

Prevalence of Recurrent Stroke among a Rehabilitation Cohort in Nigeria

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Objective: A recurrent stroke increases the rates of mortality and morbidity after an initial stroke. There is, however, a dearth of data on the prevalence of recurrent stroke in Nigeria.

Methods: A secondary analysis of the data obtained from 100 stroke survivors undergoing physiotherapy at 2 health facilities in Nigeria was carried out to document the prevalence of recurrent stroke. The association between recurrent stroke and selected socio-demographic and clinical factors of the participants was explored using logistic regression analysis.

Results: Thirty-two (32%) participants had had a recurrent stroke. Employment status and educational level were significantly associated with recurrent stroke. The outcome of the logistic regression analysis further showed that participants who were employed (OR = 0.08; P < 0.001; 95% CI = 0.02–0.32) and who had no formal education (OR = 0.22; P = 0.03; 95% CI = 0.05–0.87) were significantly less likely to present with recurrent stroke compared to the unemployed participants and those who had tertiary educational qualification, respectively.

Conclusion: Approximately 1 in 3 stroke survivors undergoing rehabilitation had experienced stroke recurrence. The finding of this study buttresses the urgent need to emphasize and aggressively pursue secondary stroke prevention. Further studies are, however, required to explore those potentially modifiable factors that are associated with recurrent stroke, and having more representative samples. [P R Health Sci J 2019;38:181-184]

Key words: Recurrent stroke, Rehabilitation, Prevalence, Nigeria

Stroke is a major cause of mortality, disability, and diminished quality of life, worldwide. Another common negative outcome of stroke is stroke recurrence, with survivors of an index stroke being at risk of a recurrent stroke (1–2). Recurrent stroke, also known as secondary stroke, can occur in the early to late phase after an initial stroke (3). The time of recurrence notwithstanding, there are more adverse outcomes after recurrent stroke than there are after a first-ever stroke (1, 4–5).

Data on the incidence and prevalence of recurrent stroke among specific populations is crucial in the prevention of secondary stroke. For instance, an improved availability of data on the rate of stroke recurrence and associated peculiarities (if any) would enable stroke survivors and their families, health personnel, and policy makers to address likely predisposing factors, which would in turn facilitate prevention. To this end, several studies have examined the prevalence and the predisposing factors of recurrent stroke in different regions and countries of the world (3–4, 6). A cursory overview of the available studies showed that most of the data used emanated from Western and/or Eastern countries, while a scarcity of information on recurrent stroke existed (still exists) in African countries. This dearth is particularly worrisome given the increasing prevalence of stroke in developing countries, including those in Africa.

Nigeria is the most populous country in Africa, and by virtue of this, the crude prevalence of stroke in the country is the highest on the continent (7); the age-standardized mortality rate of stroke in Nigeria was projected to be 126 per 100,000 (8). With such a high proportion of people at increased risk of recurrent stroke, that is stroke survivors, it is mandatory that data on the recurrence of stroke be readily available in the country. That, however, is not the case, and the scanty data available are mainly from studies that explored generic topics (9–10). Furthermore, these studies neither explored factors associated with stroke recurrence nor established any links between the prevalence of recurrent stroke and specific attributes of recurrent stroke survivors.

The aims of this study were, therefore, to document the prevalence of recurrent stroke and potential associated factors among a convenience sample of stroke survivors in Nigeria.

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Patients and Methods

Study design: A secondary analysis of the data from a cross-sectional survey of a rehabilitation cohort.

Study setting: Physiotherapy facilities in 2 government hospitals in Northern Nigeria.

Participants: One hundred consenting stroke survivors who were 18 years of age and above and who were able to sufficiently communicate in English and/or Hausa participated in the study. All the participants were residing in the community and receiving physiotherapy on an outpatient basis. In our setting, the unavailability of inpatient and community rehabilitation centers and the provision of stroke rehabilitation services almost solely by physiotherapists due to the shortage of other rehabilitation professionals coupled with the preferences of our stroke survivors for the outpatient rehabilitation setting (11) often circumscribe the recruitment of participants in stroke rehabilitation studies, limiting participants to only those receiving physiotherapy on an outpatient basis.

Procedure: Ethical approval for the study was obtained from the institutional research and ethical review committee. The data utilized in the study (socio-demographic and clinical information as well as history of recurrent stroke) were extracted from those of a study on the relationship between health-related quality of life and poststroke fatigue, and the details of the procedure have been published elsewhere (12). Data on the level of disability were obtained with the modified Rankin Scale (mRS), which measures global disability using a 6-point scale of 0 to 5, with "0" representing no disability and "5" indicating severe disability (13). Two categories of disability were derived based on the ability of the participant to walk independently or not (a score of 0 to 3 indicated the ability to walk without assistance, while a score of 4 or 5 represented the inability to walk without assistance). To aid in our identifying those with recurrent stroke, the participants were asked to choose between 2 options, namely "first-ever stroke" or "recurrent stroke." The options chosen were verified using the medical records of the participants. All the data used in this secondary analysis were collected by the second author from February to April 2013.

Data analyses: Descriptive statistics of frequencies, percentages, mean, and standard deviation were used to summarize the data. Logistic regression analyses ("enter" method) were carried out to identify the socio-demographic and clinical characteristics of the participants that were associated with a given prevalence of recurrent stroke. The socio-demographic characteristics were age, gender, marital status, educational level, and employment status, while the clinical characteristics were level of disability, type of stroke, and side of the body affected. A p-value of 0.05 was considered statistically significant.

Results

Males (66%) and ischemic stroke survivors (70%) were in the majority. The mean (SD) age of the participants was 55.3

(13.9) years. Details of the participants' socio-demographic and clinical data are presented in Table 1.

Of the factors that were examined for their association with recurrent stroke, educational level and employment status were found to be statistically significant ($P = 0.03$; $P < 0.001$, respectively). The odds ratios (ORs) and 95% confidence intervals (CIs) obtained are presented in Table 2.

Table 1. Socio-demographic and clinical characteristics of participants (N = 100)

Characteristic	Value (%)
Age (years)	
Mean (SD)	55.3 (13.9)
Range	18–85
Gender	
Male	66
Female	34
Marital status	
Married	83
Single	7
Widowed	10
Employment status	
Employed	58
Unemployed	42
Educational level	
None	37
Below tertiary	28
Tertiary	35
Side of body affected	
Right	51
Left	49
Type of stroke	
Ischemic	70
Hemorrhagic	30
Disability status*	
Can walk without assistance	52
Cannot walk without assistance	48

*Assessment carried out with the modified Rankin Scale (mRS); a score of 0 to 3 indicates the ability to walk without assistance while a score of 4 or 5 represents the inability to walk without assistance.

Discussion

Recurrent stroke is a major cause of concern to healthcare professionals, policy makers, and stroke survivors and their families due to the accompanying high rates of morbidity and mortality. Stroke is a life-changing experience, and the fact that a survivor can have subsequent events after an initial stroke is especially disconcerting for all concerned. This study examined the prevalence of recurrent stroke among patients undergoing outpatient rehabilitation (physiotherapy) in Nigeria.

A prevalence rate of 32% was recorded in this study, indicating that about 1 in every 3 stroke survivors experienced a stroke recurrence. This rate is indeed worrisome and should be regarded as a call to urgent action to achieve secondary stroke prevention. Available reports on the prevalences of recurrent stroke show rates as low as 2.7% in Korea (14) and as high as approximately 25% (15) in the United Kingdom, although these rates are dependent on the length of time that passes after

Table 2. Logistic regression analysis for socio-demographic and clinical factors associated with recurrent stroke

Variable	Odds ratio	95% CI
Age (years)		
<65	1.46	0.40–5.35
≥65	1.00	Reference category
Sex		
Male	1.14	0.30–4.31
Female	1.00	Reference category
Marital Status		
Married	5.21	0.82–33.09
Single	4.85	0.35–68.20
Widowed	1.00	Reference category
Employment status		
Employed	0.08**	0.02–0.32
Unemployed	1.00	Reference category
Educational level		
None	0.22*	0.05–0.87
Below tertiary	0.85	0.22–3.34
Tertiary	1.00	Reference category
Disability status#		
Cannot walk without assistance	2.67	0.84–8.50
Can walk without assistance	1.00	Reference category
Type of stroke		
Ischemic	1.82	0.57–5.78
Hemorrhagic	1.00	Reference category
Side of body affected		
Right	0.69	0.25–1.91
Left	1.00	Reference category

CI: confidence interval; * <0.05 ; ** <0.0001 . #Assessment carried out with the modified Rankin Scale (mRS); a score of 0 to 3 indicates the ability to walk without assistance while a score of 4 or 5 represents the inability to walk without assistance.

the initial stroke. For instance in a study by Kang et al (14), the recurrence rates were 2.7%, 3.9%, and 5.7% at 30 days, 90 days, and 1 year after initial stroke, respectively, while another study reported recurrence rates of 7.1%, 16.2%, and 24.5% at 1, 5, and 10 years, respectively (15). It is, however, important to note that every case of recurrent stroke is unwanted, and considering the often-negative outcomes, achieving secondary prevention of stroke is paramount. Although the present study did not ascertain if the participants with a stroke recurrence were recipients of stroke rehabilitation after the initial stroke or whether they had received any information on secondary stroke prevention from rehabilitation professionals, it is imperative that patient education be included in stroke rehabilitation, especially as the rehabilitation phase constitutes an appreciable proportion of the stroke care continuum.

Two factors, namely, employment status and educational level, were found to be significantly associated with the prevalence of recurrent stroke. The outcome of the regression analyses also showed that stroke survivors with no formal education and those who were employed were significantly less likely to have experienced stroke recurrence than were those with tertiary educational qualification and those who were unemployed, respectively. Reasons for the observed associations are, however, not clear. For instance, the fact that the participants who had no educational qualification and, by inference, might have been

expected to be more unenlightened about stroke risk factors and prevention were less likely to have experienced recurrent stroke could be considered inconsistent.

Primary stroke risk factors such as relatively older age (15–16), hypertension (15,17–19), atrial fibrillation (15,17–18), smoking (17), and hyperlipidemia (18) have been found to be significantly associated with the prevalence of recurrent stroke, in previous studies. Although this present study did not assess several of these important risk factors, it attempted to bridge some of the existing gaps in the literature on recurrent stroke in Nigeria. Future studies that would assess associations between recurrent stroke and some risk factors that have been documented in the existing studies conducted in Western and Asian countries are therefore required. Cohort studies are also required to provide more information on the incidence and prevalence of recurrent stroke in Nigeria, including information on the time course of recurrence after an initial stroke. Information on the frequency of recurrence and a detailed analysis of the risk factors for repeated stroke events are also urgently needed.

Limitations of the study: The fact that the participants were recruited from physiotherapy facilities affects the external validity of the findings and limits generalizability. The cross-sectional design of the study also constitutes a limitation, and future prospective studies and case-control studies would be more appropriate. The lack of information on several established risk factors of stroke and the lack of assessment of their associations with the prevalence of recurrent stroke are important shortcomings of the study.

The aforementioned limitations notwithstanding, the outcome of this study showed that approximately 1 in every 3 participants had experienced stroke recurrence. This rate should serve as an urgent call for concerted efforts toward achieving effective secondary prevention of stroke.

Resumen

Objetivo: Un ictus cerebral recurrente aumenta la tasa de mortalidad y morbilidad tras un ictus previo. Sin embargo, los datos sobre la prevalencia de ictus cerebral recurrente en Nigeria son escasos. Metodología: Con el objetivo de documentar la prevalencia de ictus cerebral recurrente, se realizó un análisis secundario de los datos de 100 sobrevivientes a ictus cerebral que se trataron con fisioterapia en 2 instalaciones sanitarias de Nigeria. Se investigó la asociación entre ictus cerebral recurrente y ciertos factores sociodemográficos y clínicos de los participantes utilizando un análisis de regresión logística. Resultados: Treinta y dos (32%) participantes tuvieron un ictus cerebral recurrente. La situación laboral y el nivel educativo tenían una relación significativa con el ictus cerebral recurrente. El resultado del análisis de regresión logística también mostró que los participantes con empleo (OR = 0.08; $P < 0.001$; 95% IC = 0.02-0.32) y sin educación formal (OR = 0.22; $P = 0.03$; 95% IC = 0.05-0.87) tenían una probabilidad mucho menor

de presentar ictus cerebral recurrente en comparación con los desempleados y con los que tenían un nivel educativo superior, respectivamente. Conclusión: Aproximadamente 1 de cada 3 sobrevivientes de ictus cerebral en rehabilitación había sufrido ictus cerebral recurrente. El resultado de este estudio respalda la necesidad urgente de enfatizar y fomentar intensamente la prevención secundaria del ictus cerebral. No obstante, se necesitan más estudios para investigar factores potencialmente modificables que estén asociados con el ictus cerebral recurrente en una muestra más representativa.

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