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Stroke Admissions in the Medical Wards of a Teaching Hospital in Southeast Nigeria: A 10-year Review

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Abstract

Stroke, the third leading cause of death worldwide, contributes significantly to the morbidity and mortality of medical admissions. There is a paucity of literature on stroke outcomes in the Southeast region of Nigeria. This study, therefore, is aimed at bridging this gap in knowledge. This was a 10-year retrospective descriptive study, in which data about patients with a clinical diagnosis of stroke were extracted from the admission/discharge registers in the medical wards of Abia State University Teaching Hospital, Aba. Relevant data obtained were analyzed using Statistical Package for the Social Sciences version 20.0 software. A total of 6587 admissions were recorded within the study period; 830 (12.6%) were admitted because of stroke, made up of 382 (46%) males and 448 (54%) females. Stroke was the most common cause of death among the medical inpatients within the period under review and of all the stroke admissions, mortality was high at 42.3% with majority of the deaths (91.5%) occurring within the first 2 weeks of hospitalization. Stroke contributed significantly to medical admissions in the city of Aba, Nigeria. Mortality from stroke was high and that occurred mainly within the acute phase of the illness. There is, therefore, a need for dedicated stroke units to be set up in centers where stroke admissions are this high where the stroke inpatients will be afforded specialized multidisciplinary care instead of the present situation of medical ward admissions.

Keywords: Medical wards, Southeast Nigeria, Stroke admissions, Treatment outcome

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Introduction

Stroke is an important public health issue, the third leading cause of death worldwide after ischemic heart disease and cancer[1] and a leading cause of disability.[2] Low- and middle-income countries, especially in Africa, are disproportionately affected more than the developed countries. Stroke deaths in these countries account for as much as 87% of all the stroke deaths[3] globally. Stroke burden in Africa is made worse by the increasing prevalence of hypertension.[4-6] Despite major advances in medical research and technology for acute stroke care and management, the outcome has been that of high mortalities and millions of survivors living with multiple debilitating neurological deficits.[7] Stroke outcome in Africa is not favorable because of their low health-care budget and the epidemiological transition they are currently facing due to rapid unplanned urbanization, aging population, and increasing modifiable risk factors for non-communicable diseases.[8]

Identified non-modifiable risk factors for stroke are older age, male gender, Black race, and family history while the most common modifiable risk factor for stroke in Nigeria is hypertension.[9] Other notable ones include diabetes mellitus, central obesity, previous stroke, cardiac diseases, and HIV infection.[9] In Africa, the case fatality rate of stroke is estimated at about 35% but ranges from as low as 14.9% to as high as 77% when due to cerebral hemorrhage.[10] In Nigeria, mortality rates are very high with a range of 21–45%.[11-15] It is worthy of note that most of the dead patients in the Nigerian studies died within the acute phase.[11,13]

Stroke is a major cause of hospitalization and deaths in Nigeria[16-21] accounting for 2.4% of accident and emergency admissions and 17% of deaths in the medical wards of Ogun State University Teaching Hospital, Sagamu, Southwest Nigeria.[22] In another Nigerian hospital-based study in Jos, overall mortality from stroke was 35% of all stroke admissions and most (76.2%) deaths occurred within the 1st week of hospitalization.[9] In the same Jos study, at the end of 30 days, the death toll has increased to 95.2% of the stroke deaths and 33.3% of all the stroke admissions within the period under review. In University College Hospital, Ibadan, acute stroke constituted 33% of medical coma, 3.2% of hospital emergencies, 1.0% of total hospital admissions, and 7.3% of medical deaths during the study period.[23] Post-stroke complications, which can be medical or neurological complications, account for 23–50% of total deaths in patients with ischemic stroke.[24] Neurological complications of stroke often account for the worsening seen during the acute phase and they include brain edema, hemorrhagic transformation, seizures, delirium, and recurrent stroke.[25] The medical complications[24] of stroke, on the other hand, include aspiration pneumonia, deep vein thrombosis, and pulmonary embolism, decubitus ulcers, hypocalcemia, hyponatremia from syndrome of inappropriate antidiuretic hormone, cardiovascular complications, and sepsis. Most Nigerian studies on stroke mortality and outcome were conducted in the Southwest and Northern regions of Nigeria. There is a paucity of published data on the outcome of treatment of patients admitted on account of stroke into the medical wards in the Southeast region of Nigeria. This study, therefore, set out to bridge this gap in knowledge and to serve as an audit of stroke

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management by the Department of Internal Medicine, Abia State University Teaching Hospital (ABSUTH), Aba. Data on stroke mortality are critical for monitoring disease trends and planning public health interventions.

Subjects and Methods

Study Setting/Location

This was a retrospective descriptive study carried out on medical records of patients admitted on account of stroke into the male and female medical wards of ABSUTH, Aba. Aba is a commercial city in the Southeastern region of Nigeria known for her industrial, mercantile, and craftwork activities. The hospital is the only tertiary health facility in Aba and gets referrals from all the primary and secondary health facilities in Aba and the neighboring states. The medical wards (male and female) have 52 beds all together with two isolation wards. Medical inpatients come from the emergency department, medical outpatients clinic, and antiretroviral therapy clinic, transfer from the other specialties of the hospital such as the obstetrics/gynecology or surgical wards. The Department of Internal Medicine, ABSUTH, Aba, has the major subspecialties in medicine (cardiology, endocrinology, nephrology, gastroenterology, infectious disease unit, respiratory, and rheumatology units), each headed by a consultant in the subspecialty and assisted by medical residents and interns. The medical wards have other support staffs such as the nursing unit, medical records, pharmacy section, and the cleaners.

Inclusion Criteria

All patients admitted because of stroke in the medical wards aged 15 years and more were recruited. Patients with repeat visits within the study period were counted as two or more depending on their number of visits.

Exclusion Criteria

Patients admitted because of stroke whose data were incomplete or missing were excluded from the study.

Study Design and Definition of Operational Terms

All the diagnoses were based on the final diagnoses made by the supervising consultants. These diagnoses were arrived at mainly on clinical grounds as most of the patients were not investigated with an urgent brain computed tomography (CT) scan because of financial challenges and unavailability of CT equipment in the hospital. Duration of hospital stay of 1 day refers to patients in whom the outcome of admission occurred within 24 h of admission in the medical wards. A repeat stroke was counted as two stroke admissions if both were managed in ABSUTH, Aba, while some stroke admissions were referred from peripheral hospitals after several hours and days of treatment without obvious improvement.

Data Collection

The following data were collected from each patient's record – age, gender, definitive diagnosis, duration of hospital stay, and outcome of admission. In this study, the outcome measures were improved and discharged home, died, discharged against medical advice (DAMA), or transferred to another specialty outside the medical wards or to another health facility.

Ethical Consideration

Ethical approval was obtained from the Institution's Health Research Ethics Committee before commencing the study

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS Inc., Chicago IL., USA) version 20.0 statistical software was used for data analysis. For continuous variables such as the ages of the study subjects and length of hospital stay, mean values and standard deviations were calculated and the means compared using independent two samples *t*-test. Categorical variables such as the frequency of the diagnosis, sex, and outcome of medical ward treatment were summarized using proportions expressed in percentages. The categorical variables were compared using the non-parametric test, Chi-square test. The level of statistical significance was set at $P < 0.05$.

Results

A total of 6587 admissions were recorded in the medical wards within the study period, of which 830 (12.6%) were admitted because of stroke, made up of 382 (46%) males and 448 (54%) females with a ratio of 1:1.17. The age range was 22–103 years with a mean age of 63.65 ± 13.25; male 64.15 ± 12.30 and female 63.15 ± 13.99. The differences in the mean ages of the male and female patients were not statistically significant ($t = 1.08$, $P = 0.277$). The minimum ages of the male and female participants in the study were 32 and 22 years, respectively, but the maximum ages of the males and females were 93 and 103 years, respectively. The mean duration of hospital stay for the patients was 10.09 ± 12.03 days with a range of 1–123 days; males were 9.49 ± 9.79 days and females were 10.59 ± 13.64 days. The differences in the mean duration of hospital stay of the male and female patients were not statistically significant ($t = 1.315$, $P = 0.189$). Majority of the stroke admissions, 529 (63.7%) belonged to elderly population followed by the middle aged while stroke in the young (age <40 years) was rare at 3.7% and this was predominantly in the female patients [Table 1].

Stroke was the most common cause of medical ward deaths within the study period [Table 2]. Overall, 437 (52.7%) of the stroke admissions improved and were discharged home, 351 (42.3%) died and 36 (4.3%) were discharged against medical advice [Table 3]. Majority of the stroke mortalities (79.2%) occurred within the 1st week of hospitalization and by the end of the 2nd week, the death toll has risen to 91.5% of the stroke deaths. By day 30, majority of all those that improved (95.9%) have been discharged home [Table 4].

Discussion

Stroke contribution to medical admissions in the index study reflects the disproportionately higher occurrence of stroke in the low- and middle-income countries than the developed world.[3] Two-thirds of all strokes globally are estimated to occur in the low- and middle-income countries, especially sub-Saharan Africa.[26] Stroke

Table 1: Gender and outcome of stroke admissions stratified by age groups in ABSUTH, Aba

Age group (years)	*Male*	*Female*	*Improved*	*Died*	*DAMA*	*Referred*	*Total (%)*
20–39	7	24	15	15	1	0	31 (3.7)
40–59	130	140	144	107	16	3	270 (32.5)
60 and above	245	284	278	229	19	3	529 (63.7)
Total	382	448	437	351	36	6	830 (100)

DAMA: Discharged home against medical advice, Improved: Improved and discharged home. ABSUTH: Abia State University Teaching Hospital

Table 2: Outcome of treatment of the major diseases that caused medical admissions

Conditions	*HIV/AIDS*	*DM complications*	*Stroke*	*HF*	*CKD*	*HTN*	*Malaria*
Home	390	915	437	646	220	302	255
Dead (%)	279 (4.24)	249 (3.78)	351 (5.34)	106	111 (1.69)	6	8
DAMA	55	46	36	20	17	8	10
Referred	128	10	6	5	24	0	0
Total	852	1220	830	777	372	316	273

HIV/AIDS: Human immunodeficiency virus/acquired immune deficiency syndrome, DM: Diabetes mellitus, HF: Heart failure, CKD: Chronic kidney disease, HTN: Hypertension, DAMA: Discharged against medical advice

Table 3: Treatment outcome of stroke patients by gender in ABSUTH, Aba

Gender	*Improved and discharged home*	*Died*	*DAMA*	*Referred*	*Total*
Male	212	151	13	6	382
Female	225	200	23	0	448
Total (%)	437 (52.7)	351 (42.3)	36 (4.3)	6	830

DAMA: Discharged home against medical advice. [χ^2=10.825, *P*=0.013]

Table 4: Stroke outcome on a day-by-day basis from day of hospitalization

Day of admission	*Discharged home (n=437)*	*Died (n=351)*	*DAMA (n=36)*	*Referred*	*Total*
Day 1	3	92	8	1	104
Day 2	11	57	2	1	71
Day 3	19	54	6	1	80
Day 4	26	24	2	0	52
Day 5	18	21	3	0	42
Day 6	21	11	2	0	34
Day 7	27 Total=125 (27.9%)	19 Total=278 (79.2%)	0 Total=23(63.9%)	0	46
Day 8	36	10	2	0	48
Day 9	27	5	1	0	33
Day 10	27	9	0	0	36
Day 11	21	6	2	0	29
Day 12	18	6	2	0	26
Day 13	27	6	1	1	35
Day 14	18 Total=299 (68.4%)	1 Total=321(91.5%)	1	1	21
Day 15	26	2	0	0	28
… to day 30	Total=120 (27.5%)	Total=19 (5.4%)			

DAMA: Discharged against medical advice

admission in our medical wards is comparable to the findings in other Nigerian studies.[16-21] In two tertiary hospital-based studies in Sagamu[22] and Ibadan,[23] acute stroke accounted for 2.4% and 3.2% of accident and emergency admissions, respectively. This statistics is a reflection of what would happen in their medical wards and this is in tandem with the increased stroke admissions noted in the medical wards of ABSUTH, Aba. The implication of a considerable stroke admission in the medical wards is that the stroke inpatients may not have received the best of critical care needed compared to admissions in a dedicated stroke unit. A possible explanation for the increased stroke admissions in the medical wards could be because the modifiable risk factors of stroke are not receiving adequate attention. Stroke in this study occurred more (63.7%) in elderly population than in the middle aged (32.5%) probably because older age is a non-modifiable risk factor for stroke. However, more females (54%) than males had stroke in this study contrary to what is known that male gender is a non-modifiable risk factor for stroke occurrence. Reason for this is not very obvious, but it may be that the modifiable risk factors in the population could have a strong cofounding influence over the non-modifiable risk factors when both are present or that women have a better health seeking behavior and therefore more likely to present to the hospital. Stroke in the young at 3.7% is relatively high for this age group and a cause for worry as this age group is not at high risk for stroke. Reason for this is not obvious and can be an objective for a future study. The middle-aged population (32.5%) came second in the stroke admissions in the index study, of which more than half of that population (17.3%) improved and were discharged home with expected varying degrees of neurological deficits and disability. This is not good for the economic and workforce supply of the country. The stroke mortality rate of 42.3% observed in this study is in keeping with findings in other Nigerian studies where mortality

rates were reportedly very high with a range of 21–45%.[11-15] It is comparable to the high case fatality of stroke in Africa which is estimated at 35% but ranges from as low as 14.9% to as high as 77% when due to cerebral hemorrhage.[10] Stroke contribution to medical ward deaths (5.43%) in the index study is lower than the 17% and 7.3% reported in Sagamu[22] and Ibadan,[23] respectively. On the other hand, the overall stroke mortality in the index study is higher than 35% stroke deaths reported in Jos, Nigeria.[9] Reasons for this disparity in stroke medical ward mortalities in these Nigerian studies are not known, as the most common cause of medical ward deaths within the study period, all hands must be on deck by individuals, communities, government, and health-care professionals to address the stroke modifiable risk factors in a bid to prevent strokes. Finally, majority of stroke deaths in the index study (79.2%) occurred within the 1st week of hospitalization and by the end of the 2nd week, the death toll had risen to 91.5% of all stroke deaths within the period under review. This result is similar to the findings in the Jos[9] study and may suggest serious shortcomings in intensive nursing and medical care which are crucial to a favorable outcome. It is possible that in the setting of a dedicated stroke unit in these Nigerian health facilities, where multidisciplinary care services are rendered, the outcome would have been different from the current findings. In the study in Jos,[9] Nigeria, death toll at the end of 30 days in the ward was 95.2% which is comparable to 96.9% noted in this study.

A limitation of this study was our inability to characterize the type of strokes, whether ischemic or hemorrhagic. This was occasioned by the fact that most of the patients in this review did not undergo neuroimaging due to lack of facilities and cost. A corollary of this is that the effectiveness of thrombolytic therapies (use of recombinant tissue plasminogen activator) and surgical interventions in ischemic and hemorrhagic strokes, respectively, could not be assessed by this study. These data are important for health planners, stake holders, government, and the clinicians in tackling the challenges of stroke in the community.

Conclusion

This study has shown that stroke is an important cause of medical admissions in ABSUTH, Aba in Southeast Nigeria with a significant mortality which was more prominent in the acute phase of hospitalization for the illness. The geriatric population was the predominant age group admitted for stroke. There is a need, therefore, to address the modifiable risk factors of stroke with a view to preventing strokes. This can be achieved through massive health education in schools, churches, mosques, health facilities, and the mass media with a view to controlling the modifiable risk factors of stroke. Dedicated stroke units are overdue in specific centers in the major regions of Nigeria.

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