Socio-Demographic Evaluation of Stroke Survivors Managed at a Physiotherapy Department in a Tertiary Teaching Hospital in Nigeria

**Uchenna Prosper Okonkwo*,
Ebubechukwu Maryrita Anyoke,
Uzoamaka Nwakaego Akobundu,
Kenneth Umezulike Ani,
Emeka Sylvester Igwe,
Samuel Chidile Mounwe,
Ifeoma Blessing Nwosu,
Chiamaka and
Ezinne Chika Ekediegwu**

Department of Medical Rehabilitation,
Nnamdi Azikiwe University, Awka, Nigeria

*Corresponding author: Uchenna Prosper Okonkwo,

Department of Medical Rehabilitation,
Nnamdi Azikiwe University, Awka, Nigeria

✉ up.okonkwo@unizik.edu.ng

Abstract

Stroke has been reported as a major cause of death and neurological disability in adults and imposes a heavy emotional and financial burden on the family of the patient and society. Several risk factors have been associated with the occurrence of stroke. This research was aimed at evaluating the pattern of stroke among survivors managed at the physiotherapy department of a tertiary teaching hospital in Nigeria. The socio-demographic and comorbid risk factors associated with stroke were evaluated.

A total of 100 case files of stroke survivors were reviewed (2016-2020). The socio-demographic data and the comorbid risk factors associated with stroke were retrieved and analyzed.

Ischemic stroke (81%) and left hemispheric stroke were more prevalent than right hemispheric and brainstem strokes. The research identified a large percentage of stroke cases to be diagnosed in 2020. Female clients between the ages of 51-60 years, married and had less than five children represented a greater percentage of stroke survivors. Hypertension (80%), diabetes mellitus (39%), and high blood cholesterol (14%) were associated with ischemic stroke. The most recorded occupation group was traders (37%), followed by civil servants (11%).

The outcome of the study shows that hypertension, diabetes mellitus, and high blood cholesterol were the most prevalent co-morbid risk factors. It is advised that healthcare practitioners educate patients on the modifiable risk factors identified in this study.

Keywords: Stroke; Stroke survivors; Risk factors; Hypertension; Physiotherapy

Introduction

Stroke is defined as a syndrome of rapidly developing clinical signs of focal or global loss of cerebral functions with symptoms lasting 24 hours or longer or resulting in death with no apparent cause other than of vascular origin [1]. Stroke has been reported as a major cause of death and neurological disability in adults and imposes a heavy emotional and financial burden on the family of the patient and society [2]. It remains the third leading cause of death and the leading cause of serious long-term disability [3]. In addition to the physical impairments caused by a stroke, the emotional, social, and economic impacts of the stroke can be overwhelming for stroke survivors and their families [3]. Though there is a limited national statistic on stroke, there are however reports indicating that stroke had become the leading cause of neurological admission in most tertiary hospitals in Nigeria, taking over from central nervous system infections reported in earlier studies [4].

Stroke may be due to infarction (Ischemic stroke) in 80% of cases or hemorrhage in the remaining 20%. Ischemic stroke presents clinically as a focal neurological deficit of sudden onset presenting with headache, weakness of a part of the body, and loss of speech as common symptoms unless the brain stem

is involved [5]. Hemorrhagic stroke manifests in diverse ways depending on the site, size of the bleed. Headache, vomiting, global neurological deficit, and decreased level of consciousness are characteristic symptoms and there may be quick progress to coma. Hemorrhagic stroke is usually associated with longstanding and uncontrolled hypertension [6].

Studies in Nigeria have confirmed hypertension as the most dominant risk factor of stroke [7]. As regards age, younger people seem to be more affected with hemorrhagic stroke than ischemic stroke. Diabetes mellitus has been reported in up to 20%-37% of patients with stroke [5]. Cardiac diseases, especially rheumatic valvular heart disease which may be associated with atrial fibrillation causing embolic strokes are also common determinants of stroke [8]. Sex differences in stroke patients have not been consistent [5]. Other risk factors include cigarette smoking, neurosyphilis, heavy alcohol consumption, homozygous sickle cell disease, obesity, anemia, dehydration, infections (including HIV), undernutrition and congenital heart disease [9].

The management of stroke patients is practically divided into phases; the acute phase includes ambulance service and care, emergency room care, neuro-intensive care, and stroke unit management [10]. The sub-acute phase management is mainly supportive and takes place in the stroke care ward and physiotherapy unit. The chronic phase takes place in the community and outpatient clinic [10]. Thrombolytic therapy which is the mainstay in the management of ischemic stroke cannot be instituted until the doctor can confidently diagnose the patient as suffering from an ischemic stroke because this treatment might increase bleeding and could make a hemorrhagic stroke worse [10]. However, inadequacies in the availability of advanced diagnostic tools in Nigeria have made this challenging [4]. Rehabilitation forms a cornerstone in managing post-stroke-related disabilities. In rehabilitating a stroke patient, physical therapy, occupational therapy, speech, and language therapy are instituted [11]. Many stroke patients require psychological or psychiatric help after a stroke because psychological problems such as depression, anxiety, frustration, and anger are common post-stroke disabilities [11]. Stroke is a debilitating syndrome both physically and emotionally. This necessitates the evaluation of patterns, risk factors, outcomes among stroke survivors, and the vocation that is mostly affected. Very few studies have been done to assess the patterns of stroke, risk factors, presentation, management, and outcome of management of stroke in the South-eastern region of Nigeria [5] and none have been carried out in hospitals in Anambra state. Hence, this has created a knowledge gap which this study intends to fill by undertaking a five-year review of stroke patients managed at the Physiotherapy Department, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria.

Methodology

Research design

A retrospective research design was used for this study.

Research population

The data for this research was collated from the case report of stroke survivors managed at the Department of Physiotherapy,

Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra state.

Inclusion criteria/exclusion criteria

The following case files were included

- Case files of stroke survivors between January 2016 and December 2020.

- Case files of stroke survivors who were admitted and managed at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra state.

- Case files of stroke survivors who attended physiotherapy in the department of physiotherapy of NAUTH within the period under review.

- Case files of stroke survivors who were referred for physiotherapy from NAUTH,

The following case files were excluded

- Case files with incomplete patient details.

- Case report without a definitive diagnosis

- Case files of stroke survivors who were not managed at NAUTH

Sample size and technique

120 case files were retrieved using a purposive sampling technique but 100 case files met the inclusion criteria.

Research instrument

A self-developed pro forma was used for the recording of retrieved case report data. The retrieval sheet consisted of three sections namely, A, B and C. Section A contained socio-demographic data of patients including age, gender, occupation, marital status, number of children. Section B contained diagnostic data of patients including the date of diagnosis, type of stroke diagnosed. Section C contained data on the risk factors associated with stroke among the patients.

Procedure for data collection

Ethical approval was obtained from the Ethical Review Committee of the Faculty of Health Sciences and Technology, Nnamdi Azikiwe University before the commencement of the study. Approval was sought and obtained from the head of the Department of Physiotherapy, in Nnamdi Azikiwe University Teaching Hospital, Nnewi to have access to the case files. The purpose and procedure of the study were explained to the head of the department, and the head of the recording unit in the Physiotherapy Department and the information needed was retrieved from the patient case files. Three members of the research team were involved in the retrieval and documentation of data from the stroke survivors' case files using a self-developed proforma. One person did the retrieval of the case files, the second person oversaw the crosschecking of completeness of the documented clinical details, and the third person did documentation of the retrieved data in the proforma. This data retrieval process was done three times per week and it lasted for four weeks. The three members

were involved in the final scrutiny of the completed proforma for accuracy of data imputation before it was subjected to data analysis.

Data analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. The descriptive data comprising the participants' socio-demographic data were summarized using frequency counts and percentages, mean and standard deviation. Chi-square analysis was used to test for association between the non-continuous data. The alpha level will be set at 0.05. There was no record of missing data after the analysis.

Results

There were more female stroke survivors than males (52% and 48% respectively). The least frequent age was 30-40 years (6%), while the highest was 51-60 years (38%). Most stroke survivors were married and had five or fewer children (55%) (Table 1).

The most recorded occupation group was traders (37%), followed by civil servants (11%). The occupation of five stroke survivors was not recorded in the case files reviewed (Table 2).

The year 2020 recorded the highest occurrence of stroke survivors (33%); ischemic stroke was the more prevalent type of stroke diagnosed (84%). Left hemispheric stroke (58%) was more common than right hemispheric stroke (39%) and more so, brainstem stroke (Table 3).

The most common comorbid risk factors were hypertension (80%), diabetes mellitus (39%) and high cholesterol (14%) (Table 4).

Among the socio-demographic factors, the number of children given birth to was significantly associated with the type of stroke (Table 5).

The table shows that the risk factors were not associated significantly with any type of stroke.

This shows that 2020 recorded the highest number of stroke survivors in the physiotherapy department followed by 2019, 2017, 2018 and 2016 respectively (Figure 1 and Table 6).

Discussion

This study evaluated the pattern of stroke and stroke-associated risk factors in patients being rehabilitated at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi. Most of the patients in this study were above the age of 50 years but below the age of 70 years. Similar studies on the Iranian stroke patients reported relatively older patients than the current study [12,13]. Also, the current study confirms the conclusions reached by MahdiHabibi-koolaee, et al. that the average age of stroke incidence among stroke patients is declining to younger ages [14]. This trend can be attributed to a shift in prevalence of vascular risk factors towards younger adults; A meta-analysis of ischemic stroke data showed a sharp increase in the prevalence of hypertension followed by hypercholesterolemia over the age of 35 years and interestingly a striking increase in the number of risk factors per patient just over 35 years of age [15]. A greater number of the patients in this

Table 1: Socio-demographic characteristics.

Socio-demographic characteristics of the stroke survivors		Frequency (100)	Percent (%)
Category	Female	52	52
	Male	48	48
	Total	100	100
Age range	30-40	6	6
	41-50	11	11
	51-60	38	38
	61-70	28	28
	Above 70	17	17
Marital status	Married	93	93
	Single	4	4
	Widowed	3	3
Number of children	5 or less	55	55
	More than 5	45	45

Table 2: Distribution of patients based on occupation.

Occupation	Frequency (100)	Percent (%)
Not given	5	5
Farmer	7	7
Palm wine tapper	1	1
Trader	37	37
Reverend father	1	1
Civil servant	11	11
Driver	2	2
Seamstress	3	3
Dependent	8	8
Businessman	3	3
Politician	1	1
Carpenter	1	1
Engineer	1	1
Teacher	4	4
Businesswoman	2	2
Wielder	1	1
Catering	1	1
Retired	7	7
Student	1	1
Photographer	1	1
Lawyer	1	1
Clergy	1	1
Total	100	100

study were females (Table 1). Ahangar, et al. reported that the incidence of stroke among female patients was relatively higher than male patients; whereas the study conducted by Branyan and Sohrabji, revealed that there was a greater prevalence of stroke in females especially older females, and this prevalence may be linked to certain risk factors like loss of estrogen after menopause, hypertension, oral contraceptive use and atrial fibrillation [15,16,17]. This female gender prevalence in this study implies that the female population is more likely to experience a stroke.

Table 3: Distribution of patients based on year of diagnosis, type of stroke, and brain region affected.

		Frequency (100)	Percent (%)
Year of diagnosis	2016	10	10
	2017	20	20
	2018	16	16
	2019	21	21
	2020	33	33
Stroke type	Ischemic	84	84
	Haemorrhagic	16	16
Brain region	Left hemisphere	58	58
	Right hemisphere	39	39
	Brainstem	3	3

Table 4: Distribution of comorbid risk factors among stroke survivors.

Risk factors	Frequency	Percent
Hypertension	80	80
Diabetes mellitus	39	39
Heart failure	2	2
Alcohol	6	6
Peptic ulcer disease	4	4
Stroke	3	3
Hepatitis c	1	1
Brain tumor surgery	1	1
High cholesterol	14	14
Family history	5	5

Table 5: Association between the type of stroke and gender, marital status, number of children, family history of stroke and occupation.

		Haemorrhagic	Total	X^2	P
Gender	Female	10	52	0.841	0.359
	Male	6	48		
Marital status	Married	15	93	0.814	0.666
	Single	1	4		
	Widowed	0	3		
Age range	30-40	0	6	8.753	0.068
	41-50	2	11		
	51-60	4	38		
	61-70	9	28		
	Above 70	1	17		
Number of children	5 or less	5	55	4.341	0.037
	More than 5	11	45		
Family history	Yes	2	10	0.132	0.716
Occupation				19.65	0.544

In this study, a significant association was found between the number of children and the pattern of stroke (Table 2). This may probably be due to stress from pregnancy, childbirth, and childcare which may cause uncontrolled hypertension, fatigue,

preeclampsia or eclampsia, and insufficient time for exercise. The authors opined that given birth to several children or reproductive experiences might increase the systemic metabolic rate. The implication is that multiparous women are at increased risk of experiencing a stroke. The finding that most of the stroke survivors were traders might be linked to the fact that the population of the study belongs to the Igbo race who are known for their merchandising activities. So there is a high possibility that the dominant occupational population might be more affected by stroke than any other population.

The current study finding also indicates that the number of ischemic stroke survivors was three times as high as hemorrhagic stroke survivors (Table 3). This study outcome is in agreement with two previous findings, firstly, there is a higher prevalence of ischemic stroke compared to hemorrhagic [18,19]; and secondly, there is a better survival chance for ischemic stroke compared to hemorrhagic stroke [20]. Interestingly, Habibi-koolaee, et al. reported 70.7% ischemic stroke incidence and 29.3 % hemorrhagic stroke incidence [13,14].

The current finding also showed that there was higher left hemispheric stroke prevalence than right hemispheric stroke (Table 3). This difference has been attributed, partly, to the origin of the left carotid artery from the aorta [21]. The findings of Hedna, et al. indicate that left-hemispheric are more common, more severe, and result in poorer outcomes than right hemispheric strokes. They suggested that these hemispheric differences in
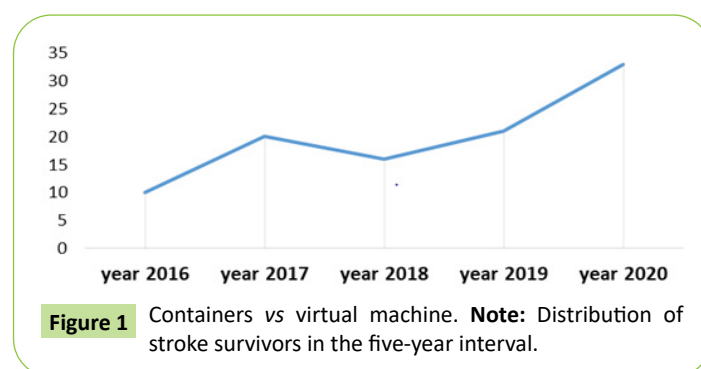
Figure 1 Containers *vs* virtual machine. **Note:** Distribution of stroke survivors in the five-year interval.

Table 6: Association between risk factors for stroke and type of stroke.

Risk factors	Ischemic N (% in ischemic)	Haemorrhagic (% in hemorrhagic)	Total	X^2	P
Hypertension	70 (83.3%)	10 (62.5%)	80	0.741	0.544
Diabetes mellitus	33 (39.3%)	6 (37.5%)	39	0.018	0.893
Heart failure	2 (2.3%)	0	2	0.389	0.533
Alcohol	5 (5.95%)	1 (6.25%)	6	0.002	0.963
Peptic ulcer disease	3 (3.57%)	1 (6.25%)	4	0.251	0.616
Stroke	3 (3.57%)	0	3	0.589	0.443
Hepatitis c	1 (0.12%)	0	1	0.192	0.661
Brain tumor surgery	1 (0.12%)	0	1	0.192	0.661
High cholesterol	12 (14.3%)	2 (12.5%)	14	0.036	0.85

frequency and outcomes were particularly due mainly to the higher incidence of large vessel strokes in the left middle cerebral artery [21,22].

In general, the current study identified the presence of some risk factors such as hypertension, diabetes mellitus and dyslipidemia, all of which have been reported in previous literature [23]. It has been established that hypertension is a major risk factor for stroke, both ischemic and hemorrhagic [24]. In this study, although the most frequent risk factor in both ischemic (70%) and hemorrhagic (14%) stroke subtypes is hypertension, the chi-square test showed that association with a particular type was not statistically significant. This statistical observation was likely due to the relatively smaller occurrence of hemorrhagic stroke survivors. MahdiHabibi-koolaee, et al. in addition to making a similar finding as this current study concerning hypertension, also reported through regression model of all risk factors that the prevalence of hypertension in ischemic stroke patients is 1.755 times higher than hemorrhagic stroke patients [13,14]. Furthermore, a prospective study of 50,000 adults in the Golestan by Sepanlou, et al. showed a positive association between hypertension and stroke mortality although they did not consider stroke subtypes [24,25]. The role of hypertension in the pathogenesis of stroke has been reported to include the initiation of vasculopathy, promotion of micro atheroma, lipohyalinosis, and atherosclerotic diseases and blood-brain barrier disruption [20]. A meta-analysis study of clinical trials reported that the incidence rate of stroke was dropped by 41% when both systolic and diastolic blood pressure were reduced [26]. It has also been shown that antihypertensive therapy and lifestyle modification can reduce the risk of stroke and its recurrence. This is why lowering hypertension risk profile through lifestyle changes starting in middle age can prevent cardiovascular events in older ages (Figure 1) [27].

Another important risk factor identified in this study was diabetes mellitus, particularly with the ischemic subtype (Table 4). According to the current finding, 39% of all stroke patients were diabetic and this is in agreement with Hosaini, et al. whose findings showed that 29.3% of all stroke patients had hyperglycemia [19,20]. Also, the prevalence of diabetes in ischemic stroke patients was higher than that in patients with hemorrhagic stroke. Previous research study has shown that diabetes causes several metabolic and pathologic changes that lead to stroke, including arterial stiffness, systematic inflammation, endothelial dysfunction, and heart failure [28]. By these changes, stroke in a diabetic patient increases hospital mortality (Table 5). Controlling diabetes can prevent both primary and secondary stroke and may decrease mortality as well [29]. Clinical studies suggest that improvements in nutrition and dietary pattern, besides weight management, in diabetic patients lower cardiovascular disease incidence significantly [29]. Thus, dietary components and nutritional patterns should be incorporated into any prevention strategy at the national level [30].

In the current study, we also found that high cholesterol level was present in 14% of the stroke patients (Table 6). A previous study has strongly associated dyslipidemia with the incidence of total stroke (P<0.05), which was also consistent with previous findings [31]. The prevalence of dyslipidemia in ischemic stroke patients was higher than in hemorrhagic stroke cases. Atherosclerosis is the major mechanism of dyslipidemia, which leads to stroke [32]. It seems that reducing lipid profile can reduce atherosclerotic plaques, which results in a decreased risk of stroke. Interestingly, the previous study has revealed that low-density lipoprotein cholesterol levels equal to or greater than 130 mg/dl confer a higher risk of ischemic stroke, but individuals with high triglycerides and low high-density lipoprotein levels who were also suffering from diabetes showed more than 2 times higher incidence of ischemic stroke [33]. The previous study has reported a significant association between dyslipidemia and diabetes [14]. This may imply that the coincidence of two risk factors, namely, diabetes and dyslipidemia, already double the risk of ischemic stroke incidence and such at-risk populations should be given priority in prevention programs. According to National Stroke Foundation, Australia, stroke is also a risk factor of stroke, someone who has already experienced a stroke is at increased risk of having another. After a person experiences a stroke or mini-stroke, the likelihood of having another is significant, the risk is highest early after the first stroke [33].

Limitations of the Study

Poor record-keeping by the hospital under study made retrieval of patient data difficult and time consuming. The low sample size population may affect the generalizability of the study.

Conclusion

The results from this current study have shown that ischemic stroke was more prevalent than hemorrhagic stroke and so was left hemispheric stroke in the studied population. The most prevalent comorbid risk factors were hypertension, diabetes mellitus, and high cholesterol. Also, traders were mostly affected, and the only significant association was found between the number of children and the pattern of stroke. The authors recommend that stroke survivors with comorbid risk factors should be alerted and advised on how to manage such risk factors. Specifically, clinicians should adopt dietary approaches to stop hypertension during young adulthood to middle age as a healthier diet significantly contributes to a lower risk of developing hypertension and consequently cardiovascular events such as stroke in the elderly. Family planning should be encouraged among couples to avoid the excessive burden that may predispose them to stroke. Awareness about risk factors of stroke should be conducted amongst traders to lessen the risk posed to the traders who emerged as the most population. Further studies should be carried out to compare the influence of each comorbid risk factor against an equal number of ischemic and hemorrhagic strokes. Also, multi-site based study should be conducted to compare the outcome with the current study.

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