


ORIGINAL RESEARCH ARTICLE

Open Access



# Correlates of participation restrictions and quality of life among Hausa women with post-stroke disabilities

Muhammad Muhammad Lawan<sup>1\*</sup> , Isa Usman Lawal<sup>2</sup> and Ali Maryam Yusuf<sup>1</sup>

## Abstract

**Background:** Almost all health professionals refer and use the term participation restrictions in activities of daily living as one of the successful outcomes of stroke rehabilitation. Higher occurrences of stroke-related functional disability among women who suffer stroke tend to affect their quality of life, participation in, and reintegration into the community in general. Hence, the aim of this study is to investigate the correlation of participation restrictions and quality of life of Hausa women post-stroke event.

**Method:** This study employed a cross-sectional design; 67 post-stroke patients were recruited and assessed for participation using Stoke Impact Scale (SIS 3.0), quality of life was assessed using SSQOL, and MRS was used to assess post-stroke disabilities.

**Results:** Findings of this study indicate participation to be significantly related to quality of life ( $r = 0.801, P = 0.000$ ). Participation was significantly related to limb strength ( $r = 0.606, P = 0.000$ ), mood and emotions ( $r = 0.399, P = 0.001$ ), ADL ( $r = 0.733, P = 0.000$ ), mobility ( $r = 0.564, P = 0.000$ ), and hand function ( $r = 0.687, P = 0.000$ ). Recovery from stroke was found to be a determinant of participation ( $r = 0.624, P = 0.000$ ).

**Conclusion:** Correlates of participation in Hausa women who suffered stroke are quality of life, strength, mood and emotions, ADL, mobility, hand function, and level of recovery from stroke. Both participation and quality of life also inversely correlated significantly with demographic factors of age and stroke severity.

**Keywords:** Stroke, Participation restrictions, ADL, Hausa

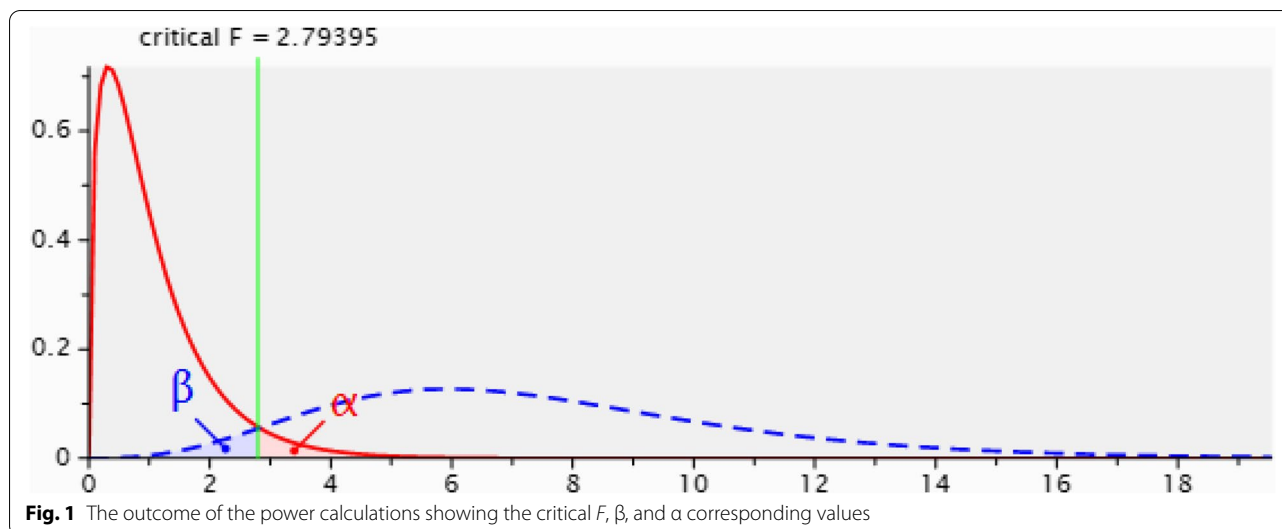
## Background

Body structure and function, activity, and participation are among the three components of functionality that needs positive interactions, which can be influenced by personal and environmental factors that may become facilitators or barriers to performing activities and participation [1]. The world health organization (WHO) 1995 proposed quality of life as “An 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; thus, spiritual and religious aspects are needed to be recognized in quality of life of patients [2]. Hamzat et al. [3] reported that higher occurrence of stroke-related functional disability among women who suffer stroke tend to affect their quality of life, participation in, and reintegration into the community in general. The international classification of functioning, disability and health (ICF) 2001 defined participation restrictions as the difficulty an individual may have in involvement in life situation. Therefore, involvement in life situations requires activities or interactions at the environmental, community, and social level. Lack of social interactions and failure to assume previous occupations or employment and inability to participate in

\*Correspondence: muhammadgadeef@gmail.com

<sup>1</sup> Physiotherapy Department, Aminu Kano Teaching Hospital, Kano, Nigeria  
Full list of author information is available at the end of the article



leisure activities are the participation restrictions experienced post-stroke [4].

Women have an increasing risk of disability and handicap following a stroke due to the evidence that women have greater prevalence at later stage in life [3] de Graaf et al. [5] explained that factors such as psychological, emotional deficits, cognitive deficits, functional dependency, increasing age, and comorbidities contribute to restrictions in participation after suffering stroke. Napier et al. [6] explained that perceptions and behaviors concerning health are cultural and differ between societies, therefore should not be addressed by measures of clinical care and diseases. The earlier presented definition of quality of life by WHO (1995) recognizes the influence of cultural system/values on quality of life and arguably participation; this therefore suggest that cultural practices of people may reflect in a unique fashion on health. It therefore, becomes necessary to examine quality of life and related factors that are most relevant to a host of people from different cultural background. The aim of the study is to determine participation restrictions and quality of life of Hausa women post-stroke event.

## Methodology

### Setting

This study was conducted in three hospitals in Kano State, one of the hospitals is Aminu Kano teaching hospital, and the hospital has staff strength of 2400, out of which over 100 are consultants in various specialties, with 700 bed facility. The second hospital is Murtala Muhammad specialist hospital which is the best secondary government hospital in the state; it offers a broad range of medical services, medical diagnosis, and chiropractic services catering to all within the Kano area and

some neighboring states. The third hospital is Muhammad Abdullahi Wase hospital Kano, which is also a secondary health care facility run by Kano State Government and provides general and specialized medical care.

### Research design and population of the study

The study was cross-sectional in design employed among Hausa women who suffered stroke attending physiotherapy department outpatient clinic or are currently on hypertensive clinics in these three hospitals.

### Sample size and sampling technique

#### Sample size

$F$ -tests linear multiple regression was used to determine sample size with power of 95% at  $\alpha = 0.05$  as adopted from a previous similar study [7], a total sample size of 55 was generated using  $G^*$  power statistical package. However, to address any chances of decline participation, 20% of the total sample was computed and added to address such attrition as such the targeted sample size 66 participants. The outcome of the power calculations (Fig. 1).

#### Sampling technique

Convenient sampling technique, Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. They are selected because they are the easiest to recruit for the study.

#### Inclusion criteria

- I. All Hausa women who suffered stroke.
- II. Hausa women of 18 years and above.

- III. Participants attending physiotherapy outpatient and hypertensive clinic.

#### Exclusion criteria

- i. Patients with cognitive impairment.
- ii. Patients that are not attending these three hospitals.
- iii. Patients with traumatic brain injury.

#### Data collection instruments

Questionnaires were administered to the selected participants at the departments of Physiotherapy in each of the three hospitals selected for the study; one of the questionnaires (MRS) is a researcher-administered questionnaire. The questionnaires were administered to the participants in person, where they were given a pen to fill the questionnaires while the examiner attends to them where they have any difficulty with an aspect of it. Correlates of participation were assessed by the Stroke Impact Scale. The Stroke Impact Scale is a disease-specific, self-report questionnaire that evaluates disability and health-related quality of life after stroke. The SIS 3.0 takes approximately 15 to 20 min to administer and requires no formal training; it assesses self-reported impact of stroke in eight domains: Strength, memory and thinking, motion, communication (instrumental) activities of daily living (ADL/IADL), mobility, hand function and participation. In addition, a visual analogue scale ranging from 0 to 100 measures general perceived recovery since the onset of stroke. The stroke specific quality of life scale is a self-report questionnaire, used as a patient-centered outcome in stroke measurement of quality of life scale, consisting of 49 items in the 12 domains, for the purpose of this study the eight domains made-up of 26 items representing participation on the SSQOL was used. The Hausa versions of Stroke Impact Scale (SIS) and SSQOL used in this study were previously validated [8, 9].

#### Data collection procedure

An introductory letter was collected from the department of physiotherapy BUK and it has been taken to ethical committees of the ministry of health Kano (MOHK) and Aminu Kano Teaching Hospital (AKTH) for approval and consent of patients has been sought and obtained prior to the commencement of the study. All subjects were informed about the purpose and procedure of the study. Participants were informed of their rights to refuse to take part or quit from the study if they so desire. However, they were encouraged to give honest responses. Informed consent for participation was obtained before

the commencement of the study and all their questions were entertained for clarity prior to the questionnaire administration.

#### Data analysis procedure

Data obtained was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 using window software. Both descriptive and inferential statistics with a  $p$  value of  $\leq 0.05$  has been used. Descriptive statistics of mean, frequency, distribution tables, and standard deviation was used to describe the data. Inferential statistics of Pearson correlation was computed to determine the relationship between the participation restrictions of Hausa women after stroke and their quality of life. The Pearson correlation was computed to determine the relationship between age, socioeconomic status, pre-stroke occupations, post-stroke disabilities, and participation restrictions of Hausa women post-stroke and their quality of life.

## Results

### Demographic variables of the participants

A total of 67 female stroke survivors participated in this study, their mean age was  $55.6 \pm 1.6$  years, most participants are married (72%), and unemployed (70%), largely from lower socioeconomic class (91%), with no western education but possess Qur'anic education (72%) (Table 2). In physical characteristics, participants predominantly present with normal body composition (46%); however, 24% are overweight and another 21% are rated as class 1 obesity (Table 1).

### Descriptive statistics of clinical features and outcome measure scores

Ischemic stroke was found to be the most common (70%) stroke type, with right sided affectation being the commonest presentation (53%) and majority of the participants presented with moderate level disability (51%) as measured by Modified Rankin Scale (Table 2).

Results showed that participants have mean scores of  $\geq 50$  in most domains of the SIS (mood and emotions, ADL, and mobility), with higher scores of  $\geq 90$  in (communication and memory). Three domains are the weakest, strength ( $42.8 \pm 17.3$ ), participation ( $36.9 \pm 21.5$ ), and hand function ( $29.1 \pm 25.5$ ). Similarly, hand function has the most heterogeneous distribution scores followed by participation and QOL. Recovery from stroke has a mean score of about 52/100 and quality of life has a mean score of about 72/100 (Table 2).

### Correlation analysis

Findings of this study indicated significant relationship between quality of life and age ( $r = -0.254$ ,  $p =$

**Table 1** Demographic and physical features of participants

Variables	M ± SD or n	%	Variables	n	%
<b>Age (years)</b>	55.6 ± 1.6				
<b>Marital status</b>			<b>Educational qualification</b>		
Married	48	71.6	Illiterate	4	6.0
Divorced	17	25.4	Primary education	4	6.0
Widowed	2	3.0	Secondary education	5	7.5
Total	67	100.0	Short-cycle tertiary education	3	4.5
Occupation			Bachelors or equivalent level	2	3.0
Civil servant	5	7.5	Masters or equivalent level	1	1.5
None	47	70.1	Others (Qur'anic)	48	71.6
Petty trader	15	22.4	Total	67	100.0
Total	67	100.0			
<b>Socio economic status</b>			<b>Body mass index</b>		
Lower class	61	91.0	Underweight	1	1.5
Middle class	5	7.5	Normal	31	46.3
Upper class	1	1.5	Overweight	16	23.9
Total	67	100.0	Obesity class 1	14	20.9
			Obesity class 2	5	7.5
			Total	67	100.0

**Table 2** Descriptive statistics of clinical features and outcome measure scores

Variable	M ± SD or n	%
<b>Stroke type</b>		
Ischemic	48	71.6
Hemorrhagic	19	28.4
Total	67	100.0
<b>Stroke severity(MRS)</b>		
No significant disability despite symptoms	2	3.0
Slight disability	15	22.4
Moderate disability	34	50.7
Moderately severe disability	16	23.9
Total	67	100.0
<b>Stroke laterality</b>		
Left sided	31	46.3
Right sided	36	53.7
Total	67	100.0
<b>Stroke impact scale domain scores</b>		
Strength	42.8 ± 17.3	
Memory	90.5 ± 17.6	
Mood and emotions	65.5 ± 10.6	
Communication	95.1 ± 15.2	
ADL	58.0 ± 18.6	
Mobility	68.0 ± 25.4	
Hand function	29.1 ± 25.5	
Participation	36.9 ± 21.5	
VAS	51.6 ± 16.0	
<b>SSQOL</b>	71.6 ± 20.4	

.038), stroke severity ( $r = -0.607$ ,  $p = 0.000$ ). However, other demographics such as marital status, education, socio-economic status, BMI, type, and laterality of stroke were not significantly related to quality of life ( $P \geq 0.005$ ). Quality of life was found to be significantly related to all domains of the SIS strength ( $r = 0.610$ ,  $P = 0.000$ ), memory ( $r = 0.317$ ,  $P = 0.009$ ), mood and emotions ( $r = 0.378$ ,  $P = 0.002$ ), ADL ( $r = 0.784$ ,  $P = 0.000$ ), Mobility ( $r = 0.730$ ,  $P = 0.000$ ), hand function ( $r = 0.767$ ,  $P = 0.000$ ), and participation ( $r = 0.801$ ,  $P = 0.000$ ) with the exception of communication ( $r = 0.229$ ,  $P = 0.063$ ). Recovery from stroke was also determine to be significantly related to quality of life ( $r = 0.731$ ,  $P = 0.000$ ).

Participation was found to be related to age ( $r = -0.259$ ,  $P = 0.035$ ) and stroke severity ( $r = 0.507$ ,  $P = 0.000$ ) with no significant relationship with other demographics such as marital status, economic status, stroke type, laterality as well as education ( $P \geq 0.05$ ). Findings also shows that participation was significantly related to strength ( $r = 0.606$ ,  $P = 0.000$ ), mood and emotions ( $r = 0.399$ ,  $P = 0.001$ ), ADL ( $r = 0.733$ ,  $P = 0.000$ ), mobility ( $r = 0.564$ ,  $P = 0.000$ ), and hand function ( $r = 0.687$ ,  $P = 0.000$ ). Recovery from stroke was found to be a determinant of participation ( $r = 0.624$ ,  $P = 0.000$ ). Participation was also found to be significantly related to quality of life ( $r = 0.801$ ,  $P = 0.000$ ). Most of the domains of the SIS, strength ( $r = 0.429$ ,  $P = 0.000$ ), ADL ( $r = -0.367$ ,  $P = 0.002$ ), mobility ( $r = -0.617$ ,  $P = 0.000$ ), and hand function ( $r = -0.405$ ,  $P = 0.001$ ) were

significantly related to stroke severity with the exception of memory, mood and emotions, and communication ( $P$  value  $\geq 0.05$ ).

## Discussion

This study investigated the restrictions in participation (using Stroke Impact Scale) and quality of life (using Stroke Specific Quality of Life Scale) among Hausa female stroke survivors with mild, moderate and severe disability measured by Modified Rankin Scale.

The Hausa female stroke survivors were found to be restricted in many domains of functioning but the greatest percentage is in hand function (carrying heavy objects, e.g., pot of food, turning a doorknob, opening a jar, putting on a flip flop, pick up an object from the floor) with a mean score of  $29.1 \pm 25.5$ , this could be due to the fact that good dexterity/hand function is mostly seen in stroke survivors with optimum recovery. Limitations/impairments in the upper limb is specifically related to the ability to accomplish proper self-care activities. Poor upper extremity function has been found to contribute to dependent on others in stroke survivors [10]. The second domain that participants showed poor performance is participation itself; this domain encompasses areas like family/friend role, religious, or spiritual roles and that of helping others. Most of the participants were having difficulty engaging in previous roles due to disability from stroke. The lack of ability to return to work often results in a role change for the participants, where individuals were providing for their families, disability from stroke would lead to role reversal, thereby, forcing stroke survivors to become dependent on others [11]. Sub-themes related to decreased social interactions as felt by the participants included not being able to get out of the house, and being separated from the family and neighbors while some participants felt that they were able to do only part of the domestic activities, others expressed that they could not do anything [4]. Similar, findings were found in relation to participation and strength post-stroke (i.e., strength of the arm, leg, foot/ankle, and grip strength) in which participants demonstrated poor performance in both upper and lower extremities post-stroke. The relationship between hand function, strength, and participation resulted in decrease participation with individuals having poor strength and hand function showing significant restriction in participation especially self-care activities. Findings showed that limbs muscle strength and function did indeed affect the ability to perform activities which hinder participation [12]. Although, not all studies found significant restriction in participation. Eriksson et al. [13] reported only 12% of the participants perceived their participation to be limited. Cawood et al. [12] also

demonstrated low score on participation with a mean score of 31.3.

However, three domains, mood and emotions (i.e., feeling sad, feelings of becoming a burden, having a goal, smiling, and laughing) ADL (dressing, toileting, bathing, bowels, and shopping), and mobility (sitting, standing, moving from bed to chair, and climbing stairs) showed moderate restrictions. Perhaps this could be due to the lifestyle of the Hausa community, where women spend a huge part of their time with other family members thus having good form of support and less depression as they will be carried along in all activities and equally be supported. Also, most of the participants of this study were 6 months post-stroke and have benefited from rehabilitation services therefore presenting with better function. This study found a significant relationship between mood and emotions and participation, indicating that participants with positive mood and emotions show better participation. A qualitative inquiry by Rhoda [10] explained that participants expressed experiencing certain emotions as a result of not being able to do the activities they could previously perform. D'Alisa et al. [14] explained that social integration tended to be more restricted as the level of depression increased and identified emotional status as a highly relevant determinant of such restriction in participation. Results shows significant relationship between activities of daily living (ADL) and participation. Female stroke survivors experienced restrictions in day-to-day activities and social roles with those living in residential care facilities having significantly higher participation restrictions [15]. Many respondents were uncomfortable with their dependence in self-care and did not wish to burden their relatives, friends or volunteers [4]. Mobility and participation were also found to be related. Participants that have functional independence at sitting, standing, and walking were found to be less restricted. The challenges experienced with regard to mobility related to difficulty maintaining standing posture and walking speed, which contributed to participation restrictions in the environment [10]. Difficulties with accessing transport can have far-reaching consequences with regards to the inability to go out socially and even more participate in major life roles such as work [16, 17].

Stroke severity and age of the Hausa female stroke survivors was found to be a significant determinant of their participation; thus, the greater the severity/age, the lesser is their ability to participate in work, social, and recreational activities as well as ability to help others and role as a family member. The elder ones were reported to have more severe strokes and comorbidities and associated with poor recovery after stroke with women suffering a greater form of disability [15, 18]. Several studies have demonstrated an increase in participation restrictions

**Table 3** Relationship between demographic variables and outcome measures

Correlations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Age	Pearson C	1																		
Marital status	r	.147	1																	
	Prob.	.234																		
SES	r	-.160	-.016	1																
	Prob.	.194	.900																	
Education	r	.240	.270	-.069	1															
	Prob.	.050	.027	.581																
BMI	r	-.026	-.175	.124	-.137	1														
	Prob.	.834	.157	.317	.269															
Onset	r	.061	.155	.131	.049	.044	1													
	Prob.	.621	.212	.289	.694	.726														
Type	r	-.230	-.123	.096	-.081	-.048	-.011	1												
	Prob.	.062	.319	.441	.516	.702	.927													
Laterality	r	.162	-.016	-.065	.108	.055	.066	-.147	1											
	Prob.	.192	.897	.602	.382	.661	.593	.236												
Severity	r	.257	-.077	.073	.078	.167	.020	-.050	.142	1										
	Prob.	.036	.536	.556	.531	.176	.870	.688	.252											
Strength	r	-.241	-.070	.094	.005	.018	-.023	-.064	-.147	-.429	1									
	Prob.	.049	.573	.451	.969	.883	.854	.607	.235	.000	.67									
Memory	r	-.058	-.046	.127	.033	-.200	-.146	.079	.209	-.100	.159	1								
	Prob.	.643	.714	.304	.793	.105	.237	.523	.090	.421	.197									
Mood/emotion	r	-.201	-.083	.021	.207	-.128	.064	.191	.173	-.185	.122	.293	1							
	Prob.	.103	.503	.868	.094	.301	.609	.122	.161	.134	.326	.016								
Communication	r	.038	-.088	.096	.009	.007	.079	-.023	.335	.018	.015	.662	.359	1						
	Prob.	.761	.480	.438	.942	.957	.527	.850	.006	.885	.904	.000	.003							
5.ADL	r	-.158	-.178	-.089	-.060	-.066	.015	-.045	.058	-.367	.722	.142	.225	.113	1					
	Prob.	.203	.150	.472	.631	.598	.902	.716	.642	.002	.000	.253	.067	.362						
Mobility	r	-.281	.039	-.085	-.002	-.105	.027	-.026	-.189	-.617	.603	.002	.077	-.103	.656	1				
	Prob.	.021	.754	.492	.987	.397	.825	.833	.127	.000	.000	.984	.537	.407	.000					
Hand	r	-.119	-.177	-.057	-.025	.030	-.118	-.143	-.244	-.405	.724	.157	.206	.077	.729	.558	1			
	Prob.	.339	.151	.644	.843	.807	.340	.248	.047	.001	.000	.204	.094	.536	.000	.000				
Participation	r	-.259	-.075	.015	-.076	-.019	.021	.090	-.013	-.507	.606	.191	.399	.107	.733	.564	.687	1		
	Prob.	.035	.547	.906	.542	.878	.865	.468	.915	.000	.000	.122	.001	.389	.000	.000	.000			
VAS	r	-.242	-.283	.091	-.129	-.094	.070	.011	-.097	-.445	.550	.104	.287	.119	.620	.565	.657	.624	1	
	Prob.	.048	.020	.463	.298	.447	.573	.930	.435	.000	.000	.404	.019	.337	.000	.000	.000	.000		
SSQO	r	-.254	-.085	-.042	-.064	-.112	-.015	.001	.006	-.607	.610	.317	.378	.229	.784	.730	.767	.801	.731	1
	Prob.	.038	.496	.737	.605	.368	.901	.996	.964	.000	.000	.009	.002	.063	.000	.000	.000	.000	.000	



in relation to stroke severity and physical limitation [14]. According to Vincent-onabajo [7], social participation varies across stroke survivors with those having mild stroke recording higher degree of social participation compared to those with moderate and severe stroke. Kwakkel et al. [19] explained that severity of stroke within 1 month after onset plays a crucial role in predicting stroke outcomes. Furthermore, initial stroke severity has been associated with post-stroke functional activity and health-related quality of life. This findings highlight that those with severe initial stroke severity may be associated with long-term participation restrictions. Result shows no significant relationship between participation and other demographics such as marital status, economic status, stroke type, laterality, and education. This is not surprising since most participants are married, illiterate, and unemployed. Most of the domains of the SIS were related to stroke severity with the exception of memory, mood and emotions, and communication. However, Erikson et al. [13] found no significant association between stroke severity and all the domains of the SIS even though most of the participants in his study were reported to have mild and moderate severity and the study considered 6 months post-stroke patients only.

Most of the stroke survivors assessed by this study were found to have good memory (ability to remember things day before, to do things such as appointments or taking medication and thinking quickly) and were able to communicate well (ability to understand what was being said, reply questions, name objects correctly, and participate in conversations) with a mean score of 90.5 and 95.1 respectively, which is explained in terms of an individual cerebral affectation, thus indicating absence of Aphasia among participants. This could also be due to the fact that most of the participants have benefited from rehabilitation services for at least 3 months. A study by Carod-Artal [20] observed a ceiling effect of 17.3% in the communication domain of the SIS, which supports the findings of this study.

Relationship between socio-demographic features and quality of life was determined by this study, and it was found that those with higher stroke severity have lesser quality of life compared to stroke survivors with mild severity. More severe strokes in women often contribute to decrease in functional outcome and participation restriction [18]. Quality of life of Nigerian stroke survivors was significantly correlated with stroke severity [21, 22]. Similarly, quality of life of participants in this study was found to be influenced by their age ( $r = -0.0254$ ,  $P = 0.038$ ) with the younger survivors having better quality of life than the older ones, this is in line with the findings of Gbiri and Akinpelu [23]. However, Fatoye et al. [24] found that there was no significant relationship between age and quality of life of stroke

survivors even though most studies consider both male and female stroke survivors. However, the uniqueness of this study involving only female stroke survivors and of specific tribal background presents a new dimension regarding the relationship between age and quality of life post-stroke. This study also found no significant relationship between Qol and other demographic variables such as marital status, economic status, education, BMI, stroke type, and laterality as well as stroke onset. However, acuteness of the condition and level of educational attainment were found to be significant determinants of quality of life [24]. While other studies found marital status to be an influencing factor of quality of life [23].

Findings of this study shows that female stroke survivors having greater strength in arms, legs and feet as well as grip strength, with good memory and thinking and were able to concentrate on their schedules, without experiencing sad mood and emotions shows more improved quality of life. Aspects of quality of life that are significantly affected by stroke are the physical functioning [21, 25] and “work” [26] “feeling” [27], and “emotion” domains [28] as well as family and social roles [25]. Results from this study also indicated that participants that were able to enroll on some activities of daily living, able to sit, stand, and walk, with improved balance and hand function have better quality of life. This explained that independence in function among stroke survivors influence their quality of life. Cunningham and Rhoda [10] explained challenges in mobility and self-care activities as major concern of stroke survivors after discharge. Restrictions in participation was determine to be one of the significant determinants of quality life as most participants with participation restrictions were unable to control their life as they desire, unable to participate in social and religious roles thus contributing to decreased quality of life. This signifies that the social, physical, and emotional domains of the quality of life of the participants are all affected. However, findings show that participants quality of life was not affected by communication difficulties or impairments. Even though most participants of this study score well in the communication domain. Akinpelu et al. [26] also reported no significant implication on Qol on the language domain (Table 3).

## Conclusion

Correlates of participation in Hausa women who suffered stroke are quality of life, strength, mood and emotions, ADL, mobility, hand function, and level of recovery from stroke. Quality of life on the other hand correlates with similar factors as in participation including memory but does not correlate significantly with communication. Both participation and quality of life also inversely

correlate significantly with demographic factors of age and stroke severity.

#### Acknowledgements

We hereby appreciate all stroke patients that participated in the study.

#### Authors' contributions

MML come up with the study and assist with data collection, analysis, and compilation of the study, while IUL and AMY supervise the study and assist with data analysis, computing of results and with all the necessary corrections. All authors participated in drafting the manuscript and have read and approved the final version of the manuscript.

#### Funding

The study was self-funded.

#### Availability of data and materials

Is not available online

#### Declarations

##### Ethics approval and consent to participate

Ethics approval was obtained from Kano State Ministry of Health. Written informed consent to participation was sought and obtained from the participant.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare that they have no competing interests.

##### Author details

<sup>1</sup>Physiotherapy Department, Aminu Kano Teaching Hospital, Kano, Nigeria.

<sup>2</sup>Department of Physiotherapy, Bayero University, Kano, Nigeria.

Received: 27 June 2022 Accepted: 6 September 2022

Published online: 14 December 2022

#### References

- Silva SM, Corrêa FI, Faria CD, Corrêa JC. Comparison of quality-of-life instruments for assessing the participation after stroke based on the International Classification of Functioning, Disability and Health (ICF). *Braz J Phys Ther*. 2013;17(5):470–8. English, Portuguese. <https://doi.org/10.1590/S1413-35552012005000118>.
- Kranciukaite D, Rastenyte D. Measurement of quality of life in stroke patients. *Medicina (Kaunas)*. 2006;42(9):709–16. PMID: 17028468.
- Hamzat TK, Peters GO. Motor function recovery and quality of life among stroke survivors in Ibadan, Nigeria: a 6 months follow-up study. *Eur J Phys Rehabil Med*. 2009;45(2):179–83.
- Urimubenshi G. Activity limitations and participation restrictions experienced by people with stroke in Musanze district in Rwanda. *Afr Health Sci*. 2015;15(3):917–24.
- de Graaf JA, van Mierlo ML, Post MWM, Achterberg WP, Kappelle LJ, Visser-Meily JMA. Long-term restrictions in participation in stroke survivors under and over 70 years of age. *Disabil Rehabil*. 2018;40(6):637–45. <https://doi.org/10.1080/09638288.2016.1271466>.
- Napier AD, Arcano C, Butler B, Calabrese J, Chater A, Chatterjee H, et al. University College London Commission on Culture and Health; 2014.
- Vincent-Onabajo OG. Social participation after stroke: one-year follow-up of stroke survivors in Nigeria: Hindawi Publishing Corporation ISRN Stroke; 2013. p. 532518.
- Odetunde MO, Akinpelu AO, Odole AC. Cross-cultural adaptation and validation of the stroke specific quality of life 2.0 scale into Hausa language. *J Patient Rep Outcomes*. 2018;2:63. <https://doi.org/10.1186/s41687-018-0082-1>.
- Mohammad AH, Al-Sadat N, Loh SY, Chinna K. Reliability and validity of the Nigerian (Hausa) version of the stroke impact scale (SIS) 3.0 index. *Biomed Res Int*. 2014;2014:302097 7 pages.
- Rhoda A. Limitations in activity and participation experienced by stroke patients: a qualitative inquiry. *South Afr J Physiother*. 2012;68:20–4. <https://doi.org/10.4102/sajp.v68i3.20>.
- Resnik L, Bradford DW, Glynn SM, Jette AM, Hernandez CJ, Will S. Issues defining and measuring veteran community reintegration: proceedings of the working group on community reintegration. *J Rehabil Res Dev*. 2012;49(1):87–100.
- Cawood J, Viasagie S, Mji G. Impact of post-stroke impairments on activities and participation as experienced by stroke survivors in a Western cape setting. *South Afr J Occup Ther*. <https://doi.org/10.17159/2310-3833>.
- Erikson G, Baum CM, Wolf JT, Connor TL. Perceived participation after stroke: the influence of activity retention, reintegration, and perceived recovery. *Am J Occup Ther*. 2013;67:e131–8.
- D'Alisa S, Baudo S, Mauro A, Miscio G. How does stroke restrict participation in long-term post-stroke survivors. *Acta Neurol Scand*. 2005;112:157–62.
- Chau PJ, Thompson RD, Twinn S, Chang MA, Woo J. Determinants of participation restriction among community dwelling stroke survivors: a path analysis. *BMC Neurol*. 2009. <https://doi.org/10.1186/1471-2377-9-49>.
- Hartman-Maeir A, Soroker N, Ring H, Avni N, Katz N. Activities, participation and satisfaction one-year post stroke. *Disabil Rehabil*. 2007;29(7):559–66.
- Daniel K, Wolf CD, Busch MA, Mc Kevitt C. What are the social consequences of stroke for working-aged adults? A systematic review. *Stroke*. 2009;40(6):e431–40.
- Phan TH, Blizzard LC, Reeves JM. Factors contributing to sex differences in functional outcomes and participation after stroke. *Neurology*. 2018;0:1–9.
- Kwakkel G, Kollen BJ, van der Grond J, Prevo AJ. Probability of regaining dexterity in the flaccid upper limb: impact of severity of paresis and time since onset in acute stroke. *Stroke*. 2003;34(9):2181–6. <https://doi.org/10.1161/01.STR.0000087172.16305.CD>.
- Carod-Artal FJ, Coral LF, Trizotto DS, Moreira CM. The stroke impact scale 3.0: evaluation of acceptability, reliability, and validity of the Brazilian version. *Stroke*. 2008;39:2477–84. <https://doi.org/10.1161/STROKEAHA.107.513671>.
- Owolabi MO. What are the consistent predictors of generic and specific post-stroke health-related quality of life? *Cerebrovasc Dis*. 2010;29(2):105–10.
- Owolabi MO. Consistent determinants of post-stroke health-related quality of life across diverse cultures: Berlin-Ibadan study. *Acta Neurol Scand*. 2013;128(5):311–20.
- Caleb GOA, Akinpelu OA. Quality of life of Nigerian stroke survivors during first 12 months post-stroke. *Hong Kong Physiother J*. 2012;30(1). <https://doi.org/10.1016/j.hkjp.2012.01.004>.
- Fatoye FO, Komolafe MA, Eegunranti BA, Adewuya AO, Mosaku SK, Fatoye GK. Cognitive impairment and quality of life among stroke survivors in Nigeria. *Psychol Rep*. 2007;100:876–82.
- Akosile CO, Adegoke B, Ezeife CA, Maruf FA, Ibikunle PO, Johnson OE, et al. Quality of life and sex-differences in a south-Eastern Nigerian stroke sample. *Afr J Neurol Sci*. 2013;32(1).
- Akinpelu AO, Odetunde MO, Odole AC. Cross-cultural adaptation and initial validation of the stroke-specific quality of life scale into the Yoruba language. *Int J Rehabil Res*. 2012;35(4):339–44.
- Enato EFO, Yowwin EO, Ogunrin OA. Assessment of health-related quality of life in stroke survivors attending two healthcare facilities in Benin City Niger. *J Pharm Bioresour*. 2011;8(1). <https://doi.org/10.4314/jpb.v8i1.9>.
- Hamza MA, Al-Sadat N, Low YS, Jahan KN. Predictors of poststroke health-related quality of life in Nigerian stroke survivors: a 1-year follow-up study. *Biomed Res Int*. 2014;2014:350281. <https://doi.org/10.1155/2014/350281>.

#### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.