of the scale for the Turkish population was previously conducted (33).

Statistical Analysis

Statistical Package for Social Sciences (SPSS) for Mac 21.0 package program was preferred for all statistical analyses. Analyses are expressed as mean ± standard deviation and as a percentage. Internal consistency and test-retest analyses were used to determine the reliability of the LSIQ. Internal consistency analysis was calculated by Cronbach's Alpha, and test-retest results were calculated by intraclass correlation coefficient (ICC). A Cronbach Alpha value of ≥0.70 was considered sufficient (31). ICC values ≤0.5, 0.50–0.75, 0.75–0.90, and >0.90 indicated weak, moderate, good, and excellent reliability, respectively (19). The validity of the questionnaire was calculated by correlating the total score of the LSIQ with the total scores of the VAS, BQ, RMDQ, and TSK. Pearson correlation was used for this analysis, and it was interpreted as excellent (r=0.81–1.00), very good (r=0.61–0.80), well (r=0.41–0.60), poor (r=0.21–0.40), and

bad correlation (r=0–0.20) (14). All values were considered significant at p<0.05.

RESULTS

Of the 100 patients who participated in the study, 49 were male and 51 were female. Their detailed demographic data are summarized in Table I. In our analyses, Cronbach's Alpha value of the LSIQ was found to be 0.818. This value indicated that the questionnaire had a high level of internal consistency. When the questions were removed one by one and the analysis was repeated, it was seen that the Cronbach's Alpha value decreased for all questions except for the 2nd and 15th questions (Table II). This shows that these questions broadly contribute to internal consistency.

ICC analysis was performed to determine the test-retest reliability of the scale. Results indicated that the questions had medium-to-excellent (0.590–0.917) reliability. The total ICC value of the LSIQ was found to be at an appropriate level (0.839) (Table III).

Pearson correlation analysis to determine the validity of the questionnaire showed that the LSIQ was positively and well correlated with TSK (r=0.520) and very good with BQ (r=0.667), RMDI (r=0.767), and VAS (r = 0.702) (Table IV).

DISCUSSION

This study was conducted to determine the psychometric properties of the Turkish version of the LSIQ. We found that the questionnaire was reliable and valid for the Turkish-speaking population.

Low back pain affects most people both economically and mentally (22). For this reason, clinicians and researchers have been conducting many studies on the diagnosis and treatment of low back pain. The treatment approaches performed in patients with low back pain primarily include measurement methods such as range of motion of the spine and strength maneuvers. However, the relations of these measurements with parameters such as symptom changes and activities of daily and working life were found to be weak (12,23,26). This indicated that the objective and subjective examination of the lumbar spine in patients with low back pain, as in other pathologies, should be done with the outcome measurements that are appropriate and validated for the disease (11,12,15, 26). However, at this point, the categorization of patients with

Table I: Demographics of the Participants

Parameters	Value
Age (year)(x±ss)	40.08 ± 16.22
Height (cm) (x±ss)	168.01 ± 13.83
Body Mass (kg) (x±ss)	72.92 ± 15.46
Back pain duration (month) (x±ss)	47.28 ± 76.12
VAS for back pain (x±ss)	5.07 ± 2.23

VAS: *Visual analog scale,* ***x±ss:*** *mean±standart deviation.*

Table II: Internal Consistency Analyses

1. If item 1 deleted	0.795
2. If item 2 deleted	0.823
3. If item 3 deleted	0.806
4. If item 4 deleted	0.813
5. If item 5 deleted	0.808
6. If item 6 deleted	0.804
7. If item 7 deleted	0.804
8. If item 8 deleted	0.813
9. If item 9 deleted	0.800
10. If item 10 deleted	0.809
11. If item 11 deleted	0.795
12. If item 12 deleted	0.811
13. If item 13 deleted	0.809
14. If item 14 deleted	0.803
15. If item 15 deleted	0.820
16. Total	0.818

Table III: Test-Retest Analyses

LSIQ	Intraclass Correlation Coefficent (95% Confidence Interval) (Upper-Lover Bound)
First Question	0.708 (0.449-0.846)
Second Question	0.749 (0.526-0.867)
Third Question	0.590 (0.226-0.783)
Fourth Question	0.890 (0.793-0.942)
Fifth Question	0.599 (0.241-0.788)
Sixth Question	0.788 (0.600-0.888)
Seventh Question	0.792 (0.608-0.890)
Eighth Question	0.826 (0.672-0.908)
Ninth Question	0.646 (0.331-0.813)
Tenth Question	0.646 (0.331-0.813)
Eleventh Question	0.884 (0.780-0.939)
Twelfth Question	0.894 (0.799-0.944)
Thirteenth Question	0.800 (0.622-0.894)
Fourteenth Question	0.917 (0.843-0.956)
Fifteenth Question	0.772 (0.569-0.880)
Total point	0.839 (0.696-0.915)

Table IV: Correlation Analyses

	r(p)			
Outcome Measures	BQ	RMDI	TKA	VAS
LSIQ	0.667 (**<0.001**)	0.767 (**<0.001**)	0.520 (**<0.001**)	0.702 (**<0.001**)

LSIQ: *Lumbar spinal instability questionnaire,* ***BQ:*** *Bournemouth questionnaire,* ***RMDQ:*** *Roland morris disability questionnaire,* ***TKQ:*** *Tampa kinesiophobia questionnaire,* ***VAS:*** *Visual analog scale.*

low back pain poses a problem. Currently, low back pain is classified as specific and nonspecific low back pain, and the latter constitutes a large group. Patients with lumbar spinal instability in this group show some differences in terms of diagnosis and treatment (30). It has been reported that the LSIQ can be used in patients with lumbar spinal instability as well as in patients with low back pain (8,10).

Although there are many questionnaires evaluating low back pain in the clinic, none of them is accepted as the gold standard (7). In this sense, the LSIQ has a different feature from other patient-based outcome measurements evaluating low back pain.

In non-English version studies, translation and cultural adaptation stages should be completed properly (5) so that the outcome measurement scales created in different languages could be applied in different societies. The translation and cultural adaptation stages implemented within the scope of this study were completed without any problems.

One of the most important issues in the use of outcome measurement questionnaires is the validity and reliability of those questionnaires. The Cronbach's Alpha value was found to be 0.818 by the internal consistency analysis of the LSIQ. This value was 0.69 in the original version (21) and 0.79 in the Brazilian-Portuguese (4) version. In the Thai version, no data on internal consistency analysis was available (9). According to these results, the Turkish and Brazilian-Portuguese language versions had a higher internal consistency than the original questionnaire.

Another important issue in terms of the reliability of the patient-based outcome measurements is the test-retest reliability. Test-retest analyses shed light on the stability of the time of the questionnaires. However, there is no consensus on the appropriate time interval between repetitions of these two tests. Short interval periods can cause the participants to remember their previous answers, and long periods can cause a change in the course of the disease. For this reason, in this study, the test-retest period was determined based on the study of Marx et al., and a 2-day interval was preferred (24).The analyses showed that the ICC values of the survey questions ranged between 0.590 and 0.917, and the total ICC value was 0.839. This value was 0.74 in the Brazilian-Portuguese version (4) and 0.91 in the Thai version (9). When the non-Turkish language compatibility of the questionnaire was assessed, it was found that ICC values of the original version were not available. Additionally, question-based ICC analyses of the versions in other languages were not available. When these data were assessed, the stability of the questionnaire over time was found to be sufficient.

Validity analyses are of great importance in using questionnaires translated from different languages into the target language for the related disease or symptom. Therefore, the total scores obtained from the LSIQ were compared with the total scores of the VAS (r=0.702), BQ (r=0.667), RMDQ (r=0.767), and TSK (r=0.520). We saw that there was a positive relationship between good and very good validity. In the validity analysis of the Brazilian-Portuguese version of the questionnaire, the questionnaire was found to have a good correlation with the Pain Numeric Rating Scale (0.46), TSK (0.49), and Beck Depression Inventory (0.44), and it had a very good correlation with RMDQ (0.66) (4). Although these values are the first construction of the validity data of the LSIQ, they indicate that the questionnaire is valid.

This study has some limitations. The responsiveness analysis, which would determine the sensitivity of the LSIQ to symptoms and clinical changes, could not be performed within the scope of this study. The responsiveness analysis is vital for a clearer understanding of the psychometric properties of the LSIQ and will be performed in future studies.

CONCLUSION

As a result of this study, the Turkish version of the LSIQ was found reliable and valid. Its clear structure, short completion time, easy score calculation and its use in patients with lumbar spinal instability as well as in patients with back pain show that the LSIQ is a preferable questionnaire for clinical use.

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AUTHORSHIP CONTRIBUTION

Study conception and design: GG,OEG, HY

Data collection: HY, GG

Analysis and interpretation of results: GG

Draft manuscript preparation: GG,OEG,HY

Critical revision of the article: GG,OEG,HY

Other (study supervision, fundings, materials, etc...): GG,OEG,HY

All authors (GG,OEG,HY) reviewed the results and approved the final version of the manuscript.

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