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Prevalence of hypertension in a rural, agrarian community in South-South Nigeria

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Abstract

Background: Of the estimated 1.13 billion of persons with hypertension, two-thirds live in low- and middle-income countries. Hypertension is a serious medical condition that remarkably increases the risks of heart, brain, kidney and other diseases. This study aimed to determine the prevalence of hypertension in an agrarian, rural, community in South-Southern Nigeria.
Methods: This is a cross-sectional study, involving 163 participants, was carried out with a structured questionnaire in South Ibie community in Etsako West local government area of Edo State, South-Southern Nigeria. Socio-demographics, anthropometric data, blood pressure and weight measurements as well as random blood sugar (RBS) were obtained from consenting participants.
Results: 163 participants (73 males and 90 females), aged between 18 and 92 years, completed the study with a mean age of 48.22 ± 18.36 yr. The mean weight was 75.45 ± 15.53 and mean body mass index (BMI) was 28.42 ± 6.27kg/m^2. Obesity was present in 35% of the population. The prevalence of hypertension was 24.5% and factors associated with condition were age >40yrs ($p<0.001$) and weight > 80kg ($p = 0.002$). None of those hypertensive had random blood sugar (RBS) levels > 140mg/dl.
Conclusion: Hypertension was highly prevalent in the study population. Age and increased body weight were the major factors associated with hypertension in this community. From the foregoing, we recommend sustained advocacy and health awareness programs targeted at timely detection and control of hypertension as well as mitigation of its associated co-morbidities.

Keywords: Hypertension, Prevalence, Nigeria, Rural

Introduction

Hypertension remains a significant public health problem globally. It is a principal modifiable risk factor for various cardiovascular diseases accounting for nearly 54% of stroke and 47% of coronary artery disease [1]. It remains a significant cause of stroke, congestive heart failure and peripheral vascular disease because of its high prevalence [2-4]. Recent studies have shown increasing trends in the prevalence of hypertension with the number of individuals with hypertension projected to be almost 1.56 billion by 2025 worldwide, and with approximately 75% of them living in developing countries [5]. Hypertension is the 4th contributor to premature deaths in developed countries and the 7th in developing countries [6]. Sub -Saharan African countries are not spared of the increasing global trend of hypertension prevalence. According to United Nations Population Fund data, 125.5 million people are projected to be living with hypertension in Sub-Sahara Africa by 2025, with the prevalence rate rising by 1.2% in 2008 [7]. However, whereas earlier studies demonstrated low prevalence of hypertension in rural communities in Africa [8,9], some more recent studies such as that conducted by Ulasi *et al.* [10] recorded a high prevalence of 32.8% in a rural and semi-urban population in Enugu, South Eastern, Nigeria. Probable reasons adduced for the rising hypertension prevalence include 'westernization' and changing lifestyles of the rural dwellers.

This study aimed to determine the prevalence of hypertension in an agrarian community of South Ibie, Edo State, South-Southern Nigeria. Conceivably, the

physical exercise associated with agricultural activities not only helps control hypertension but also helps in body weight management, strengthening the heart and lowering of stress levels. Consequently, a healthy weight, a strong heart and general emotional health are all combine to lowering blood pressure of such physically active individuals. The findings from the study are expected to guide sustained advocacy and health awareness creation by the relevant authority to the rural dwellers.

Methods

This cross-sectional population-based study was carried out in South Ibie community in Etsako West local government area of Edo State during a medical outreach program for rural community dwellers in South-Southern Nigeria. South Ibie, a rural community has an estimated population of approximately 100,000. The principal economic activity in the rural community was trading and peasant farming in rice, yam and cassava. They are also majorly reputed for high quality palm oil production.

Subjects and selection method

Adult participants who attended the health screening outreach program and met the inclusion criteria were consecutively recruited for the study. Using a structured questionnaire, demographic data and medical history were obtained from them. Clinical examination of participants, including weight, height and blood pressure measurement was done.

Inclusion criteria: Participants who were willing and able to give informed consent for participation in the study were included. All those who were above 18 years of age were also eligible to be enrolled.

Exclusion criteria: Pregnant women and individuals with any form of incapacity.

Study procedure

This cross-sectional study employed quantitative method of data collection. An interviewer – administered questionnaire was used to collect data from the participants. Relevant information of respondents on the socio-demographic data, including age and medical history such as personal and family history of hypertension and diabetes were recorded. Anthropometric data was also collected and the body mass index determined. Thereafter, the random blood sugar sample of each participant was taken.

Having rested for about ten minutes, blood pressure of the participants was measured in the sitting posture with an appropriate-sized cuff encircling the arm, using auscultation method with a standardized sphygmomanometer. Two separate readings were taken at an interval of three minutes. The average of the two readings was taken. Systolic blood pressure (SBP) measured at the appearance of the Korotkov's sounds (Phase I) and Diastolic blood pressure (DBP) was taken at the point of disappearance of the sounds (Phase V). [11]

Weight was measured to the nearest 0.1kg using a standardized bathroom scale with participants standing barefooted and only lightly clothed. Correspondingly, height was measured to the nearest 0.5cm using a stadiometer while participants stood barefooted with feet placed together after removing shoes and head coverings. The weight and height of respondents were measured and body mass index (BMI) was worked out.

Operational definitions

Applying the criteria of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of high blood pressure [12], hypertension was defined as SBP greater than or equal to 140mmHg and/or DBP greater than or equal to 90mmHg or being on drug therapy for hypertension. Participants with blood pressures less than 140/90mmHg were classified as normotensive while those with blood pressure readings greater than 140/90mmHg were regarded as hypertensives. Participants with a first degree relative with hypertension were classified as having a family history of hypertension.

Obesity was defined as a BMI $\geq$ 30 kg/m.^{2} [13] while lesser values were described as non-obese. Determining the random blood glucose (RBG) of participants, with an Accu Check glucometer, diabetes mellitus was defined in participants with RBG value greater than140mg/dl or reported a previous history of diabetes or use of anti-diabetic medications [14].

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 20 statistical software was used for data analysis. For continuous variables, mean values and standard deviations were calculated and the means compared using the independent samples t test. The prevalence of hypertension was determined by a simple proportion of individuals with hypertension compared with the total population using cross-tabulation. Factors associated with hypertension were determined with the Fisher's exact test.

Ethical Clearance

Ethical approval for the study was sought and granted by the Ethics and Research Committee of the Bayelsa state Ministry of Health against the backdrop of it being part of study conducted in both states. The Chairman of Etsako Local Government Council, who attended the medical outreach program in person, granted

authorization for the study. Similarly, all respondents also voluntarily assented to be part of the study.

Results

A total of 163 (73 male and 90 female) participants, with a mean age of 48.22 ± 18.36 years completed the study. The mean weight and BMI of participants were 75.45±15.53 kg and 28.42±6.27 kg/m^2 respectively. The demographic and clinical characteristics of participants are shown in Table 1.

Table 1: Demographic and clinical characteristics of participants

Variables	Range	Mean	SD
Age (yrs)	18 -92	48.22	18.36
BMI (kg/m^2)	17.9 – 48.3	28.42	6.27
RBS (mg/dl)	68 – 479	115.38	44.39
SBP (mmHg)	80 – 200	129.58	22.84
DBP (mmHg)	40 – 120	81.28	14.86
Weight (kg)	32 – 125	75.45	15.53

SD = standard deviation, yrs = years, BMI= body mass index, RBS = random blood sugar, SBP – systolic blood pressure, DBP = diastolic blood pressure

Excluded from analysis were persons with incomplete responses to the questionnaire. Hypertension was found in 40 out of 163 individuals, giving an overall prevalence of hypertension of 24.5%. Twenty-one (28.8%) males and 19 (21.1%) females had hypertension. Whereas systolic hypertension was observed in 32 (19.6%) participants, diastolic hypertension was seen in 33 (20.2%) of them while 25 persons had combined systolic and diabetic hypertension. Thirty-three (20.2%) participants had a previous history of hypertension.

Hypertension was more prevalent in those older than 40 years compared with those who were younger. Out of the 96 individuals who were > 40 years old, hypertension was found in 36(38.3%) while only 4(5.8%) of 69 persons below age 40 had hypertension. This difference was significant (p <0.001). Figure 1 shows that there was a progressive increase in prevalence of hypertension with age.

Fifteen individuals (9.2%) had diabetes out of which 7 (46.7%) had hypertension compared with 22.3% (33 out of 148 individuals) without diabetes. Although the prevalence of hypertension was higher in those with diabetes, the difference was not statistically significant. (p=0.055). Similarly, 57 (35%) of the participants were obese. The prevalence of hypertension among the obese was 31.6% compared with 20.8% in the non-obese. This difference was not statistically significant. However, those who had a higher body weight (>80 kg) had a significantly higher rate of hypertension (p = 0.002).

There was no statistical significance in the prevalence of hypertension across gender (p = 0.259) or the presence or absence of family history of hypertension (p= 0.623). Similarly, there was no difference in prevalence rates in the presence or absence of a previous or a family history of diabetes (with p values of 0.208 and 0.786 respectively. (Table 2).

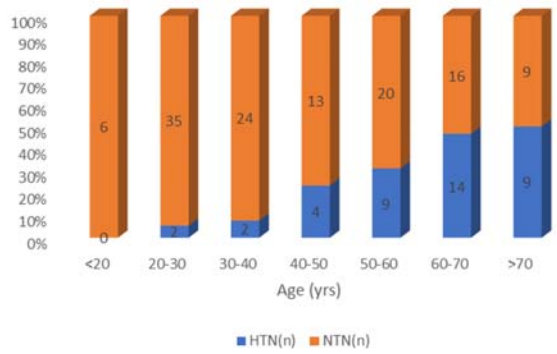

Figure 1: Prevalence of hypertension according to age of participants . HTN = Hypertension, NTN = normotension

Discussion

In this study, there is high prevalence of hypertension in South Ibie was high. This figure is similar to earlier reports in a rural community in Delta State in Nigeria [15, 16]. However, Effiong et al [17] reported a higher rate in a comparative study of urban and rural communities in Akwa Ibom, South-Southern Nigeria. Geographic variations and differing cultural practices in the various populations may account for the dissimilarities in prevalence. In contrast, Adebayo et al. [18] reported a lower prevalence of hypertension in a rural population in Ife North Local Government Area of Osun State, South Western Nigeria. Little wonder, however, as they used a higher threshold for the definition of hypertension in their study. Gender showed no association with hypertension in this study. This is contrary to reports of several other earlier studies [18, 19].

In this study, the prevalence of hypertension was higher in older individuals with higher body weights. Not a few studies have shown that increasing age is associated with increase in blood pressure in the general population, including persons diagnosed with hypertension [20, 21]. The increase in blood pressure with age is, in the main, associated with structural changes in the arteries, and especially with large artery stiffness.

In many earlier studies, body mass index (BMI) exhibited a direct linear relationship with the risk of hypertension. [22 - 26]. Whereas, the association of BMI with hypertension, in this study, was not statistically significant, weight, however, did show some association with hypertension. The positive effect of weight loss with blood pressure control has been reported in several studies [27- 30]. The reason for the lack of association with BMI is not clear. In a related study, the relationship between BMI and

Table 2: Comparison of clinical characteristics between hypertensive and normotensive subjects

Variable	ALL	HTN	NTN	X^2	P
Age(yrs)					
>40	94	36	58	22.698	< 0.001*
<40	69	4	65		
Gender					
Male	73	21	52	1.276	0.259
Female	90	19	71		
Previous History of DM					
Yes	10	4	6	1.375	0.208
No	153	36	117		
Family History of HTN					
Yes					
No	26	5	21	0.471	0.623
	137	35	102		
Family history of DM					
Yes	19	4	15	0.141	0.786
No	144	36	108		
Presence of obesity					
Yes	106	22	84	2.345	0.126
No	57	18	39		
Weight (kg)					
>80	53	21	32	9.648	0.002*
<80	110	19	91		
RBS					
<140mg/dl	148	33	115	4.368	0.055
>140mg/dl	15	7	8		

HTN = hypertension, NTN = norm tension, DM = diabetes mellitus, RBS = random blood sugar
*statistically significant

hypertension, by Ehma et al [31], there was no statistical significance established between BMI and hypertension.

The effect of weight loss on blood pressure reduction was demonstrated in Phase 1 of the Treatment of Hypertension Prevention (HOT) Study [32]. Researchers in the HOT study were interested in the effects and outcome of non-pharmacological variables on hypertension. The variables studied included sodium restriction, stress management, weight reduction, and supplementation with calcium, magnesium, potassium, or fish oil. Weight reduction in the participants was remarkably associated with considerable decline in blood pressure in borderline hypertensives. Apart from sodium restriction which was also associated with blood pressure reduction, the other variables were of no benefit.

Recent studies have demonstrated the effects of elevated serum glucose on hypertension [33]. Hypertension and type 2 diabetes are both aspects of metabolic syndrome, a condition that includes obesity and cardiovascular disease. Both hypertension and diabetes may have some underlying causes in common, and they share some risk factors. Unarguably, diabetes mellitus and hypertension are among the most common diseases and cardiovascular risk factors, respectively, worldwide, and their frequency increases with increasing age [34].
Absence of assessment of residual confounding by family history, lifestyle factors and dietary patterns may be considered as potential limitations of the study. Other limitations include absence of other indices of obesity, such as waist circumference. Hypertension was diagnosed after three different readings in a single sitting for participants that met the diagnostic criteria.

Conclusion

The prevalence of hypertension in South Ibie, a rural community in the Southern part of Nigeria, is high and increases with age and body weight. The findings of the study underscore the need for improved advocacy and health promotion programs on hypertension targeted at rural populations.

List of abbreviations

HTN, hypertension; NTN, norm tension; DM, diabetes mellitus; RBS, random blood sugar

Declarations

Ethics approval and consent to participate

Not provided

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current

study are available from the corresponding author on reasonable request.

Competing interests

No conflict of interest associated with this work.

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Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

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