The Correlates and Predictors of Poor Health-related Quality of Life Among Nigerian Stroke Survivors

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Abstract

Background: The impact of a disease on a patient is an increasing important outcome measure in medicine and healthcare. Issues such as quality of life are now widely used in clinical trials and in patient management for assessing morbidity and impact of treatment especially for debilitating illness like stroke.

Aim: The current study comprehensively determined potential correlates and possible predictors of poor health-related quality of life of stroke survivors in a tertiary hospital in Lagos, Nigeria.

Method: Participants consisted of one hundred and twelve patients at the neurology outpatient department who previously had experienced stroke(s) confirmed by neuro-imaging at the acute period of the stroke. Health-related quality of life was assessed using the Health-related quality of life in stroke patient measure, stroke severity was measured using the National Institute of Health Stroke Scale, disability with modified rankin scale, cognitive assessment done using the Mini Mental State Examination, depression was diagnosed using the Mini International Neuropsychiatry Interview .Other variables were collected using socio-demography questionnaire and case file.

Results: The mean of health-related quality of life score was 49.33 ±12.55. Participants had lower mean in the physical sphere compared to the spiritual sphere. Consistently, age, stroke severity, depression, levels of disability, employment status and cognitive impairment correlated significantly with most domains. However, the independent predictors of poor health-related quality of life were depression, younger age, unemployment and stroke severity in the physical sphere compared to the spiritual sphere that had depression and cognitive functions.

Conclusion: Health-related quality of life is lower among stroke survivors, strategic interventions that target depression, stroke severity, cognitive functions and unemployment after recovery should be done to improve stroke survivor's outcome.

Keywords: stroke, depression, Health-related quality of life, disability, stroke severity.

Introduction

Stroke is a costly disease from human, family and societal perspective and the burden of stroke encompasses data on its prevalence, incidence, morbidity, mortality and socioeconomic implications worldwide. According to WHO, 16 million people have a stroke worldwide each year while there are about 62 million survivors of stroke [1].

In Africa, figures indicate 535,000 new stroke cases and 2.09 million stroke survivors in the year 2013 [2]. The crude prevalence of stroke in urban Nigeria is 1.14/1000 males and 1.51/1000 females [3] and it constitutes 0.5% to 45% of medical admissions in south-western Nigeria[4].

There are an increasing number of people who survived stroke due to better treatment such as thrombolytic in the acute phase and integrated multi-disciplinary care, now living with the attending squeal. The increase in survival rate has led to new methods in measuring health outcomes associated with stroke. One of such methods is Quality of Life, which has meaning in almost all the educational disciplines and can therefore be defined in different ways. This made it a broad concept with different political, philosophical and health linked meanings [5].It is broadly defined as "the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" [6]. The health-related Quality of Life (HRQOL) concept though narrower and more focused than QOL, still needs to assess multiple dimensions of life.

HRQOL can be affected by physical, psychological, functional, social relationship, personal belief and spirituality, the environment and functional status [6]; therefore, there is a need for a multi-dimensional approach, to measuring it.

Most of the HRQOL measures previously employed (both generic and stroke specific) did not fully operational zed this concept of HRQOL to embrace relevant spiritual dimensions in the stroke patients; thereby neglecting this core aspect of HRQOL except the Health related quality of life in stroke patient (HRQOLISP) and WHOQOL-Bref[7].

HRQOL can be measured with generic or disease specific measures. Generic measures are designed to compare HRQOL across populations or different diseases while disease specific measures are designed to assess HRQOL with questions and scales that are specific to a disease or condition. Generic QOL instruments such as the Medical Outcomes Study Short-Form 36-item survey (SF-36) may underestimate the effect of stroke [8]; therefore, disease-specific tools are considered more helpful in providing information about the difficulties that patients with stroke may experience.

Stroke causes a decrease in HRQOL [6, 9]. Stroke severity, impairment of physical function and depression are the most important factors that contribute negatively to HRQOL among African stroke survivors and the average HRQOL scores is between 50-60% [10].

Over the last decade, there has been increasing interest looking at the quality of life of stroke patients in Nigeria, with studies showing that Nigerian stroke survivors experienced a fairly moderate Quality of Life [11, 12] though there have been varied reports of the area's most severely affected by stroke with social, physical and emotional domains all affected in most studies.

Stroke severity, disability and depression are the important predictors of Quality of Life among Nigerian stroke survivors.

This study will provide important information of the potential predictors of poor health-related quality of life in each domain by using a disease specific measure that assesses it among Nigerian stroke survivors.

Method and Materials

Setting: It was a cross-sectional study that was carried out at the neurology out-patient department of the Lagos State University Teaching Hospital, IKEA (LASUTH). The clinic sees an average of 150 stroke-related follow-up patients in a year (based on the register of the past twelve months).

Participants: The respondents were adults (aged 18-65 years) who had survived stroke regardless of the level of handicap or independence. The inclusion criteria were basically a previous of stroke not less than 6months confirmed by neuroimaging (Computed Tomography Scan/ Magnetic Resonance Imaging) of the brain within the acute episode of stroke (within 7 days after stroke).

Exclusion criteria were history of any psychotic disorder with or without treatment, history of pre-stroke mood disorder, language impairment severe enough to prevent valid neuro-psychiatry assessment, history of other central nervous disorders (head injury, multiple sclerosis etc) and acute illness preventing proper assessment.

A calculated sample size of 112 is needed for a 95% confidence interval in detecting a margin of error of 0.05.

Instruments: The instruments included,

 A pro-forma questionnaire used to collect relevant socio-demographic information: age, gender, marital status, residential status, employment status, educational level, monthly income, level of social support. Clinical variables about stroke location (neuroimaging report), stroke type, number of episodes and duration of illness and severity of stroke were obtained from their case files.

(1) Health-Related Quality of Life in Stroke Patient (HRQOLISP) questionnaire: Operationalizes the concept of health-related quality of life (HRQOL) as a holistic, multi-dimensional, subjective and patient cantered outcome measure. This concept is based on the WHO definition of HRQOL. It has 2 spheres and 7 domains, the physical sphere includes physical, psycho emotional, cognitive and ecosocial domains whereas the spiritual sphere includes soul, spiritual and spirit domains. HRQOL scores from each domain were computed by Likert method, with a high score indicating better quality of life. The Liker scale range from 1-5 and domain scores transformed into a score of 0-100, with 0 indicating worst health and 100 best health. The overall HRQOL score was computed by finding the arithmetic mean of the various domain scores. HRQOLISP is the only HRQOL instrument that has been validated among stroke survivors in Nigeria and it has been found to demonstrate good face content, construct and discriminate validity and internal consistency reliability [13].

(2) Depression was assessed using the depression module of Mini International Neuropsychiatric Interview (MINI) English Version 5.0.0: The MINI was developed as a brief structured interview for the major axes I psychiatric disorders in DSM-IV & ICD-10. Validation and reliability studies have been done comparing it to the SCID-P for DSM- III

R & CIDI the results of these studies show that the MINI as acceptably high validation and reliability score and can be administered in a much shorter period of time. The MINI has been used in various studies in Nigeria [14].

(3) Mini Mental State Examination (MMSE): is the most widely used instrument for assessing cognitive function. It is an interviewer-rated instrument which assesses cognitive function on subcategories of orientation, registration, attention calculation, recall, language and ability to follow simple commands. The test takes between five and ten minutes. A maximum score of 30 with normal individuals scoring 24 and above, while a score of less than 24 defines abnormal cognitive function. It correlates well with sophisticated neuropsychological batteries and differentiates mild cognitive impairment from normal elderly, and it has been used in Nigerian studies [15].

(4) National Institute of Health Stroke Scale (NIHSS): Is an objective clinical tool used in the evaluation of stroke severity. The scale is designed to be simple and reliable. It provides an ordinal, non-linear measure of acute stroke .It comprises 15 items of neurologic examination. The scale incorporates assessment of levels of consciousness, language, neglect, visual field loss, extra-ocular movement, motor strength, ataxia, dysarthria and sensory loss. It is scored from 0 (no impairment) to a maximum of 42. Persons with a low score have less severe stroke while those with a high score have more severe stroke. High NIHSS score therefore signifies severe stroke and it has been shown to be the best predictor of outcome. It has been validated in Nigeria and the sum of greater or equals to 16 forecasts a high probability of severe disability and a score of less than 16 forecasts good recovery [16]. The admission stroke severity was obtained from the case files retrospectively using NIHSS. It has been applied retrospectively in various studies including Abubakar et al [17].

(5) Modified Rankin Scale (MRS): The MRS measures independence rather than performance of specific tasks. In this way, mental as well as physical adaptations of the neurological deficits are incorporated. The scale consists of 6 grades from 0 to 5, with 0 corresponding to no symptoms and 5 corresponding to severe disability. These grades are well defined and easily understood to describe the range of global disability. Patients with score of 0-3 were categorized as good outcome (not handicapped) and those with score of 4-5 as handicapped [18]. It has been used in Nigeria studies of stroke survivors [17].

Procedure: Approval was obtained from the Ethics and Research committee of LASUTH, IKEA sampling technique of simple random sampling without replacement was used and this gave equal opportunity of everyone being selected. Recruitment was carried for eight weeks and written informed consent obtained from the participants who met the inclusion criteria after the aims and objectives was explained to them.

Literate patients were allowed to self-complete the self-administered questionnaires (socio-demographics and while those who are not, had answers taken accordingly. The researcher then administered HRQOLISP, MINI, MRS, NIHSS and MMSE between 9am -1pm and the other variables were added from their respectively cases files.

Data analysis: The data was coded and entered into a statistical package and cleaned. The statistical analysis was performed using Statistical Package for Social Sciences(SPSS) version 23. Categorical variables were summarized with frequencies and percentages while continuous variables were summarized with their mean, median, range and standard deviation

The sampled population was divided into diagnostic groups based on a cut-off 50 on the HRQOLISP measure scores, good ($\geq$ 50.00) and poor (<50.00) health-related quality of life since the domain score were standardized to minimum of 0 meaning worst health and a maximum of 100 meaning best health. Chi-square was used to find significance of study parameters on categorical variables on each domain of health-related quality of life between the two groups. P-value was set at 0.05. Independent predictors of poor health-related quality of life of each domain were determined by binary logistic regression. A p-value of <0.05 was considered significant.

Results

A Total of 112 patients were recruited and assessed. The same number was analyzed. The socio-demographic and clinical profile are summarized in Table 1 The mean age of the respondents was 56.71 $\pm$ 6.49 years with the median of 58 years and a range of 34 - 65 years and there were 67 (59.8%) males. Eighty (71.4%) were presently married and 71 (63.4%) were from Yoruba ethnic group and 78(69.6%) were Christians.

Forty seven (42.0%) had Tertiary education while 67(59.8%) were self-employed. Sixty six people (58.9%) collected monthly salary/ allowance between 20,000 to 50,000 naira. Eighty five (75.9%) were staying with their nuclear family and up to 90(80.4%) rated their perceived social support from family members as fair.

A combine neuroimaging of both MRI/CT scan showed 62(55.4%) had right hemisphere stroke, while 88 (78.6%) is due to infarction. The mean duration of stroke was 51.78 $\pm$ 46.21 months with majority (n-48, 42.9%) between 13-36 months. Ninety four (83.9%) have had only an episode of stroke whereas 5 (4.5 %) have had 3 episodes. Up to seven (6.3%) of them have had 3 or more hospitalization due to stroke .The mean Mini Mental State Examination (MMSE) score was 27.42 $\pm$ 2.42 with a range of 21-30, showed that eight (7.1%) respondents had mild cognitive impairment.

The mean NIHSS score was 15.46 $\pm$ 3.00 with median of 15.00 and a range value of 9-26. There were forty seven (42.0%) participants who scored 16 and above which forecasted severe stroke. The mean MRS score was 1.69 $\pm$ 1.19 with the median of 1.00 and range of 0-5. Twelve respondents (10.7%) showed no symptom and 49(43.8%) showed no significant disability. Forty eight (42.9%) had major depressive disorder based on the Mini International Neuropsychiatry Interview (MINI).

Table I: Clinical and socio-demographic characteristics of the 112 Nigerian stroke survivors

Variables		No	%	Mean, Median, Range, SD
Age	< 50 years	17	15.2	**Mean**-56.71 years
	50-60 years	59	52.7	**Median**- 58 years
	>60 years	36	32.1	**Range**- 34-65 years
				SD- 6.49 years
Gender	Male	67	59.8	
	Female	45	40.2	
Marital Status	Single	3	2.7	
	Married	80	71.4	
	Separated	5	4.5	
	Divorced	1	0.9	
	Widowed	23	20.5	
Ethnicity	Hausa	12	10.7	
	Igbo	24	21.4	
	Yoruba	71	63.4	
	Others	5	4.5	
Religion	Christianity	78	69.6	
	Islam	34	30.4	
Level of Education	None (Formal)	3	2.7	
	Primary	13	11.6	
	Secondary	43	38.4	
	Tertiary	47	42.0	

	Postgraduate	6	5.3	
Occupation	Unemployed	28	25.0	
	Employed(others)	17	15.2	
	Self-employed	67	59.8	
Monthly allowance(naira)	<20,000	14	12.5	**Mean** – 49,880
	20000-50000	66	58.9	**Median-** 35,500
	51000-100000	21	18.8	**Range** -8,000 -200,000
	>100000	11	1.8	**SD** -37,850
Living Arrangement	Alone	4	3.6	
	With Nuclear family	85	75.9	
	With Extended Family	21	18.8	
	With Others	2	1.7	
Perceived social support	Good	12	10.7	
	Fair	90	80.4	
	Poor	10	8.9	
Neuroimaging	Left hemisphere	48	42.9	
	Right hemisphere	62	55.4	
	Both hemispheres	2	1.7	
Aetiopathogenesis	Infarction	88	78.6	
	Intracerebral	19	17.0	
	Subarachnoid	2	1.8	
	Cerebral venous thrombosis	3	2.7	
Duration of illness	0-12 months	14	12.5	Mean- 51.78 months

	13-36 months	48	42.9	Median- 36 months
	37-60 months	23	20.5	Range-7-288 months
	>60 months	27	24.1	SD- 46.21 months
Number of Episodes	1	94	83.9	
	2	13	11.6	
	3	5	4.5	
Number of previous admissions	1	95	84.8	
	2	10	8.9	
	3 or more	7	6.3	
MMSE	18-23(mild impairment)	8	7.1	Mean= 27.42
	24-30 (no impairment)	104	92.9	Median= 28
				Range= 21-30
				SD= 2.42
MRS	0(No symptoms)	12	10.7	Mean= 1.69
	1(No significant disability)	49	43.8	Median= 1.00
	2(Slight)	28	25.0	Range= 0-5
	3(Moderate)	10	8.9	SD= 1.19
	4(Moderately severe)	11	9.8	
	5(Severe)	2	1.8	
NIHSS	0-15(Forecasts recovery)	65	58.0	Mean= 15.46
				Median= 15.00
	16 and above(forecast	47	42.0	Range= 9-26

	severe stroke)		SD= 3.00
Depression **(MINI)**	Major Depressive disorder	48	42.9
	No Depression	64	57.1

The raw scores of the health-related quality of life in stroke patient measure were converted to transformed scores with a minimum of 0 indicating worst health and a maximum of 100 indicating best health. The total mean HRQOL score of the study population was 49.33 ±12.55. The full details are included in table 2.

Table 2: showing the health related quality of life profile of the study population.

Domains	Mean(SD)	Median	Range
Physical	46.36 (3.72)	47.46	35.59 – 57.63
Emotional	42.91 (15.30)	50.00	14.58 – 66.67
Cognitive	58.05 (12.02)	61.46	27.08 – 77.08
Eco-social	47.92 (15.50)	54.35	16.30 – 72.82
Spirit	51.49 (16.26)	57.14	14.29 – 75.00
Soul	48.53(14.09)	54.77	10.48 – 69.52
Spiritual interaction	50.06(18.50)	58.33	12.50 – 75.00
Mean Total	49.33(12.55)		

Correlation between poor HRQOL domain scores and variables

In the vicariate analysis, poor HRQOL was significantly associated with different variables on each domain. Employment status ($p< 0.001$), illness duration ($p=0.020$), cognitive function ($p<0.001$), depression ($p<0.001$), disability levels ($p<0.001$) and stroke severity ($p<0.001$) were associated with cognitive domain, whereas depression ($p=0.013$) and stroke severity ($p=0.003$) were associated with physical domain. Age ($p=0.039$), employment status ($p<0.001$), previous

number of admission (p=0.002), cognitive function (p<0.001), depression (p<0.001), levels of disability (p<0.001) and stroke severity (p<0.001) were associated with ecosocial domain. The emotional domain was associated with employment status (p<0.001), monthly income (p=0.005), previous number of admission (p<0.001), cognitive function (p=0.003), depression (p<0.001), levels of disability (p<0.001) and stroke severity (p<0.001).

For the spiritual sphere, poor HRQOL was significantly associated with employment status, cognitive function, depression, levels of disability and stroke severity in all three domains, while age was associated with spiritual interaction and soul domains whereas previous number of admission was associated with soul and spirit domains. Other details are shown in tables 3-9.

Table 3: Test of association of poor HRQOL and Variables on the cognitive domain using chi-square.

VARIABLE	TOTAL (N=112)	Low(<50) (N=24)	High(≥50) (N=88)	SIGNIFCANCE
AGE GRP				
<50 years	17	5(29.4)	12	X^2=0.929, df=2, P=0.629
50-60 years	59	11(18.6)	48	
>60 years	36	8(22.2)	28	
GENDER				
Females	45	13(28.9)	32	X^2=2.487, df=1, P=0.115
Males	67	11(16.4)	56	
MARITAL STATUS				
Presently not married	32	5(15.6)	27	X^2=0.896, df=1, P=0.344
Presently married	80	19(23.8)	61	
ETHNICITY				
Yoruba	71	17(23.9)	54	X^2=0.729, df=1, P=0.393

Others	41	7(17.1)	34	
RELIGION				
Christianity	78	20(25.6)	58	X^2=2.708, df=1, P=0.100
Islam	34	4(11.8)	30	
HIGHEST EDUC				
Primary or less	16	4(25.0)	12	X^2=1.101, df=2, P=0.577
Secondary	43	7(16.3)	36	
Tertiary	53	13(24.5)	40	
EMPLOYMENT STA				
Unemployed	28	15(53.6)	13	X^2=22.923, df=2, **P<0.001***
Employed	17	2(11.8)	15	
Self employed	67	7(10.4)	60	
ALLOWANCE/MTH				
0-50k	80	20(25.0)	60	X^2=2.121, df=1, P=0.145
51k and above	32	4(12.5)	28	
SOCIAL SUPPORT				
Good	12	0(0.0)	12	X^2=3.771, df=2, P=0.152
Fair	90	22(24.4)	68	
Poor	10	2(20.0)	8	

ILLNESS DURATION

0-12 months (0-1 year)	14	7(50.0)	7	X^2=7.868, df=2, P=**0.020***
13-36 months (1-3 years)	48	9(18.8)	39	
>36 months (> 3 years)	50	8(16.0)	42	

PREVIOUS ADM

1	95	17(17.9)	78	X^2=4.662, df=2, P=0.097
2	10	4(40.0)	6	
3 or more	7	3(42.9)	4	

CLINICAL TYPE

Left	59	10(16.9)	49	X^2=2.173, df=2, P=0.338
Right	51	13(25.5)	38	
Quadri-paresis	2	1(50.0)	1	

IMAGING-Hemisphere

Left hemisphere	48	13(27.1)	35	X^2=2.916, df=2, P=0.233
Right hemisphere	62	10(16.1)	52	
Both hemispheres	2	1(50.0)	1	

IMAGING-Cause

Cerebral infarct	88	18(20.5)	70	X^2=0.231, df=1, P=0.630
Haemorrhagic stroke	24	6(25.0)	18	

COGNITION (MMSE)

24-30 (No impairment)	104	17(16.3)	87	X^2=22.338, **P<0.001***	df=1,
18-23 (mild impairment)	8	7(87.5)	1		

MINI

Not depressed	64	1(1.6)	63	X^2=35.004, P<**0.001***	df=1,
Depressed	48	23(47.9)	25		

MRS

• 0-3 (Good outcome/not handicapped)	99	14(14.1)	85	X^2=29.391, **P<0.001***	df=1,
• 4-5 (handicapped)	13	10(76.9)	3		

NIHSS

• 0-15 (forecast good recovery)	65	1(1.5)	64(98.5)	X^2=36.396, P<**0.001***	df=1,
• 16 and above (forecast severe stroke)	47	23(48.9)	24(51.1)		

Table 4: Test of association of poor HRQOL and Variables on the physical domain using chi-square.

VARIABLE	TOTAL (N=112)	Low (N=97)	High (N=15)	SIGNIFCANCE
AGE GRP				

<50 years	17	16(94.1)	1	X^2=1.011, df=2, P=0.603
50-60 years	59	50(84.7)	9	
>60 years	36	31(86.1)	5	

GENDER

Females	45	39(86.7)	6	X^2=0.000, df=1, P=0.988
Males	67	58(86.6)	9	

MARITAL STATUS

Presently not married	32	27(84.4)	5	X^2=0.192, df=1, P=0.661
Presently married	80	70(87.5)	10	

ETHNICITY

Yoruba	71	61(85.9)	10	X^2=0.080, df=1, P=0.777
Others	41	36(87.8)	5	

RELIGION

Christianity	78	67(85.9)	11	X^2=0.112, df=1, P=0.738
Islam	34	30(88.2)	4	

HIGHEST EDUC

Primary or less	16	14(87.5)	2	X^2=0.024, df=2, P=0.988
Secondary	43	37(86.0)	6	
Tertiary	53	46(86.8)	7	

EMPLOYMENT STA

Unemployed	28	25(89.3)	3	X^2=1.529, df=2, P=0.466
Employed	17	16(94.1)	1	
Self employed	67	56(83.6)	11	

ALLOWANCE/MTH

0-50k	80	68(85.0)	12	X^2=0.624, df=1, P=0.430
51k and above	32	29(90.6)	3	

SOCIAL SUPPORT

Good	12	10(83.3)	2	X^2=0.210, df=2, P=0.900
Fair	90	78(86.7)	12	
Poor	10	9(90.0)	1	

ILLNESS DURATION

0-12 months (0-1 year)	14	13(92.9)	1	X^2=0.546, df=2, P=0.761
13-36 months (1-3 years)	48	41(85.4)	7	
>36 months (> 3 years)	50	43(86.0)	7	

PREVIOUS ADM

1	95	80(84.2)	15	X^2=3.099, df=2, P=0.212
2	10	10(100.0)	0	
3 or more	7	7(100.0)	0	

CLINICAL TYPE

Left	59	50(84.7)	9	X^2=3.053, df=2, P=0.217
Right	51	46(90.2)	5	
Quadri-paresis	2	1(50.0)	1	

IMAGING-Hemisphere

Left hemisphere	48	43(89.6)	5	X^2=1.076, df=2, P=0.584
Right hemisphere	62	52(83.9)	10	
Both hemispheres	2	2(100.0)	0	

IMAGING-Cause

Cerebral infarct	88	76(86.4)	12	X^2=0.021, df=1, P=0.885
Haemorrhagic stroke	24	21(87.5)	3	

COGNITION (MMSE)

24-30 (No impairment)	104	90(86.5)	14	X^2=0.006, df=1, P=0.939
18-23 (mild impairment)	8	7(87.5)	1	

MINI

Not depressed	64	51(79.7)	13	X^2=6.164, df=1, P=**0.013***
Depressed	48	46(95.8)	2	

MRS

• 0-3 (Good outcome/not handicapped)	99	84(84.8)	15	X^2=2.274, df=1, P=0.132

• 4-5	13	13(100.0)	0	
(handicapped)				
NIHSS				
• 0-15	65	51(78.5)	14(21.5)	X^2=8.860, df=1, P=**0.003***
(forecast good recovery)				
• 16 and above	47	46(97.9)	1(2.1)	
(forecast severe stroke)				

Table 5: Test of association of poor HRQOL and Variables on the emotional domain using chi-square.

VARIABLE	TOTAL (N=112)	Low (N=55)	High (N=57)	SIGNIFCANCE
AGE GRP				
<50 years	17	12(70.6)	5	X^2=4.000, df=2, P=0.135
50-60 years	59	28(47.5)	31	
>60 years	36	15(41.7)	21	
GENDER				
Females	45	26(57.8)	19	X^2=2.263, df=1, P=0.133
Males	67	29(43.3)	38	
MARITAL STATUS				
Presently not married	32	15(46.9)	17	X^2=0.089, df=1, P=0.765
Presently married	80	40(50.0)	40	

ETHNICITY

Yoruba	71	33(46.5)	38	X^2=0.536, df=1, P=0.464
Others	41	22(53.7)	19	

RELIGION

Christianity	78	37(47.4)	41	X^2=0.287, df=1, P=0.592
Islam	34	18(52.9)	16	

HIGHEST EDUC

Primary or less	16	9(56.3)	7	X^2=0.443, df=2, P=0.801
Secondary	43	20(46.5)	23	
Tertiary	53	26(49.1)	27	

EMPLOYMENT STA

Unemployed	28	23(82.1)	5	X^2=16.370, df=2, **p<0.001***
Employed	17	6(35.3)	11	
Self employed	67	26(38.8)	41	

ALLOWANCE/MTH

0-50k	80	46(57.5)	34	X^2=7.892, df=1, **P=0.005***
51k and above	32	9(28.1)	23	

SOCIAL SUPPORT

Good	12	4(33.3)	8(66.7)	X^2=2.943, df=2, P=0.230

Fair	90	44(48.9)	46(51.1)	
Poor	10	7(70.0)	30(30.0)	
ILLNESS DURATION				
0-12 months (0-1 year)	14	8(57.1)	6	X^2=0.413, df=2, P=0.813
13-36 months (1-3 years)	48	23(47.9)	25	
>36 months (> 3 years)	50	24(48.0)	26	
PREVIOUS ADM				
1	95	39(41.1)	56	X^2=16.412, df=2, P<**0.001***
2	10	9(90.0)	1	
3 or more	7	7(100.0)	0	
CLINICAL TYPE				
Left	59	26(44.1)	33	X^2=1.285, df=2, P=0.526
Right	51	28(54.9)	23	
Quadri-paresis	2	1(50.0)	1	
IMAGING-Hemisphere				
Left hemisphere	48	27(56.3)	21	X^2=1.747, df=2, P=0.417
Right hemisphere	62	27(43.5)	35	
Both hemispheres	2	1(50.0)	1	
IMAGING-Cause				
Cerebral infarct	88	45(51.1)	43	X^2=0.677, df=1, P=0.411

Haemorrhagic stroke	24	10(41.7)	14	
COGNITION (MMSE)				
24-30 (No impairment)	104	47(45.2)	57	X^2=8.929, df=1, **P=0.003***
18-23 (mild impairment)	8	8(100.0)	0	
MINI				
Not depressed	64	9(14.1)	55	X^2=73.384, df=1, P<**0.001***
Depressed	48	46(95.8)	2	
MRS				
• 0-3 (Good outcome/not handicapped)	99	42(42.4)	57	X^2=15.242, df=1, P<**0.001***
• 4-5 (handicapped)	13	13(100.0)	0	
NIHSS				
• 0-15 (forecast good recovery)	65	13(20.0)	52(80.0)	X^2=52.509, df=1, P<**0.001***
• 16 and above (forecast severe stroke)	47	42(89.4)	5(10.6)	

Table 6: Test of association of poor HRQOL and Variables on the eco-social domain using chi-square.

VARIABLE	TOTAL (N=112)	Low(<50) (N=51)	High(≥50) (N=61)	SIGNIFCANCE
AGE GRP				

<50 years	17	12(70.6)	5	X^2=6.465, df=2, P=**0.039***
50-60 years	59	27(45.8)	32	
>60 years	36	12(33.3)	24	
GENDER				
Females	45	23(51.1)	22	X^2=0.943, df=1, P=0.332
Males	67	28(41.8)	39	
MARITAL STATUS				
Presently not married	32	15(46.9)	17	X^2=0.032, df=1, P=0.857
Presently married	80	36(45.0)	44	
ETHNICITY				
Yoruba	71	31(43.7)	40	X^2=0.275, df=1, P=0.600
Others	41	20(48.8)	21	
RELIGION				
Christianity	78	35(44.9)	43	X^2=0.046, df=1, P=0.831
Islam	34	16(47.1)	18	
HIGHEST EDUC				
Primary or less	16	10(62.5)	6	X^2=2.189, df=2, P=0.335
Secondary	43	18(41.9)	25	
Tertiary	53	23(43.4)	30	

EMPLOYMENT STA

Unemployed	28	25(89.3)	3	X^2=28.975, df=2, **P<0.001***
Employed	17	6(35.3)	11	
Self employed	67	20(29.9)	47	

ALLOWANCE/MTH

0-50k	80	42(52.5)	38	X^2=5.476, df=1, P=0.073
51k and above	32	9(28.1)	23	

SOCIAL SUPPORT

Good	12	3(25.0)	9	X^2=10.188, df=2, P=**0.006***
Fair	90	39(43.3)	51	
Poor	10	9(90.0)	1	

ILLNESS DURATION

0-12 months (0-1 year)	14	10(71.4)	4	X^2=4.931, df=2, P=0.085
13-36 months (1-3 years)	48	22(45.8)	26	
>36 months (> 3 years)	50	19(38.0)	31	

PREVIOUS ADM

1	95	37(38.9)	58	X^2=12.448, df=2, P=**0.002***
2	10	7(70.0)	3	

3 or more	7	7(100.0)	0	
CLINICAL TYPE				
Left	59	21(35.6)	38	X^2=5.006, df=2, P=0.082
Right	51	29(56.9)	22	
Quadri-paresis	2	1(50.0)	1	
IMAGING-Hemisphere				
Left hemisphere	48	27(56.3)	21	X^2=7.140, df=2, P=0.061
Right hemisphere	62	22(35.5)	40	
Both hemispheres	2	2(100.0)	0	
IMAGING-Cause				
Cerebral infarct	88	40(45.5)	48	X^2=0.001, df=1, P=0.974
Haemorrhagic stroke	24	11(45.8)	13	
COGNITION (MMSE)				
24-30 (No impairment)	104	43(41.3)	61	X^2=10.305, df=1, **P<0.001***
18-23 (mild impairment)	8	8(100.0)	0	
MINI				
Not depressed	64	4(6.3)	60	X^2=92.931, df=1, **P<0.001***
Depressed	48	47(97.9)	1	
MRS				

• 0-3 (Good outcome/not handicapped)	99	39(39.4)	60	X^2=12.973, P<**0.001***	df=1,
• 4-5 (handicapped)	13	12(92.3)	1		
NIHSS					
• 0-15 (forecast good recovery)	65	10(15.4)	55	X^2=56.777, P<**0.001***	df=1,
• 16 and above (forecast severe stroke)	47	41(87.2)	6		

Table 7: Test of association of poor HRQOL and Variables on the spiritual interaction domain using chi-square.

VARIABLE	TOTAL (N=112)	Low (N=45)	High (N=67)	SIGNIFCANCE
AGE GRP				
<50 years	17	12(70.6)	5	X^2=13.351, df=2, P=**0.001***
50-60 years	59	26(44.1)	33	
>60 years	36	7(19.4)	29	
GENDER				
Females	45	21(46.7)	24	X^2=1.317, df=1, P=0.251
Males	67	24(35.8)	43	

MARITAL STATUS

Presently not married	32	13(40.6)	19	X^2=0.004, df=1, P=0.951
Presently married	80	32(40.0)	48	

ETHNICITY

Yoruba	71	26(36.6)	45	X^2=1.022, df=1, P=0.312
Others	41	19(46.3)	22	

RELIGION

Christianity	78	33(42.3)	45	X^2=0.485, df=1, P=0.0.486
Islam	34	12(35.3)	22	

HIGHEST EDUC

Primary or less	16	9(56.3)	7	X^2=2.228, df=2, P=0.328
Secondary	43	15(34.9)	28	
Tertiary	53	21(39.6)	32	

EMPLOYMENT STA

Unemployed	28	19(67.9)	9	X^2=12.067, df=2, **P<0.002***
Employed	17	6(35.3)	11	
Self employed	67	20(29.9)	47	

ALLOWANCE/MTH

0-50k	80	36(45.0)	44	X^2=0.703, df=1, P=0.402

51k and above	32	9(28.1)	23	
SOCIAL SUPPORT				
Good	12	4(33.3)	8	X^2=1.931, df=2, P=0.381
Fair	90	35(38.9)	55	
Poor	10	6(60.0)	4	
ILLNESS DURATION				
0-12 months (0-1 year)	14	8(57.1)	6	X^2=4.470, df=2, P=0.107
13-36 months (1-3 years)	48	22(45.8)	26	
>36 months (> 3 years)	50	15(30.0)	35	
PREVIOUS ADM				
1	95	33(34.7)	62	X^2=8.844, df=2, P=0.012
2	10	6(60.0)	4	
3 or more	7	6(85.7)	1	
CLINICAL TYPE				
Left	59	20(33.9)	39	X^2=4.459, df=2, P=0.108
Right	51	23(45.1)	28	
Quadri-paresis	2	2(100.0)	0	
IMAGING-Hemisphere				
Left hemisphere	48	22(45.8)	26	X^2=1.287, df=2, P=0.525
Right hemisphere	62	22(35.5)	40	

Both hemispheres	2	1(50.0)	1	
IMAGING-Cause				
Cerebral infarct	88	37(42.0)	51	X^2=2.249, df=1, P=0.134
Haemorrhagic stroke	24	8933.3)	16	
COGNITION (MMSE)				
24-30 (No impairment)	104	38(36.5)	66	X^2=12.197, df=1, P<0**.001***
18-23 (mild impairment)	8	7(78.5)	1	
MINI				
Not depressed	64	4(6.3)	60	X^2=47.435, df=1, P<**0.001***
Depressed	48	41(85.4)	7	
MRS				
• 0-3 (Good outcome/not handicapped)	99	34(34.3)	65	X^2=22.424, df=1, **P<0.001***
• 4-5 (handicapped)	13	11(84.6)	2	
NIHSS				
• 0-15 (forecast good recovery)	65	10(15.4)	55	X^2=39.616, df=1, P<**0.001***
• 16 and above (forecast severe stroke)	47	35(74.5)	12	

Table 8: Test of association of poor HRQOL and Variables on the soul domain using chi-square.

VARIABLE	TOTAL (N=112)	Low (N=46)	High (N=66)	SIGNIFCANCE
AGE GRP				
<50 years	17	11(64.7)	6	X^2=6.593, df=2, P=**0.037***
50-60 years	59	25(42.2)	34	
>60 years	36	10(27.8)	26	
GENDER				
Females	45	21(46.7)	24	X^2=0.973, df=1, P=0.324
Males	67	25(37.3)	42	
MARITAL STATUS				
Presently not married	32	13(40.6)	19	X^2=0.004, df=1, P=0.952
Presently married	80	33(41.3)	47	
ETHNICITY				
Yoruba	71	25(35.2)	46	X^2=2.752, df=1, P=0.097
Others	41	21(51.2)	20	
RELIGION				
Christianity	78	33(42.3)	45	X^2=0.162, df=1, P=0.687
Islam	34	13(38.2)	21	

HIGHEST EDUC

Primary or less	16	10(62.5)	6	X^2=3.544, df=2, P=0.170
Secondary	43	16(37.2)	27	
Tertiary	53	20(37.7)	33	

EMPLOYMENT STA

Unemployed	28	21(75.0)	7	X^2=18.026, df=2, **P<0.001***
Employed	17	6(35.3)	11	
Self employed	67	19(28.4)	48	

ALLOWANCE/MTH

0-50k	80	36(45.0)	44	X^2=1.786, df=1, P=0.181
51k and above	32	10(31.3)	22	

SOCIAL SUPPORT

Good	12	2(16.7)	10	X^2=6.411, df=2, P=0.041
Fair	90	37(41.1)	53	
Poor	10	7(70.0)	3	

ILLNESS DURATION

0-12 months (0-1 year)	14	8(57.1)	6	X^2=2.669, df=2, P=0.263
13-36 months (1-3 years)	48	21(43.8)	27	
>36 months (> 3 years)	50	17(34.0)	33	

PREVIOUS ADM

1	95	33(34.7)	62	X^2=13.099, df=2, **P=0.001***
2	10	6(60.0)	4	
3 or more	7	7(100.0)	0	

CLINICAL TYPE

Left	59	20(33.9)	39	X^2=2.651, df=2, P=0.266
Right	51	25(49.0)	26	
Quadri-paresis	2	1(50.0)	1	

IMAGING-Hemisphere

Left hemisphere	48	24(50.0)	24	X^2=2.975, df=2, P=0.226
Right hemisphere	62	21(33.9)	41	
Both hemispheres	2	1(50.0)	1	

IMAGING-Cause

Cerebral infarct	88	37(42.0)	51	X^2=0.161, df=1, P=0.688
Haemorrhagic stroke	24	9(37.5)	15	

COGNITION (MMSE)

24-30 (No impairment)	104	39(37.5)	65	X^2=7.673, df=1, **P=0.006***
18-23 (mild impairment)	8	7(87.5)	1	

MINI

Not depressed	64	2(3.1)	62	X^2=88.845, df=1, P<**0.001***
Depressed	48	44(91.7)	4	

MRS

• 0-3 (Good outcome/not handicapped)	99	35(35.4)	64	X^2=11.522, df=1, P=**0.001***
• 4-5 (handicapped)	13	11(84.6)	2	

NIHSS

• 0-15 (forecast good recovery)	65	9(13.8)	56	X^2=44.559, df=1, P<**0.001***
• 16 and above (forecast severe stroke)	47	37(78.7)	10	

Table 9: Test of association of poor HRQOL and Variables on the spirit domain using chi-square.

VARIABLE	TOTAL (N=112)	Low (N=42)	High (N=70)	SIGNIFCANCE
AGE GRP				
<50 years	17	10(58.8)	7	X^2=5.753, df=2, P=0.056
50-60 years	59	23(39.0)	36	
>60 years	36	9(25.0)	27	
GENDER				
Females	45	17(37.8)	28	X^2=0.002, df=1, P=0.960
Males	67	25(37.3)	42	

MARITAL STATUS

Presently not married	32	12(37.5)	20	X^2=0.000, df=1, P=0.100
Presently married	80	30(37.5)	50	

ETHNICITY

Yoruba	71	26(36.6)	45	X^2=0.064, df=1, P=0.800
Others	41	16(39.0)	25	

RELIGION

Christianity	78	32(41.0)	46	X^2=1.363, df=1, P=0.243
Islam	34	10(29.4)	24	

HIGHEST EDUC

Primary or less	16	9(56.3)	7	X^2=3.370, df=2, P=0.185
Secondary	43	13(30.2)	30	
Tertiary	53	20(37.7)	33	

EMPLOYMENT STA

Unemployed	28	20(71.4)	8	X^2=18.401, df=2, **P<0.001***
Employed	17	4(23.5)	13	
Self employed	67	18(26.9)	49	

ALLOWANCE/MTH

0-50k	80	34(42.5)	46	X^2=2.987, df=1, P=0.084

51k and above	32	8(25.0)	24	
SOCIAL SUPPORT				
Good	12	4(33.3)	8	X^2=4.954, df=2, P=0.084
Fair	90	31(34.4)	59	
Poor	10	7(70.0)	3	
ILLNESS DURATION				
0-12 months (0-1 year)	14	9(64.3)	5(35.7)	X^2=7.463, df=2, **P=0.024***
13-36 months (1-3 years)	48	20(41.7)	28(58.3)	
>36 months (> 3 years)	50	13(26.0)	37(74.0)	
PREVIOUS ADM				
1	95	30(31.6)	65(68.4)	X^2=10.524, df=2, P=**0.005***
2	10	6(60.0)	4(40.0)	
3 or more	7	6(85.7)	1(14.3)	
CLINICAL TYPE				
Left	59	18(30.5)	41	X^2=5.55, df=2, P=0.072
Right	51	22(43.1)	29	
Quadri-paresis	2	2(100.0)	0	
IMAGING-Hemisphere				
Left hemisphere	48	21(43.8)	27	X^2=1.660, df=2, P=0.436
Right hemisphere	62	20(32.3)	42	

Both hemispheres	2	1(50.0)	1	
IMAGING-Cause				
Cerebral infarct	88	34(38.6)	54	$X^2=0.226$, df=1, P=0.634
Haemorrhagic stroke	24	8(33.3)	16	
COGNITION (MMSE)				
24-30 (No impairment)	104	35(33.7)	69	$X^2=9.190$, df=1, P=**0.002***
18-23 (mild impairment)	8	7(87.5)	1	
MINI				
Not depressed	64	3(4.7)	61	$X^2=68.600$, df=1, P<**0.001***
Depressed	48	39(81.3)	9	
MRS				
• 0-3 (Good outcome/not handicapped)	99	31(31.3)	68	$X^2=13.930$, df=1, P<**0.001***
• 4-5 (handicapped)	13	11(84.6)	2	
NIHSS				
• 0-15 (forecast good recovery)	65	10(15.4)	55	$X^2=32.323$, df=1, P<**0.001***
• 16 and above (forecast severe stroke)	47	32(68.1)	15	

Potential Independent predictors of poor HRQOL by binary regression analysis

Table 10 presents the results of the independent predictors of poor HRQOL from the significantly associated variables by binary logistic regression. Severe stroke was a predictor in cognitive domain (aOR- 18.387, p= 0.021); age (aOR- 0.079, p=0.023), employment (aOR - 0.023, 0.035,p =0.008, <0.001), depression (aOR – 12.184, p<0.001) and severe stroke(aOR- 30.373, p<0.001) were predictors in the ecosocial domain while depression and severe stroke were predictors in the emotional domain. In the spiritual sphere, depression was a predictor in spiritual interaction and soul domains whereas improved cognitive function was a predictor in the spirit domain.

Table 10: Binary Logistic regression showing independent predictors of poor HRQOL on each domain

Domain	Variable	Adjusted Odds ratio	95% CI	p-value
Cognitive	**Employment status**			
	Unemployed	1		
	Employed	0.358	0.33, 3.896	0.399
	Self employed	0.425	0.094, 1.924	0.267
	Illness duration (years)			
	0-12	1		
	13-36	0.161	0.017, 1.536	0.113
	>36	0.137	0.016, 1.136	0.065
	Mini			
	Not depressed	1		
	Depressed	0.252	0.032, 2.003	0.193
	MMSE			
	No impairment	1		
	Mild impairment	7.057	0.479, 103.862	0.154
	MRS			
	0-3	1		

	4-5	2.018	0.386, 10.540	0.405
Physical	**NIHSS score**			
	0-15	1		
	≥16	18.387	1.558, 216.970	**0.021***
	Mini			
	Not depressed	1		
	Depressed	1.610	0.249, 10.428	0.617
Emotional	**Employment status**			
	Unemployed	1		
	Employed	0.627	0.018, 21.240	0.795
	Self-employed	1.042	0.132, 8.246	0.969
	Allowance/ Months			
	0-50k	1		
	51k and above	0.370	0.035, 3.911	0.409
	Previous admission			
	1	1		
	≥2	0.912	0.029, 28.320	0.958
	MMSE			
	No impairment	1		
	Mild impairment	0.266	0.053, 1.322	0.105
	Mini			
	Not depressed			
	Depressed	42.218	5.899, 302.128	**<0.001***
	MRS			

	0-3	1		
	4-5	6.027	0.189, 192.338	0.309
	NIHSS score			
	0-15	1		
	≥16	6.195	1.119, 34.308	**0.037***
	NIHSS score			
	0-15	1		
	≥16	9.002	0.787, 103.008	0.077
Eco-social	**Age group (years)**			
	<50	1		
	50-60	0.240	0.037, 1.545	0.133
	>60	0.079	0.009, 0.710	**0.023***
	Employment status			
	Unemployed	1		
	Employed	0.023	0.001, 0.378	**0.008***
	Self employed	0.035	0.006, 0.221	**<0.001***
	Family support			
	Poor	1		
	Fair	0.765	0.231, 5.114	0.477
	Good	0.673	0.341, 7.221	0.211
	Previous admission			
	No	1		
	Yes	11.092	0.485, 253.923	0.132
	MMSE			

No impairment	1		
Mild impairment	0.144	0.005, 4.343	0.265
Mini			
Not depressed	1		
Depressed	12.184	4.531,21.33	**<0.001***
MRS			
0-3	1		
4-5	2.646	0.129, 54.310	0.528
NIHSS score			
0-15	1		
≥16	30.373	6.929, 133.148	**<0.001***

Spiritual interaction	**Age group (years)**			
	<50	1		
	50-60	1.163	0.165, 8.206	0.880
	>60	0.193	0.023, 1.627	0.131
	Employment status			
	Unemployed	1		
	Employed	0.747	0.076, 7.338	0.802
	Self employed	0.988	0.180, 5.429	0.989
	MMSE			
	No impairment	1		
	Mild impairment	2.497	0.269, 23.149	0.421
	Mini			
	Not depressed	1		

	Depressed	120.774	9.440, 1545.008	**<0.001***
	MRS			
	0-3	1		
	4-5	1.386	0.203, 9.469	0.739
	NIHSS score			
	0-15	1		
	≥16	1.674	0.271, 10.015	0.588
Soul	**Age (years)**			
	<50	1		
	51-60	4.496	0.354, 57.175	0.247
	>60	4.169	0.240, 72.459	0.327
	Employment status			
	Unemployed	1		
	Employed	0.812	0.039, 16.748	0.893
	Self employed	0.510	0.058, 4.508	0.544
	Previous admission			
	1	1		
	≥2	0.326	0.030, 3.568	0.358
	MMSE			
	No impairment	1		
	Mild impairment	1.006	0.091, 11.154	0.996
	Mini			
	Not depressed	1		
	Depressed	1133.208	28.596, 44907.156	**<0.001***

MRS				
0-3	1			
4-5	0.363	0.034, 3.881	0.402	
NIHSS score				
0-15	1			
≥16	0.920	0.067, 12.699	0.950	
Spirit **Employment status**				
Unemployed	1			
Employed	8.267	0.727, 93.973	0.089	
Self employed	2.757	0.514, 14.774	0.236	
Illness duration (years)				
0-12	1			
13-36	1.779	0.148, 21.418	0.650	
>36	6.451	0.488, 85.286	0.157	
Previous admission				
1	1			
≥2	0.631	0.166, 3.436	0.594	
Mini				
Not depressed	1			
Depressed	0.355	0.035, 3.628	0.383	
MMSE				
No impairment	1			
Mild impairment	0.004	0.000, 0.069	**<0.001***	
MRS				

0-3	1		
4-5	0.941	0.139, 6.357	0.950
NIHSS score			
0-15	1		
≥16	2.478	0.241, 25.448	0.445

DISCUSSION

This is among the first studies on the correlates and potential predictors of various HRQOL domains using a stroke specific measure among stroke patients whose stroke(s) were confirmed with use of neuroimaging from Nigeria.

The mean HRQOL score of 49.33± 12.55 of the present study is much lower than 73.5 ± 9.1 found at Ibadan and 69.8 ±8.9 at Berlin found by Owolabi[9], 69.0±13.3 in Ghana[19], and 72.7±9.80 in Jamaica [20] which used the same instrument as this study to measure HRQOL among stroke patient. Although mean score is closer to the average HRQOL scores found among stroke survivors in Africa [10].

The possible explanation for this variation may be due to how the HRQOL measure was administered; in this study it was interviewer administered unlike the self-administration done in the other studies. Self-reported measures rely on the assumption that individuals being evaluated are sufficiently self-aware to provide accurate self-assessment and report but this is not necessarily true of individual who has experienced stroke, who may either exaggerate or minimize changes and this is typical in patients with right hemispheric stroke [21].However, the domains most affected were emotional, physical and eco-social whereas the cognitive, spiritual interaction and spirit domains were the least affected. This is agreeing with the relative sparing of autonomy and purpose of life domains by Clarke et al [22] and reported by other similar studies[9].

Our findings are partially in agreement with previous studies [9-12] using the same measure or other measures of HRQOL. In this study depression measured by MINI and stroke severity at the onset measured retrospectively from the case notes by NIHSS correlated on all domains with poor HRQOL (<50 HRQOLISP score). Present disability measured by MRS and cognitive impairment measured by MMSE correlated with poor HRQOL on all domains except the physical domain. These may be due to the relationship between paralysis and functioning [23]. Also stroke survivors with depression tend to have depressive symptoms which may limit their ability to plan and develop goals in life that are required to achieve life satisfaction.

Post stroke duration correlated with poor HRQOL on both cognitive and spirit domains which was also observed in other studies [24, 25]. This may be due to response shift and coping strategies

which are developed after discharge from the hospital. The number previous admission due to stroke correlated significantly on ecosocial, motional, soul and spirit domains of HRQOL. Plausible explanation may be due to disruption of normal activities during each admission.

Age correlated on the ecosocial, spiritual interactions and soul domains of HRQOL. This has been reported in other studies though not consistently confirmed by other studies [26, 27], however is a non-modifiable factor. Unemployment correlated with poor HRQOL on cognitive, ecosocial, emotional, spiritual interaction and soul domains. Also a monthly allowance less than 50,000 naira correlated on the emotional domain.

Gender, perceived level of social support, number previous episodes of stroke, type of stroke and side of stroke did not show any significant relationship with poor HRQOL score in all the domains. This is similar to what was reported in other studies [28, 29].

The independent predictors of poor HRQOL that emerge from the correlated variables from each domain using the binary logistic regression was severe stroke as a predictor for cognitive domain, severe stroke, depression , younger age, and unemployment were the predictors of the ecosocial domain, depression and severe stroke were predictors for emotional domain whereas depression was a predictor for both spiritual interaction and soul domains while high MMSE scores was a predictor of the spirit domain .None of the correlated variables predicted for the physical domain.

In this study, stroke severity predicted poor HRQOL majorly in the physical sphere of the HRQOLISP measure which shows that disability and paralysis measures differ from HRQOL measures which have a broader perspective[30]. This is in line with earlier reports in literature [31].Depression status seems to affect poor HRQOL of stroke patients in both the physical and spiritual spheres which may suggest that psychosocial support and treatment of depression may be needed to enhance some HRQOL domains. This has been corroborated by various studies [32].

We found that MMSE was an important predictor for poor HRQOL in the spirit domain. However in other studies [33], cognition also affected physical functions and other domains of HRQOL.

The major strength of the study is the use of holistic and stroke specific quantitative measure that describes all the subjective realities which are crucial to the re-establishment of a sense of identity. Also the use of neuroimaging (CT scan/ MRI) to make the diagnosis of stroke thereby avoiding miss-diagnosis of conditions that are similar to a cerebrovascular accident (CVA).In addition, other cofounding variables like family support, monthly allowances, stroke type etc were included in the study.

However, the ideal design for measuring the HRQOL in stroke patients is to have a prospective study that measures the HRQOL among people who have high risk to develop stroke and subsequently measures the HRQOL after the stroke episode. Such a study is expensive and would need a large number of patients who may not develop a stroke at the end.

In conclusion, severe stroke, depression, younger age, cognitive functions and unemployment were the major predictors of poor HRQOL among stroke survivors, strategic interventions that target them should be done to improve stroke survivor's outcome and a sense of being.

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