

# THE TURKISH VALIDITY AND RELIABILITY OF HOSPITAL FOR SPECIAL SURGERY-LUMBAR SPINE SURGERY EXPECTATIONS SURVEY

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## ABSTRACT

**Objective:** The postoperative recovery expectations of patients are important for surgical decisions. The Hospital for Special Surgery-Lumbar Spine Surgery Expectations Survey (HSS-LSSES) is a questionnaire evaluating expectations from lumbar surgery. This study aims to adapt the HSS-LSSES to Turkish and to assess its validity and reliability.

**Materials and Methods:** The methodology of this study was based on the COSMIN guideline. The Turkish version of the HSS-LSSES created with the double-back translation procedure and the Turkish version of the Quebec Back Pain Disability Scale (QBPDS) were administered to the participants who were scheduled for surgery with the diagnosis of lumbar radiculopathy, respectively. Cronbach's alpha coefficient and item analysis were used to assess internal consistency. Also, intraclass correlation coefficient (ICC) was used to determine test-retest reliability.

**Results:** The study included 180 participants (54.4% male) with a mean age of 50.96±13.42 years at scheduled lumbar spine surgery. HSS-LSSES had good internal consistency (Cronbach's  $\alpha=0.87$ ) and excellent test-retest reliability [ICC (2.1)=0.99;  $p<0.01$ ]. A strong negative correlation was found between HSS-LSSES-TR and QBPDS-TR ( $r=-0.71$ ,  $p<0.01$ ). It was observed that there was no ceiling and floor effect in the scale.

**Conclusion:** HSS-LSSES-TR is a practical, valid, and reliable measurement method that can be used in clinical and research settings to evaluate the expectations of individuals planning for lumbar spine surgery and to examine how well these expectations are met after surgery.

**Keywords:** Cross-cultural adaptation, expectation, radiculopathy, lumbar surgery

## INTRODUCTION

Lumbar spine disorders are among the important health problems that can cause physical and psychological disability, especially pain, severe symptoms that often coexist, job loss, and high health expenditures. Moreover, the number of patients who are operated on to treat pain and disability due to lumbar spine disorders is increasing daily<sup>(1)</sup>. Deciding on surgical methods for the spine and their potential impact on the degenerative process and patients' symptoms remains an important research topic<sup>(2,3)</sup>. It has been revealed in many studies that one of the most important determinants is the patients' expectations, both for deciding on surgical procedures and for examining the effects of surgical methods<sup>(4-6)</sup>.

From the past to the present, patients' expectations from spine surgery for the lumbar area have been evaluated with various methods, including standard questions to individuals

before extensive surgery<sup>(7-10)</sup>. However, when these methods are examined, it has been observed that "ad hoc surveys" developed by the researchers specifically for the study, which have no validity and reliability and cannot be adapted to different languages, are used. For this reason, the Hospital for Special Surgery-Lumbar Spine Surgery Expectations Survey (HSS-LSSES) was developed in 2013<sup>(11)</sup>. This scale thoroughly evaluates the patient's recovery expectations for physical and social functions following lumbar spine surgery. When the literature is examined, no version of HSS-LSSES has been found in languages other than Russian<sup>(12)</sup>. Evaluating the expectations of individuals from lumbar spine surgery in a patient-centered framework and reporting that it is valid and reliable in the original and other published versions are among the advantages of this scale.

HSS-LSSES may help evaluate the expectations of Turkish-speaking patients and provide additional benefits for physicians in deciding on surgical procedures and achieving better clinical

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results. In addition, creating versions of the scales in different languages may contribute to the development of a general procedure for the results obtained from studies on lumbar spine surgery. Therefore, this study aims to use the Turkish version of the HSS-LSSSES by making a linguistic and cultural translation and examining the validity and reliability of this scale.

## MATERIALS AND METHODS

The methods used in this study were determined and reported according to the COSMIN guidelines<sup>(13,14)</sup>.

### Participants

Individuals who were referred to the neurosurgery department with symptoms of low back pain and decided to undergo lumbar radiculopathy (LR) surgery by a neurosurgeon were invited to participate in the study. Inclusion criteria were (1) being between 18 and 70 years of age, (2) meeting the indications for LR surgery, (3) giving consent and consent for surgical treatment, and (4) volunteering to participate in the study. The exclusion criteria were (1) planned spine surgery other than LR (spinal fusion, arthroplasty, etc.), (2) scheduled revision surgery for LR, and (3) illiteracy in Turkish. Patients who met the inclusion criteria were informed, and written and verbal consent was obtained.

The study was approved by the Karabük University Rectorship Non-interventional Clinical Research Ethics Committee (approval number: 2022/772, date: 20.01.2022) and was conducted at Karabük University Education and Training and Research Hospital between February 2022 and January 2023. This study was conducted according to the Declaration of Helsinki criteria. According to the COSMIN guideline, 7-10 times the number of items in the scale and a minimum of 100 people are required to assess construct validity<sup>(14)</sup>. Since the scale has 21 items and considering the 15% loss rate, it was decided to include at least 170 people in the study. Submitted to ClinicalTrials: NCT04547075.

### Outcome Measures

#### Hospital for Special Surgery Lumbar Spine Surgery Expectation Survey

It is a self-report measure developed by Mancuso et al.<sup>(11)</sup> and is used to evaluate patient expectations from lumbar surgeries. The original version of the scale, published in English, consists of 21 items and addresses pain, function, employment status, mental health, and expected future spinal conditions. The patient's expectations were evaluated using a 5-point Likert scale ranging between 1 and 5 points. The total score from the scale is between 25 and 100, and an increase in the score indicates high expectations.

#### The Quebec Back Pain Disability Scale (QBPDS)

It is a scale developed by Kopec et al.<sup>(15)</sup> that evaluates how much difficulty back problems cause a person during 20 different

activities. Individuals were evaluated with a score ranging from 0 to 5. A score of zero indicates no difficulty during the activity, whereas a score of 5 indicates that the activity could not be performed. The total score from the scale varies between 0 and 100. A higher score indicates greater involvement at the functional level. The Turkish validity and reliability of the scale was conducted by Melikoglu et al.<sup>(16)</sup> in individuals with low back pain.

### Translation Procedure

The following procedure was followed to develop and validate the Turkish version of HSS-LSESS<sup>(14)</sup>.

**Preparation of the Turkish Version of the Scale:** The original scale was translated into Turkish by three native speakers, and a preliminary version was created by comparing them. This version has been analyzed by a linguist for narrative purposes and revised accordingly. This version was applied to 10 participants who met the inclusion criteria but were not included in the data collection sample. Participants were asked to read the revised scale and rate the items as easy to understand, understandable, or difficult to understand. Items that were considered difficult to understand were reviewed and revised.

**Back Translation of the Scale into English and Ensuring Consistency with the Original:** The scale items were translated into English by a native English speaker who knows Turkish well. The reverse-translated scale was sent to Professor Mancuso, the scale developer, and asked to verify its consistency with the original scale.

**First Test of Scales:** HSS-LSSSES-TR and QBPDS-TR were administered by face-to-face interview to all participants who met the inclusion criteria and agreed to participate in the study. **Second HSS-LSSSES-TR Test (Retest):** HSS-LSSSES-TR was administered to the participants who agreed to repeat the assessment one week later by face-to-face interview method. Test-retest reliability was assessed using data from these participants. The scale was not applied a second time to patients who underwent surgery or gave up on surgery within a week after the first interview.

### Statistical Analysis

The study data were analyzed using IBM SPSS 22.0 (IBM Corp., Armonk, NY) package program. Descriptive variables were given using the mean, minimum and maximum, and standard deviation (SD). Percentage values were used for category data. Whether the data showed a normal distribution was examined by considering the skewness, kurtosis values, and histograms. Data with skewness and kurtosis values between +1.0 and -1.0 were considered normal distributions<sup>(17)</sup>. Standard Error of Measurements (SEM) and Minimal Detectable Changes (MDC) were calculated using the following formulas.

$$\text{SEM}=\text{SD} \times \sqrt{(1-r)}$$
$$\text{MDC}=\text{SEM} \times 1.96 \times \sqrt{2}$$

The test-retest method was used to determine reliability. The relationship between the first and second measures was

examined using the intraclass correlation coefficient [ICC (2.1)]. An ICC value of <0.5 was accepted as poor, between 0.5 and 0.75 as moderate, between 0.75 and 0.9 as good, and greater than 0.90 as excellent reliability<sup>(18)</sup>.

Hypothesis testing was used to determine the structural validity of the HSS-LSEES scale. In the established hypothesis, it was accepted that there should be a medium-high ( $0.4 \leq r \leq 0.89$ ) relationship between HSS-LSEES-TR and QBPDS-TR results. In correlation analyses, the correlation coefficient was considered negligible if it was between 0.00-0.10, weak if 0.10-0.39, medium between 0.40-0.69, high between 0.70-0.89, and very high between 0.90-1.00<sup>(19)</sup>.

In determining whether there is a ceiling and floor effect in the scale scores, 15% was accepted as the threshold value, as is widely accepted in the literature<sup>(20-22)</sup>. The minimum score obtained from the Lumbar Spine Surgery Expectations scale is 20, and the maximum score is 100. The ceiling and floor effects were evaluated according to these minimum and maximum values.

## RESULTS

Two hundred and fifty-one people were initially invited to this study, but 71 were excluded because they did not meet the inclusion criteria, and data from 180 participants were analyzed at the end of the study. The mean age of the participants was  $50.96 \pm 13.42$  years, and 54.4% were male. 36.7% of the participants had an additional chronic disease. Detailed information about the physical characteristics, gender, marital status, education level, and diseases of the participants is given in Table 1. For the test-retest analysis, one week after the first application, the HSS-LSEES-TR was questioned again with a face-to-face interview method with 165 participants who still had not undergone surgery, reaching a 90.9% response rate (Figure 1).

### Reliability

Cronbach's alpha (Cronbach's  $\alpha$ ) coefficient was used to determine internal consistency. While this value is expected to be at least 0.7 and above, values above 0.8 indicate good internal consistency<sup>(23)</sup>. Cronbach's  $\alpha$  coefficient of the 21-item HSS-LSEES-TR scale was found to be 0.87. When deleted, we investigated whether the overall scale was the item that increased the Cronbach's  $\alpha$  coefficient. In the case of deletion, no item was found that increased the Cronbach's  $\alpha$  coefficient of the scale. Item-total correlations were item 18, the only item with a minimal value of >0.20. When this item was examined in detail, it was thought that the relatively small number of participants who answered this question may have caused this situation. Participants who work in any job on the scale should mark item 17, and those who do not work in any job should mark item 18. Considering that the statistical data of the 18<sup>th</sup> item was low for this reason, it was decided that the relevant item should not be removed from the scale. Test-retest reliability

was excellent [ICC (2.1)=0.994, 95% confidence interval [(CI) 0.992-0.996,  $p < 0.001$ ]. The SEM value was 0.954 (2.27% of the mean). The MDC was 2.64 (6.3% of the mean). The mean and SD of the items and item-total correlations are shown in Table 2.

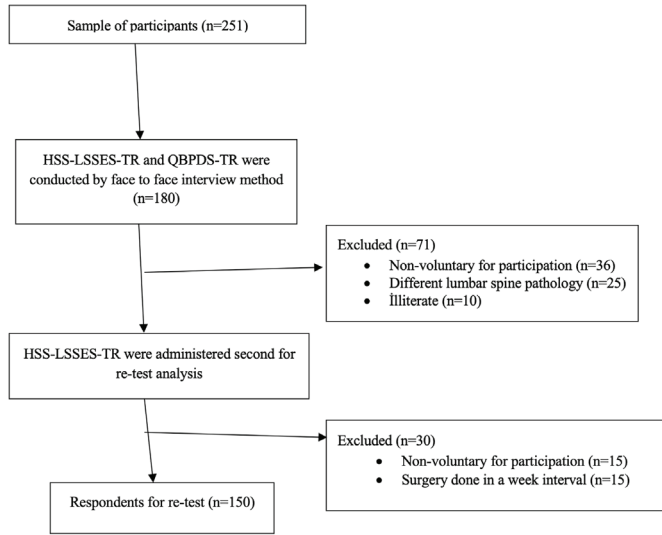
### Validity

The minimum and maximum scores obtained because of the answers given by the participants to the scale are shown in

**Table 1.** Sociodemographic Information of the Participants

Variables	X	SD
Age (year)	50.96	13.42
Height (cm)	170.67	9.03
Weight (kg)	77.97	12.65
Body mass index (kg/m <sup>2</sup> )	26.67	3.02
	<b>n</b>	<b>%</b>
<b>Sex</b>		
Female	82	45.6
Male	98	54.4
<b>Marital status</b>		
Married	139	77.2
Single/Widowed	41	22.8
<b>Work status</b>		
Housewife	63	35
Officer	30	16.7
Employee	61	33.9
Retired	23	14.4
<b>Dominant side</b>		
Right	161	89.4
Female	19	10.6
<b>Education status</b>		
Not literate	13	7.2
Elementary school	65	36.1
Middle/High school	69	38.3
College or higher	33	18.3
<b>Chronic disease</b>		
Yes	66	36.7
No	114	63.3
<b>Diseases</b>		
Diabetes	48	26.7
Cardiac diseases	22	12.2
Hypertension	43	23.9
Pulmonary diseases	12	6.7
<b>Disc herniation</b>		
L <sub>2</sub> -L <sub>3</sub>	8	4.4
L <sub>3</sub> -L <sub>4</sub>	23	12.8
L <sub>4</sub> -L <sub>5</sub>	86	47.8
L <sub>5</sub> -S <sub>1</sub>	63	35

X: Mean, SD: Standard deviation, cm: Centimeters, kg: Kilograms, L: Lumbal, S: Sacral, n: number of cases, %: Percent



**Figure 1.** Flowchart  
HSS-LSES: Hospital for Special Surgery-Lumbar Spine Surgery Expectations Survey, QBPDS: Quebec Back Pain Disability Scale

Table 3. It was determined that only 1.67% of the participants achieved a base score.

When the relationship between HSS-LSES-TR and QBPDS was examined, it was determined that there was a high negative correlation between the scores of both scales ( $r=-0.71, p<0.001$ ) (Table 4).

## DISCUSSION

The aim of this study was to evaluate the validity and reliability of the HSS-LSES by adapting it to the Turkish language. During the intercultural translation and adaptation process, it was concluded that all items, except one, were suitable for Turkish culture. It was observed that the patients could easily understand the scale. In addition, it was concluded that the HSS-LSES-TR items evaluated a single basic structure, had good internal consistency, excellent test-retest reliability, no ceiling and floor effects, and showed a high correlation with QBPDS-TR in individuals with LR.

While evaluating the internal consistency, one of the important parameters used to determine the reliability of a scale, it was stated that if the scale has a Likert structure, Cronbach's  $\alpha$  value

**Table 2.** Lumbar spine surgery expectations scale item analysis

	$X \pm SS$	Item-total correlation	Cronbach's $\alpha$ if item is deleted
Relieve pain	3.57±0.76	0.41	0.84
Relieve symptoms that interfere with sleep	3.15±1.21	0.48	0.84
Improve ability to walk more than several blocks	3.24±0.85	0.55	0.84
Improve ability to sit for more than half an hour	3.14±0.87	0.6	0.84
Improve ability to stand for more than half an hour	3.08±0.9	0.64	0.84
Regain strength in the legs	3.01±1.09	0.51	0.84
Improve balance	2.32±1.57	0.21	0.85
Improve ability to go up and down stairs	3.12±0.9	0.54	0.84
Improve the ability to manage personal care (such as dressing and bathing)	3.51±0.76	0.43	0.84
Improved ability to drive	1.94±1.94	0.58	0.83
Remove the need for pain medications	2.54±1.4	0.49	0.84
Improve ability to interact with others (such as social and family activities)	3.14±1.05	0.41	0.84
Improved sexual activity	2.41±1.67	0.3	0.85
Improve the ability to perform daily activities (such as chores, shopping, errands)	3.14±0.98	0.48	0.84
Improve the ability to exercise for general health	1.64±1.29	0.62	0.83
Remove restrictions in activities (such as be more mobile, not have to rest every few minutes)	2.69±1.06	0.55	0.84
If currently employed, fulfill job responsibilities (such as work required hours complete expected tasks)	1.18±1.69	0.38	0.85
If currently work-disabled or unemployed because of spine, return to work for salaried employment.	0.79±1.44	0.05	0.86
Reduce emotional stress and sad feelings	2.28±1.51	0.33	0.85
Stop the spine condition from getting worse	3.28±0.82	0.53	0.84
Remove the control that the spine condition has on my life	3.17±0.96	0.50	0.84

X: Median, SD: Standard deviation, Cronbach's  $\alpha$ : Cronbach's alpha

**Table 3.** Lumbar spine surgery expectations scale ceiling and floor effect

Scale	X ± SD	Lowest score	Lowest scoring participant n (%)	Highest score	Highest scoring participant n (%)
LSSE	42.28±12.3	20	3 (1.67%)	-	-

X: Median, SD: Standard deviation, LSSE: Lumbar spine surgery expectations

**Table 4.** Lumbar spine surgery expectations and the Quebec back disability questionnaire correlation

Variable	r	p
Lumbar spine surgery expectations:	-0.71	
Quebec back disability questionnaire		0.00

should be above 0.70<sup>(24)</sup>. In this study, the HSS-LSSSES-TR was shown to have a good internal consistency (Cronbach  $\alpha=0.87$ ). This result showed that the Turkish version of the scale had similar internal consistency with the Russian version ( $\alpha=0.94$ )<sup>(12)</sup> and the original version ( $\alpha=0.90$ )<sup>(11)</sup>. According to the good internal consistency results found in the studies conducted in all three versions, participants generally thought carefully about each of the items and took the necessary time to give a valid answer to each question. In addition, in the item analysis for HSS-LSSSES-TR, although the correlation value between the 18<sup>th</sup> item and the total score scores was below 0.2, Cronbach's  $\alpha$  value of the scale did not change when the relevant item was deleted. To allow generalizability and comparison of the HSS-LSSSES results, item 18 was not removed from the scale in the Turkish version either. In the original version of the scale, participants who are still active are expected to mark item 17, and those who previously worked in a paid job but did not work because of low back pain are expected to check item 18. However, regardless of low back pain, it is thought that individuals who do not work in a salaried job (such as housewives) have more difficulty choosing between these two items by answering item 17. Therefore, the item-total correlation for item 18 remains low.

Another method used to determine the reliability of a scale is the test-retest. HSS-LSSSES-TR has also been shown to have excellent test-retest reliability (ICC=0.99). Similarly, high ICC values in the Russian version (ICC=0.89)<sup>(12)</sup> and original version (ICC=0.86)<sup>(11)</sup> of the scale are an indication that consistent responses can be obtained and reliable in all versions of the HSS-LSSSES.

Construct validity is another important concept in adapting assessment tools to different languages<sup>(25)</sup>. Construct validity was examined with patient-reported functional scales because no other similar scale with validation and reliability was established to evaluate the expectations of patients scheduled for lumbar spine surgery. While the Oswestry Disability Index (ODI) was used in the Russian version of the study<sup>(12)</sup>, a similar scale to the ODI, QBPDS-TR, was used in our study. A high level of negative correlation ( $r=-0.71$ ) was observed between HSS-LSSSES-TR and QBPDS-TR, and the construct validity of HSS-LSSSES was supported by hypothesis testing. In the Russian

version, there was a weak negative correlation ( $r=-0.36$ ) with HSS-LSSSES and ODI scores<sup>(12)</sup>. Unlike the Russian version, we believe that the higher correlation may be due to QBPDS interrogating more functional activity status than ODI. However, both versions of the study revealed that individuals with worse functional performance had higher expectations. These results are also consistent with those of Mancuso et al.<sup>(26)</sup>, who reported that individuals with worse functional scores had higher expectations.

Using a scale developed for individuals scheduled for lumbar spine surgery, such as the HSS-LSSSES, which has been shown to be valid and reliable in English, Russian, and Turkish, where the expectations most expressed by patients are questioned, may provide significant clinical benefits. In particular, it may improve communication and collaborative decision making by promoting discussions among physicians before clinical decision-making<sup>(10,27)</sup>. In addition, it may contribute to patient-surgeon harmony by enabling patients and surgeons to meet in line with the same goals and expectations. Moreover, such scales can also be used to examine the patient-centered efficacy of the surgical intervention in question, as it would potentially allow a comparison of the expected amount of healing and recovery achieved before surgery.

### Study Limitations

There are some limitations to this study. Unlike the original version of the HSS-LSSSES, the participants in this study consisted only of individuals who were scheduled for surgery with a diagnosis of LR. Although this was planned to reduce heterogeneity and increase the internal validity of our study, it may negatively affect the generalizability of the study results for patients scheduled for surgery due to other spinal pathologies. In addition, responsiveness and minimal clinically important difference (MCID) values, which are not found in other versions of the scale, could not be examined in our study. Future studies may examine other psychometric properties of HSS-LSSSES, such as responsiveness and MCID, in individuals scheduled for different lumbar spinal surgeries.

### CONCLUSION

This study revealed that in addition to the Russian version of the HSS-LSSSES, it could be adapted to the Turkish language by cross-cultural adaptation, and this adapted version has good internal consistency, excellent test-retest reliability, and no ceiling and floor effects. Therefore, HSS-LSSSES-TR can be a practical, valid, and reliable measurement method that can be used in clinical and research settings to evaluate the

expectations of individuals planning for lumbar spine surgery and to examine how well these expectations are met after surgery.

### Ethics

**Ethics Committee Approval:** The study was approved by the Karabük University Rectorship Non-interventional Clinical Research Ethics Committee (approval number: 2022/772, date: 20.01.2022) and was conducted at Karabük University Training and Research Hospital between February 2022 and January 2023.

**Informed Consent:** Patients who met the inclusion criteria were informed, and written and verbal consent was obtained.

### Authorship Contributions

Surgical and Medical Practices: A.S.A, M.G., C.C.A., C.A., Concept: A.S.A, M.G., C.C.A., C.A., Design: A.S.A, M.G., M.Y., İ.S., Data Collection or Processing: A.S.A, M.Y., C.C.A., C.A., Analysis or Interpretation: A.S.A, M.G., M.Y., C.C.A., Literature Search: A.S.A, M.G., M.Y., C.C.A., İ.S., C.A., Writing: A.S.A, M.G., C.C.A., İ.S.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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