



*Full Length Research Paper*

# Hypertension prevalence in an Urban and Rural area of Nigeria

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## ABSTRACT

As a result of changing trends in the epidemiology of hypertension and its adverse consequences, there is a need for regular surveillance on the prevalence of hypertension in order to implement effective control strategies. This study aims at describing the prevalence of hypertension amongst the urban and rural dwellers in Federal Capital Territory (FCT) – Abuja – Nigeria. A stratified randomly selected population from households of urban and rural dwellers were screened for hypertension and its risk factors by a pretested, structured questionnaire and clinical examination. Hypertension was defined as systolic blood pressure (SBP)  $\geq 140$  and/ or diastolic blood pressure  $\geq 90$ mmHg or being on drug therapy for hypertension. The overall prevalence of hypertension in the study was 22.7%. Hypertension was more prevalent in the urban than rural dwellers with rates of 32.7% and 12.9% respectively ( $p < 0.001$ ). Amongst the risk factors for hypertension obesity measured by WC showed the strongest correlation with SBP and DBP ( $r = 0.463$ ,  $p < 0.001$  and  $r = 0.372$   $p < 0.001$ ) respectively. There is a rising trend in the prevalence of hypertension. Hypertension is more prevalent in the urban than rural areas and this is attributable to obesity.

**Keywords:** Hypertension, obesity, prevalence, urban, rural.

## INTRODUCTION

The global prevalence of hypertension is on the increase. In 2000, 972 million people had hypertension with a prevalence rate of 26.4%. These are projected to increase to 1.54 billion affected individuals and a prevalent rate of 29.4% in 2025 (Kearney et al., 2005). Hypertension was thought to be rare in rural Africa (Shaper et al., 1969; Pobee et al., 1977). However it is now becoming more prevalent as urbanization increases and this has been shown in several studies in Africa (Cooper et al., 1998). A recent community based study of rural and semi-urban population in Enugu, Nigeria put the prevalence of hypertension in Nigeria at 32.8% (Ulasi and Onodugo, 2010).

Uncontrolled hypertension is associated with serious end-organ damage such as heart disease, stroke, renal disease and blindness (Cressman and Gifford, 1983; Post et al., 2003; Khakurel et al., 2009). These serious complications can be prevented by adequate blood pressure control (Cuspidi et al., 2000; Neal et al., 2000).

The prevention and control of hypertension has not received due attention in many developing countries although it is one of the most modifiable risk factors for cardiovascular disease. Awareness, treatment and control of hypertension is extremely low in these countries as health care resources are overwhelmed by other priorities including HIV/AIDS, tuberculosis and malaria.

Reliable epidemiologic data are useful for the design and implementation of effective strategies for the prevention and control of hypertension. Limited data on the trends of prevalence suggest that it has increased in economically developing countries in recent years while it remained stable or decreased in developed countries (Kearney et al., 2004). As a result of changes in trends of prevalence and epidemiology of hypertension, there is need to regularly revisit the study on its prevalence to generate recent data in the developing countries especially sub-saharan Africa. In this regard, efforts need

to be made to generate comparable data to yield useful information needed to build the empirical evidence base that should be accumulated in order to trigger the necessary policy response.

This study aims at determining the prevalence and some risk factors for hypertension amongst adults in FCT- Abuja- Nigeria. It is hopeful that the findings of this study will be useful in raising awareness among policy makers and the public at large about the prevalence of hypertension and thereby contribute to the design and implementation of appropriate intervention and control measures.

## MATERIALS AND METHOD

A total of 229 participants aged 18 – 78 years were recruited for the study by a stratified random sampling method. Stratification was by age, gender and location. 113 were recruited from the urban area called Garki village in Abuja – Abuja municipal area council of Nigeria while 116 were recruited from a rural area called Kuseki village in Kuje area council. Kuseki is about four hours drive from the urban area and lacked safe water supply and electricity facilities being a typical rural setting. Both areas are within the federal capital territory (FCT) Nigeria. The study was cross-sectional and community based. It was carried out between May 2009 and June 2010.

Ethical approval was obtained from the department of medicine, Abuja municipal area council and the ethical committee of the Benue State University, Makurdi. Informed consent in written form or by a thumb print was obtained from the participants after due explanation before they were used for the study.

A structured questionnaire including age, sex, marital status, occupation and level of education was administered to the participants or completed on their behalf. Anthropometric data which included weight, height, waist circumference, biceps and triceps skin fold thickness were later obtained. The weight was measured to the nearest 0.5kg using a weighing scale with the participant wearing light clothing and removing their foot wears. Height was measured to the nearest 0.5cm using a stadiometer. The BMI was calculated as weight in kilograms divided by the square of the height in meters. The WC was measured at the level of the Iliac crests (Aronne, 2002), using a flexible tape and passing along the umbilical level of the unclothed abdomen.

Blood pressure was taken from the non dominant arm after ten minutes of rest using appropriate cuff size and Accoson brand of mercury sphygmomanometer. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were the first and the fifth korotkoff sounds respectively. Three consecutive measurements were made at an interval of five minutes after a 10 minutes rest. The mean SBP and DBP determined from the second and third measurements were used for the data analysis.

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.

The Statistical Package for Social Sciences (SPSS) version 20 statistical soft ware 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. Locality and gender differences in prevalence rates were compared with Pearson Chi-Square. Pearson correlation coefficient was used to analyse the relationship between blood pressure, age and anthropometric data. Values of p below 0.05 were considered statistically significant.

## RESULTS

### Characteristics of the study population

There were 229 participants in the study. Males were 113 in number and females were 116 in number. 113 of the participants were from urban location and 116 from rural area. The mean age of the males was  $43.04 \pm 14.34$  while that of the females was  $42.09 \pm 14.36$ . The mean weight, BMI, WC, SBP and DBP were significantly higher in the urban dwellers than the rural dwellers ( $p < 0.001$ ). There was no significant difference in the mean age of the participants by gender and locality. Females were shorter than males with higher BMI and WC in both urban and rural dwellers. SBP increased with age with a peak in the 60-69 age groups. DBP peaked in the 40 – 49 age groups. There was no significant difference in the mean SBP or DBP in both sexes. These are shown in tables 1 and 2 in addition to figure 1.

### Prevalence of hypertension

There were 52 hypertensives. 37 from urban and 15 from rural area. They consisted of 24 males and 28 females. The overall prevalence of hypertension was 22.7%. Hypertension was significantly more prevalent in the urban than in the rural village with rates of 32.7% and 12.9% respectively ( $\chi^2=12.80, p<0.001$ ). Hypertension prevalence differed little in men and women with rates of 21.2% versus 22.4% respectively ( $\chi^2=0.274, p = 0.60$ ). However more females had hypertension than males. The prevalence rate increased with age amongst all the participants. This is shown in figure 2.

### Correlation analysis

Pearson correlation analysis revealed that both SBP and DBP correlated with age, weight, BMI and WC ( $p < 0.001$ ). WC had the strongest correlation with both SBP and DBP ( $r = 0.463, p < 0.001$ ) and ( $r = 0.372, p <$

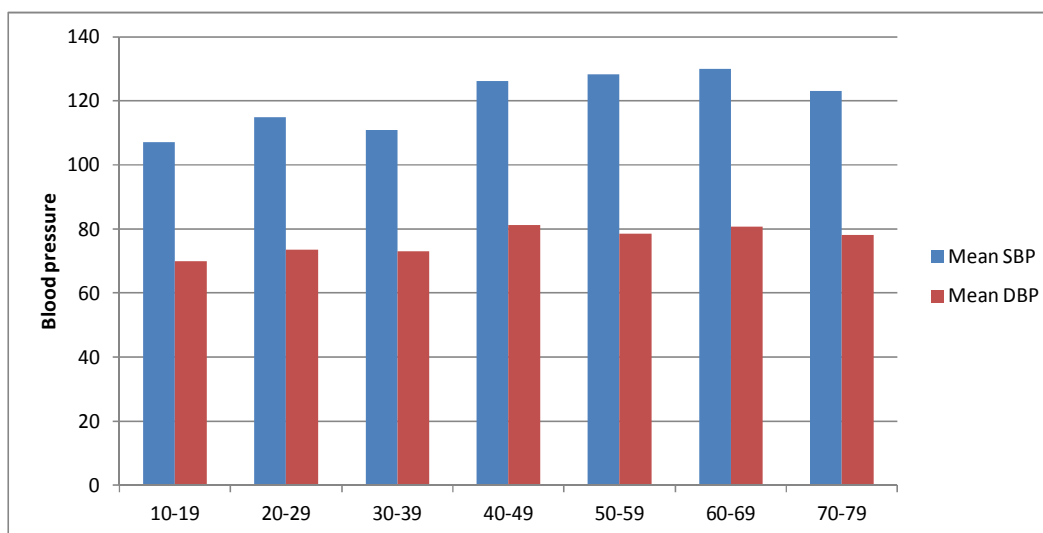
**Table 1.** Characteristics of the study population by locality

	Urban n =113 Mean( SD )	Rural n = 116 Mean( SD )	t-test	p-value
Age	43.24(13.76)	41.91(15.08)	0.70	0.485
Weight	69.43(13.61)	58.98(8.29)	7.04	<0.001*
Height	1.59(0.08)	1.61(0.07)	-1.70	0.090
BMI	27.35(4.96)	22.72(2.50)	8.95	<0.001*
WC	90.06(13.83)	80.49(7.26)	6.58	<0.001*
SBP	127.13(23.84)	113.98(16.89)	4.83	<0.001*
DBP	79.42(15.16)	74.26(9.90)	3.06	0.003*

\*=statistically significant, BMI = Body mass index

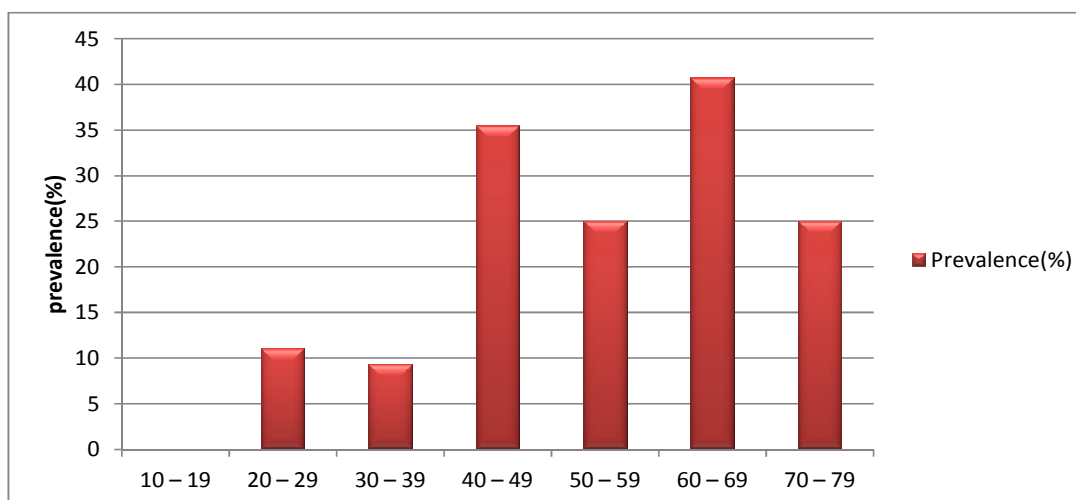
WC = Waist circumference, SBP = Systolic blood pressure

DBP = Diastolic blood pressure.



Age group (years)

Figure 1 Relationship of systolic and diastolic blood pressure with age



Age group (years)

Figure 2 Prevalence of hypertension by age group

**Table 2.** Characteristics of the study population by gender

Variable	Male	Female	t-test	p-value
	n = 113 Mean(SD)	n= 116 Mean(SD)		
Age	43.04(14.54)	42.09(14.46)	0.50	0.620
Weight	63.95(9.05)	64.32(14.93)	-0.22	0.825
Height	1.63(0.06)	1.57(0.07)	6.11	<0.001*
BMI	24.07(3.17)	25.91(5.43)	-3.11	0.002*
WC	83.75(11.34)	86.64(12.44)	-1.84	0.068
SBP	120.34(19.78)	120.60(23.32)	-0.09	0.926
DBP	78.27(11.72)	75.38(14.04)	1.69	0.093

\*= statistically significant, BMI = Body mass index  
 WC = Waist circumference, SBP = Systolic blood pressure  
 DBP = Diastolic blood pressure.

**Table 3.** Correlation between blood pressure, age and anthropometric variables

Variable	SBP	DBP
	r (p-value)	r (p-value)
Age	0.324 (<0.001)*	0.231 (<0.001)*
Weight	0.350 (<0.001)*	0.273 (<0.001)*
Height	-0.033 0.619	0.021 0.757
BMI	0.400 (<0.001)*	0.283 (<0.001)*
WC	0.463 (<0.001)*	0.372 (<0.001)*

\*statistically significant  
 SBP = systolic blood pressure  
 DBP = diastolic blood pressure  
 BMI = body mass index  
 WC = waist circumference

0.001) respectively. This was followed by BMI ( $r = 0.400$ ,  $p < 0.001$ ) and ( $r = 0.283$ ,  $p < 0.001$ ). There was no correlation between blood pressure and height. This is shown in table 3.

## DISCUSSION

In West Africa, there have been a number of studies on blood pressure distribution and prevalence of hypertension (Shaper et al., 1969; Pobee, 1993; Oviasu and Okupa, 1980; Akinkugbe, 1996; Akinkugbe and Ojo, 1968; Lisk and Ewen, 1996; Mbanya et al., 1998; Cooper et al., 1997). In our study the overall prevalence of hypertension was 22.7%. In a study of seven populations of West African origin by Cooper et al. (1997), in 1997, the prevalence of hypertension was 16% in Nigeria. The study by Cooper et al was carried out more than a

decade ago. Our study has demonstrated a rising trend in the prevalence of hypertension since 1997. This increasing trend has been noted across the globe with prevalence rates of 28.3% noted in Accra Ghana by Amoah (2003), 32.8% in Enugu Nigeria and 32.6% for blacks in the United States (Cooper et al., 1997). This rising trend in prevalence may represent a change in life style due to modernization which has swept across most nations.

Hypertension was more prevalent in the urban area with a rate of 32.7% than in the rural area where a prevalence rate of 12.9 % was noted and this difference was statistically significant. This finding is consistent with most studies carried out in West Africa (Cooper et al., 1998). Ulasi et al. (2010), and Addo et al. (2007), documented a high prevalence of hypertension in sub-saharan Africa especially in urban areas. This suggests that life style is different in the two communities.

Sedentary life style and lack of exercise which characterise urban dwelling could explain this both leading to obesity which is a risk factor for hypertension. In the rural village where the study was carried out, there is lack of electricity, transport and the source of water supply is the local stream. Hence the villagers have to trek some kilometres daily to fetch water and carry out other daily needs. Preference for indoor games in urban dwellers while rural dwellers indulge in outdoor games accounts for physical exercise in the rural dwellers preventing them from becoming obese and hence maintaining adequate blood pressure. Mean BMI and WC were significantly higher in the urban than rural dwellers and obesity was more prevalent in the urban area than rural area with rates of 40.7% versus 4.3% ( $\chi^2 = 43.81, p < 0.001$ ).

The prevalence of hypertension was higher in females than males with rates of 22.4% and 21.2% respectively but the difference was not statistically significant ( $p = 0.601$ ). In general no clear pattern of association between hypertension and gender has emerged. In the international study of hypertension in blacks carried out by Cooper et al. (1997), the prevalence of hypertension was higher in men than women in Nigeria and Cameroon. However, a study carried out more recently in Kumasi Ghana in 2002 revealed higher prevalence in women than men (Cappuccio et al., 2004). Mufunda et al. (1995), reported a higher prevalence of hypertension in women than men in 1995 and this they attributed to hyperinsulinemia.

Our study also revealed that the prevalence of hypertension increased with age from 11% in the 20- 29 age group to 40.7% in the 60-69 age group. There was a drop in the 70 -79 age group. This may be accounted for by the few number of participants in this age group and the short life span in our environment. Linear association between blood pressure and age has been widely reported (Mufunda et al., 2006).

Some of the risk factors for hypertension are age and obesity measured by BMI and WC in this study. Others include heavy alcohol consumption and high salt intake. Age, BMI WC and all correlated with hypertension with WC being the strongest correlation with SBP and DBP followed by BMI. Other studies have also reported that BMI is positively and significantly associated with blood pressures across populations in diverse geographical settings (Mhuruchi et al., 2004; International Clinical Epidemiological Network (INCLIN), 1996; Kadiriri et al., 1999). This shows that there is a direct relationship between obesity and hypertension.

## CONCLUSION AND RECOMMENDATION

The overall prevalence of hypertension in this study was 22.7%. Prevalence was higher in the urban than rural area and this is attributable to obesity. Measures should

therefore be put in place to curb the tendency to sedentary life style and lack of exercise brought about by urbanization which leads to obesity. Regular physical exercise, at least thrice weekly is recommended for every adult in both urban and rural settings. This requires health education in public places and institutions and via the media to curb the impending global epidemic of obesity and hypertension.

## Limitations

The level of salt intake and alcohol consumption were not assessed in this study. Also the diagnosis of hypertension was made based on a mean of two blood pressure measurements at a sitting. This may have affected the overall prevalence.

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