Validity and Reliability of Heart Surgery Symptom Inventory in Turkish Language

Kalp Cerrahisi Semptom Envanterinin Türk Dilinde Geçerlik ve Güvenirliği

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ABSTRACT

This study was conducted to evaluate the validity and reliability of the Heart Surgery Symptom Inventory (HSSI) in Turkish language. This methodological study consisted of 312 patients who had CABG surgery in a public and a foundation university hospital between December 2017 and September 2018. Data were collected with the Patient Information Form and the HSSI. Language validity of the HSSI was analyzed by the translation-back translation method. Content validity was evaluated by Davis technique. Cronbach α coefficient, and item total correlation were examined for the reliability of the inventory. Kaiser-Mayer-Olkin (KMO) and Bartlett's tests were performed to evaluate the sampling adequacy and the suitability of the data for factor analysis. KMO value was 0.867, which indicates suitability for principal component analysis. Bartlett's test was found as x^2=22733.809; p=0.000 and this value shows that the data are related to each other and are suitable for factor analysis. Content Validity Index (CVI) of the inventory was found 0.84. Factor loadings of the 35-item HSSI, which was examined as a single sub-dimension, varied between 333 and 858, and explained variance was 44.922%. The total Cronbach alpha coefficient was 0.961 and the total item correlations for all items were positive. As a result, the HSSI with single-subscale and 35-item was found to be valid and reliable inventory in Turkish language and could be used for the evaluation of symptoms after heart surgery.

Key Words: Heart surgery, Reliability, Symptom inventory, Validity

ÖZ

Bu araştırma, Kalp Cerrahisi Semptom Envanterinin (KCSE) geçerlik ve güvenirliğini değerlendirmek amacıyla yapılmıştır. Metodolojik türdeki bu araştırma Aralık 2017-Eylül 2018 tarihleri arasında bir devlet ve bir vakıf üniversitesi hastanesinde KABG ameliyatı olan 312 hasta ile yürütülmüştür. Veriler, Hasta Bilgi Formu ve KCSE kullanılarak toplanmıştır. KCSE'nin dil geçerliği, çeviri-geri çeviri yöntemi ile analiz edilmiştir. Kapsam geçerliğinde ise Davis tekniği kullanılmıştır. Envanterin güvenirliği için Cronbach α katsayısı ve madde toplam korelasyonları incelenmiştir. Örneklem yeterliliği ve verilerin faktör analizine uygunluğunu değerlendirmek için Kaiser-Mayer-Olkin (KMO) ve Bartlett testleri uygulanmıştır. Envanterin KMO değeri 0,867 olarak bulunmuştur ve bu değer temel bileşenler analizi için uygunluğu göstermektedir. Benzer şekilde Bartlett testi sonuçları da (x^2=22733,809; p=0,000) verinin birbiri ile ilişki gösterdiğini ve faktör analizi için uygun olduğunu göstermektedir. Envanterin Kapsam Geçerlilik İndeksi (KGİ) 0,84 olarak bulunmuştur. Tek alt boyut olarak incelenen 35 maddelik KCSE'nin faktör yükleri 333 ile 858 arasında değişmektedir ve açıklanan varyans %44,922'dir. Envanterin toplam Cronbach α katsayısı 0,961 olup, tüm maddeler için toplam madde korelasyonları pozitiftir. Sonuç olarak, tek alt boyutlu ve 35 maddeli KCSE'nin Türk dilinde geçerli ve güvenilir bir envanter olduğu ve kalp cerrahisi sonrası hastaların semptomlarını değerlendirmede kullanılabileceği bulunmuştur.

Anahtar Kelimeler: Geçerlik, Güvenirlik, Kalp cerrahisi, Semptom envanteri

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INTRODUCTION

Non-communicable diseases (NCD) are responsible for 71% of deaths worldwide.[1] According to World Health Organization (WHO) 2017 data, 40 million people die each year from NCD. Cardiovascular diseases rank first among NCDs with a high mortality rate. There were 17 million deaths in 2015 due to NCD, and 37% of these deaths were due to cardiovascular diseases.[2] It is estimated that deaths due to cardiovascular diseases will be 22.2 million in 2030.[3] According to cause of death statistics of Turkey Statistical Institute (TSI), ischemic heart diseases ranked first, accounting for 39.1% of all deaths in 2019.[4] It is reported that there are 3.1 million coronary artery patients in our country and this number increases by 200 thousand every year.[5] Coronary Artery Bypass Graft (CABG) surgery is one of the important options in the treatment of coronary artery disease (CAD), and the purpose of this surgery is to reduce the symptoms of patients, to protect the patient from the complications of the disease, and to increase the patient's quality of life.[6] It is reported that 400,000 CABG operations are performed annually in the USA[7] and in Turkey, the number of patients undergoing CABG surgery within a year is estimated to be about 20,000.[8] CABG is a major surgery in which vital complications can develop, and complications are usually seen within the first six weeks.[9] Studies on symptoms experienced after open heart surgery show that patients experience a wide range of symptoms such as; wound infection, pain in the chest or legs, loss of appetite, leg edema due to incision, nausea, vomiting, sleep disturbance, numbness in arms, dyspnea, arrhythmia, constipation, weight loss, fatigue, weakness, dizziness, cognitive problems, decreased psychosocial adjustment and sexual activity and these problems negatively affect the self-care of patients.[10,11] Completing the recovery after open heart surgery requires a period of at least two months, but in this process, patients need to be supported to adapt to their social life after surgery, to start and maintain their daily activities, to return to work, to fulfill their roles and responsibilities, to protect and improve their physical and mental health.[9,12] Therefore, it is very crucial to determine the symptoms affecting the patients' quality of life in the post-discharge period after cardiac surgery.[13] In some study evaluating the symptoms of patients who had open heart surgery over the phone, it has been reported that evaluating the symptoms experienced at home reduces problems such as recurrent cardiac events, weakness, insomnia, depression, pain, anxiety, and health expenses.[11-14] In the literature, however, there is no valid and reliable measurement tool in Turkish language that evaluates the post-discharge symptoms of patients who underwent CABG surgery. In order to provide symptom management, which is extremely important in reducing readmissions to the hospital after open heart surgery, a valid and reliable measurement tool in Turkish language that can evaluate the symptoms experienced at home after discharge is required. In this regard, it is thought that the adaptation of the Heart Surgery Symptom Inventory into Turkish language and culture will guide healthcare professionals who provide post-discharge care to this patient group. Further, it is believed that readmissions to the hospital will decrease in patients whose symptoms are evaluated by a valid and reliable symptom inventory after discharge.

MATERIALS AND METHOD

Study design and participants

This study is a methodological study and it was carried out in a foundation university hospital and a public hospital located in Istanbul between December 2017 and September 2018. The study population consisted of patients who had CABG surgery

in a foundation university hospital and a public hospital located in Istanbul between December 2017 and September 2018. In scale validity-reliability studies conducted to adapt a scale to another culture, it is stipulated that the sample size is supposed to be at least 5 times more than the number of items in the scale.[15] Accordingly, study sample consisted of 312 patients who were over 35 years old, who had CABG surgery in the last six months, and did not have a diagnosed psychiatric disease.

Data Collection

Each patient was interviewed 3 times to collect the research data. A preliminary interview was held with the participants before they were discharged at the clinic. During this meeting, the patients were informed about the research. Patients who accepted to participate in the study were asked to read and sign the Informed Consent Form. Patients who accepted to participate in the study filled and signed the Informed Consent Form and then they answered the questions of the Patient Information Form. During this interview, the patients were informed that they would be called by phone after discharge, and their contact information was obtained from the patients. In the first 24-48 hours of the discharge, the HSSI was applied for the first time by calling the patients. On the 15th day after discharge, the patients were called again by phone, and HSSI was applied to the patients for the second time.

Data Collection Tools

The data were collected by using the Patient Information Form and the Heart Surgery Symptom Inventory.

Patient information form: This form includes a total of 23 questions; 13 questions for the demographic characteristics of the patient (age, gender, education, marital status, family type, etc.) and 10 questions for the characteristics of the disease (status of previous open heart surgery, presence of chronic disease, etc.).

Heart Surgery Symptom Inventory (HSSI): HSSI is an inventory developed by LaPier (2006) to evaluate the postoperative symptoms of patients undergoing CABG surgery.[13] The original of the inventory contains 76 items and the inventory consists of 5 sub-dimensions: general, cardiac, body, lower, and upper extremity symptoms. HSSI is a 5-point Likert-type inventory and symptoms are evaluated as "none" (0), "a little" (1), "moderate" (2), "a lot" (3), "quite a lot" (4). The inventory is scored between 0-304. The higher the scores, the higher the symptom severity is.

Data Analysis

The data were analyzed with the SPSS 17.0 package program. Numbers, percentages, minimum and maximum values, mean and standard deviations were used in the analysis of the data. In the adaptation of the English form of the inventory into Turkish, translation-back translation technique recommended in the literature[16] and widely accepted for the translation and adaptation of tools in different languages was used for the language validity. In the content validity, Davis technique was used. In order to determine the construct validity of the inventory, Kaiser-Meyer-Olkin (KMO) and Bartlett's tests, principal component analysis, and Varimax rotation were applied and calculated to evaluate the adequacy of the sample and the suitability of the data for factor analysis. In addition, within the scope of reliability studies, Cronbach α coefficient, item total correlation, Spearman Rho coefficient were calculated and test re-test value was examined.

Ethical Considerations

Permission was obtained from LaPier in order to carry out the validity and reliability study of the Heart Surgery Symptom Inventory in Turkish language. Ethical approval was obtained from the Ethics Committee of Maltepe University (Number=EKK/2017/91). At the same time, written and verbal consent were obtained from the patients who agreed to participate in the study. Since there are items removed from the inventory in line with CVI scores, permission was obtained from LaPier in order to apply the inventory in its final form.

RESULTS AND DISCUSSION

Distribution of Descriptive Characteristics of the Participants

The mean age of the participants was 55.09±9.81 and 82.7% were male, 92.3% were married and 41.0% were secondary school graduates. 72.4% of the participants were overweight, 81.7% had a chronic disease and 50.6% of those with chronic disease were hypertensive (Table 1).

Table 1. Distribution of Descriptive Characteristics of the Participants (n = 312)

Descriptive Characteristics		n	%
Sex	Female	54	17.3
	Male	258	82.7
Marital Status	Married	288	92.3
	Single	24	7.7
Education	Illiterate	32	10.3
	Literate	10	3.2
	Primary school	121	38.8
	Secondary School	128	41.0
	University	21	6.7
Body Mass Index	19-24.9 normal/healthy	43	13.8
	25-29.9 overweight	226	72.4
	30-39.9 fat	41	13.1
	>40 obese	2	0.6
Comorbidity	Yes	255	81.7
	No	57	18.3
Comorbid Diseases	Hypertension	129	50.6
	Diabetes Mellitus (DM)	67	26.3
	DM and Hypertension	59	23.1
Mean Age	$\bar{X}\pm SD$ 55.09±9.81		

Language Validity

Language validity was the first step of this research. For this purpose, the originally English inventory was translated into Turkish by two people who are fluent in English and Turkish (one of whom is a lecturer in the field of nursing and a linguist). The most appropriate expressions were selected from the translations and the inventory was finalized. The Turkish translation of the inventory was translated back into English by two people (one medical specialist and one linguist) who spoke English and Turkish fluently and did not see the original of the inventory. After the translation and back-translation of the inventory was completed, both forms were compared and necessary arrangements were made. After the arrangements were made, a pilot application was carried out in 20 patients. After the pilot application, the comprehensibility of the inventory items was reviewed again and the inventory was finalized. The items in the original inventory and the back-translated inventory were compared and semantic equivalence was achieved. The final version of the inventory was sent to Tanya Kinney LaPier and confirmation of the suitability of the translation was obtained. In this way, the language validity phase of the inventory was completed.

Content Validity

Content validity is to take expert opinions in order to determine whether the items in the measurement tool are suitable for the purpose of measurement and whether they represent the area to be measured.[17] After the language validity of the inventory was completed, the inventory was submitted to the opinion of 12 experts (8 lecturers in the nursing department, 3 cardiovascular surgeons, and a specialist nurse) for an assessment that includes cultural equivalence to ensure the content validity. Expert opinions were evaluated by taking Davis technique into consideration. According to Davis Technique in which four-point grading is used, experts determine the items of the inventory; 1. "Not appropriate", 2. "A little appropriate", 3. "Appropriate", 4. "Very appropriate". After this evaluation, the sum of the last two ratings was divided by the number of experts, and 0.80 was accepted as the criterion in the content validity index.[18] In this study, the last 10 items of the inventory were excluded from the inventory at the beginning of the validity studies because they questioned the upper extremity symptoms that are seen due to the use of the radial artery for grafting during surgery and it was stated by the cardiovascular surgeons who gave the expert opinion in this study that this practice is not widely used in our country. Content validity studies of the inventory continued with 66 items. The

Content Validity Index (CVI) of the Heart Surgery Symptom Inventory was found to be 0.84. In the literature, it is reported that items evaluated according to Davis technique and with a CVI score below 0.60 should be excluded from the scale.[6] Accordingly, items 52, 53 and 65 were excluded from the inventory due to their CVI scores below 0.60, and the analysis was continued with 63 items (Table 2).

Table 2. Content Validity Index Scores of the Heart Surgery Symptom Inventory Items

Item no.	Items	1	2	3	4	CVI Score
1.	Do you have chest pain while at rest?	1	-	7	4	0.91
2.	Do you have chest pain while on the move?	-	-	3	9	1.0
3.	Do you have shortness of breath while at rest?	-	2	2	8	0.83
4.	Do you have shortness of breath while lying down?	-	-	3	9	0.91
5.	Do you have shortness of breath while on the move?	-	-	3	9	0.91
6.	Do you often have a dry, irritating cough?	-	2	6	4	0.83
7.	Do you have palpitation while at rest?	-	1	2	9	0.91
8.	Do you have palpitation while on the move?	1	-	1	10	0.91
9.	Do you experience dizziness or lightheadedness when you stand up?	-	2	7	3	0.83
10.	Do you experience dizziness or lightheadedness while on the move?	-	2	7	3	0.83
11.	Do you have edema in your legs?	-	-	5	7	1.0
12.	Do you have distention?	-	2	1	9	0.83
13.	Are you worried about problems you may have with your heart?	1	-	3	8	0.91
14.	Do you have sore throat or feel irritation?	1	1	2	8	0.83
15.	Do you have a change in your voice?	1	-	2	9	0.91

Table 2. Continued

Item no.	Items	1	2	3	4	CVI Score
16.	Do you have a phlegmatic cough, congestion in your respiratory tract?	-	2	2	8	0.83
17.	Do you have tiredness in general?	-	1	2	9	0.91
18.	Do you have weakness in your whole body?	-	1	2	9	0.91
19.	Do you have difficulty in falling asleep?	-	1	3	8	0.91
20.	Do you wake up more than once at night?	1	-	4	7	0.91
21.	Do you feel sleepy or tired?	-	1	3	8	0.91
22.	Do you feel the need for sleep during the day?	1	-	2	9	0.91
23.	Do you have a lack of appetite?	-	1	2	9	0.91
24.	Do you have nausea?	-	1	2	9	0.91
25.	Do you have indigestion?	-	1	1	10	0.91
26.	Do you have difficulty in swallowing?	1	-	3	8	0.91
27.	Do you have sexual impotence/sexual reluctance/ indifference to sexual intercourse?	1	-	3	8	0.91
28.	Do you have headache?	-	1	2	9	0.91
29.	Do you have frequent urination, burning when urinating, or is there any change in the color of your urine?	-	-	2	10	1.0
30.	Do you feel losing your balance when standing or walking?	-	1	3	8	0.91
31.	Are you afraid of falling?	1	-	2	9	0.91
32.	Do you lose your balance while standing or walking?	1	-	3	8	0.91
33.	Do you have difficulty in focusing or thinking?	1	-	2	9	0.91
34.	Do you have amnesia or trouble remembering?	1	-	2	9	0.91
35.	Do you feel confused?	1	-	3	8	0.91
36.	Do you have neck pain?	1	-	2	9	0.91
37.	Do you have back pain?	-	1	1	10	0.91

Table 2. Continued

No.	Question					
38.	Do you have shoulder pain?	-	1	1	10	0.91
39.	Do you have pain in your chest or surgery site while at rest?	-	-	2	10	1.0
40.	Do you have pain in your chest or surgery site while breathing deeply?	-	-	2	10	1.0
41.	Do you have chest pain at the surgery site when coughing or sneezing?	-	-	2	10	1.0
42.	Do you have pain in your chest or surgery site while on the move?	-	-	2	10	1.0
43.	Do you have pain in your drain areas at rest?	-	-	2	10	1.0
44.	Do you have pain in your drain areas while on the move?	-	-	2	10	1.0
45.	Do you have tenderness/irritation/itching in your chest or surgery site?	-	-	2	10	1.0
46.	Do you have tenderness/irritation/itching in your drain areas?	-	-	2	10	1.0
47.	Are there any healing difficulties or leakage in your chest or surgery site?	-	1	1	10	1.0
48.	Are there any healing difficulties or leakage in your drain areas?	-	1	1	10	0.91
49.	Do you have a stiff neck?	1	-	8	3	0.91
50.	Do you have numbness or tingling in your chest or surgery site?	-	1	2	9	0.91
51.	Is there numbness or tingling in your drain areas?	1	-	1	10	0.91
52.	How does your surgery site look like?	5	1	1	5	0.50
53.	How do your drain areas look like?	5	1	1	5	0.50

Table 2. Continued

No.	Question					
54.	Are you worried about stitches opening of your surgery site on your chest?	-	-	2	10	1.0
55.	Are you worried about stitches opening of your drain areas?	-	-	2	10	1.0
56.	Do you have protrusions/creaking/cracking in your sternum?	-	1	2	9	0.91
57.	Do you have pain at the surgery site of your leg while at rest?	-	1	3	8	0.91
58.	Do you have pain at the surgery site of your leg while on the move?	-	1	2	9	0.91
59.	Do you have tenderness/irritation/itching at the surgery site of your leg?	-	1	2	9	0.91
60.	Are there any healing difficulties or leakage in the surgery areas of your leg?	-	1	2	9	0.91
61.	Do you have weakness in your leg?	-	1	2	9	0.91
62.	Do you have stiffness in your leg?	-	1	2	9	0.91
63.	Do you have more swelling in your one leg than the other?	-	1	1	10	0.91
64.	Do you have numbness or tingling in your legs or feet?	-	1	2	9	0.91
65.	How does your surgery site look like on your leg?	5	1	2	4	0.50
66.	Are you worried about stitches opening of your surgery site on your leg?	-	1	2	9	0.91

Construct Validity Findings

After the content validity, factor analysis was performed to determine the construct validity of the HSSI. Before factor analysis, KMO and Bartlett tests were performed to evaluate sample adequacy and suitability of data for factor analysis. KMO value of the inventory was found to be 0.867, which indicates suitability for principal component analysis. Bartlett's test was found as 22733,809 (p=0.000) and this value shows

that the data are related to each other and are suitable for factor analysis. In the factor analysis, it was determined that the HSSI did not consist of five sub-dimensions similar to the original structure in Turkish Language. The distribution of many items belonging to the sub-dimensions was not similar to the original structure, and items 47, 62, and 63 had a factor load below 0.30. Therefore, at this stage, the following items shifting to different sub-dimensions; 3, 7, 10, 11, 12, 14, 25, 26, 29, 30, 31, 32, 33, 34, 35, 37, 38, 41, 43, 44, 46, 55, 56, 57 and 59, and the items 47, 62, and 63 with a factor load of less than 0.30 were excluded from the inventory. Further, it was decided to examine the remaining 35-item inventory as a single sub-dimension (Table 3). The KMO value of the 35-item inventory was determined to be 0.915 and Bartlett's test results were found as 13114.401 (p=0.000). It was observed that the factor loads of the HSSI, which were examined with a single sub-dimension and 35 items, varied between 333-858. The factor loads of all items in the inventory were above 0.30 and the explained variance was 44,922% (Table 3). For this reason, no item was removed from the inventory at this stage and the inventory was accepted as a single sub-dimension and 35-item.

Table 3. Factor Analysis Findings Regarding Heart Surgery Symptom Inventory (35 items)

Previous Item No	New Item No	Items	Factor Load
1.	1.	Do you have chest pain while at rest?	0.588
2.	2.	Do you have chest pain while on the move?	0.551
4.	3.	Do you have shortness of breath while lying down?	0.781
5.	4.	Do you have shortness of breath while on the move?	0.771
6.	5.	Do you often have a dry, irritating cough?	0.621
8.	6.	Do you have palpitation while on the move?	0.858
9.	7.	Do you experience dizziness or lightheadedness when you stand up?	0.750
13.	8.	Are you worried about problems you may have with your heart?	0.667
15.	9.	Do you have a change in your voice?	0.819
16.	10.	Do you have a phlegmatic cough, congestion in your respiratory tract?	0.333

Table 3. Continued

Previous Item No	New Item No	Items	Factor Load
17.	11.	Do you have tiredness in general?	0.728
18.	12.	Do you have weakness in your whole body?	0.725
19.	13.	Do you have difficulty in falling asleep?	0.660
20.	14.	Do you wake up more than once at night?	0.664
21.	15.	Do you feel sleepy or tired?	0.708
22.	16.	Do you feel the need for sleep during the day?	0.714
23.	17.	Do you have a lack of appetite?	0.816
24.	18.	Do you have nausea?	0.522
27.	19.	Do you have sexual impotence/sexual reluctance/indifference to sexual intercourse?	0.355
28.	20.	Do you have headache?	0.668
36.	21.	Do you have neck pain?	0.632
39.	22.	Do you have pain in your chest or surgery site while at rest?	0.573
40.	23.	Do you have pain in your chest or surgery site while breathing deeply?	0.409
42.	24.	Do you have pain in your chest or surgery site while on the move?	0.425
45.	25.	Do you have tenderness/irritation/itching in your chest or surgery site?	0.351
48.	26.	Are there any healing difficulties or leakage in your drain areas?	0.708
49.	27.	Do you have a stiff neck?	0.770
50.	28.	Do you have numbness or tingling in your chest or surgery site?	0.834
51.	29.	Is there numbness or tingling in your drain areas?	0.807
54.	30.	Are you worried about stitches opening of your surgery site on your chest?	0.845
55.	31.	Are you worried about stitches opening of your drain areas?	0.588
56.	32.	Do you have protrusions/creaking/cracking in your sternum?	0.551
60.	33.	Are there any healing difficulties or leakage in the surgical areas of your leg?	0.781
62.	34.	Do you have stiffness in your leg?	0.771
63.	35.	Do you have more swelling in one leg than the other?	0.621
Total Explained Variance (%)			**44,922**

Reliability Findings

In order to evaluate the reliability of the inventory, Cronbach α reliability coefficient was calculated and test-retest technique was used.

Cronbach α Reliability Coefficient

The Cronbach α coefficient of the 35-item inventory consisting of a single sub-dimension was 0.961 (Table 4). Item total correlations for all items of the inventory were found over 0.30 and deletion of any

item did not cause a significant increase in the Cronbach α coefficient of the inventory. Therefore, no item was excluded from the inventory at this stage either.

Table 4. Item Total Correlations and Cronbach α Coefficients of the Heart Surgery Symptom Inventory (n=312)

Prev. Item	New Item No	Items	Mean	SD.	Item total correlation	Cronbach α if the item is deleted
1.	1.	Do you have chest pain while at rest?	2.04	1.23	0.587	0.960
2.	2.	Do you have chest pain while on the move?	2.68	1.01	0.571	0.960
4.	3.	Do you have shortness of breath while lying down?	0.97	1.10	0.750	0.959
5.	4.	Do you have shortness of breath while on the move?	1.06	1.38	0.721	0.959
6.	5.	Do you often have a dry, irritating cough?	2.18	1.37	0.587	0.960
8.	6.	Do you have palpitation while on the move?	0.91	1.44	0.813	0.958
9.	7.	Do you experience dizziness or lightheadedness when you stand up?	1.57	1.04	0.729	0.959
13.	8.	Are you worried about problems you may have with your heart?	0.86	1.07	0.639	0.960
15.	9.	Do you have a change in your voice?	0.66	0.83	0.777	0.959
16.	10.	Do you have a phlegmatic cough, congestion in your respiratory tract?	3.25	0.88	0.343	0.961
17.	11.	Do you have tiredness in general?	2.38	1.06	0.724	0.959
18.	12.	Do you have weakness in your whole body?	2.37	1.05	0.724	0.959
19.	13.	Do you have difficulty in falling asleep?	2.44	1.08	0.647	0.960
20.	14.	Do you wake up more than once at night?	2.48	1.02	0.653	0.959
21.	15.	Do you feel sleepy or tired?	2.40	1.05	0.701	0.959

Table 4. Continued

Prev. Item	New Item No	Items	Mean	SD.	Item total correlation	Cronbach α if the item is deleted
22.	16.	Do you feel the need for sleep during the day?	2.44	0.99	0.710	0.959
23.	17.	Do you have a lack of appetite?	1.17	1.32	0.767	0.959
24.	18.	Do you have nausea?	0.50	0.79	0.480	0.960
27.	19.	Do you have sexual impotence/sexual reluctance/ indifference to sexual intercourse?	2.60	0.80	0.363	0.961
28.	20.	Do you have headache?	1.95	1.28	0.646	0.960
36.	21.	Do you have neck pain?	1.42	1.21	0.621	0.960
39.	22.	Do you have pain in your chest or surgery site while you are at rest?	1.90	1.09	0.581	0.960
40.	23.	Do you have pain in your chest or surgery site while breathing deeply?	2.54	0.98	0.432	0.961
42.	24.	Do you have pain in your chest or surgery site while on the move?	2.56	0.95	0.451	0.961
45.	25.	Do you have tenderness/ irritation/itching in your chest or surgery site?	0.30	0.57	0.330	0.961
48.	26.	Are there any healing difficulties or leakage in your drain areas?	0.22	0.45	0.656	0.960
49.	27.	Do you have a stiff neck?	00.82	00.92	0.758	0.959
50.	28.	Do you have numbness or tingling in your chest or surgery site?	00.78	01.08	0.789	0.959
51.	29.	Is there numbness or tingling in the drain areas?	00.61	11.11	0.756	0.959
54.	30.	Are you worried about stitches opening of your surgery site on your chest?	00.91	11.47	0.794	0.959
55.	31.	Are you worried about stitches opening of your drain areas?	00.44	00.81	0.742	0.959
56.	32.	Do you have protrusions /creaking /cracking in your sternum?	00.16	00.49	0.314	0.961

Table 4. Continued

Prev. Item	New Item No	Items	Mean	SD.	Item total correlation	Cronbach α if the item is deleted
60.	33.	Are there any healing difficulties or leakage in the surgical areas of your leg?	00.43	00.81	0.697	0.959
62.	34.	Do you have stiffness in your leg?	00.71	11.15	0.738	0.959
63.	35.	Do you have more swelling in one leg than the other?	22.44	00.82	0.478	0.960

Heart Surgery Symptom Inventory Total Cronbach α 0.961

Test-Retest Reliability

A statistically significant and positive correlation was found between the first and second measurements of the Heart Surgery Symptom Inventory (p<0.05). Since the Spearman Rho coefficient used as the test-retest equivalence coefficient was 0.788, a desired level of correlation was achieved between the two measurements.

This research was carried out to determine the validity and reliability of Heart Surgery Symptom Inventory developed by LaPier (2006). In order to define whether the Heart Surgery Symptom Inventory is valid and reliable in Turkish Language; content validity, explanatory factor analysis, and internal consistency were examined from 3 different aspects.

Various translation methods (single translation, group translation, or translation-back translation) are used in the language adaptation of a scale.[19] Translation-back translation method was used in the language adaptation of the HSSI in order to minimize the differences in expression. The inventory, which is translated into the language to be used in back translation, is given to a group (individuals who have not seen the original version of the inventory and are independent from each other) who know very well the language of the original inventory and are experts in that language, and they are asked to translate the inventory into English language again. As a result, the newly emerged inventory and the original inventory items are compared. In the literature, it has been suggested that the translation must match the original. If there are items that do not match, the translation of the scale is checked again. The translation of the scale is completed when the items of the scale that emerged as a result of the back translation method and the original scale are close to each other and meaningful.[16] In this study, a faculty member and a linguist translated the inventory from English to Turkish. The inventory, which was translated into Turkish, was translated back into English by a medical specialist and a linguist both of whom know both languages well. By comparing the original with the translation of the inventory, it was determined that there was no meaning change in the items of the inventory. Therefore, it could be said that the Turkish Form of the HSSI is a suitable measurement tool in terms of language validity.

Determining the content validity index in scale validity studies has a special importance and it is said that the number of experts should be between 3-20 in calculating the content validity index.[17] In this study, in order to evaluate the content validity index of the inventory, the HSSI of which language validity was provided was presented to the opinions of 12 experts, including 8 faculty members in the field of nursing, 3 specialist physicians and 1 specialist nurse. Davis technique was used to evaluate expert opinions and the content validity index was found to be 0.84 (Table 2). In the literature, it is reported that the content validity index score should be 0.80 and above.[17] In this study, CVI scores of all items except 52, 53 and 65 of the Heart Surgery Symptom Inventory varied between 0.83 and 1.0. When the relevant items are excluded from the inventory, it is determined that the inventory is sufficient in terms of content validity.

Before determining the factor structure of the HSSI, KMO analyzes were performed in order to examine the size of the sample group, and Bartlett's Test of Sphericity

(BTS) analyzes were performed to understand the suitability of the sample group for factor analysis and whether it is different from zero. KMO is an index that compares the size of the observed correlation coefficients with the size of the partial correlation coefficients. KMO benchmark is interpreted as follows; 0.90-1.00: excellent; 0.80-0.89: very good; 0.70-0.79: good; 0.60-0.69: medium; 0.50-0.59: weak; <0.50: unacceptable.[20] In this study, KMO value was determined as 0.86, and values between 0.80 and 0.89 are interpreted as very good results. This finding shows that the sample size is sufficient for factor analysis.

As a result of expert opinions, 13 items were removed from the inventory. When these excluded items are examined; it was determined that there was a consensus among experts on the issue of excluding the items 52, 53 and 65 because they are open-ended questions and the items 67, 68, 69, 70, 71, 72, 73, 74, 75 and 76 because they inquiry symptoms for a technique little used in Turkey. In addition, it has been determined that the HSSI does not consist of five sub-dimensions similar to the original structure in Turkish Language. The distribution of many items belonging to the sub-dimensions is not similar to the original structure. Therefore, the following items shifting to different sub-dimensions; 3, 7, 10, 11, 12, 14, 25, 26, 29, 30, 31, 32, 33, 34, 35, 37, 38, 41, 43, 44, 46, 55, 56, 57 and 59, and the items 47, 62, and 63 with a factor load of less than 0.30 were excluded from the inventory.

When the HSSI is examined as a single sub-dimension with 35 items, it is seen that the factor loads of the items vary between 0.333-0.858. It is stated in the literature that factor loads should be 0.30 and above.[18] The explained high variance ratio indicates that a scale's factor structure is strong. In the studies conducted, it is indicated that it is sufficient for the variance rates to be between 40-60%.[21] The variance explained in this inventory is 44.922%. According to the studies conducted on the subject, it can be said that the item factor loadings and the explained variance are at a sufficient level with these findings. As a result, the single sub-dimension structure of the 35-item HSSI is suitable for the model and ensures the structure validity of the inventory.

Test-retest analyzes were made to determine the invariance of the HSSI against time. When the inventory is applied to the same participants at different times, the consistency of the responses given by the participants shows that the inventory is stable over time. In this study, Spearman Rho correlation analysis was performed to evaluate the invariance of the inventory against time. In the literature, it is pointed out that at least 30 individuals should be reached for test-retest.[22] The sample group in this study consists of 312 individuals. The inventory was applied to the sample group again 2 weeks later. Spearman Rho correlation coefficient was used for test-retest reliability.

A statistically significant and positive correlation was found between test-retest measurements of the HSSI. Since the Spearman Rho correlation coefficient, which is used as the test-retest equivalence coefficient, is 0.788, a desired level of correlation is provided between the two measurements. The findings obtained from the analyzes conducted to determine the reliability of the inventory show that the reliability of the HSSI, which consists of 35 items and one sub-dimension, is at a high level.

Cronbach α coefficient takes a value between 0.00 and 1.00. If the value is close to 1.00, it shows that the reliability of the scale is high. The lowest Cronbach alpha value suggested in the literature is 0.70.[23] In the reliability study of the HSSI, Cronbach's alpha coefficient and item total score correlation were calculated to measure internal consistency. The Cronbach alpha coefficient of the HSSI, which consists of 35 items and a single sub-dimension, was found to be 0.961 (Table 4).

CONCLUSION AND RECOMMENDATIONS

In the light of the findings obtained from this study, it can be said that the 35-item and single sub-dimension Heart Surgery Symptom Inventory is valid and reliable in Turkish language. The data obtained from this study has also revealed that such an inventory is needed in Turkish culture, as 41 items were excluded from the Turkish version. Accordingly, it may be suggested to develop a scale specific to Turkish culture which can evaluate the symptoms experienced at home after cardiac surgery.

Conflicts of interest statement: Authors declare that there is no potential conflict of interest in this study.

Guideline for evaluation of the HSSI Turkish version: The HSSI is a single sub-dimension inventory with 35 items. The inventory is evaluated on a Likert scale between 0-4 as "Not at all (0)", "Very little (1)", "Moderate (2)", "A lot (3)", "Quite a lot (4)". The range of scores to be taken from the inventory varies between 0-140. The higher the scores, the higher the severity of the symptoms. There are no inverted items in the inventory and the Cronbach alpha value of the inventory is 0.961.

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