Stroke outcomes at discharge in Malawi: A cross-sectional descriptive study in limited resource setting

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Background
Stroke is the fourth leading cause of mortality and disability in Malawi. There is paucity of studies reporting on acute stroke functional outcomes, quality of life and satisfaction of patients with stroke. This study aimed to determine stroke outcomes and satisfaction with care in the country’s central hospitals.

Methods
A descriptive cross-sectional study, recruiting 114 adult patients with stroke and their caregivers, was done. FIM, EQ-SD-SL, SAC and C-SASC were used to collect data. Univariate associations were assessed using the Kruskal-Wallis test for categorical variables and the Wilcoxon Rank Sum Test for continuous variables.

Results
With 79% of the original study sample taking part, there was improvement in patients’ functional status at discharge compared to admission with notable improvement in self-care (p=0.001), sphincter control (p=0.001), locomotion (p=0.001), and social cognition (p=0.001), but no significant improvement in transfers (p=0.160), and communication (p=0.065). Satisfaction with care was high, with no significant difference between genders (p=0.143), age group (p=0.872), and marital status (p=0.194). Satisfaction ratings were also high from caregivers’ responses and their scores were not associated with age (p=0.663) or distance to the hospital (p=0.872). Quality of life was poor, most patients were either unable or had severe limitations in functional dimensions of mobility (22.9%), self-care (19.2%) and performance of usual activities (25.6%). Every additional year in age was associated with 0.56 decrease in quality of life score coefficient, β=-0.36 (95% CI -0.63, -0.10), p=0.008.

Conclusion
Patients with stroke experience improvement in functional outcomes on discharge compared to admission. Patients and caregivers were satisfied with care provision despite having poor quality of life post-stroke treatment. There is need to focus proven interventions on areas of stroke care that can impact patients’ quality of life in resource limited settings.

Key words: acute stroke, patients’ outcomes, patients’ satisfaction, rehabilitation, nursing, medical care, central hospitals, Malawi

Stroke outcomes are an indicator of quality of stroke services provided. There is a dearth of literature reporting on stroke outcomes in most sub-Saharan African countries including Malawi. A prospective study that investigated stroke outcomes among patients with HIV one year after stroke found that 53.4% of patients had poor outcomes including severe disability and death. This study showed that poor stroke outcomes were independent of HIV infection. Quality of life (QoL) post stroke is an appraisal of general wellbeing of individuals affected by stroke. Acute stroke is known to lower the QoL for its survivors through the disability it brings and associated emotional distress that could lead to depression. For example, in a Tanzanian study, 68% of all ages patients with stroke gave up their work permanently, and experienced marked disability through failure to walk independently, to perform self-care and usual activities and exhibition of psycho-affective disorders such as depression, and anxiety. In Malawi, an interview-based study by Heikinheimo and Chimbayo was conducted, where 81 patients with stroke, who were followed up six months after stroke, revealed that “good” functional outcomes in the domains of activities of daily living (ADLs) and communication was positively associated with better QoL. Patients who scored worse in the fatigue and cognition domains. Older age was also associated with lower QoL in the ADLs domain. Besides functional health outcomes and QoL, patients’ satisfaction is an important indicator of the quality of care received at stroke hospital. A recent study finding reported that 51.6% of patients who survived stroke had problems related to the type of care they received, and other caregiving roles to the person with stroke without compensation. Patients who were hemiplegic due to head injury were excluded.

Inclusion and exclusion criteria
Patients’ inclusion criteria were: (1) clinically diagnosed stroke by a qualified physician through history and physical examination (both parameters have been used in community stroke studies for the diagnosis of stroke and transient ischemic attack), (2) 18 years of age or older, (3) cognitively sound, able to speak and be understood, and (4) admitted to one of the four central hospitals. Informal caregivers were recruited if they provided direct care and other caregiving roles to the person with stroke without compensation. All participants gave a written or thumb print witnessed informed consent before participating in the study. Heads of each central hospital gave permission for the study to recruit within their patient populations. Approval was also obtained from the Ethical Review Committee of the College of Medicine in Malawi to ensure that the study staff to uphold confidentiality and privacy of study participants through protection, known only to the investigator.

Sampling and recruitment
Three interventional physiotherapists and one rehabilitation technician provided data collection, after undergoing study protocol training for the study. Each research assistant abstracted data from patients’ records on a weekly basis to identify potential study participants. The assistant also relied on the hospital referral system, where the rounding doctors referred admitted stroke patients to the Physiotherapy Department. The eligibility screen was then applied to all those who were eligible to participate in the study. Data were then entered, first by the researcher, then checked and committed patients. FIM scores were obtained after completing treatment in four referral hospitals in Malawi.

Methods
Research setting
This study was conducted in eight medical wards across the four central hospitals in Malawi, which admit and manage patients with stroke. The hospitals are Kamuzu Central Hospital (KCH; Central region, Lilongwe), with 1000 beds; Queen Elizabeth Central Hospital (QECH; Southern region, Blantyre) with 1400 beds, Mzuzu Central Hospital (MCH; Northern region, Mzuzu) with 306 beds, and Zomba Central Hospital (ZCH [Eastern region, Zomba]; with 500 beds. In all these hospitals, patients with stroke come into contact first with the hospital at the casualty, or emergency department, or Accident and Trauma Centre, as it is called in different hospitals in Malawi. There is basic physiotherapy service, which is currently restricted to central hospitals. In practice, physiotherapists assess patients with stroke and their progress to identify physiotherapy goals. Technically, during the acute phase, besides as this is an optimal situation in stroke, and their caregivers, physiotherapists work on prevention of early stroke complications such as aspiration pneumonia and the deep venous thrombosis (DVT). As part of acute care, physiotherapists also focus on early mobilization and positioning to prevent pressure sores, and proper feeding positioning to encourage function and prevent aspiration pneumonia during admission.

Research design
A descriptive cross-sectional study design was used. Patients and caregivers completed paper questionnaires, which were electronically processed using a Microsoft Excel database. In this paper, we report quantitative data.

Study population and sampling
In this hospital-based study, the entire population of patients with stroke admitted to the hospitals during the study period was included. A descriptive cross-sectional study was conducted, where the study population included 114 patients with stroke and their informal caregivers, admitted at the hospitals in the research setting between 1 April 2016 and 31 May 2016, and their informal caregivers. Inclusive sampling was used to recruit the participants.

Ethical considerations
Ethical approval was received from the University of the Western Cape (registration number 15/6/31) and the College of Medicine Research and Ethics Committee (COMREC), University of Malawi (approval number 10/15/1819). All participants gave a written or thumb print witnessed informed consent before participating in the study. Heads of each central hospital gave permission for the study to recruit within their patient populations. Approval was also obtained from the Ethical Review Committee of the College of Medicine in Malawi to ensure that the study staff to uphold confidentiality and privacy of study participants through protection, known only to the investigator.

Data analysis and interpretation
Stata v13.0 (Stata Corp, Texas, USA) was used for data management and analysis. Descriptive tabular data was computed as median (interquartile range), having confirmed graphically using histograms that continuous variables were not normally distributed. All normally distributed variables were normally distributed.
were summarised using means with standard deviation (SD). Univariate associations were assessed using the Kruskal-Wallis Test for categorical variables and the Wilcoxon Rank Sum Test for continuous variables due to the small number of participants in the study (N = 90). The correlation between two continuous variables was assessed using the Pearson product moment correlation coefficient (r). Simple bar graphs, pie charts, and scatter plots visualised the distribution of appropriate variables. One-way tabulation was used to compute proportions for categorical variables. Simple linear regression was used to investigate associations between two continuous variables.

Results
Out of 114-person study sample, 9 died before discharge, 11 were excluded due to speech problems, and 4 were lost to unexpected discharge. This study, therefore, had complete data from 90 participants, representing 79% of the initial study population. Overall mean age was 58.6 years (SD=16.3) and 48 (53%) were male. The majority of the patients were recruited from Queen Elizabeth Central Hospital (QUEC) (28; 31%) and Kamuzu Central Hospital (KCH) (27; 30%), while 19 (21%) and 16 (17%) were from Mzuzu and Zomba central hospitals (MCH and ZCH), respectively (Table 1). Comparable age (p=0.109) distribution across the four hospitals was observed but there were significantly more male patients at KCH (47 [63%]) and MCH (14 [73%]), while QUEC had more female patients (18 [64%]; p=0.041). Patients in QUEC and MCH spent a significantly longer time in the hospital with a median (interquartile range [IQR]) length of hospital stay (LOS) of 10.5 days (IQR: 5-18) and 12 days (IQR: 7-14), respectively, per the patient's satisfaction with care and caregivers' satisfaction scores with Pearson correlation coefficient (r) = 0.66 (Figure 1).

Quality of life (QoL)
QoL of stroke patients in this study is generally poor as evidenced by lower level scores of the ED 3D functional dimensions of mobility, self-care and performance of usual activities in Table 3. On mobility, most patients were either unable to walk (22 [29%]) or had severe problems with walking (18 [24%]). The majority of patients (19 [25%]) had severe problems with self-care scored by 10 (13%) who were unable to perform self-care activities. Most patients were also unable to do their “usual” activities and the second major experience severe problems (25 [31%]) in doing the same. Patients, however, did not show increased levels of psych-affective disorders, most of the participants scored low on pain or discomfort (19 [25%]), or moderate pain or discomfort (20 [27%]), and the majority did not feel anxiously or depressed (19 [25%]), or were just moderately anxious or depressed (18 [24%]). On the Visual Analogue Scale (VAS), the patient’s experience of “health today” was average, with a median VAS score of 30 out of 100 (IQR: 45-75). QoL was similar between male (median score 52.5 [IQR: 45-75]) and female patients (50 [IQR: 45-70]), p=0.307. Using a simple linear regression model, every additional year in age was associated with an average of 0.36 decrease in quality of life.

Functional Independence Measure (FIM)
Overall, FIM scores increased significantly between admission (median=51.5) and discharge (median=70; IQR: 52-95; p<0.001). Significant improvements between admission and discharge existed in the following FIM components: self-care, sphincter control, locomotion and social cognition (p≤0.003) (Table 2). Score for self-care increased from a median of 11 (IQR: 7-18) on admission to 20.5 (IQR: 12-31) on discharge. Similarly, sphincter control and locomotion improved from a median of 4 (IQR: 2-12) to 10 (IQR: 5-14) and 6 (IQR: 2-11), respectively. However, there was no significant improvement in transfers and communication (p-values>0.865), which was the same across the four sites.

Satisfaction with care: Patients’ and caregivers’ perspective
Patients’ satisfaction with care was high, with a median score of 19.5 out of a maximum score of 28 (IQR: 15-23) and there was no significant difference between male (20 [IQR: 14-25]) and female (19 [IQR: 15.5-22.5]) patients, p=0.415. Similarly, satisfaction scores did not differ by age (years), with a coefficient of -0.04 (95% CI: -0.14; 0.06), p=0.397. Satisfaction ratings were also high from caregivers’ responses, with a median score of 24 (IQR: 21-27). However, female caregivers (25 [IQR: 21-29]) rated stroke care marginally more than their male counterparts: 23 [IQR: 20.5-26], p=0.058. Again, caregivers’ satisfaction scores were not associated with age: 0.02 (95% CI: -0.07; 0.1), p=0.663. There was a positive linear relationship between patient and caregivers’ satisfaction scores with Pearson correlation coefficient (r) = 0.66 (Figure 1).

Table 1: Demographic characteristics of patients (N = 90), Hospital of study recruitment

| Variable                        | QECH       | Lilongwe  | Mzuzu  | Zomba  | p-value* |
|---------------------------------|------------|----------|--------|--------|----------|
| Number recruited (n, %)          | 28 (31%)   | 31 (37%) | 28 (31%) | 13 (14%) | 0.008    |
| Age (years) median (IQR)         | 59 (41.72) | 60 (53.68) | 70 (58.77) | 53 (35.66) | 0.109**  |
| Sex: male (n, %)                 | 10 (35)    | 17 (34)  | 14 (35) | 7 (43)  | 0.041    |
| Female (n, %)                    | 18 (65)    | 10 (20)  | 5 (12)  | 9 (62)  |          |
| Length of hospital stay (LOS)    | 10.5 (6.5) | (5, 18)  | (3, 7)  | (2, 12) | 0.008    |

IQR: interquartile range * Fisher’s Exact test unless described otherwise ** Kruskal-Wallis test

Figure 1: Correlation between patients’ and caregivers’ satisfaction scores
Correlation coefficient: 0.66
Community insights for malaria prevention

findings in other similarly low-resource settings. For example, the impact of therapy may not be completely ruled out. The poorest countries with very limited health care resources both positive and interesting, given that Malawi is one of the countries with the lowest scores in terms of health care expenditures. Therefore, understanding these domains is a step towards identifying areas for improvement in stroke service provision. Despite resource constraints, patients with stroke had functional outcomes that were significantly improved on discharge from the four central hospitals in Malawi. The improvement in patients’ functional status on discharge, compared to admission in most FIM components is both promising and interesting, given that Malawi is one of the poorest countries with very limited health care resources.

Table 3: Quality of Life (QoL) items

| ED-S5 Dimension & Level | Description of perceived problems | Number | Percentage |
|-------------------------|------------------------------------|--------|------------|
| **Mobility** Level 1    | I have no problems in walking about| 19     | 25.33      |
| Level 2                 | I have slight problems in walking about| 20     | 26.00      |
| Level 3                 | I have severe problems in walking about| 22     | 28.95      |
| Level 4                 | I have extreme problems in walking about| 18     | 23.33      |

**Effects of Life in Malawi**

- **Pain/discomfort** Level 1: I have no pain or discomfort
- **Self-care** Level 1: I have no problems dressing myself
- **Activities of daily living** Level 1: I have no problems doing my usual activities
- **Anxiety/depression** Level 1: I am not anxious or depressed
- **Mobility** Level 1: I have no problems in walking about

**Conclusions**

The functional outcomes of patients with stroke in this cross-sectional study improved significantly on discharge compared to admission status. Patients and caregivers showed that they were highly satisfied with the way care was provided despite having poor quality of life pre-stroke treatment. There is a need to focus on preventive interventions and early intervention programs that can improve the patients’ quality of life in resource limited settings such as Malawi. Malawi could consider the introduction of specialized stroke care units which have been found to improve outcomes even in low to middle income countries.

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References

1. Myint PK, Bachmann MO, Loke YK, Price GM, Hale R, et al. Important factors in predicting mortality outcome from Stroke: A Cross-sectional study. Journal of Stroke and Cerebrovascular Diseases. 2018; 27(6): 2031–2037. doi: 10.1016/j.jstrokecerebro.2018.03.027
2. Heikinheimo T, Chimbuyo D, Kamunda JJ, Kampondeni S, Allain JJ. Stroke outcomes in Malawi, a Country with High Prevalence of HIV: A Prospective Follow-Up Study. PLoS ONE 7(3): e33765. doi: 10.1371/journal.pone.0033765
3. Heikinheimo T, Chimbuyo D. Quality of life after first-ever stroke: An 18-month follow-up of patients in a rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
4. Heikinheimo T, Chimbuyo D. Quality of life after first-ever stroke: An 18-month follow-up of patients in a rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
5. Collins DJ, Mueck J, Kattikele L, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
6. Sahin B, Yilmaz F, Lee KF. Factors affecting patient satisfaction: Structural equation modelling. J Med Syst, 2007; 31(4):199–206.
7. Mahwis KM, Heikinheimo T. Stroke in Malawi – What do we know about it and How should we manage it? Malawi Med J 2010; 20(2):124-28. doi: http://dx.doi.org/10.4314/mmj.v20i2.4
8. Levin KA. Study design III: Cross-sectional studies. Evid Based Dent. 2006; 7(4):24–25. doi: 10.1017/s11136-015-1196-z
9. Rayegani SM, Raeesadat AS, Alkhani E, Bayat M, Bahamani MH, Karimzadeh A. Evaluation of complete functional status of patients with stroke by functional status, age, and discharge and six months poststroke. Iran J Neurol 2016; 15(4):202-208. doi: https://doi.org/10.17350/ijn.2016.16944
10. Chen P, Liu KC, Liang RJ, Wu CY, Chen CL, Kang CY. Validity, responsiveness, and minimal clinically important difference of EQ-5D-5L in stroke patients undergoing rehabilitation. Qual Life Res; 2016; 25(6):1585-96. doi: 10.1007/s11136-015-1196-z
11. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
12. Collins DJ, Mueck J, Kattikele L, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
13. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
14. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
15. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
16. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
17. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
18. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
19. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
20. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
21. Gollnick DJ, Niewada M, Buczek J, Karlinska A, Kothawala R, Seneviratne D, et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. J Neurol. 2011; 258(8):1422-1430. doi: https://doi.org/10.1007/s00415-011-5948-6
of complications, and discharge planning. NCGC, 2010. Scottish Intercollegiate Guidelines Network. Management of patients with stroke: Rehabilitation, prevention and management of complications, and discharge planning. NCGC, 2010,[cited March, 2018. Available at: http://www.sign.ac.uk/assets/sign118.pdf

15. Ministry of Health. Malawi Standard Treatment Guidelines, 4th Ed, 2009 [cited March, 2018]. Available at URL: http://apps.who.int/medicinedocs/documents/s18801en/s18801en.pdf

16. Dayapoglu N, Tan M. Quality of life in stroke patients. Neurol India, 2010;58(5):697-701. doi: 10.4103/0028-3886.72165

17. Somotun O A A, Osungbade KO, Akinyemi OO, Obembe TA, Adeniji FI. What factors influence the average length of stay among stroke patients in a Nigerian tertiary hospital? Pan Afr Med J., 2017, 26: 228. doi:10.11604/pamj.2017.26.228.12249

18. Nakibuuka J, Sajatovic M, Nankabirwa J, Ssendikadiwa C, Furlan AJ, Katabira E, Kayima J, Kalema N, Byakika-Tusiime J, Ddumba E. Early mortality and functional outcome after acute stroke in Uganda: Prospective study with 30 day follow-up. SpringerPlus, 2015, 4(1):450. doi: 10.1186/s40064-015-1252-8

19. Saposnik G, Webster F, O’Callaghan C, Hachinski V. “Optimizing Discharge Planning: Clinical Predictors of Longer Stay after Recombinant Tissue Plasminogen Activator for Acute Stroke,” Stroke, 2004, 36(1): 147-50. doi: 10.1161/01.STR.0000150492.12838.66

20. Langhorne P, de Villiers L, Pandian JD. Applicability of stroke-unit care to low-income and middle-income countries. Lancet Neurol 2012;11(4): 341–348. doi: https://doi.org/10.1016/S1474-4422(12)70024-8

https://dx.doi.org/10.4314/mmj.v30i3.4