ORIGINAL ARTICLE

ASSOCIATIONS OF PSYCHOLOGICAL HEALTH, COGNITION, AND PHYSICAL FUNCTION WITH HEALTH-RELATED QUALITY OF LIFE AMONG STROKE SURVIVORS

Adekola J. Odunlade[1], Michael O. Egwu[2], Taofeek O. Awotidebe[3], Adekola B. Ademoyegun[4], Oluwatobi B. Omisore[5], Oluwatobi J. Adesokan[6], Ibukun G. Falokun[7], Adepeju A. Kolade[8], Rufus A. Adedoyin[9]

Authors' Affiliation

[1,2,3,5,6,7,8,9] Department of Medical Rehabilitation, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria

[4] Department of Physiotherapy, Osun State University Teaching Hospital, Osogbo, Nigeria

Corresponding Author

Adekola B. Ademoyegun
Department of Physiotherapy, Osun State University Teaching Hospital, Osogbo, Nigeria
Email: aademoyegun@gmail.com

ABSTRACT

Objective: To assess the association between Health Related Quality of Life (HRQoL) and psychological health, cognittion, and physical function among Nigerian community-dwelling stroke survivors.

Material & Methods: Data on depression, anxiety, cognition, disability, and HRQoL of 102 stroke survivors were assessed with validated instruments. Some important covariates, including post-stroke pain, stroke duration, and sociodemographic variables were assessed as well. Logistic regression analysis was applied.

Results: About 47.0% had moderate HRQoL, while the prevalence of depression and anxiety was 36.3% and 26.5% respectively. Low cognition was significantly associated with poor HRQoL (aOR =29.83; 95%CI =25.1–33.0, p<0.001)). Furthermore, patients with normal and borderline anxiety were more likely to have better HRQoL (aOR =0.10 (95%CI=0.05 – 0.19, p<0.001)) and (aOR =0.240 (95%CI=0.08 – 1.21, p=0.018)), respectively. Similarly, stroke survivors with normal depression level (aOR =0.16 (95%CI=0.07-0.63, p<0.001)) and low disability level (aOR =0.13(95%CI=0.05-0.42, p<0.001)) were less likely to have poor HRQoL.

Conclusion: Depression, anxiety, cognitive impairment, and disability are independently associated with HRQoL among Nigerian community-dwelling stroke survivors.

Key Words: Depression, Disability, Health, Stroke, Well-being.

INTRODUCTION

Stroke is a main cause of global disability and mortality.[1] The prevalence of stroke in Nigeria is high, and accounts for most hospital admissions, especially neurological admissions, and medical deaths.[2] For the stroke survivors, the majority of them are still battling with some stroke sequale, including impaired quality of life (QoL).[3] Broadly, QoL involves personal and societal calibration of what is considered a good life. More recently, there has been a distinction and inclination towards health-related QoL (HRQoL) scenarios. HRQoL encompasses physical and psychosocial health, which are shaped by individual undercurrent and contextual factors.[4] According to Buck et al.[5] and Lai et al.,[6] HRQoL is significantly disrupted in patients with stroke, hence, current medical and rehabilitation goals are targeted towards increasing HRQoL.

Similarly, stroke attack has a significant effects on mental health of stroke survivors, including depression, anxiety, fatigue, cognition, etc. owing to emotional disturbance, social limitation, gross loss of physical functioning, pain, and persistent dependence, thus hindering rehabilitation goals. HRQoL is associated with many interacting and

complex factors.[7-9] Among all the factors, psychological health factors have been linked consistently with impaired HRQoL among stroke survivors.[10-18] Meanwhile, the results of a recent meta-analysis using a structural equation model have shown that the interaction between HRQoL and psychosocial dysfunction among stroke survivors may differ between developed and developing countries.[19] They reported that individuals in countries of different stages of economic advancement may present with varying psychosocial reactions in relation to HRQoL.[19] Unfortunately, data on the association between psychological health and HRQoL in stroke survivors is scanty in developing nations.[18]

In stroke rehabilitation, factors that may limit recovery about HRQoL outcomes are consistently taken into consideration in order to target the needed rehabilitation plan for stroke survivors. However, no significant stride seems to have been made in this regard in most developing countries for which higher prevalence of stroke is reported to be on the increase. Hence, attention must be paid to profiling the effect of psychological health on the HRQoL of stroke patients using patient-centered local data. This study aimed to assess the influence of psychological dysfunctions (depression, anxiety, and cognitive impairment) on HRQoL among Nigerian community-dwelling stroke survivors.

MATERIAL AND METHODS

Community-dwelling stroke survivors, aged 18 years and older and were receiving physiotherapy from 4 Nigerian health facilities, including Ife Hospital Unit and Wesley Guild Hospital Unit Ilesha of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Adeoyo State Hospitals, Ibadan, Federal Medical Centre, and State Hospitals, Abeokuta were included. Community-dwelling stroke survivors with difficulty in understanding the study protocols were excluded. 102 participants were recruited.

The HRQoL of the participants was assessed using Stroke Specific Quality of Life Scale (SS-QoL). The SS-QoL consist of 49 items and 12 domains, and is scored on a 5-point Likert scale. The lowest and highest score of SS-QoL is 49 and 245. A higher SS-QoL score suggests better HRQoL of stroke patients. The scores were transformed into percentile and the participants

were categorized as low (25th percentile), moderate (50th percentile), and high (75th percentile) HRQoL, respectively. The validity and reliability of Yoruba version of the SS-QoL have been proven as adequate.[21]

The participants' anxiety and depressive symptoms was assessed by the Hospital Anxiety and Depression Scale (HADS).[22] The HADS has 14 items which are equally subdivided into anxiety- and depression-subscale, and each item is scored on a 3-point Likert scale. The HADS anxiety or depression sub-scale has minimum and maximum scores of 0 and 21. The greater the HADS scores the higher the risk of depression or anxiety. HADS scores of 8-10 and 11-21 were considered borderline abnormal and abnormal (case) in anxiety and depressive symptoms. The Cronbach's alpha of the Yoruba-Nigerian HADS was 0.80 in this study.

The Standardised Mini-Mental State Examination (SMMSE) was employed to assess cognition. The SMMSE score of ≥ 24 suggests normal cognition. Cognitive impairment was categorized as severe (< 9 SMMSE scores), moderate (10-18 SMMSE scores), or mild (19-23 SMMSE scores). The Cronbach's alpha of the Yoruba-Nigerian SMMSE was 0.85 in this study. The Modified Ranking Scale (mRS) was employed to assess disability of the participants. Participants with mRS scores of 0 or 1 were categorized as having low disability, while those with mRS scores of 2 to 5 were categorized as having high disability. The Cronbach's alpha of the Yoruba-Nigerian mRS was 0.82.

The Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospitals Complex Nigeria gave ethical approval for the study. A letter of introduction was obtained from the Department of Medical Rehabilitation and it was submitted to the selected health institutions. The study details were communicated to each prospective respondent and their informed consent was sought and obtained. The self-developed proforma for this study contain questions on respondent's socio-demographic information and clinical information (type of stroke, laterality, stroke duration, and post-stroke pain).

Descriptive statistics of frequency and percentage were used to summarize data. The chi-square was employed to evaluate the association between

socio-demographic characteristics and HRQoL. Logistic regression expressed in odd ratio and 95% confidence interval (95% CI) was used to predict the association of psychological variables and disability with HRQoL. Each model of the logistic regression was adjusted for age, gender, stroke duration, post-stroke pain, education, marital status, and occupation. The alpha level was set at p<0.05. All statistical analyses were performed using SPSS version 23.

RESULTS

The mean age of respondents was 60.81±11.78 years and less than a third (31.37%) was within the age range of 41-50 years. From the results, 70.6% had left-sided stroke. **(Table 1)** About 47.0% had moderate HRQoL, while the rate of depression and anxiety was 36.3% and 26.5%.

Majority of the respondents presented with low cognitive impairment (70.6%) and high disability (72.6%). **(Table 2)**

Individuals with low cognitive impairment were 30 times more likely to have poor HRQoL (aOR =29.83(95%CI=25.1–33.0, p=0.001)). Furthermore, individuals with normal and borderline anxiety were more likely to have better HRQoL (aOR =0.10 (95%CI=0.05 – 0.19, p=0.001)) and (aOR =0.240 (95%CI=0.08 – 1.21, p=0.018)), respectively. Similarly, individuals with normal depression levels were more likely to have better HRQoL (aOR =0.16 (95%CI=0.07-0.63, p=0.001)). In addition, individuals with low disability levels were less likely to have poor HRQoL (aOR =0.13(95%CI=0.05-0.42, p=0.001)). **(Table 3)**

Table 1: Socio-demographic and clinical characteristics of the participants

Variable	Frequency	Percentage
Age group (years)		
< 40	4	3.9
41-50	16	15.7
51-60	32	31.4
61-70	28	27.5
> 70	22	21.6
Gender		
Male	59	57.8
Female	43	42.2
Marital status		
Single	2	1.9
Married	73	71.6
Divorced	10	9.8
Widowed	17	16.7
Educational level		
Tertiary	46	45.1
Secondary	23	22.6
Primary	22	21.6
No formal education	11	10.8
Laterality		
Left side	72	70. 6
Right side	28	27.5
Both sides	2	1.9
Duration of Onset		
6 months	7	6.9
>6 months	95	93.1
Types of stroke		
Ischaemic	85	83.3
Haemorrhagic	17	16.7

Table 2: The health-related quality of life, psychological health, cognition, and disability distribution of the participants

Variable	Frequency	Percentage
Health Related Quality of Life		
Low	7	6.9
Moderate	48	47.0
High	47	46.1
Depression		
Normal	39	38.2
Borderline	26	25.5
Abnormal	37	36.3
Anxiety		
Normal	48	47.0
Borderline	27	26.5
Abnormal	27	26.5
Cognition		
Low	72	70.6
Mild	14	13.7
Severe	16	15.7
Disability		
Low	28	27.4
High	74	72. 6

Table 3: Psychological factors, cognitive impairment, and disability as independent predictors of health-related quality of life of community-dwelling stroke survivors

Variable	aOR	95% CI	S. E	P-value
Cognitive Impairment (Model 1)				
Low	29.83	25.1 – 33.0	1.066	0.001**
Mild	2.44	1.21 – 4.85	0.576	0.122
Severe (ref)	1.00			
Anxiety (Model 2)				
Normal	0.10	0.05 – 0.19	0.573	0.001**
Borderline	0.24	0.08 – 1.21	0.606	0.018*
Abnormal (ref)	1.00			
Depression (Model 3)				
Normal	0.16	0.07 – 0.63	0.513	0.001**
Borderline	0.46	0.29 - 0.72	0.523	0.142
Abnormal (ref)	1.00			
Disability (Model 4)				
Low	0.13	0.05 – 0.22	0.588	0.001**
High (ref)	1.00			

*Significant at p<0.05, **p<0.001, aOR: adjusted Odd Ratio (every model was adjusted for age, gender, stroke duration, post-stroke pain, education, marital status and occupation) S.E: Standard Error, CI: Confidence Interval, ref reference.

DISCUSSION

This study aimed to investigate the influence of psychological factors on HRQoL of community-dwelling stroke survivors in Nigeria. We also assessed the impact of disability on HRQoL in this population. In this study, the HRQoL of the stroke survivors ranges from moderate to high. This finding is in disagreement with previous studies that reported that the HRQoL of stroke survivors is generally low.[23-27] Many of the aforementioned studies employed generic measures of HRQoL, however, this study used the stroke-specific QoL instrument that has been tested and validated in the study environment and found to be a reliable instrument.[21] Methodical variations involving the use of generic versus specific instruments for HRQoL may contribute to the differences in study outcomes. Besides, HRQoL is a subjective human experience and personal responses to an illness, which have been suggested to vary from one patient to another and differ based on socio-ecological and time factors.[27-29] Thus, studies assessing HRQoL among stroke survivors should employ stroke-specific QoL assessment tools instead of generic measures in order to ensure easy comparison of HRQoL across different contexts.

The findings from this study as regards psychological variables showed that depression, anxiety, and cognitive impairment are independently associated with HRQoL of community-dwelling stroke survivors. Studies from other climes and contexts have reported similar results showing that psychological impairments post-stroke are significant contributors to the decline in HRQoL of stroke survivors.[10-18] Depression and anxiety are major prevalent psychological co-morbidities of stroke in different socio-economic contexts, including the study setting.[30] The negative impacts of stroke on HRQoL of stroke survivors are transmitted indirectly through depression and anxiety.[13] By using the behavioural model of health, it was propounded that stroke diminishes survivors' physical and social participation, functional capacities, employability, and ability to return to work, and enhances fears, worry, panic attacks, negative thinking, sadness and sleep disturbances leading to depression or anxiety and ultimately reduction in HRQoL.[14, 30-33] Furthermore, stroke survivors may lose the ability to think and solve issues that require the use of imagination, which is often due to high expectations of recovery post-stroke which may lead to depression and anxiety. In this study, similar to the findings of previous studies,[12, 15, 34] cognitive impairment was associated with poor HRQoL of stroke survivors. Apart from the fact that evidence has linked poor cognition post-stroke to motor function abnormality,

including gait and balance impairments,[34] which inherently limit or reduce survivors' HRQoL, the stroke-induced cognitive impairments, especially impairment in memory, thinking, visual perception, attention, and speech or communication, etc., are independent significant predictors of poor HRQoL in patients with stroke.[12, 35-38] In line with the foregoing, findings from this study show that disability level was related to the reported HRQoL of stroke survivors. Stroke survivors with high disability levels reported poor HRQoL. The possible explanation for this could be that individuals with high disability levels may be dependent in performing functional activities. Stroke is known to negatively affect the physical health of the survivors, including loss of function, reduced exercise capacity and participation, which often have a direct negative impact on the HRQoL.[12, 15, 17, 27, 39]

Summarily, the findings of this study indicated that psychological health dysfunctions after a stroke incident are independent contributors to the poor HRQoL often experienced by stroke survivors. Therefore, since health care for stroke survivors has moved from focusing on improving physical functioning alone to improving QoL, which has been noted to be the endpoint of treatment for individuals with stroke,[12, 19, 40] there is a need for clinicians to incorporate routine psychological assessment, including assessment of depression, anxiety and cognitive impairments as part of management protocols in stroke management to detect any underlying psychosocial problems, offer necessary treatment options, including referrals to appropriate health care professionals, which may ultimately enhance their HRQoL. The findings of this study are limited to stroke survivors in Nigeria and other similar contexts, and therefore may not be generalizable to non-similar environments. Furthermore, since the design of the study is cross-sectional in nature, cause and effect and directionality between psychological dysfunctions and HRQoL cannot be inferred. Finally, the evaluation of depression, anxiety, and cognitive impairment is limited to the outcome measures utilized and cannot be taken for thorough clinical neuropsychological assessment. Thus, further longitudinal studies with the use of objective neuropsychological assessment are needed.

CONCLUSION

Depression, anxiety, cognitive impairment, and disability are independently associated with the health-related quality of life among Nigerian community-dwelling stroke survivors. Prompt and early detection and management of neuropsychological problems are warranted after a stroke incident to improve the survivors' HRQoL.

REFERENCES

1. Murray, CJ., Vos, T., Lozano, R., Naghavi, M. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet, 2012; 380: 2197-223.

2. SA Ogun, FI Ojini, B Ogungbo, KO Kolapo, MA Danesi. Stroke in South West Nigeria. A 10-Year Review. Stroke. 2005; 36: 1120-1122.

3. M Danesi, N Okubadejo, F Ojini. Prevalence of stroke in an urban mixed-income community in Lagos, Nigeria. Neuroepidemiology. 2007; 28(4): 216-23.

4. MO Owolabi, A oguniyi. Profile of health-related quality of life in Nigerian stroke survivors. Eur J Neurol. 2008; 16(1):54-62.

5. D Buck, A Jacoby, A Massey, G Ford. Evaluation of measures used to assess quality of life after stroke. Stroke. 2000; 31: 2004-2010.

6. Lai SM, Studenski S, Duncan PW, Perera S. Persisting consequences of stroke measured by the stroke impact scale. Stroke. 2002; 33: 1840-1844.

7. Halvorsrud L, Kirkevold M, Diseth A, Kalfoss M. Quality of life model: predictors of quality of life among sick older adults. Res Theory Nurs Pract.2010; 24: 241–259.

8. Wikman A, Wardle J, Steptoe A. Quality of life and affective well-being in middle-aged and older people with chronic medical illnesses: a cross-sectional population based study. PLoS One. 2011; 6: e18952.

9. Wilson IB, Cleary PD. Linking clinical variables with health-related quality of life. A conceptual model of patient outcomes. JAMA. 1995; 273: 59–65.

10. Khaw Wan-Fei, Syed Tajuddin Syed Hassan, Lye Munn Sann, et al. Depression, anxiety and quality of life in stroke survivors and their family caregivers: A pilot study using an actor/partner interdependence model. Electronic Physician. 2017; 9(8): 4924-4933.

11. Gianluca Pucciarelli, Ercole Vellone, Tatiana Bolgeo, Silvio Simeone, et al. Role of Spirituality on the Association Between Depression and Quality of Life in Stroke Survivor–Care Partner Dyads. Circ Cardiovasc Qual Outcomes. 2020;13: e006129.

12. Alex J. Mitchell, Steven Kemp, Juli´an Benito-Le´on, Markus Reuber. The influence of cognitive impairment on health-related quality of life in neurological disease. Acta Neuropsychiatrica 2010; 22: 2–13.

13. Hsu N-W, Tsao H-M, Chen H-C, Chou P. Anxiety and Depression Mediate the Health-Related Quality of Life Differently in Patients with Cardiovascular Disease and Stroke–Preliminary Report of the Yilan Study: A Population-Based Community Health Survey. PLoS ONE. 2014; 9(9): e107609.

14. Stein LA, Goldmann E, Zamzam A, Luciano JM, Messé SR, et al. Association Between Anxiety, Depression, and Post-traumatic Stress Disorder and Outcomes After Ischemic Stroke. Front. Neurol. 2018; 9: 890.

15. Pinter D, Fandler-Höfler S, Fruhwirth V, Berger L, Bachmaier G, et al. Relevance of Cognition and Emotion for Patient-Reported Quality of Life After Stroke in Working Age: An Observational Cohort Study. Front. Neurol. 2022; 13: 869550.

16. Kang SW, Lee S-H, Lee Y-S, Kwon S, Bosch P, Lee YJ, et al. Association between depression and quality of life in stroke patients: The Korea National Health and Nutrition Examination Survey (KNHANES) IV–VII (2008–2018). PLoS ONE. 2022; 17(6): e0269010.

17. Eun-Song Kim, Ju-Wan Kim, Hee-Ju Kang, Kyung-Yeol Bae, Sung-Wan Kim, et al. Longitudinal Impact of Depression on Quality of Life in Stroke Patients. Psychiatry Investig. 2018; 15(2):141-146.

18. Eman M. Khedr , Ahmed A. Abdelrahman, Tarek Desoky, Ahmed Fathi Zaki and Ayman Gamea. Post-stroke depression: frequency, risk factors, and impact on quality of life among 103 stroke patients—hospital-based study. Egy J Neurol Psych Neurosurg. 2020; 56:66.

19. Jinke Kuang, Li Yang, Runtian Lv, Jia Li, Kexin Zhou, Mengfan Xu. The mediating effect of post stroke depression between social support and quality of life among stroke survivors: A meta-analytic structural equation modeling. Int J Geriatr Psych. 2022; 37(12).

20. Daniel WW. Biostatistics: a foundation for analysis in the health sciences 7th ed. New York: John Wiley & Sons; 1999.

21. Marufat Oluyemisi Odetunde, Aderonke Omobonike Akinpelu and Adesola Christiana Odole. Validity and reliability of a Nigerian-Yoruba version of the stroke-specific quality of life scale 2.0. Health Qual Life Outcomes, 2017; 15: 205.

22. AS Zigmond, RP Snaith. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983; 67(6): 361-70.

23. Olsen TS, Dehlendorff C, Andersen KK. Sex-related time-dependent variations in post-stroke survival: Evidence of a female stroke

survival advantage. Neuroepidemiology 2007; 29(3-4): 218–225.

24. Shin AY, Porter PJ, Wallace MC, et al. Quality of life of stroke in younger individuals. Utility assessment in patients with arteriovenous malformations. Stroke. 1997; 28(12): 2395–2399.

25. Treger I, Shames J, Giaquinto S, et al. Return to work in stroke patients. Disabil Rehabili. 2007; 29(17): 1397–1403.

26. Qi C, Chunni C, Li G, et al. Health related quality of life in stroke patients and risk factors associated with patients for return to work. Medicine. 2019; 98(16): e15130.

27. Omoniyi O, Awotidebe TO, Ademoyegun AB, Falokun IG, Omisore OB, et al. Relationships among social support, exercise capacity and quality of life of stroke survivors: A case-control study. Turk J Cerebrovasc Dis. 2023; 29(1): 38-45.

28. Osoba D. Measuring the effect of cancer on quality of life. Boca Raton, CRC Press, 1991.

29. Patrick DL, Erickson P. Assessing health-related quality of life for clinical decision-making. In: Walker SR, Rosser RM, eds. Quality of life assessment: key issues in the 1990s. Dordrecht: Kluwer Academic Publishers 1993; 11–64.

30. Ademoyegun AB, Ibitoye AG, Mbada CE, Malomo OE, Adelowokan OI, et al. Handgrip and Quadriceps Strength as Independent Predictors of Post-Stroke Depression and Anxiety. JRSR. 2022; 9(1): 47-52.

31. Afanasiev S, Aharon-Peretz J, Granot M. Personality type as a predictor for depressive symptoms and reduction in quality of life among stroke survivals. Am J Geriatr Psych. 2013; 21: 832–839.

32. Campbell Burton CA, Murray J, Holmes J, Astin F, Greenwood D, et al. Frequency of anxiety after stroke: a systematic review and meta-analysis of observational studies. Int J Stroke. 2013; 8: 545–559.

33. Tariah HA, Hersch G, Ostwald SK. Factors associated with quality of life: perspectives of stroke survivors. Phys Occup Ther Geriatr. 2006; 25(2): 33-50.

34. Hui-xian Yu, Zhao-xia Wang, Chang-bin Liu, Pei Dai, Yue Lan et al. Effect of Cognitive Function on Balance and Posture Control after Stroke. Neural Plast. 2021; 2021: 6636999.

35. Nichols-Larsen DS, Clark PC, Zeringue A, Greenspan A, et al. Factors influencing stroke survivors' quality of life during subacute recovery. Stroke. 2005; 36: 1480–1484.

36. Kauhanen ML, Korpelainen JT, Hiltunen P et al Domains and determinants of quality of life after stroke caused by brain infarction. Arch Phys Med Rehabil. 2000; 81: 1541–1546.

37. Hilari K, Wiggins RD, Roy P, Byng S, Smith SC. Predictors of health-related quality of life (HRQL) in people with chronic aphasia. Aphasiology. 2003; 17: 365–381.

38. Nys, GMS; van Zandvoort, MJE; van der Worp, HB et al. Early cognitive impairment predicts long-term depressive symptoms and quality of life after stroke. J Neurol Sci 2006; 247:149–156.

39. Tomáš Sollár, Katarína Dančová, Andrea Solgajová, Martina Romanová. Depression and anxiety as predictors of quality of life after a stroke. KONTAKT. 2022; 24(1).

40. TB Cumming, A Brodtmann, D Darby, J Bernhardt. The importance of cognition to quality of life after stroke. J Psycho Res. 2014; 77(5): 374-379.