

Stroke risk factors among participants of a world stroke day awareness program in South-Western Nigeria

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Abstract

Introduction: Stroke is a major cause of death and disability in population across the world. Hypertension is the most common stroke risk factor globally as well as in the Nigerian population, however other modifiable risk factors such as obesity are becoming increasingly prevalent due to unhealthy diets and sedentary lifestyle.

Materials and Methods: We screened 224 volunteers from Ile-Ife during the 2011 and 2012 world stroke day commemorative activities. Blood pressures (BP) were measured and body mass index (BMI) was determined from weight and height measurements. The data from 40 (18%) were incomplete and were excluded from further analysis.

Results: The 184 subjects eligible for analysis comprised 85 males (46.2%) and 99 females (53.8%), with a male to female ratio of 0.85:1. Their ages ranged from 16 to 95 years (mean, 53 ± 16 years). 25% of the study population had stage 1 or 2 hypertension (mean systolic blood pressure: 127 ± 27 mmHg, mean diastolic blood pressure: 78 ± 16 mmHg), while 34.8% and 14.7% were overweight and obese, respectively (mean BMI: 25.8 ± 5.0 kg/m²).

Conclusion: Stroke risk factors such as hypertension and obesity were common among the participants of the world stroke day awareness program in an urban area of Nigeria. Community screening and modification of these risk factors should be intensified in order to reduce stroke morbidity and mortality.

Key words: Health education, Nigeria, risk factors, screening, stroke

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Introduction

Stroke is one of the leading causes of adult disability and death worldwide. Fifteen million cases of stroke occur globally each year and greater than one-third of these are fatal.^[1] Two-thirds of all strokes are known to occur in developing countries.^[1] In Nigeria, stroke incidence has been put at 26/100,000. Stroke is a major cause of hospital admissions and deaths in Nigeria^[2-7] accounting for 2.4% of emergency admissions and 17% of deaths in the medical wards of Ogun State University Teaching Hospital, Sagamu, South-West Nigeria.^[8] Crude stroke prevalence is 1.14/1000 population^[9] while 30-day case fatality rate in Nigeria may be up to 40%.^[10] It has been documented that 90% of

incident stroke is due to modifiable risk factors while the recurrent stroke is 80% preventable through optimal risk factor modification.^[11] This study is predicated upon the fact that stroke risk factors are often undiagnosed in Nigeria until stroke occurs and this is often due to a lack of awareness of stroke risk factors and prevention.

Some risk factors of stroke can be readily identified during community screening using cheap and noninvasive techniques. These risk factors include hypertension, proteinuria, and obesity. The most common risk factor, for all types of incident stroke worldwide is hypertension.^[12] In South-Western Nigeria,

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hypertension has been shown to be present in up to 85.2% of stroke patients in a rural tertiary hospital.^[12] Hypertension often remains undiagnosed in many Nigerians unless detected during routine community or hospital screening,^[13] or unfortunately at presentation with stroke or other cardiovascular complications. This coupled with a prevalent lack of public awareness of warning signs and risk factors of stroke may be partly responsible for the mounting burden of stroke in low-income countries like Nigeria.^[14] A recent rural community-based study in South-Eastern Nigeria showed that the prevalence of hypertension was 46.4%^[15] while another rural study in South-Western Nigeria puts the prevalence of undiagnosed hypertension at 37.7%.^[13] Another modifiable risk factor for stroke is obesity. A recent meta-analysis including more than 2 million American subjects as reported by Prabhakaran and Chong,^[11] concluded that the relative risk of ischemic stroke was 1.64 in obese versus healthy subjects and 1.22 in overweight versus healthy subjects. Obesity is prevalent in Nigerians with prevalence rates of overweight and obesity estimated at 20.3% and 12.5%, respectively, in a recent large community-based survey of adult residents of a semi-urban Nigerian community.^[16] Obesity prevalence may however, be as high as 30% as shown in another study from a rural Nigerian community.^[13]

Materials and Methods

This study was a descriptive cross-sectional study conducted during world stroke day 2011 and 2012 awareness programs in Ile-Ife, a semi-urban city in South-Western Nigeria with a population of 355,341 according to the 2006 Nigerian National Population Census. The predominant ethnic group in this city is Yoruba. Prior to the world stroke day, 1 h educational programs were broadcast on radio and television, and further announcements were made to invite the public to the local tertiary hospital for free medical screening and counseling. Ethical approval was sought and obtained from the hospital ethics and research committee. Informed consent was obtained from the participants after detailed information about the purpose of the study and the confidentiality of the data obtained. All interested participants were screened for hypertension and obesity. A total of 224 volunteers were screened at the two events. The sample was obtained by convenience sampling and is obviously small because recruitment was done only once on the particular occasion of a stroke awareness event. All test measurements were carried out by a team of six doctors, two physiotherapists, four nurses and two trained research assistants.

Blood pressure (BP) was measured from the left arm with an accoson mercury sphygmomanometer, with the subjects relaxed and in sitting position. Weight and height were measured with standard weighing scale and stadiometer, respectively. The body mass index (BMI) was calculated by dividing each subject's weight by the square of the

height and expressed in Kg/m². Hypertension was defined as BP ≥ 140/90 mmHg according to JNC-7 criteria, while overweight and generalized obesity were defined as BMI of ≥ 25 kg/m² and ≥ 30 kg/m², respectively.

Data were obtained from 224 subjects, but data from 40 subjects was discarded because of incompleteness. Data analysis was done with SPSS Inc. Released 2008. SPSS Statistics for Windows, Version 17.0. Chicago, SPSS Inc. Frequencies of age, gender, BMI, and BP categories were calculated and expressed as descriptive statistics. Chi-square cross-tabulation was used to evaluate the relationship between age and BP, BMI and BP, gender and BMI, as well as gender and BP. Statistical significance was assumed as *P* < 0.05.

Results

Data from 184 subjects were analyzed, comprising 85 males (46.2%) and 99 females (53.8%), with a male

Table 1: Relationship of age and BMI to BP among participants of world stroke day 2011 and 2012

Variable	Blood pressure (frequency (%))			Total	P
	Normal	Stage 1	Stage 2		
Age					
<40	43 (97.7)	1 (2.3)	0 (0)	44	0.011
>40	95 (67.9)	11 (7.9)	34 (24.2)	140	
Total	138 (75)	12 (6.5)	34 (18.5)	184	
BMI					
Underweight	3 (100)	0 (0)	0 (0)	3	0.371
Normal	66 (73.3)	7 (7.8)	17 (18.9)	90	
Overweight	51 (79.7)	4 (6.3)	9 (14.0)	64	
Obese	18 (66.7)	1 (3.7)	8 (29.6)	27	
Total	138 (75)	12 (6.5)	34 (18.5)	184	

BMI=Body mass index; BP=Blood pressure

Table 2: Relationship of BP and BMI to gender among the participants of the world stroke day 2011/2012

Variable	Gender (frequency (%))		Total (%)	P
	Male	Female		
BP				
Normal	58 (42)	80 (58)	138 (100)	0.146
Stage 1	6 (50)	6 (50)	12 (100)	
Stage 2	21 (61.8)	13 (38.2)	44 (100)	
Total	85 (46.2)	99 (53.8)	184 (100)	
BMI				
Underweight	3 (100)	0 (0)	3 (100)	<0.001
Normal	58 (64.4)	32 (35.6)	90 (100)	
Overweight	21 (32.8)	43 (67.2)	64 (100)	
Obese	3 (11.1)	24 (88.9)	27 (100)	
Total	85 (46.2)	99 (53.8)	184 (100)	

BMI=Body mass index; BP=Blood pressure

to female ratio of 0.85:1. The ages of the participants ranged from 16 to 95 years (mean 52.9 ± 15.8 years). The majority ($n = 140$, 76.1%) were above 40 years of age. A third were overweight while 14.7% were obese, 1.6% underweight, and 48.9% had normal BMI.

A quarter ($n = 46$) was hypertensive (mean systolic blood pressure: 127 ± 27 mmHg, mean diastolic blood pressure: 78 ± 16 mmHg). Table 1 shows that hypertension was commoner among persons above 40 years. There was no statistically significant relationship between BMI and BP as shown in Table 1 and between gender and BP as shown in Table 2. However, more females were obese compared to the males and this was statistically significant as shown in Table 2 ($P < 0.001$).

Discussion

The prevalence of hypertension found in this study (25%) is consistent with the range of prevalence figures from across Nigeria documented by previous workers. Ogah *et al.*^[17] observed a prevalence of 8–46.4%, while Fatiu *et al.*^[13] reported a prevalence of 37.7% for undiagnosed hypertension in a rural population and Ulasi *et al.*^[18] obtained a prevalence of 35.4% in a similar population. Though BMI and gender were not found to significantly impact BP levels in this study, other workers have shown that females tend to have a greater rise in BP with age compared to males, while males tend to have a greater increase in BP with rising BMI than females.^[18] However, the findings from this study were contrary as males had a higher BP with advancing age, though not statistically significant. The frequency of obesity in the study is also similar to earlier findings of 12.5% in the same locality.^[16] However, other workers have demonstrated a much higher prevalence figure of 21%^[19] and 21.3%^[20] in urban Northern Nigeria and 30% in rural South-Eastern Nigeria.^[14] The BMI of subjects was not found to vary significantly with age, but females were found to have a higher rate of obesity (24.2%) than males (3.5%). This finding is in keeping with the conclusions of other workers.^[15,16,19-21] In Nigeria, obesity is often considered to be a sign of good living and in the South-South region of Nigeria women are sent to the fattening rooms just before marriage. These sociocultural beliefs and practices might make obesity appear acceptable in females. This was not explored in this study and would need to be confirmed in further studies. The limitations of this study include its use of convenience sampling and the small sample size involved. These limitations preclude definitive conclusions from being made.

Conclusion

Modifiable risk factors of stroke such as hypertension and obesity are common among the participants of the world stroke day program in a semi-urban city of Western Nigeria. We recommend that community screening for these risk

factors should be carried out among the adult population. Specific public awareness programs to reduce the frequency of obesity among females in the population should be developed.

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