REVIEW ARTICLE

# Contributing to a Better Understanding and Management of Stroke in Nigeria: the Burden, the Challenges, Resources and Opportunities

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**ABSTRACT**
**Background**: Stroke is a major cause of morbidity and mortality in Nigeria and remains a leading cause of hospitalization in neurological services in the country. The economic burden of stroke, its associated disability and the challenges in its management are major sources of concern for a country beleaguered by socio-economic difficulties.
**Methodology**: We searched the PUBMED database with emphasis on studies on stroke conducted in Nigeria using a combination of the following words; stroke, prevalence, epidemiology, social issues, knowledge treatment and prevention issues in Nigeria. Articles in our personal files were also included.
**Results:** Fifty (50) relevant studies that met the criteria were reviewed and recent studies showed a rising prevalence of stroke in Nigeria. The disease is still enrobed in superstition and myths in Nigeria as a result of the influence of cultural beliefs, tradition and religion. The mortality rate still remains high due to challenges in its management in the country.
**Conclusion**: The prevalence of stroke has been observed to be rising in Nigeria. The enormous resources needed in the management of stroke in the face of the present economic realities in Nigeria are quite daunting. Therefore prevention through public campaigns, optimal care of stroke risk factors and adoption of healthy life style remains the only viable option at present.

***Keywords**: Epidemiology, knowledge, prevention, risk factors, social issues, treatment*

## INTRODUCTION

Stroke is a common neurological disorder, a leading cause of hospitalization in neurological services in Nigeria.[1] It represents a major public health concern and an important cause of disability and death among the young adult working class in Nigeria.

Stroke is the rapid development of features of global or focal neurological deficits lasting more than 24hours or leading to death with no apparent cause other than vascular.[2] The Stroke Council of the American Heart Association/American Stroke Association has come up with an updated definition of stroke for the 21st century.[3] The new definition of stroke is now extensive and more elaborate. Central nervous system infarction is now defined as brain, spinal cord, or retinal cell death attributable to ischaemia, based on neuropathological, neuroimaging, and/or clinical evidence of permanent injury.

Central nervous system infarction occurs over a clinical spectrum: Ischaemic stroke specifically refers to central nervous system infarction accompanied by overt symptoms, while silent infarction by definition causes no known symptoms.[3] Stroke also broadly includes intracerebral haemorrhage and subarachnoid haemorrhage. The updated definition of stroke incorporates clinical and tissue criteria and can be incorporated into practice, research, and assessments of the public health.[3]

Stroke follows heart disease and cancer as the third most common cause of death worldwide.[4] It is a major cause of the long-term disability found among its survivors. Though, stroke cuts across races, ages and gender, multiracial studies have shown higher prevalence among blacks compared to their Caucasian counterparts.[4,5,6] It is particularly common after the sixth decade of life although the younger age groups are also not spared.[4,7]

Stroke is responsible for between 0.9 - 4% of hospital admissions in Africa.[8] It accounts for 0.5-45% of neurological admissions in Nigeria.[9] The economic burden of the disease, its associated disability, the physical stress on the care-givers of its victim as well as the overstretching of health facilities remain topical issues.[10, 11]

In a country like Nigeria where majority of its populace live in rural areas and as well as below the poverty line; where western medicine is perceived as alternative to traditional therapy; where diseases are generally regarded with religious-animistic views, indigenous perceptions and where local traditional and spiritual healers play early catchment role for stroke patients, it is important to sensibly and carefully reexamine the role of traditional/spiritual medicine care, the economic realities, resources and available scientific evidence.[12] Such attempts will allow us to improve our understanding of ailment phenomena as experienced from the first-person point of view, and related issues surrounding stroke. It will in addition, provide optimum medical care, harmonizing than wholly adopting imported paradigms and ultimately offer culture-congruent and acceptable therapeutic modalities. This is essential for ensuring compliance, for controlling disease burden and ultimately for garnering sustained socioeconomic productivity.[12]

## THE BURDEN

### Epidemiology of Stroke in Nigeria

The exact incidence and prevalence of stroke in Nigeria is not known. However, according to the report from stroke registry in Ibadan, the incidence of stroke was 0.21/1000 in 1977.[13] Osuntokun *et al* obtained a prevalence ratio of 0.58/1000 in 1987 in a rural community in western Nigeria. Subsequent studies revealed a rise in stroke prevalence.[14] Values from rural communities in South East and South-South Nigeria were 1.63 and 8.51/1000, respectively.[15, 16]

In a door-to-door survey carried out by Danesi, *et al* in Lagos, the prevalence of stroke in an urban community was 1.41/1000.[17] This is slightly higher than the findings in a similar study in Ilorin, middle belt Nigeria where the prevalence was 1.31/1000.[18]

The following risk factors have been identified to have a strong link with stroke in Nigeria, from various studies across the country:

**Sex:** Stroke is more common among males, except in few studies where females were more affected.[16, 17, 18, 19 20, 23, 28]

**Age:** Prevalence of stroke increases with advancing age.[14, 18, 23]

**Hypertension:** Uncontrolled hypertension is the most common modifiable risk factor for stroke in the country.[14, 19, 17, 23] A study that compared risk factors for stroke between patients in Ibadan (Nigeria) and Berlin (Germany) found hypertension to be more common among patients in Ibadan as against cigarette smoking, dyslipidaemia, atherosclerosis and cardiac factors which were commoner among patients in Berlin.[24]

Other identifiable risk factors include central obesity, previous transient ischaemic attack (TIA) and stroke, diabetes mellitus, smoking excessive alcohol consumption and use of hormonal oral contraception.[19,23] Central obesity was the second commonest risk factor followed by diabetes mellitus in a study in Jos.[24] TIA was second to hypertension, followed by tobacco smoking, excessive alcohol consumption and use of oral contraception in a study from the middle-belt region of the country.[19] Diabetes mellitus was the second leading risk factor in a study at Federal Medical Centre, Ido Ekiti, South-West, Nigeria.[21] A study in Abuja, where 96.7% of the patients studied had Neuroimaging done, 61.8% had cerebral infarction, 34.8% had intracerebral haemorrhage and 3.4% had SAH.[25] The 30-day case fatality of stroke ranges between 18.8% and 41.2% across Nigeria.[19,25,26] This suggests that stroke is a continuing cause of mortality even beyond the acute phase.

**Increasing Incidence of Stroke in Nigeria**

The incidence of stroke is noticed to be increasing in Nigeria as observed in other developing countries. Some factors noted to have contributed to this include:

(1) Poor Knowledge of Stroke – Many Nigerians have a poor knowledge of stroke risk factors.[27,28] Many still believe stroke is a spiritual attack or punishment from the gods. Among adults studied in South Nigeria, 46.7% believe stroke is a spiritual attack, 41.4% believe it is best treated by herbalists (native healers).[27] Awareness of warning signs among suburban Nigerians at high risk for stroke is poor according to a study conducted by Wahab, *et al,* in South-South Nigeria. Among 225 respondents, only 39.6% could identify at least one stroke warning sign while the commonest sign identified was sudden unilateral limb weakness (24.4%).[29]

(2) Increasing prevalence of other risk factors of stroke like obesity, diabetes mellitus, tobacco smoking, excessive alcohol consumption, use of oral contraception which often co-exist with hypertension in majority of stroke patients.[18,19,24]

(3) Inadequate care of the risk factors: Many hypertensive patients in Nigeria poorly comply with medications.[30,31] Reasons include ignorance on need to take medications regularly, financial handicap, low level of formal education, younger age, lack of support from family members or friends.[30,31]

(4) Influence of cultural and religious beliefs about stroke on treatment option. Traditional medicine like acupuncture, herbal remedies and homeopathy massage are frequently chosen by patients over the western medications.[27,28]

(5) Other factors include adoption of Western diet and sedentary lifestyle.[32]

**The Socio-economic Burden of Stroke**

Stroke is a major cause of morbidity and mortality in Nigeria, constituting an economic burden to the patient, caregivers, the society and the government. About 10% of all deaths in the world are due to stroke.[33] It kills 5.5 million people yearly with 44 million disability adjusted life-years (DALYS) lost. In 2010, 70% of the 16.9 million strokes occurred in low and middle income countries. This is expected to rise over the next 20 years.[34]

Stroke patients with various disabilities have difficulty in engaging in employments thereby making them to be dependent on care-givers and thus increasing dependency population. Stroke tyrannically redefines everything. It forces its victim to accept their newly flawed body or sink into the pit of depression.[35]

The cost of illness of a chronic disabling disease such as stroke is enormous. Cost of illness describes the economic burden of a disease on the society. It consists of direct and indirect costs. Direct costs are healthcare and non-health care costs. Health care costs include expenditures on investigations, medications, rehabilitation, e.t.c. while non-health care costs include expenditures on transportation for physician visits, home and automobile modifications. Indirect costs describe lost productivity due to disability or premature death resulting from an illness or disease.

Stroke costs the United States approximately $34 billion yearly, and this includes both direct and indirect costs.[36] Yearly, the UK loses about £8.9 billion to stroke.[37] The total annual cost of stroke is estimated at £27 billion in the 27EU countries.[38] An additional cost of £11.1 billion is calculated for the value of informal care.[38] There is paucity of data on the economic burden of stroke in Nigeria. However, a pilot study conducted between 2005 and 2011, revealed that it required an average of #95,100 ($600) and #767,900 ($4860) in a government and private hospital respectively to manage stroke in the first 36 weeks.[39] This did not include costs of hospital bed space, feedings, and cost of care by medical personnel (doctors and nurses), medications throughout the 36 weeks, as well as cost of other informal care.

The study showed that between #58,400:00 ($370 = €279.16) and #196,000:00 ($1240 = €935.57) were spent on investigations which included neuroimaging. Physiotherapy for 12 weeks cost a patient between #32,000:00 ($202 = €152.41) and #200,000:00 ($1265 = €954.43); the same service cost between #89,000:00 ($56 = €422.51) and #56,000:00 ($3540 = €2670.89) for 36 weeks.[39] The sum of #4,700:00 ($30 = €22.63) and #11,900:00 ($75 = €22.63) was required for medications for seven to fourteen days post stroke.

The minimum and maximum amounts noted in this study represented the average costs in government and private health facilities respectively.[39] Considering the current exchange rate (#317.02 = $1; #387.64 = €1) and the inflation rate of 17.85%, the cost of managing stroke in the present day Nigeria will be several folds higher than the one estimated by the pilot study above.[40]

We await more studies in Nigeria that will capture the total costs of managing a stroke. This will help the policy makers in priotizing the disease.

## CHALLENGES IN THE MANAGEMENT OF STROKE IN NIGERIA

**Wrong Perception of Stroke as a Spiritual Attack**

The culture and tradition of a group of people determine their perception of a disease. This also has further impact on the treatment approach adopted by them. Many Nigerians interpret stroke as the handiwork of witchcraft some think, it is a sign that the 'gods' are angry thereby striking the victim with paralysis.[27, 28]

The Yoruba in South West Nigeria believe the stroke that occurs during sexual intercourse is attributed to a fetish condition called "Magun" which literally means "do not climb or do not have sex". Magun is believed to be a mystical charm used by the ancient culture and traditions of the Yoruba in South-West Nigeria to curb sexual promiscuity and infidelity in marriage relationships. A victim may suddenly collapse or die during the act. However, there is paucity of documentation on vascular events related to sexual activity in Africa to confound or confirm this claim.

**High Prevalence of Poverty and Illiteracy**

The National Bureau of Statistics revealed in 2010 that 60.9% of Nigerians were living in "absolute poverty".[41] Approximately 100 million Nigerians live on less than $1 a day.[41] The rate of utilization of orthodox health care is reduced among the low socioeconomic class due to lower level of education, knowledge and financial capacity found in this class. This is the reason many sufferers of stroke seek cheaper modes of treatment in spiritual homes (like churches, mosques), herbal houses, chemists, etc. Poverty contributes to non-adherence to treatment of known risk factors like hypertension, diabetes and hypercholesterolemia as the drugs are fairly expensive and most patients cannot afford continuity in their purchase

**Delay in Presentation of Patients Post-Stroke**

Delay in recognizing the symptoms of stroke, lack of means of transportation and lack of good road networks are sometimes responsible for delay in presentation.

**Expensive and Inadequate Computerised Tomography (CT) Scan Facility**

The least neuroimaging required in the management of stroke (cranial CT scan) is not available in most major towns in Nigeria. Patients travel several kilometers even in unstable clinical conditions in order to have cranial CT scan done. A brain CT scan costs between ₦40, 000 and ₦60, 000 ($126 - $189) in Nigeria, limiting the number of patients that can afford it.

**Dearth of Qualified Personnel in the Management of Stroke**

The number of neurologists in Nigeria is less than 160 for an estimated population of 180 million inhabitants. This number is grossly inadequate signifying that majority of stroke patients will be seen and managed by inexperienced personnel. These patients are referred to specialists when it is late and prognosis is poor.

**Lack of Adequate Number of Stroke Units**

Stroke units facilitate the provision of stroke care by a multidisciplinary group of specialists which comprise of neurologists, neurosurgeons, nurses, physiotherapist, dieticians, speech therapist and occupational therapists. There is documented evidence of long term reduction in death and disability by rendering such a co-ordinated care.[42] Stroke units are, unfortunately, not readily available in Nigeria.

**Poor Government Policy**

At the moment, the National Health Insurance Scheme (NHIS) does not cover every segment of the population especially the lower socio-economic class. Majority of the population therefore pay all medical bills from their pockets.

**High Prevalence of Stroke among Young Adults <45years**

This is also relatively high in Nigeria contributing to loss of economic power and a lifetime of medical complications.[7]

**Lack of Long Term Follow-up**

This is particularly difficult in Nigeria due to lack of central identification registries and poor record keeping.

**RESOURCES AND OPPORTUNITIES**

The enormous resources needed in the management of stroke in Nigeria, hinge on contributions from individuals, groups, non-governmental organizations, government and national health insurance scheme. However, considering the limited resources resulting from the present economic hardship in the

country, the cheapest means of tackling the burden of stroke appears to be its prevention.

Primary prevention can reduce stroke occurrence and be implemented at low cost. Firstly, there is urgent need to correct the widespread false beliefs on stroke via national educational campaign programs. The populace needs more enlightenment campaigns on stroke risk factors such as hypertension, smoking, excess alcohol consumption, diabetes e.t.c), the modes of presentation and the need to present early for medical care and expected recovery pattern. Campaign programs similar to Go Pink for Women Campaign & World Heart Day which have been effective in spreading education and increasing disease awareness can be employed.[43]

Globally now, the use of Smartphone technologies is being explored in the primary stroke prevention e.g. researches in New Zealand have developed a stroke Riskometer app which employs responses to a questionnaire in determining 5 and 10 years risk for stroke using a validated algorithm similar to Framingham risk score.[44]

Prevalent risk factors for stroke in the country; hypertension, central obesity, diabetes mellitus smoking and excess alcohol consumption should be targets for intervention.[19, 22, 24] National strategies aimed at promoting healthy lifestyle, reducing tobacco smoking, reducing salt and alcohol consumption should be in place.

The three-year INTERSTROKE study confirmed that 88% of strokes were attributable to 10 risk factors: hypertension, smoking, waist-to-hip ratio, diet risk score, physical inactivity, diabetes mellitus, alcohol intake, psychosocial factors (including stress and depression), Cardiac causes and the ratio of apolipoprotein B to apolipoprotein A1.[45] It further noted that targeting these risk factors on a primary care level and focusing on healthy lifestyles could significantly improve the global burden of stroke.

A promising means of reducing prevalence of hypertension and stroke in developing countries is to develop strategies to reduce salt consumption at the population level.[46] It is proven that reduction in salt intake by 3g/day is strongly corrected with reduction in blood pressure and 13% decrease in stroke.[47] The use of aspirin and low cost antihypertensive like thiazides, B blockers has been suggested as cost effective in developing countries.[46, 48]

Similarly, campaigns for smoking cessation need to be intensified. Legislations that ban public smoking, heavy taxation of tobacco companies as well as public education on hazards of tobacco will reduce incidence of smoking – related strokes.

Other preventive measures include promotion of healthy diets, physical activity and discouragement of excess alcohol intake. They reduce incidence of diabetes mellitus, obesity and hypertension which are all established aetiological factors for stroke.

The religion of an individual sometimes influences his choice of health care facility. His belief affects his view and approach to health issues. This must be thoroughly considered when dealing with health issues among Africans, who are highly religious and spiritually inclined. Highly educated individuals still patronize traditional and religious healers buttressing the ideology of religions rather than knowledge being a more significant factor in health care choices. This calls for better education of various religious leaders in influencing their followers on appropriate approach to health issues particularly stroke.

Ryan also noted that the determinant models of health seeking behaviour include demographic aspects such as the level of education, occupation and income of the household head.[49] The income of an individual or breadwinner of a household, therefore, determines their choice and pathway to health care services. As many Nigerians live below poverty level, no

wonder many opt for cheaper alternatives in the management of stroke. This calls for adequate health insurance policy to cater for all Nigerians. With this in place, patients are likely to patronize the right health care when the financial burden is not theirs to bear in the immediate period.

An ideal healthy system care for stroke requires structure, staffing and financing. Walker and colleagues argue that stroke units could be of benefit in Africa.[50] There is overwhelming evidence that dedicated specialized stroke units reduce morbidity and mortality in stroke patients.[42] As desirable as this is in Nigeria, it is doubtful if necessary funding will be available within the next few years. In the meantime, efforts at delivery of co-ordinated stroke care, availability of neuroimaging, affordable intravenous alteplase (rTPA), and good road network would translate to significant reduction of morbidity and mortality of stroke.

Failure of full restoration of neurological function lost after stroke is misconstrued by some as treatment failure thereby strengthening their belief of stroke being a spiritual attack. Counseling should therefore be an integral part of adequate management following a stroke. Patients should be carried along in the rehabilitation process and fully educated on expected pattern of functional recovery.

In conclusion, Nigeria has many challenges to contend with the management of stroke, the most congenial solution therefore lies in ensuring better preventive measures such as health education, adequate treatment of common risk factors and adoption of better lifestyles.

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