Prevalence and awareness of hypertension in a rural community in Southwest Nigeria

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Abstract:

Background: Hypertension prevalence is reported to be on the rise in sub-Saharan Africa and the rates of awareness, treatment, and control are low. Limited information exists about the prevalence of hypertension in the rural areas. Objective: - The study aimed to determine the prevalence, awareness, and control of hypertension in a rural community in Southwest Nigeria.

Materials and Methods

A cross sectional study was carried out in Epeme a rural community in Lagos state in southwest Nigeria. One hundred and fifty-five respondents aged 18 years and above were studied. Anthropometric and blood pressure measurements were taken. Information on prior knowledge of hypertension and drug history was documented. Individuals with blood pressure value ≥ 140/90mmHg were regarded as hypertensive. Awareness of hypertension was self report of a previous diagnosis of hypertension.

Results: The mean age was 38.7 ± 13.1 years. The prevalence of hypertension was 34.8% (males 28.6%, females 37.7% p = 0.267); 51.9% of those with hypertension were aware of their blood pressure status and of these 11.1% were on treatment and only 5.6% achieved blood pressure control. Prevalence of hypertension rose steadily with age and was highest in the age-group 55-64years. Forty seven (30.3%) respondents had central obesity while 27 (17.4%) had generalised obesity.

Conclusion: Prevalence and awareness of hypertension was high however the treatment and control rates were very low. There is need to incorporate hypertension management into primary health care in the rural communities

Keywords: Hypertension, awareness, treatment, rural community

Introduction

Hypertension is a disease of public health importance with rising prevalence globally and associated with significant cardiovascular morbidity and mortality [1, 2]. Currently, about 1 billion people worldwide are hypertensive and this figure is projected to increase to 1.5 billion by 2025[1]. About three-quarters of people with hypertension live in developing countries with limited health resources to handle management of hypertension and its likely complications[3]. Until recently, hypertension was thought to be rare in rural Africa as earlier cross-sectional studies among rural dwellers in West Africa revealed a low prevalence of hypertension of 4.5% to 10%[4-6]. However, recent surveys show a rising trend in prevalence of hypertension in sub-Saharan Africa as a result of adoption of western diet which is high in salt and fat, as well as a more sedentary life style[7-12]. The prevalence of hypertension in most African countries has varied widely ranging from 20 – 45%[7-12], and it is generally reported to be higher in the urban than rural communities[2-8]. Similarly, hypertension awareness, treatment and control are reported to be low in several developing countries[3, 13]. This has been attributed to the asymptomatic nature of the disease; coupled with lack of policies on detection and control of non-communicable diseases in most of these countries.

The high prevalence of hypertension and poor control are important factors in the rising epidemic of cardiovascular diseases. It is therefore important to put in place prevention programmes for the early detection and treatment of hypertension in most developing countries in order to prevent the devastating consequences of uncontrolled hypertension. Data on prevalence of hypertension in the rural communities in Southwest Nigeria are limited; we

therefore conducted this study to determine the prevalence and awareness of hypertension in a rural community in Southwest Nigeria.

Materials and Methods

This was a cross sectional community based study carried out in Epeme, a small rural community under ward A of Olorunda Local Council Development Area in Badagry Local Government. The people are Aworis with a population of about 500. They engage in diverse occupations which include trading, fishing, mat weaving and farming. The closest health facility to Epeme is a primary health centre located in Ajido which is in another ward in Badagry local government. Located in the community is a jetty and Whispering palms a notable resort centre.

Permission was obtained from the Head of the community as well as the local government council. Pre-sensitization of the community was carried out two weeks before the study. The village primary school was the location used. The sample size was determined as follows: the level of significance (α) and the degree of accuracy desired (d) were each set at 5%. The minimum using the formula nf = n / [1 + (n/population)] for a population below 10, 000 where nf = final sample size, n = initial sample size calculated from the formula n = Z^2 pq/d^2, using a prevalence of 14.5% from rural communities in Nigeria[4]. A sample size of 141 was adequate. All consenting adult participants who presented for the screening programme were interviewed. Information on socio-demographic data, educational status, occupation, previous history of hypertension or diabetes, and use of anti-hypertensive medications were obtained. Excluded were children, young adults below 18 years and pregnant women. The population screened was not selected.

Blood pressures (BP) were taken in the sitting position after 10 minutes rest with an Accoson's mercury sphygmomanometer using an appropriate cuff size on the right arm by two doctors.

Korotkoff's 1st and 5th sounds were used as the systolic and diastolic blood pressure[14]. The mean of two readings taken five minutes apart was used for analysis. Blood pressure was defined and classified according to Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII) criteria[14]. Hypertension was defined as systolic BP ≥ 140mmHg and/or diastolic BP ≥90mmHg or current use of anti-hypertensive medications. Awareness of hypertension was defined as respondents who self report a previous diagnosis of hypertension.

Anthropometric measurements such as height, weight, waist circumference and hip circumference were measured according to standard guidelines by World Health Organisation (WHO) [15]. Body Mass Index (BMI) was calculated based on the formula weight in Kg/height in metres squared[15]. BMI was classified using the WHO classification for adults as follows: normal for values in the range of 18.50 – 24.99 kg/m^2, overweight BMI between 25.00 and 29.99 kg/m^2, obesity BMI > 30.00 kg/m^2 [15]. Individuals with BMI ≥ 30 were regarded as having generalized or global obesity and this was further classified as follows: class 1– BMI 30.00 - 34.99, class 2 – BMI 35.00 - 39.99 and class 3- BMI ≥ 40.00[15]. Abdominal or central obesity was defined as waist circumference of ≥ 102 cm in men and ≥ 88 cm in women[15].

Statistical analysis

Data were entered in Microsoft ® Excel and analyzed using Epi info ® 2007. The mean values, standard deviation and percentages were recorded. Mean values of continuous variables were compared using the student t-test. Percentages were compared using χ^2 test. Analysis was done by comparing mean values obtained for male and female subjects and subjects with and without hypertension. Statistical significance was assumed at a *P* value <0.05.

Results

One hundred and fifty-five subjects were screened. There were 49 (31.6%) males and the mean age was 38.7 ± 13.1 years (age range was 18-70 years). Figure 1 shows the age distribution of the population studied; 98 (63.2%) were below 45 years. In terms of educational qualification, 59 (38.1%) respondents had no formal education, 34 (21.9%) had primary school education, 54 (34.8%) achieved secondary school education and 8 (5.2%) achieved tertiary education. About half (52.3%) of the population engaged in trading, 21.9% are artisans, 17.4% engaged in diverse activities (including driving, clergy, students, housewives, security officers, engineering, fishermen, Traditional rulers); while only 8.4% were farmers.

Amongst the respondents, 54 (34.8%) were found to be hypertensive (males 28.6%, females 37.7%). More females than male respondents had hypertension though the difference was not significant p= 0.267 (Table 1). Further analysis showed that 64 (41.3%) had normal blood pressure, 37 (23.9%) were in the pre-hypertension category, 18 (11.6%) had stage one hypertension and 36 (23.2%) stage two hypertension. Table 2 shows comparison between subjects with hypertension and those without hypertension; significant findings were that hypertensive subjects were older and more likely to have generalised obesity (BMI > 30kg/m^2) and no formal education compared with those without hypertension.

The participants were also divided into two major groups, young adults (< 40 years; n = 83) and middle aged and elderly (> 40 years; n = 72). Prevalence of hypertension was higher in the middle aged and elderly group compared with the young adults (58.3% vs 14.5% $X^2 = 32.48$, p< 0.0001) table 3.

Figure 2 shows the distribution of hypertension by age-group. Prevalence of hypertension rose steadily with age and was highest in the age-group 55-64years after which it declined slightly

and then reached a plateau. Of those with hypertension, just over half 51.9% (males 50%, females 52.5%) were aware of their blood pressure status prior to screening, and of these only 11.1% (6) were on antihypertensive medications and only 5.6% (3) had adequate blood pressure control. All those who took anti hypertensive drugs were females.

Table 4 shows comparison with reports from other studies in some selected countries in sub-Saharan Africa[6-9, 16-22]. Prevalence in our study is higher than reports from some other sub-Saharan countries and awareness was higher as well but similar to reports rural Uganda[22].

Eighty-one (52.3%) respondents had normal BMI, 9 (5.8%) were underweight, 38 (24.5%) were overweight (pre-obese), 16 (10.3%) had class I obesity, 9 (5.8%) class II obesity and 2 (1.3%) class III obesity. Forty seven (30.3%) respondents had abdominal obesity (waist circumference >102 cm male, >88 cm female). The women had significantly higher rates of both global and central obesity compared with the men (Table 1).

Discussion

The prevalence of hypertension among rural inhabitants in this study was 35%. This finding is similar to the reports by Ayankogbe et al who found a prevalence of 34.6% among the inhabitants of Ifo a rural community in Ogun state in southwest Nigeria [23]. Our findings are however higher than prevalence values from other communities in Nigeria[18, 20, 21, 24] and from other developing countries[7-9, 25] but lower than prevalence figures reported from South East Nigeria[11, 19, 26]. Clark et al conducted a cross sectional study in Ouesse, a rural community in neighbouring Benin republic which shares a boundary with South West Nigeria and reported a prevalence of 28% [9]. A study from a rural community in central India reported the prevalence of hypertension to be 19% [25], Addo et al found a prevalence of 25.4% in Ghana [8], while Isezuo et al reported a prevalence of about 25% in Northern Nigeria[21]. However, Ulasi et al, Ahaneku et al

and Ejim et al have reported prevalence values above 40% in rural communities in South East Nigeria [11, 19, 26]. In the study by Ulasi et al, about half the population had central obesity as evidenced by high waist-hip ratio[11]. They attributed the high prevalence of hypertension to sedentary life style of the traders, as well as ingestion of foods high in fat and salt. Although the prevalence of hypertension is generally on the increase in Nigeria, there appears to be some ethnic variation in prevalence, with highest values reported from rural communities in South East Nigeria. These differences could be attributed to genetic, environmental and life style factors as well as different population studied. For instance, Ejim et al studied hypertension in middle aged and elderly subjects and this could account for the higher prevalence in their study[26]. It has been observed that people of Igbo ethnicity tend to have more severe and difficult to control hypertension compared with the other major ethnic groups in Nigeria (Odutola 1999, personal communication). Possible explanations for this phenomenon are life style, diet and probably due to mineral content of the soil in the south eastern part of the country. The rising trend in hypertension in our study and other recent studies from the country is an indication that the rural areas are also undergoing a transitional phase. The rural dwellers are also being exposed to high fat and high salt diet. There is need to halt this unwholesome trend through consistent health education campaigns across the nation.

Hypertension was higher among women in this study though not significant. This is similar to findings by Kokiwar et al from central India [25], but differs from most reports in the literature in which hypertension is reported to be higher in men compared with women [7, 11, 17, 27]. However some studies found no difference in hypertension in both genders [8, 12]. The higher number of women in our study could account for this difference.

Consistent with other studies, hypertension increased with age in this study [9-11, 15, 19-21]. Subjects above 40 years were more likely to have hypertension compared with younger adults. Ejim et al

reported a prevalence of 46.4% among middle aged and elderly subjects in a rural community in Southeast Nigeria [20]. Contrary to most reports from Nigeria and other sub-Saharan countries, the level of awareness in our study was high with about 52% of the hypertensive subjects being aware of their high blood pressure [7, 8, 11, 16-18, 23]. However disappointingly, the number of subjects on treatment was small and the control rate was abysmally low. This trend has been observed in most sub-Saharan countries except for countries in North Africa [13]. This could be due to high cost of medications, lack of easy access to medical care and cultural practices like the use of herbal medications. The government should provide free anti-hypertensive drugs to the people in the rural areas at the primary care setting.

The prevalence of global and central obesity in this study were 17.4% and 30.3% respectively; these values are comparable to reports by Ahaneku et al; 13.3% global obesity and 29.4% central obesity [21], but higher than reports by Isezuo et al [16], and Oladapo et al [17] but lower than findings by Ulasi et al [11]. Consistent with reports in the literature, our hypertensive subjects were more likely to be obese (BMI > 30kg/m^2) than normotensive individuals[1, 3, 8, 11, 15, 20, 21, 24]. Obesity has been identified as an important risk factor for the development of hypertension in several epidemiological studies across different populations[1, 3, 8, 28-30]: for example, the National Health and Nutrition Examination survey showed linear association between rise in Body Mass Index (BMI) and systolic, diastolic and pulse pressure in the American population [29]. Majority of the respondents in this study are traders who go to the city to sell their goods, they therefore are exposed to diets high in salt and fat, as well as energy dense drinks that are hawked by food vendors and fast food joints in the cities. There is need for public awareness and educative campaigns on hypertension detection and control, as well as promoting healthy life style behaviours among the rural population.

Conclusion: We found a high prevalence of hypertension and high awareness among the hypertensive respondents; however the treatment and control rates were very low among the respondents. Hypertensive subjects were older, uneducated and likely to be more obese in this community. There is need to incorporate hypertension detection and control programmes at the primary health care level as well as provision of free medications by the government.

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Authors contributions:

COA, AA, EB, OF, Study concept and design; Acquisition of data; Analysis and interpretation of data; Drafting of manuscript; Review of manuscript for important intellectual content.

OO, Study concept and design; data collection and analysis.

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Table 1: Comparison of the clinical characteristics by gender

Variable	Overall N = 155 SD or %	Males N = 49 SD or (%)	Females N = 106 SD or (%)	X^2
Age (years)	38.7 ± 13.08	38.10 ± 14.25	38.97± 12.56	0.
BMI (Kg/m2)	25.13 ± 5.42	22.99 ± 3.40	26.12 ± 5.88	3.
Overweight	38 (24.5)	7 (14.3)	31 (29.2)	4.
Global obesity (BMI ≥ 30)	27 (17.4)	3 (6.1)	24 (22.6)	6.
Waist circumference (mean)	84.67 ± 13.12	80.84 ± 11.06	86.44 ± 13.66	2.
Central obesity	47 (30.3)	4 (3.2)	43 (40.6)	16
Systolic Blood pressure (mmHg)	130.26 ± 26.08	129.94 ± 24.62	130.42 ± 26.85	0.
Diastolic Blood pressure (mmHg)	82.13 ± 16.26	82.20 ± 17.81	82.09 ± 15.57	0.
Normal blood pressure	64 (41.3)	22 (44.9)	42 (39.6)	0.
Pre-hypertension	37 (23.9)	13 (26.5)	24 (22.6)	0.
Hypertension	54 (34.8)	14 (28.6)	40 (37.7)	1.
Grade 1 Hypertension	18 (11.6)	4 (8.2)	14 (13.2)	0.
Grade 2 Hypertension	36 (23.2)	10 (20.4)	26 (24.5)	0.
Past history of hypertension	28 (18.1)	7 (14.3)	21 (19.8)	0.

Table 2: Comparison of clinical characteristics of hypertensive and non-hypertensive subjects

Variable	Hypertensive subjects N = 54 (%)	Subjects without hypertension N = 101 (%)	t stat or X^2	P value
Age	46.7 ± 10.58	34.4 ± 12.2	6.25	< 0.001
Male /Female	14/40	35/66	1.23	NS
No Education	27 (50)	32 (31.7)	4.98	0.026
BMI (Kg/m^2)	25.75 ± 5.66	24.80 ± 5.28	1.04	NS
Waist circumference (cm)	86.8 ± 12.3	83.5 ± 13.5	1.47	NS
Waist-hip ratio	0.88 ± 0.06	0.86 ± 0.08	1.18	NS
Global obesity	14 (25.9)	13 (12.9)	4.14	0.042
Central obesity	20(37)	27 (26.7)	1.76	NS

Global obesity = Body mass index > 30kg/m.

Central obesity = waist circumference >102 cm male, >88 cm female

Table 3: Comparison of prevalence of hypertension in young adults and middle aged/elderly subjects

	Hypertension		
Age group (years)	No (%)	Yes (%)	Total
< 40	71 (85.5)	12 (14.5)	83
> 40	30 (41.7)	42 (58.3)	72
Total	101 (65.2)	54 (34.8)	155

$X^2 = 32.48$; $p < 0.001$

Table 4: Prevalence of hypertension in some selected rural population studies in sub- Saharan Africa

First Author and year of publication	Country	Population type	Age - group (years)	Population size	Pr
Mbanya 1998 [6]	Cameroun	Rural	25 - 74	746	
		Urban	25 - 74	1052	
Edwards R 2000 [16]	Tanzania	Rural and Urban	> 15	928	
Cappuccio FP 2004 [17]	Ghana	Rural and semi urban	40 - 75	1013	
Addo 2006 [8]	Ghana	Rural	>18	362	
Hendricks 2011 [7]	Kenya	Rural	≥ 18	2111	
Oladapo 2010 [18]	Nigeria	Rural	18 - 64	2000	
Ahaneku 2011 [19]	Nigeria	Rural	≥ 18	218	
Omuemu 2007 [20]	Nigeria	Rural	> 15	590	
Isezuo 2011 [21]	Nigeria	Rural and urban	15 - 65	782	
Clark 2012 [9]	Benin	Rural	NA	154	
Musinguzi 2013 [22]	Uganda	Rural	> 15	1623	
Amira 2013	Nigeria	Rural	18 - 70	155	

* Hypertension defined as systolic blood pressure ≥ 140mmHg and or diastolic blood pressure ≥ 90mmHg.

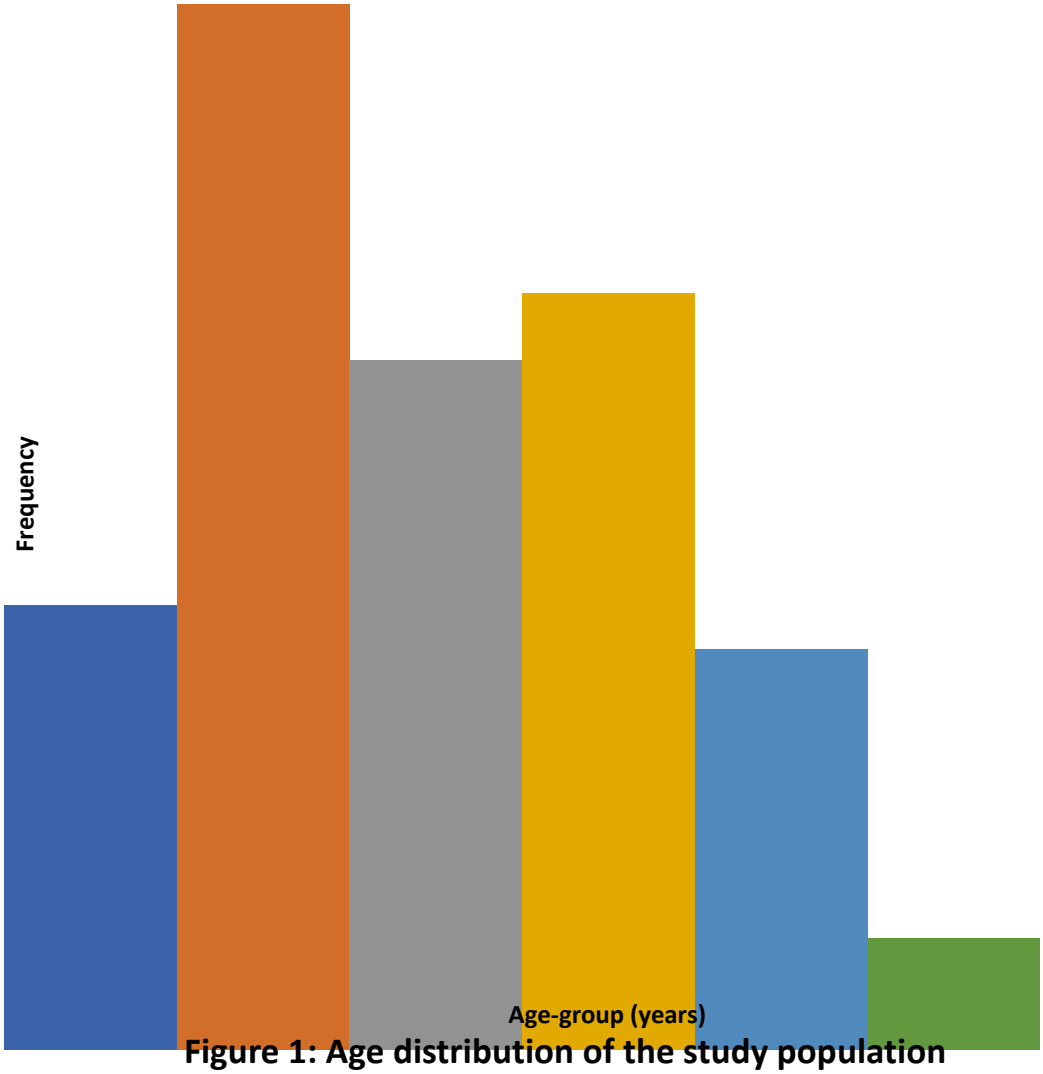

Figure 1: Age distribution of the study population

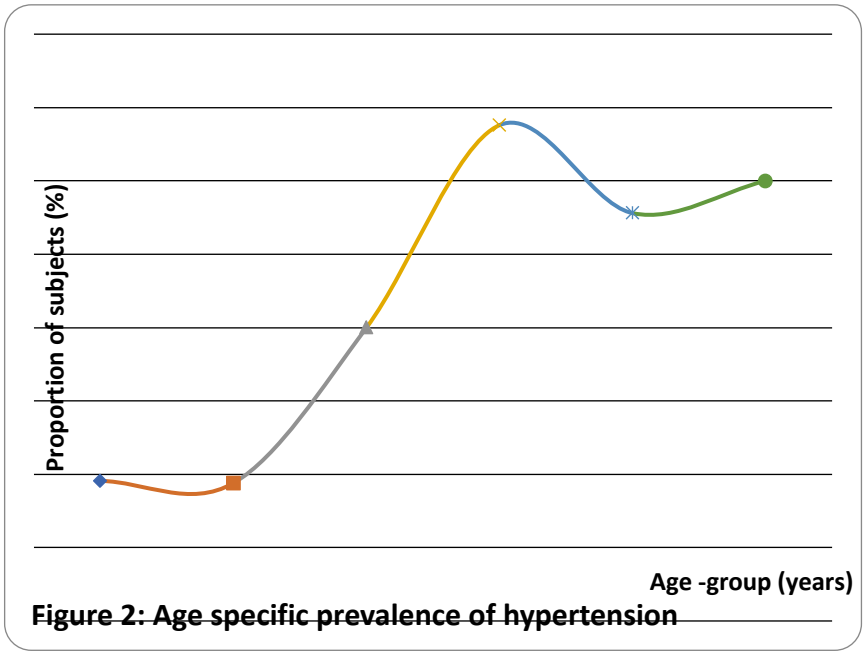

Figure 2: Age specific prevalence of hypertension