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## ORIGINAL ARTICLE

### Validation of the Swahili Stroke-Specific Quality of Life Scale

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#### ABSTRACT

Validation is a requirement in all newly devised measures and so is the case in cross-culturally adapted tools to ensure validity and reliability. Of more importance, validation enable comparisons of results of the diverse cultures that promote exchange of clinical information within the international scientific community. Our study aimed to evaluate the validity and reliability of the Swahili version of the stroke-specific quality of life (SSQOL) scale among people with stroke in Kenya. We used a cross-sectional study design. A total of 126 participants were drawn from 9 selected hospitals within Nairobi Metropolis. Quantitative data were collected using both English and Swahili versions of the SSQOL scale. Mean and psychometric properties were analyzed using descriptive statistic, spearman's rank correlation, Chronbach's and Intraclass coefficient's tests respectively. The overall mean score of the Swahili version (92.14±28.89) did not differ from English version (90.17±25.53). Same construct between the SSQOL Swahili and English version was demonstrated in ten out of 12 domains. There was a significant correlation in upper extremity function and weaker correlation in most of the domains ( $r=0.007-1.00$ ,  $p<0.01$ ). Discriminant validity was satisfactory to excellent ( $r > 0.7 - > 0.93$ ) Test re-test reliability was excellent (ICC =0.93). Internal consistency was good (Chronbach's  $\alpha=0.84$ ). The Swahili SSQOL scale is reliable to the Swahili-speaking population and demonstrated evidence of same construct as the original SSQOL English version. The Swahili SSQOL scale is feasible for use in clinical settings and research among the Swahili-speaking stroke population.

**Keywords:** Validation; Swahili; Stroke-Specific Quality of Life Scale

## 1. INTRODUCTION

Validation of clinical questionnaires is fundamental as such the clinical significance of the tool is accredited.<sup>1</sup> Validation of cross-culturally adapted tools have been reported in diverse cultures globally implying the practice is good and evidence-based.<sup>2-8</sup> Even so, research has demonstrated a global increase in utilization of precise and valid patient-centred outcome measures to enhance rehabilitation and improve stroke outcomes.<sup>9-11</sup> Validation of the Swahili version of the SSQOL scale was timely in Kenya as well as the Sub-Saharan Africa and internationally among the Swahili-stroke population due to the fact that Swahili is a national

and official language in the aforementioned countries.<sup>12</sup>

Stroke is the third-leading cause of death and disability (5.7%) of the total DALYS globally, where Low-Middle income countries (LMINs) have recorded an increase rate of 3.7 stroke-related DALYS.<sup>13</sup> This is further confirmed by World Health Organization findings that revealed over 16% of people worldwide have a disability whose major cause is stroke.<sup>14</sup> Thus, the more the burden of stroke, the higher the prevalence of disability and the lower the quality of life.<sup>11</sup>

Poor health-related quality of life (HRQOL) among people with stroke is of great concern and improving quality of life is thus a key outcome of rehabilitation requiring valid HRQOL measures to quantify outcome.<sup>9,10</sup> The HRQOL

measures are patient-reported and so the need to validate them to not only globally but at the local level so as to verify their validity and reliability.<sup>1,15</sup>

Validity is about the soundness of a tool to determine its ability to measure what it is envisioned to measure whereas reliability looks at the integrity of a tool in producing similar results if applied in diverse settings.<sup>1,13,16</sup> Psychometric evaluation is a robust process, in which ensuring adequate sample size is important to correctly power the statistical analysis.<sup>17</sup>

The original English Stroke-Specific Quality of Life scale (SSQOL) was devised in Europe.<sup>18</sup> The questionnaire has been translated and validated locally and globally to many languages like Marathi, Norwitchian, Arabic, Yoruba, Hausa, Igbo, and Amharic.<sup>2-8</sup> The Swahili version of the stroke-specific quality of life scale is one of the translated and adapted versions in Kenya for the Swahili stroke population however it has not been validated.<sup>19</sup> This therefore limits its significance and international utilization, thus the purpose for this study to determine the psychometric properties of the SSQOL Swahili version including- construct, discriminant and known group validity, internal consistency and test re-test reliability.

## 2. METHODS

This study employed a cross-sectional descriptive study utilizing quantitative methods. The Swahili SSQOL is a disease-specific patient-reported outcome measure used to assess the quality of life post stroke.<sup>18,19</sup> The SSQOL Swahili version has 49 items clustered into 12 domains of upper extremity function, mobility, thinking, language, personality, work, family roles, self-care, social roles, vision, mood, and energy as in the original English version.<sup>19</sup> Each domain has a number of items ranging between 3 and 6 whose responses are in form of a Likert scale. The maximum overall score of the questionnaire is 245 whereas the minimum is 49. A score of 60% of the maximum score denotes a low quality of life.<sup>20</sup>

### 2.1 Study Site and population

This study was conducted in Nairobi Metropolis at level-6 and level-5 hospitals comprising Kenyatta and Mathare National hospitals, Machakos, Kiambu, Murang'a, and Kajiado county hospitals, Mama Lucy, Thika and Gatundu level five hospitals. A total of 126 consenting adult participants with either ischemic or haemorrhagic stroke attending outpatient services in physiotherapy, occupational and speech therapy, neurosurgery, and neurology clinics responded in this study. This number of respondents was in line with recommendations of 100 to 400 sample size of such studies.<sup>16</sup> The Swahili Version was repeated among 95 respondents at an interval of seven days.

### 2.2 Data collection Procedure

Trained physiotherapy research assistants who were fluent in English and Swahili collected data using two questionnaires – the English and Swahili versions of the SSQOL. Eligible participants were provided with a written explanation about the study and were requested to sign a written consent prior to completing the questionnaire. Consenting adult participants were then issued with both questionnaires to complete from a private room as they were assisted by research assistants upon receiving physiotherapy services. Data were collected in random order from the outpatient departments of the respective selected hospitals. Participation was voluntary and all information given was treated with confidence and participants names and registration numbers were not written on the questionnaire.<sup>4</sup> Further, consenting participants completing the Swahili questionnaire repeated the study after an interval of 7 days as in other validation studies.<sup>3,4,8</sup>

### 2.3 Data Management and Analysis

Data were entered in SPSS version 26, cleaned and coded. Descriptive statistics were used in analyzing social demographic characteristics and domain scores. Construct validity was analyzed using spearman's rank correlation test whereby scores ranging between 0.10 to 0.29 are ranked as weak, 0.30 to 0.49 moderate and those from 0.50 to 1.0 strong correlation. Test re-test reliability was determined by intraclass correlation coefficients with a score of 1.0 meaning perfect reliability,  $\geq 0.9$  excellent,  $\geq 0.75$  to  $\leq 0.9$  good reliability,  $\geq 0.5$  to  $\leq 0.75$  moderate,  $\leq 0.50$  poor and 0 not reliable. Internal consistency was tested with the Cronbach's alpha where scores of  $\geq 0.91$  to  $\leq 1.00$  indicates excellent consistency,  $\geq 0.81$  to  $\leq 0.90$  good,  $\geq 0.71$  to  $\leq 0.80$  acceptable,  $\geq 0.61$  to  $\leq 0.70$  questionable,  $\geq 0.51$  to  $\leq 0.60$  not acceptable and  $\leq 0.50$  poor. Level of significance was set at  $p < 0.05$  and confidence interval at 95%.

### 2.4 Ethical Review Considerations

Jomo Kenyatta University of Agriculture and Technology institutional ethics review committee of approval number, JKU/IERC/02316/0488 authorised this study as well as the National Commission for Science, Technology, and Innovation of approval number, NACOSTI/P/22/15664. Permission to collect data was granted by the medical superintendents of the selected hospitals.

## 3. RESULTS

### 3.1 Social demographics and clinical characteristics of the final Swahili version (FSV)

One hundred and twenty six participants with either ischaemic (62%) or haemorrhagic (38%) stroke responded to both the Swahili version and the original English version

in a period of 3 months. The stroke onset mean age of participants was 55.82 with 83% being diagnosed at age 40 years or over and 62% were female. Stroke duration median was 8 (IQR 2) months. (Table 1)

**Table 1: Social demographic and clinical characteristics of the final Swahili version for the validation study**

Variable	Description	Frequency	Percent (%)
<b>Gender</b>	Male	48	38
	Female	78	62
<b>Stroke type</b>	Haemorrhagic	48	38
	ischaemic	78	62
<b>Age at onset of stroke</b>	18-39	22	18
	40-49	23	25
	50-59	27	21
	60-69	21	17
<b>Affected side</b>	≥70	33	26
	Left	86	68
<b>Stroke duration</b>	Right	40	32
	1-12 months	79	63
	13-24 months	13	10
	25-36 months	8	16
	37-48 months	9	7
<b>Marital status</b>	≥49 months	17	14
	Married	83	66
	Single	26	21
	Relationship	7	6
<b>Work status before stroke</b>	Widow(er)	10	8
	Employed	27	84
<b>Work status after stroke</b>	Unemployed	5	16
	Employed	19	15
	Unemployed	107	85

Adapted from Hausa version of the stroke-specific quality of life scale.<sup>3</sup>

### 3.2 Construct validity of Swahili version of SSQOL scale

Comparison of overall mean scores of the SSQOL scale English and Swahili version was conducted where the English version scored 90.17+25.53 and the Swahili version 92.14+28.891. The Wilcoxon’s signed rank test for the domain scores of SSQOL English and Swahili demonstrated no statistically significant difference except in the mood and personality domains (Table 2).

Respondents scores of English and Swahili versions of SSQOL scale were tested using Spearman’s rank correlation test (r = 0.007 to 1.000). The upper extremity domain demonstrated a significant correlation (r = 1.00) however all other domains showed poor, non-significant correlations (P = < 0.01) (Table 3).

**Table 2: Wilcoxon’s signed rank test participants domain scores of the SSQOL scale English and Swahili version**

Domains	English /Swahili	Mean	SD	Z-Value	P-value
Energy	English	1.27	0.66	-0.22	0.83
	Swahili	1.22	0.64		
Family roles	English	1.72	0.97	-0.49	0.63
	Swahili	1.75	1.01		
Language	English	2.23	1.66	-0.27	0.79
	Swahili	2.24	1.60		
Mobility	English	1.23	0.64	-0.70	0.49
	Swahili	1.24	0.51		
Mood	English	2.61	1.18	-2.33	0.02
	Swahili	2.95	1.21		
Personality	English	2.04	1.26	-2.12	0.03
	Swahili	2.38	1.42		
Self-care	English	1.39	0.64	-0.62	0.53
	Swahili	1.42	0.67		
Social roles	English	1.32	0.56	-0.08	0.94
	Swahili	1.30	0.57		
Thinking	English	2.67	1.26	-0.74	0.46
	Swahili	2.74	1.44		
Upper extremity function	English	1.41	0.83	-0.00	1.00
	Swahili	1.41	0.83		
Vision	English	3.67	1.56	-0.07	0.95
	Swahili	3.70	1.56		
Work/productivity	English	1.12	0.43	-1.96	0.34
	Swahili	1.08	0.42		
<b>Overall scores</b>	English	1.89	<b>0.52</b>	-	<b>0.26</b>
	Swahili	1.95	<b>0.57</b>		

Adapted from Hausa version of the stroke-specific quality of life scale.<sup>3</sup>

**Table 3: Spearman’s rank correlation test of participants domain mean scores of English and Swahili version of SSQOL scale**

Domains	r-value	P-value
Energy	-0.120	0.82
Family roles	0.147	0.11
Language	0.155	0.09
Mobility	0.146	0.11
Mood	0.061	0.83
Personality	0.007	0.84
Self-care	0.087	0.35
Social roles	-0.015	0.87
Thinking	0.286	0.00
Upper extremity function	1.000	0.01
Vision	-0.106	0.25
Work/productivity	-0.152	0.10
Overall	0.125	0.17

Adapted from Hausa version of the stroke-specific quality of life scale.<sup>3</sup>

Discriminant validity had a satisfactory to excellent correlation in all the domains except in social role ( $r = > 0.7 - > 0.93$ ). Also, item-correlation with different domains, revealed a majority of the items scored  $> 0.20$  (Table 4).

The Mann Whitney U test comparisons of domains and overall scores by gender showed no statistically significant differences in all the domain scores of males and females ( $p < 0.05$ ). Kruskal Wallis tests of distribution of domains across age groups also demonstrated that distribution of domains was the same across age groups except in the language and self-care domains. The test further showed that there was a statistical significance difference between age 70 and above and all other age groups (18-39, 60-69, 40-49 and 50-59). (Table 5)

### 3.3 Reliability of FSV of SSQOL scale

Internal consistency of the domains of the FSV was conducted using Cronbach's alpha test and the findings were good (Cronbach's  $\alpha=0.84$ ) and the domains scores ranged between 0.77-0.81. For the test re-test reliability, intraclass correlation coefficient of the domain score of FSV was excellent (ICC = 0.93) and the domain scores ranged between 0.87-0.98, P-value  $< 0.01$ . The floor and ceiling effects test on the Swahili version was also analyzed and the findings were less than 20% in both ceiling and floor indicating that they were not significant (Table 6).

## 4. DISCUSSION

This study aimed to find out the validity and reliability of the final Swahili version of the stroke-specific quality of life (SSQOL) scale among people with stroke in Kenya. The study explored on the construct, discriminant and known-group validity, internal consistency, and test-retest reliability of the final Swahili Version as in other previous studies.<sup>2-8</sup> Mean scores of the SSQOL scale English and Swahili version had no major differences that is 90.17+25.53 and 92.14+28.891 respectively. Same constructs of the SSQOL Swahili version and English version were demonstrated in 10 out of 12 domains. There was a perfect correlation in upper extremity domain ( $r= 1.00$ ) and the rest of the domains demonstrated a weak correlation ( $r=0.007-1.00$ ). Item-domain correlations findings showed that items were comparable with their respective domains ( $r = > 0.7 - > 0.93$ ). Known group validity by gender and age showed no statistically significant differences in all the domain scores of males and females. Whereas, the distribution of domains was the same across age groups except in the language and self-care domains. Internal consistency was good (Cronbach's  $\alpha=0.84$ ) and test re-test reliability was excellent (ICC = 0.93).

Our cohort of participants with stroke were similar in the age and type of stroke to other studies conducted in Africa and worldwide.<sup>3-5,9,11,21,22</sup> However, in age there was a notable number of young adults with stroke ranging between

age 18-49 (43%) in our study supporting findings of previous studies that anticipated an increase of stroke in Sub-Saharan Africa among the young adults.<sup>23,24</sup> By implication, the findings support a projection of an increase of 68% of stroke in young generation by 2025.<sup>25</sup> Also, in stroke, the findings were different in the body side affected where high income countries and some regional studies revealed the right-side body weakness as the most common as compared to this study that demonstrated left side weakness.<sup>3</sup> Also, in this study, female's participants were more as in other studies conducted in Kenya.<sup>21,26</sup> However, the findings contrast those of similar studies outside Kenya that showed more males to be affected as compared to females.<sup>2-6,8,23</sup>

Evidence of same construct was demonstrated between the FSV and English version of the SSQOL scale. This is supported by the findings of this study which showed no major differences between the overall mean scores of the English version and that of the Swahili version. These findings agreed with other studies that showed no major differences between overall mean scores of Igbo, Hausa SSQOL and English SSQOL.<sup>8,18</sup> In addition, the domain scores of 10 out of 12 Swahili SSQOL and English SSQOL demonstrated no statistically significant difference between the scores. Similar findings were also demonstrated in the validation of Hausa and Igbo versions of SSQOL whereby ten out of 12 domains scores were similar.<sup>8,18</sup> Lack of differences in this study could however be deduced in many ways and imply that the FSV provides a valid evidence of same construct as the English version of SSQOL scale or does not provide valid evidence. The differences could be attributed to the cultural differences that were recognized between the English version and Swahili version. For instance, in the mood domain the English version used the phrase "I was not interested in food" and the Swahili version used "I did not have appetite".<sup>19</sup>

The difference in the personality domain may be elucidated to the fact that personality is a concept of human behavior which is diverse across cultures. These findings are similar to a study conducted in Ethiopia that also demonstrated significant differences in the personality domain.<sup>8</sup> Further, in this study, there was a perfect correlation only in the upper extremity function domain and most domains showed no or weak correlation ( $r = 0.007-1.00$ ). These findings contrast those of similar studies that demonstrated strong correlation for instance, the SSQOL English was correlated with stroke specific Hausa version ( $r= 0.70-0.92$ ) and SSQOL Igbo version ( $r=0.58$  to 0.87). The different results could be due to the bigger sample size (126) that was used in this study as compared to the Hausa study (86) and Igbo study (50).<sup>3,4</sup> Alternatively, the test may have been underpowered to show significance. The significant correlation of the upper extremity function may be associated to the findings of this study which showed that majority (68%) of the participants had a left sided body

**Table 4: Item-domain correlations (convergent and discriminant validity) of SSQOL Swahili version (n=126)**

Domains	E	FR	L	M	MD	P	SC	SR	T	UE	V	W
E1	0.753	0.241	0.171	0.233	0.163	0.273	0.317	0.238	0.034	0.393	0.069	0.068
E2	0.817	0.187	0.046	0.165	0.019	0.050	0.175	0.171	0.091	0.209	0.137	0.114
E3	0.856	0.226	0.065	0.287	0.019	0.102	0.235	0.268	0.002	0.330	0.072	0.024
FR1	0.237	0.791	0.397	0.637	0.160	0.131	0.451	0.097	0.325	0.306	0.082	0.062
FR2	0.054	0.866	0.314	0.403	0.484	0.380	0.350	0.313	0.371	0.404	0.166	0.110
FR3	0.339	0.343	0.160	0.341	0.229	0.209	0.239	0.208	0.103	0.281	0.033	0.192
L1	0.034	0.429	0.898	0.486	0.329	0.150	0.447	0.211	0.457	0.405	0.260	0.145
L2	0.154	0.436	0.900	0.463	0.300	0.172	0.471	0.201	0.432	0.412	0.206	0.125
L3	0.029	0.351	0.906	0.414	0.394	0.181	0.482	0.216	0.433	0.361	0.191	0.090
L4	0.104	0.325	0.926	0.385	0.365	0.252	0.509	0.229	0.471	0.329	0.184	0.073
L5	0.104	0.332	0.884	0.404	0.438	0.258	0.525	0.281	0.460	0.442	0.287	0.107
M1	0.042	0.516	0.427	0.826	0.242	0.079	0.483	0.181	0.350	0.263	0.187	0.139
M2	0.218	0.188	0.028	0.740	0.011	0.019	0.349	0.164	0.011	0.319	0.020	0.243
M3	0.171	0.505	0.402	0.726	0.199	0.004	0.558	0.266	0.330	0.383	0.122	0.273
M4	0.242	0.367	0.264	0.732	0.102	0.010	0.362	0.135	0.134	0.235	0.147	0.014
M5	0.144	0.583	0.402	0.890	0.224	0.135	0.597	0.249	0.308	0.327	0.245	0.211
M6	0.098	0.622	0.442	0.857	0.258	0.087	0.616	0.230	0.378	0.337	0.200	0.200
MD1	0.054	0.564	0.309	0.309	0.721	0.562	0.366	0.366	0.379	0.315	0.229	0.072
MD2	0.009	0.245	0.188	0.061	0.792	0.426	0.330	0.226	0.454	0.218	0.200	0.035
MD3	-0.010	0.275	0.186	0.102	0.805	0.443	0.332	0.290	0.448	0.261	0.253	0.086
MD4	0.125	0.033	0.148	0.055	0.731	0.287	0.082	0.257	0.145	0.227	0.106	0.087
MD5	0.043	0.271	0.399	0.344	0.757	0.272	0.379	0.185	0.379	0.158	0.356	0.031
P1	0.120	0.388	0.316	0.196	0.460	0.884	0.289	0.294	0.364	0.252	0.200	0.034
P2	0.135	0.360	0.221	0.155	0.524	0.904	0.298	0.316	0.349	0.265	0.279	0.063
P3	0.178	0.061	-0.001	0.018	0.458	0.750	0.174	0.210	0.239	0.196	0.128	0.092
SC1	0.184	0.131	0.055	0.286	0.065	0.053	0.738	0.130	0.142	0.247	0.111	0.087
SC2	0.238	0.412	0.527	0.457	0.455	0.321	0.929	0.299	0.445	0.511	0.302	0.229
SC3	0.176	0.321	0.209	0.549	0.140	0.111	0.707	0.171	0.152	0.362	0.123	0.241
SC4	0.265	0.334	0.180	0.499	0.147	0.035	0.767	0.210	0.168	0.399	0.049	0.318
SC5	0.249	0.402	0.242	0.579	0.212	0.131	0.866	0.297	0.237	0.391	0.063	0.259
SR1	0.468	0.188	0.163	0.320	0.102	0.050	0.308	0.324	0.152	0.265	0.083	0.433
SR2	0.363	0.161	0.099	0.282	0.060	0.061	0.177	0.301	0.105	0.113	0.038	0.061
SR3	0.048	0.270	0.243	0.231	0.425	0.256	0.278	0.702	0.459	0.161	0.179	0.021
SR4	0.245	0.156	0.189	0.247	0.185	0.109	0.190	0.375	0.296	0.062	0.144	0.155
SR5	0.013	0.099	0.001	0.004	0.204	0.257	0.089	0.457	0.013	0.201	0.065	0.016
T1	0.032	0.434	0.451	0.376	0.440	0.272	0.451	0.187	0.832	0.297	0.307	0.155
T2	0.033	0.398	0.551	0.299	0.474	0.331	0.497	0.209	0.825	0.457	0.295	0.211
T3	0.086	0.206	0.202	0.125	0.421	0.367	0.274	0.133	0.797	0.232	0.240	0.042
UE1	0.206	0.291	0.405	0.202	0.347	0.211	0.423	0.199	0.321	0.853	0.284	0.164
UE2	0.188	0.248	0.163	0.400	0.116	0.086	0.337	0.203	0.140	0.769	0.109	0.347
UE3	0.128	0.277	0.191	0.371	0.086	0.126	0.328	0.246	0.146	0.791	0.093	0.428
UE4	0.286	0.360	0.210	0.473	0.097	0.079	0.406	0.205	0.205	0.538	0.047	0.389
UE5	0.088	0.278	0.163	0.206	0.165	0.077	0.357	0.224	0.160	0.677	0.106	0.348
V1	0.020	0.091	0.265	0.186	0.281	0.227	0.277	0.147	0.268	0.289	0.881	0.148
V2	0.146	0.177	0.180	0.212	0.308	0.257	0.261	0.153	0.402	0.207	0.868	0.047
V3	0.162	0.171	0.160	0.156	0.260	0.239	0.230	0.110	0.273	0.193	0.833	0.033
W1	0.273	0.109	0.177	0.200	0.145	0.077	0.215	0.247	0.180	0.146	0.107	0.579
W2	0.150	0.156	0.171	0.238	0.148	0.049	0.328	0.213	0.247	0.310	0.134	0.824
W3	0.143	0.113	-0.048	-0.070	-0.072	-0.128	0.081	-0.040	-0.003	-0.041	-0.041	0.736

E (Energy), FR (Family role), L (Language), M (Mobility), MD (Mood), P (Personality), SC (Selfcare), SR (Social role), T (Task), UE (Upper extremity function), V (Vision), W (Work). Adapted from Hausa version of the stroke-specific quality of life scale.<sup>3</sup>



**Table 5: Kruskal Wallis test of domain mean and overall scores of FSV comparisons by age**

Domains	Age groups					OVM $\bar{X}$ $\pm$ SD (n=126)	Z-Value	df	P-Value
	18-39 $\bar{X}$ $\pm$ SD (n=22)	40-49 $\bar{X}$ $\pm$ SD (n=23)	50-59 $\bar{X}$ $\pm$ SD (n=27)	60-60 $\bar{X}$ $\pm$ SD (n=21)	>70 $\bar{X}$ $\pm$ SD (n=33)				
E	1.39 $\pm$ 0.81	1.42 $\pm$ 0.98	1.20 $\pm$ 0.59	1.01 $\pm$ 0.07	1.13 $\pm$ 0.34	1.23 $\pm$ 0.64	4.979	4	0.289
FR	1.88 $\pm$ 1.16	1.80 $\pm$ 1.12	2.00 $\pm$ 1.20	1.70 $\pm$ 0.91	1.46 $\pm$ 0.75	1.75 $\pm$ 1.01	3.531	4	0.473
L	2.37 $\pm$ 1.67	2.03 $\pm$ 1.64	3.10 $\pm$ 1.71	2.22 $\pm$ 1.57	1.61 $\pm$ 1.16	2.24 $\pm$ 1.60	5.426	4	0.004
M	1.28 $\pm$ 0.56	1.31 $\pm$ 0.71	1.35 $\pm$ 0.57	1.18 $\pm$ 0.37	1.11 $\pm$ 0.28	1.24 $\pm$ 0.51	4.136	4	0.388
MD	2.62 $\pm$ 1.36	2.73 $\pm$ 1.35	3.36 $\pm$ 1.00	3.27 $\pm$ 1.11	2.78 $\pm$ 1.16	2.95 $\pm$ 1.21	7.396	4	0.116
P	2.62 $\pm$ 1.42	2.13 $\pm$ 1.27	2.74 $\pm$ 1.58	2.16 $\pm$ 1.13	2.25 $\pm$ 1.53	2.38 $\pm$ 1.42	3.550	4	0.470
SC	1.51 $\pm$ 0.86	1.46 $\pm$ 0.71	1.60 $\pm$ 0.81	1.45 $\pm$ 0.54	1.12 $\pm$ 0.30	1.41 $\pm$ 0.67	10.08	4	0.039
SR	1.22 $\pm$ 0.39	1.23 $\pm$ 0.49	1.48 $\pm$ 0.84	1.42 $\pm$ 0.61	1.19 $\pm$ 0.35	1.31 $\pm$ 0.57	2.256	4	0.689
T	2.71 $\pm$ 1.49	2.59 $\pm$ 1.56	3.28 $\pm$ 1.38	2.98 $\pm$ 1.63	2.25 $\pm$ 0.35	2.74 $\pm$ 1.44	7.630	4	0.106
UE	1.51 $\pm$ 0.75	1.44 $\pm$ 0.69	1.24 $\pm$ 0.44	1.34 $\pm$ 0.67	1.10 $\pm$ 0.26	1.31 $\pm$ 0.57	8.719	4	0.069
V	3.97 $\pm$ 1.48	3.41 $\pm$ 1.63	3.70 $\pm$ 1.58	4.05 $\pm$ 1.37	2.48 $\pm$ 1.67	3.70 $\pm$ 1.56	3.423	4	0.490
W	1.05 $\pm$ 0.16	1.12 $\pm$ 0.45	1.02 $\pm$ 0.89	1.25 $\pm$ 0.91	1.00 $\pm$ 0.00	1.08 $\pm$ 0.42	2.539	4	0.638
OVM	1.91 $\pm$ 0.54	1.93 $\pm$ 0.64	2.89 $\pm$ 0.52	2.13 $\pm$ 0.48	1.90 $\pm$ 0.36	2.01 $\pm$ 0.51	7.604	4	0.107

E (Energy), FR (Family role), L (Language), M (Mobility), MD (Mood), P (Personality), SC (Selfcare), SR (Social role), T (Thinking), UE (Upper extremity function), V (Vision), W (Work), OMS (Overall mean score). Adapted from Hausa version of the stroke-specific quality of life.<sup>3</sup>

**Table 6: Cronbach's alpha, floor & ceiling effects and intraclass correlation of Final Swahili Version of SSQOL scale**

Domains	No. of items	Mean $\pm$ SD	Cronbach's alpha	Floor and ceiling effects (%)		Intraclass correlation coefficient (95% CI)		
				Floor	Ceiling	ICC	L.B	U.B
Energy	3	1.22 $\pm$ 0.63	0.806	0.8	4.0	0.97	0.95	0.98
Family roles	3	1.75 $\pm$ 1.01	0.780	0.8	4.0	0.98	0.97	0.99
Language	5	2.24 $\pm$ 1.60	0.788	0.8	4.0	0.98	0.97	0.99
Mobility	6	1.22 $\pm$ 0.47	0.801	0.8	2.9	0.94	0.90	0.96
Mood	5	2.95 $\pm$ 1.21	0.774	0.8	4.0	0.95	0.92	0.97
Personality	3	2.38 $\pm$ 1.42	0.802	0.8	4.0	0.97	0.95	0.98
Self-care	5	1.41 $\pm$ 0.67	0.787	0.8	3.7	0.96	0.94	0.97
Social roles	5	1.31 $\pm$ 0.57	0.803	0.5	3.3	0.89	0.83	0.92
Thinking	3	2.74 $\pm$ 1.44	0.773	0.8	4.0	0.97	0.95	0.98
Upper extremity	5	1.31 $\pm$ 0.57	0.802	0.8	3.0	0.96	0.94	0.97
Vision	3	3.70 $\pm$ 1.56	0.808	0.8	4.0	0.93	0.89	0.95
Work	3	1.09 $\pm$ 0.42	0.811	0.5	4.0	0.87	0.80	0.91
OVM	49	1.94 $\pm$ 0.60	0.84	0.9	2.9	0.93	0.96	0.98

OVM-overall mean score, L.B-lower bound, U.B - upper bound. Adapted from Amharic version of the stroke-specific quality of life.<sup>8</sup>

weakness and a right hand dominance (92%). This therefore may imply that the participants were able to perform most of the hand function well since the right side of most participants was not affected. The significant correlation may also mean that the translated Swahili version on the upper extremity function domain was valid. The poor correlation in the majority of the domains in this study may be attributed to the fact that the original SSQOL English version that was correlated with the Swahili version is not contextualized into the Kenyan setting therefore it may not have been clearly understood by the participants leading to inconsistency

affecting correlation outcome.

This weaker correlation findings perhaps are the reason as to why majority of similar studies opted to correlate the translated versions using measures that have been contextualized into their settings. For instance, the SSQOL Yoruba version was correlated with the Yoruba version of WHOQoL-BRE (r= 0.214-0.360) and SSQOL Amharic was correlated with SF-36 Amharic version (r = 0.21-0.61).<sup>3,4</sup> Also cultural differences that were recognized between the English version and Swahili version in the majority of the domains including- mobility, vision, energy, family roles and

language could be the reason as to why there was a weaker correlation.<sup>19</sup> The poor correlation may also mean that those domains in the Swahili version are not valid.

The known group validity findings of this study revealed that there were no statistically significant differences between gender in all the domains and overall scores of the FSV. However, the test may be underpowered to detect a difference.<sup>16</sup> The findings are consistent with those reported for the Yoruba, Hausa, Igbo, and Amharic version which also reported lack of significant differences across the gender.<sup>3-5,8</sup> Further, the current study also revealed an association between domain scores of FSV and age except in the language and self-care domains that deferred significantly across the age groups. The findings were similar to the Hausa version that reported statistically significant differences in some domains like language and self-care age groups.<sup>4</sup> The current study findings may be attributed to the fact that the participants aged 70 years and above were the majority affected with stroke and the fact that increase in age leads to a decline in performance could therefore explain why the self-care domain was affected. Further, the findings projected the lowest mean scores on those two domains in people aged above 70 years as compared to other ages further explaining the significant differences demonstrated in the language and self-care domains. Again, the findings of this study demonstrated a significant difference in the older age groups as compared to the younger age groups. The difference may be attributed to the decline of function that is witnessed in old people. The highest mean scores were recorded in younger age groups (except mood domain) and lowest in the oldest age group (except mood, personality and thinking) an indication that psychological functions are less affected across the age groups. The findings are with those of previous studies which also revealed less effects on psychological functions across all age groups affected with stroke.<sup>3,27</sup> These findings therefore imply that age in people with stroke is a strong determinant of health-related quality of life.

Item domain correlations in this study demonstrated a high correlation levels of items with their own domains ( $r = > 0.7 - > 0.93$ ) than other domains evaluating different concepts. These findings of strong correlations of items with their domains is similar with reports of Yoruba ( $r = 0.711-0.920$ ), Hausa ( $r = 0.803-0.979$ ), and Igbo ( $r=0.58$  to  $0.87$ ).<sup>3-5</sup> This further explains the relevance of items with their corresponding domains and discriminant validity of the Swahili SSQOL scale in this study.

The final Swahili version further demonstrated excellent test-retest reliability both in overall scores and domain scores in an interval of 7 days and excellent internal consistency. Findings of this study are consistent with finding from previous studies on different versions of SSQOL scale. For example, the following versions of SSQOL scale reported excellent test re-test; Hausa, Igbo version and Amharic

version.<sup>4,5,8</sup> The internal consistency findings for this study were good and comparable with previous similar studies too.<sup>2,4,6,8</sup> The ceiling and floor effects were not significant in this study as in other similar studies.<sup>3-5,8</sup>

### **Strengths and limitations**

The vast of the study site that was Nairobi metropolis was a strength for our study. We were able to get enough data in different perspectives and setting making the process easy. This study had a limitation which may be taken into considerations in deducing and generalizing its findings. For instance, there are limited health-related quality of life measures that are valid, language and culture appropriate in Kenya. Therefore, the validation of the Swahili SSQOL scale had to depend on the Original English version of the SSQOL scale that has not been validated in the Kenyan context.

### **5. CONCLUSION**

The Swahili version of the SSQOL scale was validated. The FSV of the SSQOL scale demonstrated same constructs as in the SSQOL English version in ten out of the 12 domains. There was a significant correlation in upper extremity domain and excellent test-retest reliability as well as good internal consistency. Further research is needed to assess the validity of the Swahili version of the SSQOL scale using a bigger sample size to give further insights into the FSV psychometric properties.

### **Abbreviations and Acronyms**

- DALY's- Disability-adjusted life years
- FSV- Final Swahili Version
- HRQOL- Health-Related Quality of Life
- ICC- Intra-class correlation coefficient
- SPSS- Statistical Package for social sciences
- SSQOL- Stroke Specific Quality of Life Scale
- WHO- World Health Organization
- WHOQOL- World Health Organization Quality of life

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### **Competing interests**

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them

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### Data availability

There were no new data created or analysed in our study therefore data sharing is not applicable to this article.

### Disclaimer

The views and opinions expressed in our article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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