Instantaneous stroke risk assessment of adults in Enugu, South-East Nigeria: results from a random point survey

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Abstract

Stroke remains a major cause of morbidity, death, and disability around the world, especially in black Africans. Understanding the magnitude and appreciation of stroke risk in susceptible populations remains a key strategy in reducing stroke burden. This study compared 5-year stroke risk in an adult Enugu, South-East Nigeria adult population. A point cross-sectional survey assessing stroke risk in adults was conducted in October 2019 in the city of Enugu using the Stroke Riskometer app as part of the World Stroke Day commemoration. The data were analyzed, and ethical approval was obtained. The total number of participants in this survey was 117 traders in a market in the Enugu metropolis, Enugu State, Nigeria. More males, 63%, than females, 37%, participated in this study. The total mean age was 47.50 years, with a total mean 5-year stroke risk of 3.93. Stroke risk was higher in females 4.56 than in males 3.56. In 35% of the participants, elevated blood pressure was present, and 5% of the total population had elevated blood glucose. The World Stroke Organization's Stroke Riskometer app is a valuable tool for assessing stroke risks, especially in resource-poor settings. This app also serves as a cost-effective method of conducting epidemiological research on stroke and other non-communicable diseases internationally. Hypertension remains the most common risk factor for stroke globally. Higher stroke risk in females is likely associated with higher mean age.

Introduction

The socioeconomic and health effects of stroke are huge and increasing worldwide, but especially so for developing countries and black populations. However, there is still low awareness about stroke and its risk factors in such Low- and Middle-Income Countries (LMICs). These factors, coupled with the under-utilization of strategies for the primary prevention of stroke and the lack of accurate data on the prevalence and effect of risk factors in different countries and populations, have been implicated in the ever-increasing worldwide burden of Non-Communicable Diseases (NCDs) including stroke.[1-4]

The burden of stroke has also increased in young and middle-aged adults <65 years, which can be related to the increase in overweight/obesity caused by high consumption of fat diet. Knowledge about the contribution of modifiable risk factors to the increasing global and regional burdens of stroke is crucial for informing stroke prevention strategies.

The current prevalence of stroke in Nigeria is 1.14 per 1000, while the 30-day case fatality rate is as high as 40%.[5] Management of the disease is largely conservative, with little or no funding for high-quality research.[5]

A crude stroke prevalence rate of 1.31/1000 population was observed in three semi-urban communities in the middle belt region of Nigeria. The prevalence of stroke was higher among the males than the females (1.54/1000 *vs* 1.08/1000) with a ratio of 1.4:1. Sixteen subjects (94.1%) had one or more risk factors for stroke. Uncontrolled systemic hypertension (82.4%) was the most common risk factor for stroke, followed by Transient Ischemic Attack (TIA) (41.2%).[6]

There is a paucity of literature and data on stroke risk as assessed in the South-East zone of Nigeria, of which Enugu is the capital. This study reflected the scope and magnitude of the stroke risk debacle in this region and served as a basis for greater concerted efforts.

This paper seeks to assess stroke risks in selected populations of Nigerian adults utilizing the Word Stroke Organization (WSO) Stroke Riskometer app, which has been demonstrated to be a sim-

ple yet efficient instrument for predicting stroke risk. The results still reflect the poor awareness among the general population and a need for the implementation of new, effective, widely available, and cost-effective prevention and treatment strategies to reduce the incidence and severity of stroke in Nigeria.

Materials and Methods

Study site

Enugu state, from the 2006 National census in Nigeria, had a population of 3,267,837 people and was projected to have an estimated population of over 4.4M as of 2016.[7] The state lies geographically between longitudes $7^0\ 26^0$ E to 30^0 E and latitudes $6^0\ 23^0$ N to 28^0 N. The capital is Enugu City, with a population of 722,664 according to the 2006 Nigerian census.

Study design

This was a descriptive cross-sectional community survey of stroke risk in adults in a large market in Enugu metropolis, Southeast Nigeria.

Study population, resources and size

One hundred and seventeen adults aged >18 years were recruited during a public health enlightenment campaign as part of the commemoration of World Stroke Day by the Neurology and Stroke Units of the University of Nigeria Teaching Hospital Enugu, on October 29, 2019, in a market in Enugu metropolis. Consenting adults had their sociodemographic data obtained and their 5-year cumulative stroke risk assessed using the WSO Stroke Riskometer app. The validated Stroke Riskometer app provides the stroke probability score comparable to 2 well-known stroke prediction tools - the Framingham Stroke Risk Score and QSTROKE stroke risk prevention algorithms - commonly used in the medical field.[8,9] The Stroke Riskometer app involves a high degree of interactivity and personalization and has received endorsement from the World Federation of Neurology, the World Stroke Organization, and the World Heart Federation.[10] This app has been demonstrated to be a simple, cheap, easily accessible, and effective instrument for determining the risk of stroke in an individual for the next five years.[10]

Results

The total number of participants in this study was 117 traders in a market in Enugu metropolis, Enugu State, Nigeria (Table 1).

More males, 63%, than females, 37%, participated in this study. The total mean age was 47.50 years, with a total mean stroke risk of 3.93. Stroke risk was higher in females, 4.56 (Table 2). The number of participants with elevated blood pressure was 36% of males and 33% of females. The number of participants with elevated blood glucose was 7% for males and 2% for females (Table 3).

Discussion

The recent INTERSTROKE case-control study, conducted in 22 countries worldwide, provided evidence that, collectively, ten risk factors accounted for 88.1% (99% Confidence Interval, CI; 82.3-92.2%) of the population-attributable risk for all stroke.[11] Because many (but not all) of these risk factors are modifiable, the

INTERSTROKE data suggest that interventions that reduce blood pressure, promote physical activity, smoking cessation, and a healthy diet could substantially reduce the burden of stroke.

The Global Burden of Diseases 2010 studies found that the three leading risk factors for disease burden were high blood pressure, tobacco smoking (including second-hand smoke), and alcohol use.[12] Moreover, these three risk factors were ranked in the top 3 for several low- to middle-income regions, including Central and Eastern Europe, Southern Latin America, and Central Asia. In addition, lifestyle factors, such as high sodium, low fruit diets, and physical inactivity, contributed to 10% of disability-adjusted life years in 2010. These risk factors, along with the nonmodifiable factors of age, sex, and ethnicity, contribute significantly to stroke incidence.[11]

Feigin *et al.*[13] observed globally, 90·5% (95% UI 88·5-92·2) of the stroke burden (as measured in DALYs) was attributable to the modifiable risk factors analyzed, including 74·2% (95% UI 70·7-76·7) due to behavioral factors (smoking, poor diet, and low physical activity).

The Stroke Riskometer App is an important tool in spreading awareness about stroke, its risk factors, and how to tackle them. The Stroke Riskometer revealed a higher stroke risk in females among traders in the Enugu metropolis. This trend was also seen in global reports or studies on stroke risk assessments. The American Stroke Association reported that women have a higher stroke risk than men.[14] Several factors like pregnancy, preeclampsia, birth control pills, and hormonal replacements were implicated in the higher stroke risk in females.

In this risk assessment conducted among traders in the Enugu metropolis, elevated blood pressure contributed more to stroke risk than elevated blood glucose. In sub-Saharan Africa, Nigeria has the highest number of people with diabetes, with an estimated 3.9 million people (or an extrapolated prevalence of 4.99%) of the adult population aged 20-79 years old.[15] This pattern was also observed in this study, with a total frequency of elevated blood glu-

Table 1. Study population.

Sex	Number of participants	Mean age (years)	Modal age
Male	74	46.73	45
Female	43	48.81	52
Total	117	47.50	53

Table 2. Percentage of stroke risks.

Sex	Number of participants	Mean 5-year risk	Modal 5-year age
Male	74	3.56	2.5
Female	43	4.56	2.6
Total	117	3.93	2.6

Table 3. Population with Elevated Blood Pressure (EBP)/Elevated Blood Glucose (EBG).

Sex	EBP	EBG	Total
Male	27(36%)	5(7%)	32
Female	14(33%)	1(2%)	15
Total	41(35%)	6(5%)	47

cose of 5%. The frequency of elevated blood pressure in this survey was 36% in males and 33% in females, which reflects the higher proportion of hypertension in males, as seen in several studies done in Nigeria. Adeloye *et al.* noted an estimate of 29.5% in males and 25% in females in a meta-analysis of the prevalence of hypertension in Nigeria.[16]

Conclusions

The WSO Stroke Riskometer App is a valuable tool in assessing stroke risks, especially in resource-poor settings. This app also serves as a cost-effective method of conducting epidemiological research on stroke and other non-communicable diseases internationally.

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