

## ORIGINAL ARTICLE

# Reliability and validity of Stroke specific quality of life Urdu version - A preliminary approach

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## ABSTRACT

**Aim:** To measure reliability, validity, and psychometric properties of Urdu version of Stroke-Specific Quality of Life scale.**Methodology:** A longitudinal cross-sectional observational survey was conducted from March 2019 to February 2020. The sample size was calculated by using Rao soft and non-probability convenient sampling technique was used to raise the sample. For translation purpose, the original English version of SSQOL was translated into Urdu by National Language Promotion Department, Govt. of Pakistan. 96 stroke survivors filled the final SSQOL Urdu version twice within seven-day period. Data was analyzed by using Spearman and Pearson correlation, Cronbach's alpha, Intra-class Correlation Coefficient (ICC) at their threshold values, independent t-test, and One-way ANOVA at  $p < 0.05$ .**Results:** The SSQOL-U exhibited acceptable to excellent internal consistency with Cronbach's alpha= 0.943 with ICC= 0.84-0.93. In comparison ceilings effects were higher than floor effects. Results also established high test-retest reliability in all domains had Spearman's rho scores  $>0.8$  except for Energy, family, and Mood. An acceptable item to scale correlation convergent validity with  $r_p$  values ranged between 0.81–0.97.**Practical Implication:** The SSQOL-U will be utilized by practitioners and researchers across the country to accurately measure patient reported quality of life in post stroke patients.**Conclusion:** SS-QOL-U showed adequate psychometric properties. SS-QOL-U was found reliable and valid tool to measure the quality of life in Urdu-speaking patients having subacute and chronic stroke.**Key words:** Stroke, validity, reliability, Stroke specific quality of life

## INTRODUCTION

Stroke, leading source of disability, affects quality of life of the affected person, is considered one of the major sources of disability and a key cause of death globally. Stroke causes death of around 5.5 million people per year with continuous rise recorded in the prevalence as 21.9% till 2030<sup>1</sup>. Prevalence of stroke is directly related to age and<sup>2</sup> research shows that it will rise to 29% by 2030. Although stroke causes motor function disability, moreover it also affects social and emotional aspect of a person's life; low self-esteem, depression, cognitive impairments, and social contact are mainly affected which decreases the quality of life<sup>3,4</sup>. Lack of physical function plays a significant role in abandonment from family and social contacts and the estimation of deterioration of the quality of life of a stroke patient<sup>5</sup> is difficult to record accurately as the functioning of a patient is different at home, hospital and other social environment<sup>6</sup>. Stroke gives a great blow to quality of life of the survivor and it is negatively affected, quality of life related to health is essential outcome to understand stroke impact and plan for rehabilitation and care for the stroke patient<sup>7</sup>. The process of evaluation, planning and implementation of the stroke rehabilitation program is of high significance for stroke patient<sup>8</sup>. The outcome measures used for assessment are mostly centered on symptoms and functional recovery without focusing patient centered assessment and HRQoL tool<sup>9</sup>.

Stroke commonly induces functional impairments, mobility restrictions, anxiety and depression that badly effects the quality of life of stroke survivors. Stroke specific quality of life scale is a multidimensional tool that assess the health of stroke survivors in various domains including personality, productivity, self-care and social roles etc<sup>10</sup>.

The stroke related quality of life tool shows great variations among patients due to differences in cultural background, social difference and language.<sup>11</sup> Many self-reporting outcome measure tools are used previously, targeting various health dimensions, to carry out the clinical decision making process according to the assessed quality of life after stroke<sup>9</sup>. Williams et al. developed a comprehensive, standardized and disease specific health related

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quality of life scale, the Stroke Specific Quality of Life Scale SSQoL<sup>12</sup>, that is widely used to evaluate the patient reported quality of life and multiple impacts of stroke on patient's life<sup>8</sup>.

Urdu is the national and official language of Pakistan<sup>13</sup> (the other presently being English). This second language is commonly spoken and understandable by most Pakistanis and is being recognized increasingly as a first language by urbanized Pakistani's<sup>14</sup>. There is no reliable and effective questionnaire in Urdu language to measure quality of life of stroke patients in Pakistan. As any translated test tool requires assessing further its validity and reliability, cross cultural adaption and validity as mentioned in literature, similar as if it was a new tool. In various countries SS-QOL has been cross-culturally adapted to different languages and examined for validity for example English<sup>12</sup>, Norwegian<sup>15</sup> Spanish<sup>16</sup> Danish<sup>17</sup> Amharic<sup>8</sup> Turkish<sup>18</sup>, Persian<sup>19</sup> Arabic<sup>20</sup> Marathi<sup>21</sup> Brazilian<sup>22</sup>, Nigerian-Yoruba<sup>23</sup>, Hausa<sup>10</sup> and Korean languages<sup>24</sup>.

Hence the present study was aimed to translate the English version of SSQoL in to Urdu Version and find out the validity, reliability and psychometric properties of translated version in Urdu of the SS-QOL in stroke patients.

## METHODOLOGY

The SS-QOL, is a disease-specific tool originally established by Williams, Weinberger, Clark, Harris and Biller in 1999. The questionnaire comprises of 49 items, 12 domains which include the energy, thinking, personality, family role, vision, work/productivity consists of three questions each in their domain. Five questions were present in each category of social role, language, self-care, mood, upper extremity function while in mobility is comprised of six questions in its domain. 5-point Likert scale was used for rating each item, for response measuring, 1 is for totally disagree and 5 is for totally agree. The sum of each category constitutes the total score which ranges from 49 to 245, the higher the total sum, better will be QOL<sup>18,19</sup>. The original tool was derived in English language by interviewing stroke patients in United States<sup>25,26</sup>.

The longitudinal cross-sectional observational survey was conducted from March 2019 to February 2020 conducted at

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neurological OPD and Physical therapy department of Pakistan Institute of Medical Sciences (PIMS), Islamabad. After getting approval from ethical review committee of Riphah College of Rehabilitation Sciences (RIPHAH/RCRS/REC/Letter-00448). The sample size was calculated by using Rao soft, by assuming stroke patients' population 150, By considering the confidence level 95% and margin error 5%, the sample size of our study was 110. The sample was raised through nonprobability convenient sampling technique. For translation purpose, copy of English version was submitted to "National Language Promotion Department, Govt. of Pakistan" on 18<sup>th</sup> December 2018 and got the translated version on 23<sup>rd</sup> January 2019 along with official verification letter of the translated version. The main purpose was to attain a practical version analogous to the original one incorporating maximum level of patients understanding and perception. Those included were patients of age 50-80 years, of either gender<sup>27</sup>, diagnosed by neurologist, with subacute or chronic stroke irrespective of its ischemic, hemorrhagic, or recurrent nature and supported by either magnetic resonance imaging or computed tomography findings. The patients were also able to read, write or understand Urdu (Native) language. Stroke patients at the acute phase with communication difficulties, such as those with aphasia or reduced consciousness, traumatic brain injury, psychiatric disorders, and stroke survivors with the inability to walk independently were excluded. A written well-informed consent in Urdu was taken priorly from all the participants nature and the purpose of study was well explained to every patient. Baseline demographics were collected regarding age, gender, education, occupation, stroke type and duration since diagnosis. Questions were asked in Urdu Native language by the trained physiotherapist under the full observation of neurologist. Ninety-six stroke subjects answered the SS-QOL-U questionnaire twice, within a one-week duration after the first time. The interviewer interfered when there was any need for clarification in a question, however; did not disclose any information to the individual about the value of each question or its impact on outcome. Also, no clues, or meaning of question was explained to subjects in Urdu language. The clearness and relevance of questions were also evaluated.

**Data analysis procedure:** Data was analyzed using SPSS 25. Descriptive statistics, for categorical variable percentage and frequency and for numerical variables Mean±SD was calculated. Cronbach's  $\alpha$  values was used to calculate the internal consistency, a value  $>0.70$ = standard,  $> 0.8$ =good, and  $> 0.9$ = excellent values were considered. Test-retest reliability was checked through intra-class correlation (ICC). Independent sample t-test and One-way ANOVA of variance was conducted for known groups validity with gender and various age category at significance level of  $p < 0.05$ . For retesting, and to calculate relationship magnitude Spearman's  $\rho(r_s)$  was used. A satisfactory level of acceptance i.e.,  $r_s$  value  $> 0.80$  was set for scale stability. Convergent validity was assessed for each item in relation to its domain by using the Pearson's correlation ( $r_p$ ). Convergent validity was expected when moderate item was correlated with its respective domain ( $r_p \geq 0.40$ ). To measure the psychometric properties of the scale; floor effect and ceiling effect was computed. For floor effect, percentage of respondents who scored one for each item and for ceiling effect, the percentage of respondents who scored five for each item was calculated while acceptable are those under 20%.

## RESULTS

Ninety-six participants were included in the study who met the inclusion criteria. Table 1 shows the sociodemographic characteristics of study participants. The mean age was  $64.13 \pm 9.7$  years. Out of 96, 29.2% were female whereas 70.8% were male. Most of the participants were married 92.7 %, low income 46.9% and had completed primary level of education 44.7%. The main type of stroke suffered by participants was Ischemic 69.8%. However, the main co existing medical condition among participants was diabetes and hypertension 37.5%.

Overall total mean score of participants on Urdu version of SS-QoL was  $113.95 \pm 38.30$  Total number of items in each category SSQOL Domains, maximum and minimum scores that each category along mean and standard deviation of all components were mentioned in Table 2.

Table 1: Participants sociodemographic characteristics N=96

Variable		n (%)
Gender	Male	68 (70.8)
	Female	28 (29.2)
Age groups	50-59 years	38 (39.6)
	60-69 years	34 (35.4)
	$\geq 70$ years	24 (25.0)
Marital Status	Single	1 (1.0)
	Married	89 (92.7)
	Widowed	7 (7.3)
Socioeconomic status	Low income	45 (46.9)
	Middle income	38 (39.6)
	Higher income	13 (13.5)
Education level	Understand Language	10 (10.4)
	Primary level	43 (44.7)
	Secondary level	31 (32.2)
	Graduate	12 (12.5)
Stroke type	Ischemic	67 (69.8)
	Hemorrhagic	30 (31.2)
Risk factors	Smoking	11 (11.5)
	Diabetes	16 (16.7)
	Hypertension	20 (20.8)
	High cholesterol	13 (13.5)
	Diabetes and Hypertension	36 (37.5)

Table 2: Mean and Standard Deviation of SS-QOL Domains

SS-QOL Domains	Total Item	Max. Score	Min. Score	Mean	Std. Deviation
Energy	3	15	3	6.89	3.18
Family Roles	3	15	3	7.26	3.02
Language	5	25	5	12.11	5.02
Mobility	6	30	6	12.47	5.65
Mood	5	25	5	12.79	4.36
Personality	3	15	3	8.09	2.94
Self-Care	5	25	5	11.77	5.1
Social Roles	5	25	5	11.11	4.26
Thinking	3	15	3	7.43	2.81
Upper Extremity Function	5	25	5	11.12	5.08
Vision	3	15	3	8.04	3.27
Work /Productivity	3	15	3	6.96	3.07
Total Score	49	190	49	113.95	38.30

Table 3: Comparison of domains and total score of SSQOL -U across gender

Domains	Gender		t-value	p-value
	Male Mean $\pm$ SD	Female Mean $\pm$ SD		
Energy	7.0 $\pm$ 3.29	6.6 $\pm$ 2.92	0.49	0.620
Family Roles	7.3 $\pm$ 3.29	6.6 $\pm$ 2.92	0.61	0.540
Language	12.2 $\pm$ 5.10	11.6 $\pm$ 4.89	0.54	0.548
Mobility	12.8 $\pm$ 5.96	11.5 $\pm$ 4.81	1.04	0.297
Mood	13.1 $\pm$ 4.68	12.0 $\pm$ 3.44	1.08	0.279
Personality	8.1 $\pm$ 2.97	7.9 $\pm$ 2.91	0.35	0.726
Self-Care	11.9 $\pm$ 4.88	11.3 $\pm$ 5.65	0.55	0.528
Social Roles	11.5 $\pm$ 4.43	10.1 $\pm$ 3.70	1.49	0.138
Thinking	7.6 $\pm$ 2.86	7.0 $\pm$ 2.68	0.89	0.372
Upper Extremity function	11.5 $\pm$ 5.20	10.1 $\pm$ 4.73	1.21	0.227
Vision	8.1 $\pm$ 3.44	7.7 $\pm$ 2.87	0.55	0.578
Work/productivity	7.2 $\pm$ 3.18	6.2 $\pm$ 2.71	1.40	0.164
Total score	116.82 $\pm$ 38.32	106.96 $\pm$ 38.03	1.14	0.254

Independent T test \* $p < 0.05$

Table 3 shows comparison of each category and total sum of Urdu versions of SSQoL by gender. The result indicated difference among gender and different domains score was not significant ( $p >$

0.05). Table 4 demonstrates the result of the One-way ANOVA comparison of domains and total score by age group. Eight out of the twelve depicted no significant differences in the total mean and domains score of SSQoL -U across various age category ( $p > 0.05$ ); whereas significant differences across age category with  $p < 0.05$  were reported in 4 domains (mobility, upper extremity role, work productivity, thinking). Highest mean was observed for 50-59 years. Additionally, lowest mean score was noted for 60-69 years age group on all domains except for thinking vision and total score.

The Cronbach's  $\alpha$  for the SS-QOL-U questionnaire was 0.943. All the SS-QOL-U scale domains represented excellent and acceptable internal consistency, with  $\alpha$  coefficients ranged between 0.90 to 0.94. Intra-class correlation coefficient (ICC) value was 0.90 with 95% CI ranged between 0.84-0.93, also showed excellent test-retest reliability.

As Spearman's correlations were all high in all 9 domains so in present study test-retest stability of SS-QOL-U was reported good, (Table 5) except for three domains that exhibited coefficients below 0.7 Energy ( $\rho = 0.683$ ) and Family role ( $\rho = 0.790$ ) and Mood ( $\rho = 0.697$ ). The convergent validity of SSQOL -Urdu version questionnaire was also high with  $r_p$  values ranging between 0.81–0.97. Into their respective domains, all items of the scale were effectively loaded.

Table 5 also presented floor and ceiling effects of all domains of the SSQOL-U scale. Generally, the ceiling effects were greater than floor effect. The domain which exhibited the highest floor effect was energy 22.9% then work/ productivity 10.9%, however vision had the greatest ceiling effect 32.3% preceded by language 29.2%, self-care 28.9% and upper-extremity function 29.0% respectively.

Table 4: Comparison of the SS-QOL-U domains by age group

Domains	Age groups			f- value	p-value
	50-59 Mean $\pm$ SD	60-69 Mean $\pm$ SD	$\geq 70$ Mean $\pm$ SD		
Energy	7.42 $\pm$ 3.02	6.08 $\pm$ 2.77	7.20 $\pm$ 3.79	1.75	0.178
Family Roles	7.86 $\pm$ 2.51	6.382 $\pm$ 2.74	7.54 $\pm$ 3.85	2.37	0.098
Language	13.26 $\pm$ 5.10	10.79 $\pm$ 4.78	12.16 $\pm$ 4.97	2.22	0.114
Mobility	12.81 $\pm$ 4.87	11.50 $\pm$ 5.20	13.33 $\pm$ 7.26	3.84	0.012*
Mood	13.21 $\pm$ 3.73	12.38 $\pm$ 4.00	12.70 $\pm$ 5.72	0.32	0.724
Personality	8.44 $\pm$ 3.48	7.41 $\pm$ 2.73	8.50 $\pm$ 2.12	1.42	0.245
Self-Care	12.65 $\pm$ 5.47	10.35 $\pm$ 4.86	12.37 $\pm$ 4.53	2.10	0.128
Social Roles	12.26 $\pm$ 3.92	10.17 $\pm$ 4.09	10.62 $\pm$ 4.73	2.43	0.093
Thinking	8.28 $\pm$ 2.84	6.94 $\pm$ 2.81	6.79 $\pm$ 2.50	3.22	0.025*
Upper Extremity function	12.34 $\pm$ 4.73	10.00 $\pm$ 4.85	10.79 $\pm$ 5.71	2.91	0.014*
Vision	8.76 $\pm$ 3.25	7.61 $\pm$ 2.74	7.50 $\pm$ 3.88	1.55	0.217
Work productivity	8.00 $\pm$ 3.36	6.29 $\pm$ 2.52	6.29 $\pm$ 2.97	3.73	0.027*
Total score	122.50 $\pm$ 38.27	104.06 $\pm$ 35.38	114.42 $\pm$ 40.53	2.13	0.124

One-way ANOVA, \* $p < 0.05$

Table 5: SSQOL-U Version Questionnaire, internal consistency, test -retest stability and Floor and Ceiling effects

Domains	Total items	Floor and ceiling effect (%)	Internal consistency	Test- retest stability	
			Cronbach alpha $\alpha$	Spearman's $\rho$	p-value
Energy	3	22.9,6.5	0.943	0.683	0.001*
Family Roles	3	15.6,6.2	0.941	0.790	0.001*
Language	5	2.4,29.2	0.943	0.816	0.001*
Mobility	6	4.2,14.7	0.940	0.850	0.001*
Mood	5	2.1,18.5	0.942	0.697	0.002*
Personality	3	7.9,12.3	0.939	0.806	0.001*
Self-Care	5	2.3,28.9	0.934	0.895	0.001*
Social Roles	5	10.3,8.4	0.933	0.897	0.001*
Thinking	3	3.2,18.9	0.937	0.863	0.002*
UE Function	5	1.9,29.0	0.902	0.911	0.003*
Vision	3	2.1,32.3	0.939	0.817	0.005*
Work/Productivity	3	10.9,12.5	0.937	0.872	0.001*

Test-retest Spearman's  $r > 0.80$ , internal consistency by using Cronbach's  $\alpha \geq 0.7$ , floor and ceiling under 20% values in proportion of minimum and maximum scores

## DISCUSSION

The present study indicated that SSQOL-U version had excellent acceptable reliability, validity as well as psychometric properties for assessing changes in quality of life with subacute and chronic stroke patients.

Known-group validity of the SSQoL-U indicated no significant difference in gender between the total sum of scale and domains. The results consisted of the previous literature done by Marufat O. Odetunde et al<sup>28</sup>. The present study demonstrated that the Cronbach's alpha for the total scale of SS-QOL U version was 0.94, making our findings similar with those of past studies. SS-QOL-Turkish version and Norwegian version both studies found total scale reliability 0.97<sup>15,18</sup>. The SS-QOL Persian version and SS-QOL-Am language both studies found reliable with Cronbach's  $\alpha$  value 0.96<sup>8,19</sup>. SS-QOL A version has 0.88<sup>20</sup>. SSQOL-K version showed Cronbach  $\alpha$  of 0.98<sup>24</sup>.

Cronbach's alpha coefficients of all 12 domains are highly acceptable varied between 0.90 to 0.94. SSQoL-Am all 12 domains also exhibited acceptable to excellent internal consistency,

with Cronbach's alpha values that were between 0.72–0.93<sup>8</sup>. Previous work on SSQOL-Turkish version showed value range between 0.73 and 0.89<sup>18</sup>. SS-QOL- Persian version has range 0.74-0.94<sup>19</sup>, SS-QOL Spanish and Marathi version showed valued ranged between 0.81–0.96 and 0.81 to 0.94 respectively<sup>16,21</sup>. The SS-QoL Norwegian version showed  $\alpha$  coefficient =0.79–0.93<sup>15</sup>. The SS-QOL-Arabic version showed Cronbach's  $\alpha$  ranged between 0.78–0.94<sup>20</sup>. SSQOL French version showed acceptable internal consistency 0.65- 0.91<sup>28</sup>. The current study findings are also relatable to the available previous literature.

In the current study SS-QOL Urdu version showed excellent Intra-class correlation coefficient (ICC=0.90) The findings were consistent with the previous study conducted on SSQOL-Am which also showed excellent test-retest reliability ICC = 0.93<sup>8</sup>. However, SS-QOL Arabic version showed ICC values between range of 0.77 and 0.94<sup>20</sup>.

The results of current study showed good test-retest stability of scale as Spearman's correlations in domains  $>0.7$ , except for in three domains with coefficients below 0.7 Energy ( $\rho = 0.683$ ) and Family role ( $\rho = 0.790$ ) and Mood ( $\rho = 0.697$ ). Previous studies

conducted also displayed good stability in most of the domains with rho values ranged between 0.67–0.94 (all  $p < 0.001$ ) yet the rho for vision domain was 0.35 ( $p < 0.05$ )<sup>15</sup>. In QOL- Spanish version all 10 domains reported had rho efficient of  $> 0.8$  which also support current findings. However no significant correlation was reported as the vision had  $r_s = 0.71$  and thinking had  $r_s = 0.79$  respectively in their study<sup>16</sup>.

The results of the present study also indicated that convergent validity of SSQOL-U scale among items within its domain was stated high with  $r_p = 0.81$ – $0.97$ . In another study SS-QOL-Arabic version convergent validity  $r_p = 0.76$ – $0.98$  was also strong in all domains<sup>20</sup>. The findings were further supported by another study that mentioned the convergent validity of SS-QOL-Spanish version with  $r_p$  values =  $0.800$ – $0.900$ <sup>16</sup>.

Questionnaire acceptability evaluation in relation to the ceiling effect showed that vision, language, UE function and self-care were above the threshold for exhibiting a ceiling effect (20%). Findings were consistent with Spanish<sup>29</sup>, Danish<sup>17</sup>, Persian<sup>19</sup>, Marathi<sup>21</sup> and Norwegian<sup>15</sup> versions of the questionnaire.

A few limitations of this study include small sample size, sample collection from one clinical setting also the study was unable to report and perceive different quality of life concerns during different phases of recovery. Moreover, it must be observed that although all subjects were able to read and write in Urdu, they also had different education levels that may limit tool uniformity.

Currently, this was the first study according to our knowledge, that measure the reliability and validity of SS-QOL-U scale. The results of present study also verified that the Urdu version of SS-QOL has a proficiently structured, validated and can be used to access QOL after stroke reliably and confidently. Though we further recommend translating this tool of different regional languages of Pakistan to accurately measure the quality-of-life status to different regional population of Pakistan e.g. Punjabi, Pushto, Sindhi, Saraiki, Balochi, Hindko languages. Furthermore, future studies should work to eliminate the aspect that different stages of stroke disease revolve around different stages of recovery hence different quality of life status is expected.

## CONCLUSION

This study concluded that SS-QOL-U is reliable and valid tool to evaluate quality of life in patients with stroke. The questionnaire has good psychometric properties. It has easy, simple, and understandable language for stroke patients who can read and write in Urdu. Hence, researchers and clinicians may use SSQOL-U version in future research to evaluate the quality of life in Urdu-speaking patients having sub-acute and chronic stroke.

**Ethical approval:** Study was approved by Research ethical committee of Riphah College of Rehabilitation Sciences RCRC, Riphah International University, Islamabad

**Authors' contributions:** Sidra hanif and Hafsah Arshad: Substantial contribution to the conception, design of the acquisition, analysis, and interpretation of data for the work, Hafsah Arshad, Kinza Anwar and Hafsah Gul Khattak: Drafting the work for revising it critically for important intellectual content, Hafsah Arshad: Final approval of document

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