

# Turkish version of the Stroke-Specific Quality of Life Scale

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**Aim:** To test the reliability and validity of the Turkish version of the Stroke-Specific Quality of Life Scale (SS-QOL).

**Background:** Stroke is a leading cause of activity limitation and participation restriction that negatively affect health-related quality of life. The assessment of SS-QOL in stroke patients has not been validated in Turkey.

**Methods:** Cross-sectional and methodological research design was used. Five hundred stroke survivors who had been diagnosed with stroke at least 6 months previously were included in this cross-sectional study. The reliability of the SS-QOL was based on internal consistency, item correlation. Construct validity was evaluated by Exploratory Factor Analysis. Cronbach's alpha coefficient was calculated for the total score of the SS-QOL to establish the internal consistency of the instrument. Construct validity was assessed by comparing patients' scores on the SS-QOL with those obtained by other test methods: SF-36 Health Survey and Katz Index of Activities of Daily Living.

**Findings:** In the process of adaptation to the Turkish population, the scale was converted to 48 items. The correlation coefficient for the test-retest scores of the SS-QOL was calculated as 0.81. Internal consistency for the scale showed Cronbach's alpha = 0.97. As a result of applying factor analysis to the scale, eight factors were obtained, which accounted for 77.47% of the scale's total variance.

**Conclusion:** SS-QOL is a reliable and valid instrument for measuring self-reported health-related quality of life at group level among people with stroke who are diagnosed with stroke at least 6 months previously in the Turkish population.

**Keywords:** Nursing Care, Quality-of-Life Research, SF 36, Stroke

## Introduction

The annual incidence of stroke is 15 million worldwide; one third of these patients will die and one third will experience permanent disability (Delbari et al. 2010). The incidence of this disease is steadily increasing along with the aging of the popula-

tion (Aşti & Kaya 2002; Eskiurt et al. 2005; Haacke et al. 2006). The population of Turkey is approximately 70 million and almost 5 million people are over 65 years of age (Çakar et al. 2010). According to the data for Turkey, in 2002, 15% of deaths in hospitals were from cerebrovascular causes, and in 2003, these accounted for 11.2% of all deaths. About 25% of hospital admissions with acute stroke are due to recurrent stroke (Hornnes et al. 2011). Stroke occurs with complications; it can cause disability without proper treatment and significantly lower the quality of life (Bottemiller et al. 2006; Ones et al. 2005).

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Quality of life is an important patient-centred outcome after stroke since stroke can affect not only physical but cognitive, language, emotional and social functioning. Stroke is a leading cause of activity limitation and participation restriction that negatively affect health-related quality of life (Duncan et al. 2000; Mayo et al. 2002). Rehabilitation interventions aim to facilitate functional independence by overcoming activity limitations and thus preventing restrictions in the patient's ability to participate in the household, community and the prevention of disablement in the shortest possible time (Eskiyurt et al. 2005; Secrest & Thomas 1999; Wu et al. 2011). Therefore, in order for rehabilitation nurses and the rest of the healthcare team to provide support for stroke victims, to plan appropriate strategies and to evaluate the results of these strategies, they must first be able to assess quality of life. The aim of this research was to test whether the Turkish version of the Stroke-Specific Quality of Life Scale (SS-QOL) is a reliable, valid and relevant instrument for determining the quality of life of stroke patients in Turkey. No reports on translations or validation of SS-QOL to Turkish language have been reported previously.

### Aim of the study

The study was carried out to translate the SS-QOL into Turkish and to test the validity and reliability of the SS-QOL in stroke patients.

### Methods

#### Design

A cross-sectional and methodological design was used in the study.

#### Sample

The study was conducted in İzmir province in western Turkey. The potential sample of the study consisted of outpatients attending the Neurology Outpatient Clinic of a University Hospital, who had been diagnosed with stroke. The inclusion criteria were as follows: the diagnosis of stroke was made at least 6 months previously, and patients had to be able to complete the questionnaire, not have visual or hearing impairment and be able to communicate. The number of items in the scale ( $n = 49$ ) was taken into consideration in determining the appropriate sample size for the study. The goal for the research sample was determined to be 490 stroke patients, which is 10 times the 49 items on the SS-QOL. Five hundred (500) patients provided informed consent and were included in the study. Data were collected by one of the researchers. The duration of interviews was approximately 20 min for each patient.

### Instruments

The data of the study were collected with four tools: (1) the patient information form, (2) the SS-QOL (3), the SF-36 Health Survey and (4) the Katz Index of Activities of Daily Living (ADL).

#### Patient information form

The patient information forms were developed for this study by the researchers. This form included patients' characteristics such as age, gender and education level.

#### Stroke-Specific Quality of Life Scale

The scale was developed by Williams, Weinberger, Clark, Harris and Biller in 1999 with the aim of evaluating the life quality of patients with stroke (Williams et al. 1999). The questionnaire has 49 items in 12 domains, namely mobility (M), energy (E), upper extremity functioning (UE), work/productivity (W), mood (MD), self-care (SC), social roles (SR), family roles (FR), vision (V), language (L), thinking (T) and personality (P). The SS-QOL items are evaluated on a five-point Likert-type scale. The responses range from 1 (I totally disagree) to 5 (I totally agree). A high score on the scale shows that life quality is high, and a low score shows that life quality is low.

#### The SF-36 Health Survey

The SF-36, developed by Ware & Sherbourne (1992), consists of a multi-item scale, which assesses eight health concepts: physical functioning (PF), physical role (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), emotional role (RE) and mental health (MH; Haan et al. 1993; Hobart et al. 2002; Pinar et al. 2009). The range of points on the scale is between 0 and 100. A high score on the scale shows that life quality is high, and a low score on the scale shows that life quality is low (Hobart et al. 2002). Work on the validity and reliability of the scale in this country was conducted by Pinar in 1995.

#### Katz Index of Activities of Daily Living

This index was developed by Katz in 1979, and is used both in this country and abroad. The Scale of Activities of Daily Living consists of six questions related to bathing, dressing, movement, elimination and nutrition activities (Shelkey & Wallace 1998). If a daily living activity is performed independently it scores 3 points; if it is performed with assistance, it scores 2 points; and if it cannot be performed at all, it scores 1 point. 0–6 points on the Scale of Activities of Daily Living is evaluated as 'dependent', 7–12 points is evaluated as 'semi-dependent' and 13–18 points is evaluated as 'independent'.

#### Data collection procedures

Data collection was by face-to-face interview with the stroke patients in the hospital education room. The patient's files were

investigated by the researcher and co-morbid diseases were recorded. The first questionnaire was used to collect information on socio-demographic variables. Afterwards, the SS-QOL, the SF-36 Health Survey and the ADL were completed by the researcher.

#### Language validity

Written permission was obtained from Williams and her colleagues to adopt the SS-QOL in stroke patients. The English version of the SS-QOL was translated into Turkish by the researcher, and 10 nursing faculty members. The scale was translated back from Turkish into English by two language experts. The resulting English text was compared with the original English text and necessary changes were made.

#### Content validity

The Turkish version of the SS-QOL was sent to 10 teaching faculty members for their opinions on content validity. They evaluated every item for its comprehensibility, distinctiveness and appropriateness for the tool's aim. The faculty members used an index for evaluation, on which a score of 1–4 is given for each item (1 = inappropriate, 4 = very appropriate; Gözüm & Aksayan 2003). Modifications were made to some items in accordance with the experts' recommendations and the scale was given its final form. Lastly, the scale was pre-tested on 10 stroke patients.

#### Construct validity

An exploratory factor analysis was used to determine the construct validity of the scale. The Kaiser-Meyer-Olkin (KMO) index, which is a criterion for determining whether items are appropriate for basic component analysis, was investigated for the exploratory factor analysis (EFA) sample. The KMO index was 0.95 for the EFA sample (Bartlett's = 31 889.83,  $P < 0.01$ ). Initial factors were extracted using the basic components analysis, and rotations were then performed by the varimax method. To assess the validity, the SS-QOL was correlated with SF-36 and ADL values using the correlation.

#### Internal consistency reliability of the scale

To establish the internal consistency of the instrument, Cronbach's alpha coefficient was calculated for the total score of the SS-QOL.

#### Test-retest reliability

Stability of the scale against time was evaluated by test-retest reliability. Thirty stroke patients were interviewed again after 2 weeks. The correlation between the first and the second lot of data was examined using Pearson product-moment correlation

coefficient. In determining the internal consistency, Spearman-Brown and Gutmann split-half reliability coefficients were calculated.

#### Data analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) 11.5 (SPSS Inc., Chicago, IL, USA). Descriptive analysis [frequencies, means, standard deviations (SD)] of patient data included numeric and percentile distributions.

#### Ethics

Approval for using the scale was received from the author via email. The Ethics Committees of the Ege University School of Nursing and Ege University Hospital approved the research. Approval to conduct the study was obtained from the medical director. Patients were informed and their consent was taken verbally and in writing.

## Results

#### Participants

The mean age of participants was  $63 \pm 12.7$  (SD) years. The majority of participants were men (59.2%). 75.8% of the patients had some chronic disease such as hypertension or diabetes. 55.8% of patients had experienced left hemiplegia, 43.0% in the morning hours (Table 1).

#### Validity results

The separate subdimension items of self-care, work/productivity, mobility and upper extremity functioning, which were present on the original scale, were collected under one dimension. This new dimension was designated as 'activities'. This was the strongest factor, explaining the greatest percentage of variance and having the highest average loadings on the SS-QOL. Items, which were present in the original scale as two different dimensions, 'family roles' and 'social roles', were collected under one dimension (Table 2). This dimension was designated as 'Social and family roles' and the variance load, which it explained, was 14.14%. As a result of basic component analysis, the item MD8, which was in the subdimension of mood on the original scale, was moved to the subdimension of 'energy' (Table 2).

The eight dimensions were activities, social and family roles, language, vision, energy, mood, personality and thinking. The loadings and factor structure of the items, eigenvalues and percentage of variance explained by each factor, and item-total correlations, are shown in Table 2. The eight factors explained 77.47% of the variance.

Table 1 The distribution of participants characteristics

Characteristics	<i>n</i>	%
Gender		
Female	204	40.8
Male	296	59.2
Education		
Primary school	289	57.8
High school	79	15.8
Illiterates	75	15.0
University	57	11.4
Marital status		
Married	399	79.8
Single	9	1.8
Divorced or widowed	92	18.4
Employment status		
Unemployed	165	33.0
Employed	61	12.2
Retired	274	54.8
Onset		
6–12 months	217	43.4
13–36 months	159	31.8
>37 months	124	24.8
Hemisphere of stroke		
Left	279	55.8
Right	221	44.2
Co-morbid disease		
Present	379	75.8
Absent	121	24.2
Total	500	100.0

The correlation between the total mean score of the SS-QOL and the mean score obtained from each subdimension of SF-36 was calculated using the Pearson moment correlation coefficient. The subdimensions in which correlation coefficients were found to be the highest were 'physical functioning' ( $r=0.74$ ) and 'mental health' ( $r=0.60$ ).

The calculated correlation coefficients between the subdimensions of factors 1, 2, 5 and 4, and factor 8 of SS-QOL, and the subdimension 'physical functioning' of SF-36 were found to be high, with values of 0.87, 0.66, 0.62, 0.42 and 0.37, respectively. The calculated correlation coefficient between the subdimensions of factor 3 and the subdimension 'general health' was calculated as 0.39, and the calculated correlation coefficients between subdimensions of factors 7 and 6 and 'mental health' were calculated as 0.51 and 0.47, respectively. The Pearson moment correlation coefficient between the total mean score of SS-QOL and the mean points of ADL was found to be 0.54 ( $P < 0.01$ ).

#### Reliability results

The mean scores of the sub-dimensions of the scale varied between 2.38 and 4.32 (Table 3). The correlations of item totals

were examined in order to evaluate the internal reliability of the scale. When evaluating T4 and T3, the correlations coefficients of the third and fourth items were found to be low: 0.02 and 0.16, respectively. Item T3 was not removed from the scale because the *Z*-test showed that the difference between the value of this item and 0.20 was statistically insignificant. Item T4 was removed from the scale because the *Z*-test showed that the difference between the value of this item and 0.20 was statistically significant and other reason as to remove culturally different. After the removal of item T4, that subscale was retested for reliability with the Cronbach's alpha test. No change was seen in the  $\alpha$  values of the items or in the Cronbach's alpha coefficient of the scale as a whole.

The extent of the internal consistency of the SS-QOL was examined first by calculating Cronbach's alpha for the 48-item instrument and for each of the subscales. The total instrument was found to have an alpha coefficient of 0.97. The activities, social and family roles, language, vision, energy, mood, personality and thinking subscales show alpha coefficients of 0.97, 0.97, 0.97, 0.93, 0.77, 0.75, 0.73 and 0.48, respectively.

The correlation coefficient resulting from applying the scale again to 30 people after 2 weeks was found to be statistically significant ( $r = 0.81$ ,  $P < 0.01$ ; Table 3). Results of the correlation analysis of test-retest scores of the subdimensions 'Vision' and 'Thinking' were shown not to be statistically significant ( $P = 0.101$  vs.  $P = 0.049$ , respectively). It was thought that the results relating to these subdimensions could change in 2 weeks.

## Discussion

### Reliability

The  $\alpha$  coefficient for the total instrument was 0.97. The  $\alpha$  coefficient for four domains (activities, social and family roles, language and vision) were highly acceptable. These values show that items on the scale are consistent with one another, and that the scale is made up of items which examined components of the same property. Cronbach's alpha coefficients of the domains of the original scale varied between 0.73 and 0.89. In other studies, Ewert & Stucki (2007) stated that the Cronbach's alpha coefficient varied between 0.78 and 0.97, and Muus et al. (2007) stated that the Cronbach's alpha coefficient varied between 0.81 and 0.94 (Ewert & Stucki 2007; Muus et al. 2007). It was found that total Cronbach's alpha of subdimensions of the original form of the scale and the form which was adopted in this country had a high degree of consistency. The total score correlation coefficient of items T3 vs. T4 on the scale was found to be lower than the 0.20 reliability level, which was determined for this study. Item T4 was removed from the scale.

Table 2 Factor construct of the SS-QOL (*n* = 500)

Domains and its items	F1	F2	F3	F4	F5	F6	F7	F8
<b>Activities</b>								
SC1. Did you have trouble preparing food?	0.74							
SC2. Did you have trouble eating, for example, cutting food or swallowing?	0.59							
SC4. Did you have trouble getting dressed, for example, putting on socks or shoes, buttoning buttons or zipping?	0.85							
SC5. Did you have trouble taking a bath or shower?	0.83							
SC8. Did you have trouble using the toilet?	0.81							
W1. Did you have trouble doing daily work around the house?	0.81							
W2. Did you have trouble finishing jobs that you started?	0.82							
W3. Did you have trouble doing the work you used to do?	0.82							
M1. Did you have trouble walking? (If you cannot walk, circle 1 and go to question M7)	0.71							
M4. Did you lose your balance when bending over or reaching for something?	0.72							
M6. Did you have trouble climbing stairs?	0.68							
M7. Did you have trouble with needing to stop and rest when walking or using a wheelchair?	0.75							
M8. Did you have trouble with standing?	0.74							
M9. Did you have trouble getting out of a chair?	0.73							
UE1. Did you have trouble writing or typing?	0.51							
UE2. Did you have trouble putting on socks?	0.85							
UE3. Did you have trouble buttoning buttons?	0.84							
UE5. Did you have trouble zipping a zipper?	0.85							
UE6. Did you have trouble opening a jar?	0.84							
<b>Social and family roles</b>								
SR1. I did not go out as often as I would like		0.83						
SR4. I did my hobbies and recreation for shorter periods of time than I would like		0.83						
SR5. I did not see as many of my friends as I would like		0.83						
SR6. I had sex less often than I would like		0.81						
SR7. My physical condition interfered with my social life		0.83						
FR5. I did not join in activities just for fun with my family		0.78						
FR7. I felt I was a burden to my family.		0.41						
FR8. My physical condition interfered with my family life		0.78						
<b>Language</b>								
L2. Did you have trouble speaking, for example, get stuck, stutter, stammer or slur your words?			0.91					
L3. Did you have trouble speaking clearly enough to use the telephone?			0.90					
L5. Did other people have trouble understanding what you said?			0.90					
L6. Did you have trouble finding the word you wanted to say?			0.89					
L7. Did you need to repeat yourself so others could understand you?			0.90					
<b>Vision</b>								
V1. Did you have trouble seeing the television well enough to enjoy a show?				0.82				
V2. Did you have trouble reaching for things because of poor eyesight?				0.89				
V3. Did you have trouble seeing things off to one side?				0.88				
E2. I felt tired most of the time					0.72			
E3. I had to stop and rest often during the day					0.76			
E4. I was too tired to do what I wanted to do					0.73			
MD8. I was not interested in food					0.36			
<b>Mood</b>								
MD2. I was discouraged about my future						0.48		
MD3. I was not interested in other people or activities						0.78		
MD6. I felt withdrawn from other people						0.76		
MD7. I had little confidence in myself						0.43		
<b>Personality</b>								
P1. I was irritable							0.80	
P2. I was impatient with others							0.85	
P3. My personality has changed							0.62	
<b>Thinking</b>								
T2. It was hard for me to concentrate								0.54
T3. I had trouble remembering things								0.39
Eigenvalue	13.74	6.78	5.19	2.78	2.61	2.48	2.24	1.34
Variance explained (%)	28.63	14.14	10.81	5.79	5.44	5.16	4.67	2.81
Item-total correlations	0.60–0.82	0.64–0.82	0.54–0.57	0.49–0.51	0.43–0.59	0.40–0.61	0.20–0.35	0.16–0.46

F1 = Factor 1; F2 = Factor 2; F3 = Factor 3; F4 = Factor 4; F5 = Factor 5; F6 = Factor 6; F7 = Factor 7; Factor8 = Factor 8; SC = self-care; W = work/productivity; M = mobility; UE = upper extremity functioning; SR = social roles; FR = family roles; L = language; V = vision; E = energy; MD = mood; P = personality; T = thinking.

Table 3 Descriptive and reliability statistics of the SS-QOL

SS-QOL domains	Items number	$\bar{X} \pm SD$	Cronbach's alpha	Spearman-Brown	Gutmann split-half	Test-retest	
						r	P
Activities	19	3.38 ± 1.22	0.97	0.97	0.96	0.78	<0.01
Social and family roles	8	2.82 ± 1.74	0.97	0.96	0.96	0.80	<0.01
Language	5	3.91 ± 1.17	0.97	0.97	0.93	0.63	<0.01
Vision	3	4.32 ± 0.99	0.93	0.94	0.85	0.30	0.101
Energy	4	3.02 ± 1.36	0.77	0.77	0.77	0.66	<0.01
Mood	4	3.52 ± 1.35	0.75	0.83	0.83	0.54	<0.01
Personality	3	2.38 ± 1.41	0.73	0.66	0.60	0.68	<0.01
Thinking	2	2.43 ± 1.47	0.48	0.48	0.48	0.36	0.049
Total score	48	3.22 ± 0.90	0.97	0.87	0.87	0.81	

The correlation coefficient for the test-retest scores of the scale was calculated as 0.81 in this study. This correlation is a linear correlation and is significant statistically at the 99% confidence level. The test-retest correlation coefficient of the original scale was found to be 0.92. The internal consistency level of the only 'thinking' subdimension was lower than that of the other subdimensions. In another study, the test-retest correlation coefficient of the scale was determined to be 0.53–0.96, and in the same study, it was found that the internal consistency level of the 'thinking' subdimension was lower than that of the other subdimensions (Muus et al. 2007). It is thought that this arises from cultural differences, from the socio-demographic characteristics of the patients included in the study, and from the time since their stroke.

It can be said that the scale has the property of rendering a similar measurement value when the measurement is repeated at different times.

### Validity

The results of the analysis showed that the items of the scale were grouped under eight factors and that the eigenvalue of every factor was greater than 1. The factor loads of items located in each factor were found to be high. In a study by Ewert & Stucki (2007), it was pointed out that the items of the scale were grouped under eight subdimensions and these factors explained 69.8% of total variance (Ewert & Stucki 2007). In the same study, items that fell into the subdimensions of 'upper extremity functioning', 'work/productivity', 'mobility' and 'self-care' were collected under one subdimension and this was designated as the 'activities' subdimension. It was pointed out that item MD8, which had been in the 'mood' subdimension, now fell into the 'energy' subdimension.

Although the factor structure of the SS-QOL does not coincide exactly with the structure determined by Williams et al., it accords conceptually with the subdimensions intended (Williams et al. 1999).

A linear direction and medium-level correlation was found between the total mean score of the SS-QOL and the mean points of the subdimensions, and the mean points of the subdimensions of SF-36. A linear direction and medium-level correlation was found between the total mean score of SS-QOL and the mean score of ADL.

### Conclusion and recommendation

Stroke often results in a variety of chronic conditions with impaired quality of life as a consequence for patients. The SS-QOL is a reliable and valid research tool that can help to evaluate patients' quality of life prior to targeted interventions by nurses and other healthcare professionals. The study reported in this paper has demonstrated the steps that need to be taken in order to test successfully the appropriate application of the tool to a Turkish population. These steps could be followed by nurse researchers for any population subgroup, thus ensuring evidence-based nursing and health care that is focused on specific, identified needs. This scale is ready for use, and can be used to measure outcomes in a study

Our study had a limitation that patients should have been diagnosed with stroke at least 6 months previously. This study should be implemented in different groups outside our study limitation, and the factor structure can be examined. It is suggested that the factors related to individual characteristics such as age, gender, education level, chronic diseases, which can affect the quality of life of stroke patients, can be re-evaluated in further research on this subject.

### Implications for practice

Valid and reliable measurement instruments are needed to assess life quality in Turkish stroke patients both in research and practice. Turkish researchers and healthcare providers can use the SS-QOL to assess the life quality in stroke patients. Because of globalization, nurses in other parts of the world may have to give nursing care to foreign patients with stroke, so nurses working anywhere should be able to understand and use this tool, which may assist in assessing need and enhancing care for stroke patients.

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### Conflicts of interest

There is no conflict of interest.

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### Author contributions

GHY and LK were responsible for the study conception and design and GHY and LK were responsible for the drafting of the manuscript. GHY performed the data collection and the data analysis. GHY and LK made critical revisions to the paper. All authors read and approved the final manuscript.

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