

**PREVALENCE AND FACTORS ASSOCIATED WITH HYPERTENSION AMONG ADULTS  
IN CHIROMA COMMUNITY, LAFIA,  
NASARAWA STATE, NIGERIA**

**BY**

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(MPH/MED/15854/2011 - 12)**

**DEPARTMENT OF COMMUNITY MEDICINE,  
FACULTY OF MEDICINE,  
AHMADU BELLO UNIVERSITY,  
ZARIA, NIGERIA**

**MARCH, 2015**

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**DEPARTMENT OF COMMUNITY MEDICINE,  
FACULTY OF MEDICINE,  
AHMADU BELLO UNIVERSITY,  
ZARIA, NIGERIA**

**MARCH, 2015**

## **DECLARATION**

I declare that the work in this thesis entitled “Prevalence and factors associated with hypertension among adults in Chiroma Community, Lafia, Nasarawa State, Nigeria” has been performed by me in the Department of Community Medicine, under the supervision of Professor Aisha Indo Mamman. The information derived from the literature has been duly acknowledged in the text and the list of references provided. No part of this thesis was previously presented for another degree or diploma at any other university.

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Name of Student

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Signature

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Date

## CERTIFICATION

I certify that the work for this thesis entitled “PREVALENCE AND FACTORS ASSOCIATED WITH HYPERTENSION AMONG ADULTS IN CHIROMA COMMUNITY, LAFIA, NASARAWA STATE, NIGERIA.” by Abdullahi Habibat Ahmed meets the regulation governing the award of the degree of Masters of Public health in Field Epidemiology of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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## **DEDICATION**

To my amiable parents Hajiya Habibat Abashiya and Alhaji Ahmadu Rabo Abashiya the Ohinoyi of Egbura Gadabuke, Toto Local Government Area of Nasarawa State, May Allah bless you all with Jannatul Firdausi, Amin. And to my beloved family Hajiya Halimatu and Hajiya Maimuna Abdullahi Ahmad, Umar Faruk Ahmad, Hafsat Umar , Habibullah A. Ahmad , Hauwa Kulu A. Ahmad, Ibrahim Abdullahi, Faiza Abdullahi, Muhammad A. Ahmad, Young Ahmad A. Ahmad(Amir) and Habibat A. Ahmad (Ummin Baba) for their patience , prayers and love during the period of my study. May Allah in His infinite mercy reward you all with Rahama in Jannatul Firdausi, Amin.

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Ahmed A.H.

## SUMMARY

Hypertension, a non communicable, silent killer disease is of public health significance worldwide. As a public health challenge, hypertension is fast becoming a great concern in Chiroma Community, Lafia with complications such as stroke, kidney failure, heart failure and sudden death. Ill-health associated with hypertension shortens life expectancy due to sudden death among the economically active segment of the society. The need for identifying its prevalence and determinants prompted this research.

The study investigated the prevalence and factors associated with hypertension among adults in Chiroma Community, Lafia, Nasarawa State, Nigeria. A cross sectional study design was employed, using the multistage sampling techniques.

A structured pretested interviewer administered questionnaire was utilized for data collection, the height, weight and blood pressure were measured. The data obtained was analyzed using Epi-info Version 3.4.3. Chi square was used to determine associations. Significant associations were presumed if  $p < 0.05$ . A total of 393 participants (245 males and 148 females) were recruited for the study.

The result showed a mean age of  $32 \pm 13$  years for the participants, 143 (37%) were university graduates, most were married, and in government employment. The prevalence of hypertension in Chiroma Community, Lafia is 39.9%(95%CI, 1.83-5.64) with 25.2% for men and 14.8% for women. About seventy percent(69.9%) of the participants had satisfactory knowledge of hypertension and 33% agreed that Ageing is the most common risk factor for hypertension in the area followed by stress. Ninety-three percent of participants heard about hypertension, 59% obtained information about hypertension in the hospital and 89% of participants described it as a deadly disease. The common symptoms and signs of hypertension mentioned include headache 56% and dizziness 47% respectively.

The finding showed that the participants also agreed that the males (58%) were more affected than female (42%) in the area and the age group most commonly affected was 40 – 49 years. Cigarette was the most common tobacco product used with a mean age of commencement of smoking at  $22\pm 7$  years. Eighteen percent (18%) of the participants were in physically rigorous jobs. Fifteen percent (15%) had visited traditional healers for the treatment of hypertension and 34% participants used orthodox treatment for raised blood pressure.

The Bivariate analysis showed statistically significant relationships with hypertension on one hand and age, bodyweight, alcohol use, smoking, family history of hypertension and diabetes independently with all having P-values  $< 0.001$ . However, the logistic regression showed diabetes ( $p < 0.002$ ), smoking, age, and family history were independent predictors of hypertension with P-values  $< 0.001$ .

From the research, the participants suggested multipurpose approach strategies as the most effective way of preventing and treating hypertension. The mean body weight (kg) of the participants was 67.0 kg, the mean height was 2.24 meters and the body mass index (BMI) showed that 106 (27%) participants were overweight, while up to 23.7% were obese. The rating of intake of diets e.g. fruits and vegetables by the participants were inadequate as majority (55.3% and 68.7%) of the participants took fruits and vegetables for less than 3 days per week respectively. Forty four percent (44%) of participants had 1 -5 hours of sedentary lifestyle daily.

In conclusion, the prevalence of raised blood pressure in Chiroma community was high, with family history, diabetes, age, smoking as the major independent predictors of hypertension. Although a high proportion of the participants had good knowledge of hypertension, there was low regular check up visits to health facilities. More so, recommendations and suggestions were also made among which were increase awareness campaign on hypertension to the public especially on the importance of regular blood pressure check up through the media houses.

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## LIST OF ACRONYMS

SBP	-	Systolic Blood Pressure
DBP	-	Diastolic Blood Pressure
BP	-	Blood Pressure
AHA	-	American Heart Association
ASA	-	American Stroke Association
US\$	-	United States Dollar
CVD	-	Cardiovascular Disease
W.H. O.-		World Health Organization
CDC	-	Centers for Disease Control and Prevention
HTN	-	Hypertension
NCD	-	Non Communicable Disease
BMI	-	Body Mass Index
JNCT-		Joint National Committee on prevention, detection, and recommendation and Treatment of High Blood Pressure
GHO	-	Global Health Organization

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background information

Hypertension is a term used to describe high blood pressure.<sup>1</sup> It is a measurement of the force against the walls of the arteries as the heart pumps blood through the body. When the left ventricle of the heart contracts, blood is pumped out into the aorta, and travels through the large arteries to the smaller branch vessels.<sup>2</sup>

Blood pressure is also referred to as the pressure of the blood within the arteries of the body.<sup>2</sup>

Blood pressure is a product of the heart rate and peripheral resistance. The systolic blood pressure is the arterial pressure at the height of the heart's contraction. The diastolic blood pressure is the arterial pressure when the heart muscle is fully relaxed, that is during the heart resting phase.<sup>2</sup>

An abnormally high blood pressure is referred to as hypertension while hypotension on the other hand refers to an abnormally low blood pressure. Hypotension can cause dizziness and / or fainting, especially on standing upright directly from a sitting or lying position. In severe cases, hypotension may lead to shock.<sup>2</sup> Women on the average tend to have lower blood pressures than men.<sup>2</sup>

Blood pressure readings are usually given as two numbers for example, 120 over 80 (written as 120/80mm Hg) representing the systolic and diastolic pressures respectively. Although both numbers are elevated in hypertension, either can be raised in isolation indicating systolic or diastolic hypertension as the case may be. Normal blood pressure is lower than 130/85 mmHg most of the time. High blood pressure (hypertension) is when one's blood pressure is 140/90 mmHg or above most of time. If the blood pressure numbers are 130/85 or higher, but below 140/90, it is called pre-hypertension. Therefore any person with pre-hypertension is more likely to develop hypertension which may be mild, moderate or severe<sup>18</sup>.

Nigeria which is the most populous country in Sub-Saharan Africa is a home to over 250 different ethnic groups. Nigeria is experiencing rapid urbanization of the population which is likely to increase the population at risk for hypertension.<sup>1</sup>

It is also described as an intermittent or sustained elevation in diastolic or systolic blood pressure, which occur as two major types. The essential (idiopathic) hypertension and secondary hypertension which result from renal diseases or other identifiable cause.<sup>5</sup>

Ageing which causes the stiffening of the blood vessels increases the risk of hypertension. Reduced elasticity of the vessels with resultant hypertension can be complicated by stroke, myocardial infarction, heart failure, kidney disease and death. Hypertension is an important cause of shortened life expectancy.<sup>2</sup>

The prevalence of hypertension ranges from as low as 7.8% in Idanre, peaking at 35.6% in Dakace a Zaria suburb.<sup>4</sup> The national survey on non – communicable diseases (NCDs) in Nigeria conducted in 2013 reported a prevalence estimates ranging from 20.2 to 36.6% and the risk factors for hypertension in the survey included diabetes mellitus, obesity, alcohol intake, physical inactivity, cigarette smoking, urban living, advancing age, affluence .ethnicity and familial tendency, and kidney disease.<sup>1</sup> Hypertension is one of the major risk factors for cardiovascular mortality which accounts for 20 – 50 percent of all deaths.<sup>4</sup>

Although persons less than 18 years of age are considered as minors, hypertension in this age group is an inter play of age, genetic, environmental, behavioral and medical factors. It is a growing health problem both in the rural and urban areas globally.<sup>6</sup>

The attendant problem of hypertension and its resultant early deaths among working and aging adults is very relevant for a research. Fortunately this problem can be controlled by enlightenment about causes and its complications. Hypertension has been recognized as a strong independent risk factor for heart diseases and stroke and a predictor of premature death and disability from cardiovascular complications.<sup>1</sup>

## **1.2. Statement of the problem**

WHO in 2013 reported that raised blood pressure is estimated to cause 7.5 million deaths worldwide, about 12.8% of total of all deaths.<sup>11</sup> Because of population growth and ageing the number of people with uncontrolled hypertension rose from 600 million in 1980 to nearly 1 billion in 2008.<sup>11</sup> Evidence indicates an upward trend as WHO in 2013 reported that the number of Nigerians living with high blood pressure was estimated at about 56 million.<sup>11</sup>

Hypertension (HTN) as a public health challenge, is fast becoming a great concern in Chiroma community, Lafia. It affects both male and female adults resulting in complications like stroke, kidney failure, heart failure, and sudden death among working and ageing adults in the community, It is increasingly becoming the major cause of high morbidity, disability and mortality in the area of study involving more men than women who are the breadwinners of the families.

It has also been observed that hypertensive heart disease and stroke are the leading causes of death in the community. Illnesses related to hypertension cause poverty and shorten life expectancy due to sudden death among economically active segment of society. In 2013, the monthly patronage of Dalhatu Araf Specialist Hospital Lafia by patients with high blood pressure was 35. This suggests a loss of productivity in care-seeking, as well as a threat to family economy through out-of- pocket drug procurement.

## **1.3 Justification for the study**

The rationale of this study is anchored on the prevalence of hypertension in sub – Saharan Africa, which in recent years has ranged from 7.8% in Idanre and 27% in Idikan both in Southern Nigeria to 35.6% in Dakace near Zaria in Northern Nigeria.<sup>4</sup>

The risk factors for hypertension include: diabetes mellitus, obesity, alcohol intake, physical inactivity, cigarette smoking, urban living, advancing age, affluence, familial tendency, kidney

disease, and socio – economic status (poverty).<sup>4</sup> It has been reported that 13.5% deaths and 6% of disability-adjusted life years(DALYs) were attributed to hypertension globally, and for low and middle income people, these figures were 12.9 and 5.6%,respectively.<sup>1</sup>

These risk factors are very prevalent in the community; however, there is paucity of data in Chiroma community, Lafia. This forms the basis for the research which will further provide the plat form for increased awareness on high blood pressure to the community.

The problems caused by hypertension are made worse when people are not aware of the necessity for, or are unable to afford regular blood pressure check.<sup>8</sup> Blood pressure control is a global challenge, for which adequate and appropriate health education is a potentially useful tool.<sup>9</sup>

There is the need to promote awareness on the causes and consequences of high blood pressure. There is an urgent need for developing sustainable preventive measures for this growing problem on a national scale.<sup>8</sup>

#### **1.4 Research questions**

1. What is the prevalence of hypertension in Chiroma community, Lafia?
2. What are the factors that may be associated with hypertension in this community?
3. What is the level of Knowledge of adults in Chiroma community, Lafia on hypertension?

#### **1.5 General and Specific Objectives**

##### **1.5.1 General objective**

To determine the prevalence and factors associated with hypertension among adults 18 years and above in Chiroma community, Lafia, Nasarawa State, Nigeria.

##### **1.5.2 Specific Objectives**

1. To determine the prevalence of hypertension among adults 18 years and above in Chiroma community, Nasarawa State, Nigeria.

2. To identify the factors associated with hypertension among adults 18 years and above in Chiroma community.
3. To assess the level of knowledge of participants on hypertension in the community.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Definition/Historical Perspective

Blood pressure is made up of the systolic and diastolic pressures. The blood pressure is the pressure exerted by circulating volume of the blood on the arterial walls, veins and chambers of the heart .<sup>6</sup> It is therefore the measurement of the force against the walls of the arteries as the heart pumps blood through the body.<sup>2</sup> Hypertension is the term used to describe high blood pressure.<sup>1</sup>

Many years ago it was generally declared that high blood pressure was rare in nature Africans. This was based on reports mainly by workers on the eastern coast of the continent such as Cooke, Donnison, Jex Blake and Vint.<sup>44</sup>

The earliest report on hypertension in Nigerian African was probably by Callander. He noted that 100 healthy soldiers during routine medical examination and recruitment, 52 had a symbolic blood pressure > 140mmHg and 23 has a diastolic blood pressure (BP) > 90mmHg. His observation from the army recruitment were more remarkable. In 400 recruits aged 19-24 years 42.5% were rejected on account of elevated blood pressure.<sup>44</sup>

In two reports in 1956, hypertension was documented as a risk factor of cardiovascular disease in Nigeria. Beet el at noted that it was responsible for 24% of cases of heart failure in Northern Nigeria while Nwokolo et al also documented some cases in Enugu in the Eastern part of the country. Also, Lambo et al reported on the association of high blood pressure and mental disorder in the western region.<sup>44</sup>

The earliest and first large-scale study of blood pressure in Nigerians was by Abraham et al.. The study was conducted in 1961 in a rural town of Ilora which is about 50km north of Ibadan. They noted that blood pressure rose with age in both men and women. This was followed by

studies by Smith in Lagos, Akinkugbe et al in Ibadan, Johson in Lagos, Oviasu et al in Benin city and Oyediran in Epe near Lagos.<sup>44</sup>

Akingkuba is generally regarded as the father and doyen of blood pressure and hypertension research in Nigeria because of his seminal works in this field in the late 60s and 70s. among his documented work are: (1) systolic blood pressure rose with age in both sexes and all age groups from 12-70 years, this trends was less marked in diastolic blood pressures and (2) blood pressure levels were similar in women from rural and urban areas but seemed much higher in urban than in rural men.<sup>44</sup>

Cole et al was the first to conduct a drug trial on hypertensive patients and this was followed by a series of works by Salake et al, in 1971. In 1973 Salako et al evaluated the usefulness of moduretics in the treatment of hypertension in Nigerians. A series of studies by Salako and Falase in 1976 showed that Nigerians responded well to Thiazide diuretics and calcium channel antagonists, when these drugs were used as monotherapy.<sup>44</sup>

Effective management of hypertension in Nigerians therefore requires the use of thiazide diuretics or calcium channel antagonists as monotherapy or in combination with other classes of antihypertensive agents. Abdurrahman el al in 1978 studied blood pressure in school children in Northern Nigeria. Earlier studies used 160/95mmHg as the benchmark for the diagnosis of hypertension. The vast majority of studies which were conducted in the last 20 years used 140/90mmHg as the cut off and the majority of the population based studies used multistage cluster sampling.<sup>44</sup>

In 1980 Oviason et al documented on blood pressure and hypertension in urban city of Benin/occupational factors of hypertension. In 1981 Ladipo carried out a study on hypertensive retinopathy in Ile-Ife. These events were recorded among those that took place in the first 21 years of blood pressure and hypertension research in Nigeria from 1961 to 1981.<sup>44</sup>

## 2.2 Introduction

Hypertension is a condition in which the blood pressure measured with a sphygmomanometer is higher than normal. In an adult, hypertension is said to occur when the blood pressure, measured on two or more occasions is equal or above 140mmHg (systolic) and 90 mmHg (diastolic).<sup>18</sup>

Chronic hypertension is when the rise in blood pressure is usually slight to moderate and continues to rise slowly over many years, is termed benign. Sometimes complications are the first indication of hypertension e.g. kidney disease, heart failure, cerebrovascular accident and myocardial infarction. Occasionally the rate of progress increases and the hypertension becomes malignant.<sup>45</sup>

Malignant (accelerated) hypertension is when the blood pressure is already elevated and continues to rise rapidly over a few months. Diastolic pressure in excess of 120mmHg is common. The effects are serious and quickly become apparent, e.g. haemorrhage into the retina, papilloedema (oedema around the optic disc) encephalopathy (cerebral oedema and progressive renal diseases, leading to cardiac failure.<sup>45</sup>

Isolated systolic – hypertension is a systolic pressure which is persistently above 140 mmHg, while the diastolic is consistently below 90 mmHg.<sup>18</sup>

Hypertension is also a systolic blood pressure (SBP) of 140 mmHg or more or a diastolic blood pressure (DBP) of 90 mmHg or more or taking antihypertensive medication.<sup>21</sup>

The local names of hypertension include the following:<sup>2</sup> Hawan jini (Hausa), Ifunpa giga or Ejeriru (Yoruba), and Obala mgbanienu (Igbo).

### **2.2.1. Classification of hypertension**

Blood pressure is the force of blood pushing up against the blood vessel walls. The higher the pressure the harder the heart has to pump. Hypertension means “high blood pressure or sustained elevation of systolic arterial blood pressure to a level likely to induce cardiovascular damages or other adverse consequences”.<sup>24</sup> Hypertension can lead to damaged organs as well as several illnesses such as renal failure (kidney failure), heart failure, stroke or heart attack. When systolic and diastolic blood pressure falls into different categories, the higher category should be selected to classify the individual’s blood pressure. Isolated systolic hypertension is a systolic blood pressure of 140 mmHg or more and a diastolic blood pressure of less than 90 mm of Hg.<sup>25</sup>

Hypertension is divided into two major types: primary (essential) and secondary. Hypertension is classified as “essential” when the causes are generally unknown. Essential hypertension is the most prevalent form of hypertension accounting for 90% of all cases of hypertension.<sup>26</sup> Hypertension is classified as “secondary” when other disease process or abnormality is involved in its causation, prominent among these are diseases of the kidneys (chronic glomerulonephritis and chronic pyelonephritis), hormonal disorders of the adrenal glands, congenital – narrowing of the aorta, birth control pills, and toxemias of pregnancy. Altogether, these are estimated to account for about 10 percent or less of the cases of hypertension.<sup>26</sup> Hypertension is also described as an intermittent or sustained elevation in systolic or diastolic blood pressure, it occur as two major types, the essential (idiopathic) or primary hypertension of unknown causes and secondary hypertension which results from renal disease or another identifiable cause.<sup>26</sup> Hypertension is predominantly a condition of middle and later life that may be classified as “benign” or malignant.<sup>41</sup> Benign hypertension is much more common, relatively stable and is treatable in the long term anti-hypertensive drugs. “Malignant” hypertension only affects 5% of hypertensive patients but is more severe is liable to affect men under 50 years of age. It is defined as diastolic pressure of more than 120mmHg.<sup>41</sup>

Malignant hypertension is a severe, fulminant form of hypertension common to both types.<sup>19</sup> Hypertension is the major cause of cerebrovascular accidents, cardiac diseases and renal failure.<sup>20</sup> Prognosis is good if it is detected early and treatment commenced before complications develop.<sup>21</sup> Severely elevated blood pressure (hypertensive crisis) may be fatal.<sup>22</sup> Clinically hypertension may be mild, moderate or severe, as follows:-

- a. Mild hypertension, when diastolic pressure is between 90 – 99mmHg.
- b. Moderate hypertension, when diastolic pressure is between 100–109mmHg.
- C. Severe hypertension, when diastolic is 110mmHg and above, See table1 below:

**Table 1: Classification of Blood Pressure Measurement**

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Normal	<130	<85
High normal	130-139	85-90
<b>Hypertension</b>		
Stage I mild	140 – 159	90 -99
Stage II Moderate	160 – 179	100 – 109
Stage III severe	> 180	>110

**Source:** <sup>18</sup>

Based on the recommendation of the seventh report of the joint national committee on prevention, detection, and recommendation and treatment of high blood pressure (JNCT), the classification of blood pressure (BP) for adults aged 18 years or older is as follows. <sup>23</sup>

**Normal:** Systolic lower than 120 mmHg and diastolic lower than 80 mmHg.

**Pre-hypertension:** Systolic 120 – 139 mmHg and Diastolic 90- 99 mmHg

**Hypertension:** Stage I: Systolic 140 -159 mmHg, diastolic 90 – 99 mmHg, Stage II: Systolic 160 mmHg or greater, diastolic 100 mmHg or greater.

Another classification using (organ damage) is as follows:<sup>42</sup> Stage I: No objective sign of organic changes, Stage II: At least one of the following: - left ventricular hypertrophy, arteriolar narrowing on fundoscopy, Proteinuria, serum creatinine raised but less than 2mg/dl and atherosclerotic plaque. Stage III: symptoms and signs of organ damage;

Heart - angina, myocardial infarction, heart failure

Brain - transient ischaemic attacks, stroke, encephalopathy

Fundus - haemorrhages, exudates, papilloedema

Kidney - serum creatinine greater than 2.0mg/dl, renal failure

Vessels - dissecting aneurysm, arterial occlusive disease.

### **2.2.2 Epidemiology of hypertension**

Hypertension is a global health challenge. Overall, approximately, 20% of the world's adults have hypertension with a remarkable increase in prevalence after the age of 60years. <sup>9</sup> In many countries, 50% of the individuals in this age group have hypertension. Worldwide, approximately 1billion people have hypertension, contributing to more than 7.1 Million deaths per year.<sup>9</sup>

The number of adults with hypertension in 2025 was predicted to increase by about 60% to a total of 1.56 billion globally.<sup>11</sup> As one of the most prevalent non-communicable conditions worldwide; hypertension is responsible for an estimated 45% of deaths due to heart disease and 51% of deaths due to stroke globally. <sup>12</sup> Hypertension is responsible for more deaths worldwide than any other cardiovascular risk factors. <sup>14</sup>Globally, the overall prevalence of raised blood pressure in adults aged 25 and above was around 40% in 2008.<sup>10</sup> However, because of population growth and ageing, the number of people with uncontrolled hypertension rose from 600 million in 1980 to nearly 1billion in 2008.<sup>10</sup>

About 67 million American adults (31%) have high blood pressure, that is 1 in every 3 American adults and more than 348,000 American deaths in 2009 included high blood pressure as primary or contributing cause.<sup>12</sup> High blood pressure costs the United States of America US\$47.5 billion annually in direct medical expenses and US\$3.5 billion each year in lost productivity.<sup>13</sup> About half (47%) of people with high blood pressure in America have their condition under control.<sup>13</sup>

In a large US study, the prevalence of hypertension was evaluated between 1988 and 1991. The national health and nutritional survey (NHANES) showed that overall, hypertension is more common in blacks (32%) than in whites (23%) but by the seventh decade of life BP levels were similar.<sup>48</sup> The possible explanation is that more severe hypertension in younger blacks leads to a greater mortality rate living less severely afflicted black hypertensive to age.<sup>48</sup> The determinants of hypertension in black Americans are multi factorial in origin e.g. high animal fat intake, and high consumption of highly refined, saturated fat containing foods with high caloric contents, while for blacks living in Africa are affected by post infectious kidney disease.<sup>48</sup>

The major common risk factors of hypertension for both the blacks are high salt intake and obesity which can account for differences in the standardized hypertension prevalence of 16% in West Africa, 20% in urban West Africa and 26% in the Caribbean compared with 33% in the United State. Rural Africa remains one of the social environments that is kindest to a human cardiovascular system. Unfortunately it seems as if by 2001 to 2002 at least some of the rural Africa were succumbing to the advance of civilization.<sup>48</sup>

The first demographic and health survey in south Africa was conducted in 1998 in random sample of 13 802 subjects age 15 years or older of whom 76% were blacks, 13% of mixed ancestry, 8% white and 3% Indian/Asiatic. The age-adjusted incidence of hypertension, namely,  $BP \geq 140/90$  mm Hg on medication, measured automatically for this predominantly

black South African population was 21% (females and males at equal rates). For those above 65years of age, 50% to 60% were hypertensive.<sup>48</sup>

High blood pressure accounts for 26% of total mortality in Germany. The prevalence of hypertension in Germany is 55%. Hypertension treatment and control rates in Germany were 26% and 8% respectively.<sup>50</sup> A total of 26.6% of Chinese adults had hypertension, and a greater number of men were hypertensive than women( 29.2% vs 24.1%,  $p<0.001$ ).<sup>56</sup>The age specific prevalence of hypertension was 13.0%, 36.7%, 56.5% among persons aged 20 to 44 years (young people), 45 to 64 years (middle-aged people), and 65years elderly people, respectively.<sup>56</sup>

According to the 5<sup>th</sup> basic survey of cardiovascular diseases in 2000, 47.5% of Japanese men and 43.8% of Japanese women aged  $\geq 30$ years have a systolic blood pressure of  $\geq 140$ mmHg or a diastolic blood pressure of  $\geq 90$ mmHg, or were taking antihypertensive drugs, and the total number of hypertensive patients was approximately 40million.<sup>52</sup>

In India, Cardiovascular diseases (CVDs) are estimated to be responsible for 1.5 million deaths annually. Hypertension is a major risk factor for CVDs, including stroke and myocardial infarction and its burden is increasing in India as it undergoes demographic transition with the prevalence of for hypertension in urban India at 29 – 45% in men and 25 – 38% in women.<sup>54</sup>

A result of basic health research 2007 conducted in Indonesia showed that the hypertension prevalence in Indonesia based on measurements and disease history was 32.2%. The significant risk factors were elderly (OR11.5) male gender (OR1.3), low education (OR1.6), obesity (OR2.8) and abdominal obesity (OR1.4). However, prevention programme and control of NCD and its risk factors will be needed to decrease the prevalence of hypertension in Indonesia.<sup>51</sup>

A National population and trend of hypertension survey conducted in 2009 revealed that the prevalence of hypertension in Jordan was 32.3% and was significantly higher among males,

older age groups, least educated, obese, and diabetics than their counterparts.<sup>57</sup> Hypertension is on the rise in Jordan, and level of awareness and control are below the optimal levels.<sup>57</sup>

In community based studies conducted by examining subjects in age group of 30 – 70 years of selected household during a 5 years period between 1995 and 2000 in Saudi Arabia showed that the prevalence of hypertension in Saudi Arabia was 26.1% in crude terms. For males, the prevalence of hypertension was 28.6% and while for female; the prevalence was significantly lower at 23.9% ( $p < 0.001$ ). The urban population showed significantly higher prevalence of hypertension of 37.9%, compare to rural populations prevalence of 22.45% ( $p < 0.001$ ).<sup>49</sup>

Across the WHO African region, the prevalence of raised blood pressure was highest in Africa, where it was 46% for both sexes combined. Both males and females have high rates of raised blood pressure in the African region, with prevalence rates of over 40%.<sup>10</sup>

A survey carried out in 2012 on hypertension in Sub-Saharan Africa revealed that the age standardized prevalence of hypertension was 19.3% in rural Nigeria, 21.4% in rural Kenya, 23.7% in Tanzania and 38.0% in urban Namibia.<sup>15</sup> The total number of hypertension in the developing world is high and cost analysis showed that these countries cannot afford the same treatment as developed countries.<sup>16</sup> Emerging evidence has indicated that the problem of hypertension affects the developing nations more than the developed ones, with the decline in the prevalence of infectious diseases and a steady increment of NCDs as major causes of death.<sup>31</sup>

Screening not only detects hypertension but also provides opportunity for education; therapy and prevention of complications.<sup>16</sup> Low levels of hypertension control are alarming. Strengthening of health care systems in sub-Saharan Africa to contain the emerging epidemic of cardiovascular disease (CVD) is urgently needed.<sup>15</sup>

Nigeria is one of many developing countries where the health services have focused on treating infectious diseases, such as malaria and tuberculosis, but in recent years Non-communicable conditions have become an increasing problem.<sup>12</sup>

About 22 percent of the Nigeria population is affected by high blood pressure and it is called a silent killer, because it does not show obvious signs or symptoms till it might be too late.<sup>7</sup> Hypertension and other Non-communicable diseases are currently responsible for at least 20% of all deaths in Nigeria and constitute up to 60% of the patient admitted into medical wards of most tertiary hospitals in Nigeria.<sup>17</sup> Yet the treatment outcomes for the patients have remained very poor prompting a call for better patient education.<sup>17</sup>

In many developing countries few people go for routine medical check up to monitor the risk factors associated with non communicable diseases and Nigeria is no exception.<sup>8</sup> Health seeking behavior related hypertension is limited by a combination of poverty and ignorance; as the average cost of checking blood pressure is one thousand naira which is approximately US\$6.36.<sup>8</sup>

The absence of obvious symptoms limits the motivation towards screening for hypertension. Poor health seeking, incomplete health sector data and non-sustainable policies have hampered the development of strategies to reduce the morbidity of hypertension.<sup>8</sup> There is therefore that need to roll out coverage for such basic and essential services including access to diagnosis and treatment for hypertension under a national health bill by the federal government.<sup>8</sup>

Hypertension is a chronic condition of concern due to its role in the causation of coronary heart disease, stroke and other vascular complications. It is one of the major risk factors for cardiovascular mortality, which accounts for 20-50 percent of all death.<sup>18</sup>

### **2.3 Pathophysiology**

In developing hypertension, there is increase in peripheral resistance which usually involves the constriction of the arterioles due to the contraction of smooth muscles upon stimulation by sympathetic nerves. Constriction of arterioles is also affected by oxygen concentration, metabolic products, hormones and drugs.<sup>55</sup>

The increased peripheral resistance causes increase in heart rate in an attempt to overcome the resistance.<sup>55</sup> Subsequently the cardiac output increases due to a concomitant increase in stroke volume. The consistent peripheral resistance places a greater demand on the heart resulting in myocardial hypertrophy and subsequent cardiomegaly.<sup>55</sup> The increased cardiac output is transmitted through the vessels and against the elevated resistance hence the rise in blood pressure.<sup>55</sup>

With ageing, the arteries are subjected to arteriosclerotic changes, which in addition to constricted arterioles results in reduced blood supply to many organs in the body such as the brain, the lung, the heart, the kidney and muscles.<sup>55</sup> Arteriosclerotic changes in the vessel wall reduces the diameter of blood vessels with reduced blood flow and oxygen delivery. This accounts for ischaemic changes in the brain, heart and kidneys. The clinical outcomes include confusion, headache, dyspnoea on exertion, angina pain, oliguria, and fatigue respectively.<sup>55</sup> Damage to cerebral cells with subsequent paralysis is termed stroke. There are two types of stroke namely haemorrhagic and ischaemic.<sup>55</sup>

The tiny vessels are prone to rupture due to arteriosclerotic changes and increased pressure within them.<sup>55</sup> Where this occurs, it accounts for the haemorrhage exemplified by epistaxis in hypertension.<sup>55</sup> Bleeding to the retina may occur resulting in blurred vision and blindness.<sup>55</sup> Apoplexy (stroke) is usually due to this reason.<sup>55</sup>

### **2.3.1 Risk factors for hypertension**

Hypertension is not only one of the major risk factors for most forms of cardiovascular diseases, but that it is a condition with its own risk factors. A WHO Scientific group recently reviewed the risk factors for essential hypertension.<sup>18</sup> These may be classified as:-

#### **2.3.1a Non-modifiable risk factors**

**1. Age:** Blood pressure rises with age, in both sexes and the rise is greater in those with higher initial blood pressure.<sup>18</sup> Some populations have now been identified whose mean blood pressure does not rise with age. These communities are for the most part primitive societies with calorie and often salt intakes at subsistence level.<sup>18</sup>

**2. Sex:** Early in life there is little evidence of a difference in blood pressure between the sexes. However at adolescence, men display a higher average level, this difference is most evident in young and middle aged adults.<sup>18</sup> Late in life, the difference narrows and the pattern may even be reversed. Post-menopausal changes in women may be the contributory factor for this change.<sup>18</sup> Studies are in progress to evaluate whether estrogens supplementation protects against the late relative rise of blood pressure in women.<sup>18</sup>

**3. Genetic factors:** There is considerable evidence that blood pressure levels are determined in part by genetic factors and that the inheritance is polygenic.<sup>18</sup> The evidence is based on twin and family studies. Twin studies have confirmed the importance of genetic factors in hypertension. The blood pressure values of monozygotic twins are usually more strongly correlated than those of dizygotic twins. In contrast, no significant correlation has been noted between husbands and wives, and between adopted children and their adoptive parents.<sup>18</sup>

Family studies have shown that the children of two normotensive parents have three percent possibility of developing hypertension, whereas this possibility is 45 percent in children of two hypertensive parents. Blood pressure levels among first degree adult relatives have also been noted to be statistically significant.<sup>18</sup>

**4. Family History:** having a family history of hypertension or high blood pressure places in a person in a high risk category than someone with no family history of high blood pressure. However, for what this means is still a topic of research. It is clear that family history plays an important role in determining risk of developing high blood pressure. <sup>62</sup> having one or more close family members with high blood pressure before the age of 60 means you have two times the risk of having hypertension also. A strong family history means you have three or more relatives who had high blood pressure before 60yrs of age. A family history of high blood pressure had been linked to other risk factors or heart disease and stroke. The factors include; high cholesterol, high body fat, and being more sensitive to effect of salt on raised blood pressure. <sup>75</sup>

**5. Ethnicity:** Population studies have consistently revealed high blood pressure levels in black communities, than other ethnic groups. <sup>1,18</sup> Average difference in blood pressure between two groups varies from slightly less than 5mmHg during the second decades of life to nearly 20mmHg during the sixth. <sup>18</sup> Black Americans of African origin have been demonstrated to have higher blood pressure levels than whites. <sup>18</sup>

### **2.3.1b Modifiable risk factors.**

**1. Obesity:** Epidemiological observations have identified obesity as a risk factor for hypertension, the greater the weight gain, the greater the risk of high blood pressure. <sup>18</sup> Data also indicated that when people with high blood pressure lose weight, their blood pressure generally decreases. <sup>18</sup> Central obesity indicated by increased waist- to - hip ratio, has been positively correlated with high blood pressure in several populations. <sup>18</sup>

**2. Salt intake:** There is an increasing body of evidence to the effect that a high salt intake (i.e 7-8g per day) increases blood pressure proportionately. <sup>18</sup> Low sodium intake has been found to lower the blood pressure for instance, the higher incidence of hypertension is found in Japan

where sodium intake is above 400mmol/day while primitive societies ingesting less than 60mmol/day have virtually no hypertension.<sup>18</sup> It has been postulated that essential hypertensive have a genetic abnormality of the kidney which makes salt excretion difficult except at raised levels of arterial pressure .<sup>18</sup>

Besides sodium, there are other mineral elements such as potassium which are determinants of blood pressure. Potassium antagonizes the biological effects of sodium, and thereby reduces blood pressure. Potassium supplements have been found to lower blood pressure of mild to moderate hypertensive.<sup>18</sup> Other caution such as calcium, Cadmium and Magnesium have also been suggested as of importance in reducing blood pressure levels .<sup>18</sup>

**3. Saturated fat:** The evidence suggested that saturated fat raises blood pressure as well as serum cholesterol .<sup>18</sup> saturated facts and trans fatty acid have been linked to raised cholesterol level in the blood leading to increase rate of cardiovascular diseases in the body. The saturated fatty acid mainly in animal fat e.g butter, milk, cheese, eggs and part of meat and fish. However, there are exception as for example coconut and palm oil although vegetables have an extremely high percentage of saturated fatty acid. On the other hand, fish oil although they are not vegetables oil contain poly and mono saturated fatty acid. The poly unsaturated fatty acid are mostly found in vegetable oils. Vegetable oils e.g some plants store fat in there seed e.g groundnut, mustard, sesame, coconut etc. other fats are small quantity of fat (invisible fat) are found in much other seeds such as cereals, pulses, nuts and vegetables. E.g rice has 3%,wheat has 3% etc. <sup>18</sup>

**4. Dietary fibre:** Several studies indicate that the risk of CHD and Hypertension is inversely related to the consumption of dietary fiber. Most Fibers reduces plasma total and LDL cholesterol .<sup>18</sup> dietary fibre which is mainly non-starch poly saccharide is a physiologically important component of thee diet. Its find in vegetables, fruits and grains. There are two types of dietary fibres. Insoluble fibres include cellulars, hemicelluloses and ligmin, and soluble once

are pectin, gums and mucilages. <sup>18</sup> dietary fibre has many functions. It absorbs water and this increases the bulk of the stool and helps reduce the tendency to constipation. Dietary fibres are resistant to digestion in the digestive tract. In the large intestine the bacterial action causes the fermentation of the fibre, thus making the stool soft and passage easier. <sup>18</sup> Dietary fibre is known to be associated with a reduced risk of coronary heart disease. The mechanism of this action is attributed to its binding to bile salts and preventing its reabsorption and thus reducing cholesterol levels in circulation. The fibres, particularly the gum and pectin, when included in a diet are reported to reduce post-prandial glucose levels in blood. <sup>18</sup>

The fibres have no metabolic effect. However, too much of fibre can decrease the absorption of valuable micro-nutrients. People who eat a well-balanced diet obtain enough roughage. A daily intake of about 40 grams of dietary fibre is desirable when whole grains, cereals, pulses and vegetables are consumed daily. <sup>18</sup>

**5. Alcohol:** High alcohol intake is associated with an increased risk of high blood pressure. <sup>27</sup> It appears that alcohol consumption raises systolic pressure more than the diastolic. But the finding that blood pressure returns to normal with abstinence suggests that alcohol-induced elevations may not be fixed, and do not necessarily lead to sustained blood pressure elevation. <sup>27</sup>

**6. Heart rate:** When groups of normotensive and untreated hypertensive subjects, matched for age and sex are compared, the heart rate of the hypertensive group is invariably higher. <sup>18</sup> The role of heart variability in blood pressure needs further research to elucidate whether the relation is causal or prognostic. <sup>18</sup>

**7. Physical activity (Exercise):** Physical activity by reducing body weight may have an indirect effect on blood pressure. <sup>18</sup> Exercise helps maintain good health as it helps to control weight, improve emotional wellbeing and relieve stress, improve blood circulation, increases

flexibility, lower blood pressure increases energy levels, improves balance, thus, reduces the danger of falls, lowers blood sugar levels thus, helps in diabetes, improve bone density and therefore, helps prevent osteoporosis.

**8. Environmental stress:** The term hypertension itself implies a disorder initiated by tension or stress. Since stress is nowhere defined, the hypothesis is untestable. However, it is an accepted fact that psychosocial factors operate through hypertension.<sup>18</sup> Virtually all studies on blood pressure and catecholamine levels in young people revealed significantly higher noradrenalin levels in hypertensive than in normotensives.<sup>18</sup> This supports the contention that over activity of the sympathetic nervous system has an important part to play in the pathogenesis of hypertension .<sup>18</sup>

**9. Socio- economic status:** In countries that are in post- transitional stage of economic and epidemiological change, consistently high levels of blood pressure have been noted in lower socio-economic groups. This inverse relation has been noted with levels of education, income and occupation .<sup>18</sup>

However, in societies that are transitional or pre-transitional, a high prevalence of hypertension has been noted in upper socio-economic groups. This probably represents the initial stage of the epidemic of CVD .<sup>18</sup>

**10. Smoking:** at present 22% of men and 18% of women aged 65 to 74years in developed countries are smokers. Though this figure is lower than among younger adult, older people have usually smoke for longer have been and continue to be heavy smokers, and are likely to have chronic diseases with smoking causing further deterioration.<sup>18</sup> smoking is an important risk factor in heart diseases, stroke and hypertension. Former smokers live longer than continuing smokers, smoking cessation at the age of 50yrs reduces the risk of dying within the next 15yrs by 50%.<sup>18</sup>

**11. Other factors:** The commonest present cause of secondary hypertension is oral contraception, because of the estrogen component in combined preparations.<sup>18</sup> Other factors such as chronic kidney disease, adrenalin and thyroid problems and tumors, insufficient calcium, potassium, and magnesium consumption, and vitamin D deficiency, noise, vibration, temperature and humidity require further investigations .<sup>28</sup>

### **2.3.2. Symptoms of hypertension**

There is no guarantee that a person with hypertension will present any symptoms of the condition. About 33% of people actually do not know that they have high blood pressure, and this ignorance can last for years. For this reason, it is advisable to undergo periodic blood pressure screenings even when no symptoms are present. Extremely high blood pressure may lead to symptoms which include. Severe headaches, fatigue or confusion, dizziness, nausea, problem of vision-unclear or hazy vision, chest pains, breathing problems, irregular heartbeat (palpitations), blood in the urine.<sup>28</sup>

One or a combination of these symptoms may occur in a person. It should be noted that these symptoms are not specific for hypertension and may occur in persons with normal blood pressure .<sup>28</sup>

It must however be emphasized that hypertension is mostly without any symptoms and can only be recognized by measuring the blood pressure .<sup>28</sup>

### **2.3.3 Clinical features**

The clinical features of hypertension include the following; headache –experienced mainly in the morning, dizziness, visual changes (including blindness), vertigo, tinnitus, syncope, sustained elevation in blood pressure ( BP), Fatigue, Insomnia – sleeplessness, Nervousness, epistaxis, angina pectoris, shortness of breath.

## **2.4. Complications**

These include the followings; arteriosclerosis, heart failure, myocardial infarction, cerebrovascular accident (C.V.A), renal complication – nephrosclerosis, chronic pyelonephritis, changes in Retina – small haemorrhage in the retina may result in blindness, stroke and Sudden death.

## **2.5. Investigations**

### **2.5.1 Rules of halves**

Hypertension is an iceberg disease. It became evident in the early 1970s that only about half of the hypertensive subjects in the general population of most developed countries were aware of the condition, only about half of those aware of the problem were being treated and only about half of those treated were considered adequately treated. If this was the situation in countries with highly developed medical services, in the developing countries, the proportion treated would be far too less.<sup>18</sup>

### **2.5.2. Tracking of blood pressure**

If blood pressure of individuals were followed up over a period of years from early childhood into adult life then those individuals whose pressures were initially high in the distribution, would probably continue in the same “track” as adult.<sup>18</sup> In other words, low blood pressure levels tends to become higher as individuals grow older.<sup>18</sup>

This phenomenon of persistence of rank order of blood pressure has been described as “Tracking”.<sup>18</sup> This knowledge can be applied in identifying children and adolescents “at risk” of developing hypertension in future.<sup>18</sup>

### **2.5.3. Diagnosis of hypertension**

A careful health history should be taken, and information related to the patient's psychosocial functional and life style is obtained. This is to seek evidence to identify the probable type of hypertension, the severity of the condition and any conditions that could cause secondary hypertension.

Physical examination with the aim of detecting signs of cardiac enlargement, and adrenal or renal mass. Palpation of radial and femoral pulses to determine rate and quality, and blood pressure readings taken with the patient in sitting position.

A patient is assessed for hypertension and hypotension. The diagnosis of hypertension is not made with only random elevated reading. The diagnoses of hypertension in adults are made, when an average of two or more diastolic readings on at least two subsequent visits is 90 mmHg or higher or when an average of two systolic readings on at least two visits is 140mm Hg or higher<sup>6</sup>Blood pressure measurement or readings are done with sphygmomanometer and a stethoscope<sup>6</sup>.

The only way hypertension can be diagnosed is by measuring the blood pressure with a sphygmomanometer. It is therefore advisable that all adults above the age of 30years in the community should have their blood pressures measured at least once every year<sup>2</sup>

Blood pressure readings taken at home may be a better measure of one's current blood pressure than those taken at the doctor's office. One should ensure he gets a quality, well-fitting home device. It should have proper size cuff and a digital read out<sup>18</sup>.

Practice with one's health care provider to make sure one is taking his blood pressure correctly e.g. blood pressure monitors for homes. The doctor may perform physical exams to look for signs of heart disease, damage to the eyes and other changes in the body.<sup>18</sup>

Diagnosis for complications or secondary hypertension can be performed through various laboratory procedures e.g.<sup>39</sup> Serum electrolytes evaluation which may give clue to primary aldosteronism, hyperkalaemia and chronic renal disease( phosphate retention), blood urea nitrogen(bun) and creatinine clearance tests are done to assess renal dysfunction, results may be elevated, urinalysis is necessary to detect epithelial and red cell casts(which might indicate chronic glomerular lesions) or pus cells suggesting pyelonephritis and proteinuria, special studies may include serum thyroxin, intravenous pyelogram, rennin assays, split renal function and urinary steroid excretion and some other tests may be done to look for: .<sup>18</sup> high cholesterol level, heart diseases such as an echocardiogram or electrocardiogram and kidney disease such as a basic metabolic panel and urinalysis or ultrasound of the kidney.

The routine investigations which are perform in all patients are as follows:<sup>42</sup> haematocrit, electrolytes, urea, creatinine, blood sugar, cholesterol level, uric acid levels, urine analysis – protein, sugar, cells, cast, bacteria, chest x-ray and ecg.

## **2.6 Management**

Although essential hypertension has no cure, drugs and modifications in diet and life style can control it. Drug therapy usually begins with a diuretic alone and sympathetic blockers or vasodilators added as needed. Life style and dietary changes may include weight loss, relaxation techniques, regular exercise and restriction of sodium and saturated fat intake .<sup>18</sup>

Treatment of secondary hypertension includes correction of the underlying cause in addition to controlling hypertension effect .<sup>18</sup>

The goal of treatment is to reduce blood pressure so that the patient will have lower risk of complications .<sup>18</sup>

### **2.6.1. Non-drug treatment**

For all hypertensive patients, advice should be given on: . reducing salt in their food, aimed for less than 1.50mg per day, reducing body weight, exercising regularly:-Non strenuous exercise of walking, gentle jogging and swimming are ideal. Competitive sports and intensive exercises, especially those to which one is unaccustomed, may be dangerous, Reduce stress: - Try to avoid thing that cause you stress, limit alcohol intake: - One bottle drink a day for women, two for men, if you smoke: - Quit, or find a program on health care that will help you stop and Eat a healthy diet, including potassium and fiber, and drink plenty water.<sup>23</sup>

Mild hypertensive who comply with the above advise may not require further treatment with drugs.

### **2.6.2. Drug treatments**

There are many different medicines that can be used to treat high blood pressure i.e. there are many classes of drugs from which the doctors can choose, based on their efficiency and side effects in the particular patient. These drugs include some groups such as; thiazides e.g. bendruiofluazide, hydrochothezide, hydroflumethazide, beta blockers e.g., propranol and atenolol, calcium channel blockers e.g., nifedipine and amlodipine, angiotensions converting enzymes such as (ace) inhibitors, e.g., captopril and lisinopril, vasodilators e.g., hydralazine and diazoxide and others are methyldopa, Reserpine, Prazosin and Clonidine.<sup>23</sup>

The goals of management of the patient with hypertension are as follows: detecting hypertension in a patient early and treating it, reducing the blood pressure to normal and maintaining it within the normal range, educating the patient on the need for long-term monitoring and avoidance of risk factors and preventing and treating complication of hypertension.<sup>2</sup>

Most groups including JNC, the American Diabetic association (ADA) and the American Heart Association/American stroke Association (AHA/ASA) recommended lifestyle modification as the first step in managing hypertension <sup>6,24</sup>

#### **a. Lifestyle modifications (changes)**

Recommendation to lower BP and decrease cardiovascular disease risk include the following with greater results achieved when two or more lifestyle modifications are combined, weight loss (range of approximately systolic BP reduction (SBP) 5-20 mmhg per 10kg), limit alcohol intake to no more than 10z (30ml) of ethanol per day for men or 0.502 (15ml) ethanol per day for women, and people of lighter weight (range of approx SBP reduction, 2-8mmhg), reduce sodium intake to no more than 100mmol per day (2.4g sodium or 6 of sodium chloride, range of approx. SBP reduction 2-8mmhg), maintain adequate intake of dietary potassium approximately 90mmol per day, stop smoking and reduce intake of dietary saturated fat and cholesterol for over all cardiovascular health and engage in aerobic exercise at least 30 minute daily for most days (range of approximate SBP reduction, 4-9mmhg). <sup>6, 24</sup>

#### **b. Pharmacological therapy**

If lifestyle modifications are insufficient to achieve the goal BP, there are several drug options for treating and managing hypertension.

#### **2.6.3. Monitoring**

The monitoring include; regular measurement of blood pressure and adjustment of treatment if necessary, examination of urine for protein and sugar, periodic clinical examinations for early signs of complications and regular measurement of body weight.

#### **2.6.4. Prevention**

The goals of preventing of hypertension are: to reduce the occurrence of hypertension in the community, to promote lifestyle changes which reduces risks of developing hypertension and to detect and treat secondary causes of hypertension.<sup>24</sup>

#### **2.6.5. Strategies**

**Health Education:-** People who do not have hypertension should continue to receive health education to adopt lifestyle that promotes good health.

**Pregnant women:-** All pregnant women must receive antenatal care, during which period their blood pressure should be measured regularly.

**Regular checking of blood pressure:-** All adult members of the community should have their blood pressures checked at least once a year, especially the following at-risk group, who should have their blood pressures checked even more frequently.

All persons who are overweight, individual in whose families, one (or more) of their members, have been known to have hypertension, or died from hypertension or its complications, persons who do not exercise, or whose jobs require sitting in a place, e.g. executives who sit in the office all the time, and hardly walk about, (often, they have drivers, who take them to and from work around) and persons with other risk factors for hypertensions.<sup>2</sup>

#### **2.6.6 Knowledge**

Knowledge and awareness in general population regarding the risk factors and warning symptoms on hypertension and its complications are essential for the prevention and initiation of immediate effective treatment. Besides that, awareness of risk factors may also improve adherence to medical advice regarding lifestyle modification. Systemic reviews have shown that one time advice from healthcare workers during routine patient's interaction can have an

appreciable impact on patient's behavior. Interview scheduled to assess knowledge relating to warning symptoms and risk factors of hypertension questions related to risk factors of hypertension were used, for example warning symptoms of hypertension and its complications include personal history/history of illness of risk factors i.e history of tobacco use, alcoholism, diabetes, family history of hypertension, heart diseases and history of stroke.<sup>88</sup>

The warning symptoms refer to the subjective indications of hypertension i.e sudden confusion, dizziness, loss of balance or coordination, sudden and severe headache with no cause. The risk factors refer to the established risk factors contributing the development of hypertension and its complication for example: obesity, alcoholism, smoking, family history, diabetes. Grading of knowledge of risk factors of hypertension was done as follows as satisfactory knowledge and unsatisfactory knowledge.<sup>88</sup>

Poor practices were because of lack of knowledge and awareness about hypertension. This study attempted to create more awareness and knowledge of hypertension and its complication to the community and guide those with hypertension to health facilities for optimal care and advice and encourage the population on lifestyle modifications and adherence to antihypertensive drugs where necessary to prevent, control and properly treat hypertension and its complications in the area of study.

## CHAPTER THREE

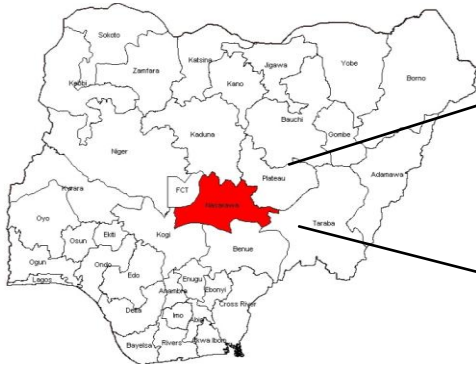
### METHODOLOGY

#### 3.1 Study Area

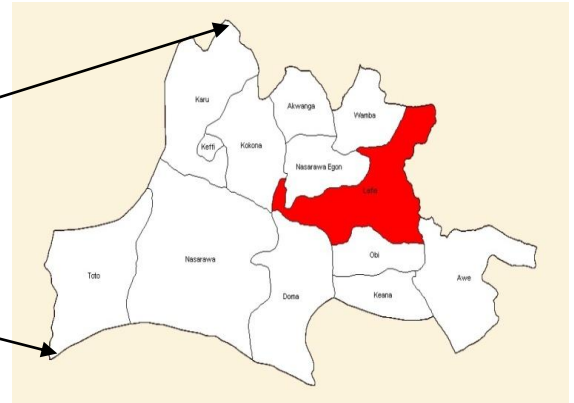
The study was carried out in Chiroma community, Lafia, Nasarawa State, Nigeria. Lafia town is the capital city of Nasarawa State that was created on 1<sup>st</sup> of October, 1996. Lafia Local Government Area shares boundaries with Nasarawa Eggon to the North, Bokkos to the North – East, Quan’pan to the East and Doma Local Government Area to the West.

Lafia remain the largest metropolis in the former Plateau State with a total area of 2,737 squares (km) with a projected population of about 330,000 people, according to the 2006 census. Lafia is located in the Guinea Savanna region with a significant portion of arable land for convenient cropping of yams, cassava, maize, cereals, tubers, oil palm and legumes like beans. Nearly all the ethnic groups in Nigeria are represented in Lafia with adherents of Islam, Christianity and Traditional religion. It is made up of 4 communities namely: Makama, Zanwa, Chiroma and Gayam of the metropolis.

The Chiroma community is the largest among the four (4) communities in the metropolis. The people are friendly and accommodating, social economic status average however, very much use to ceremonies which exposed them to oily and fatty foods. A typical Chiroma man is huge in body weight and used to sedentary life style which predisposed them to overweight, obesity and eventually hypertension. The youths take smoking as a joyous habit to belong to peer groups which may lead to addiction resulted in cardiovascular diseases especially hypertension. Firewood is a great source of material for cooking in the area, smokes cover the environment especially in the evenings. Firewood selling is a good business for both men and women. Therefore, firewood used for cooking may expose individuals in the congested houses to smokes.



**Fig 1:Map of Nigeria highlighting Nasarawa State**



**Fig 2:Map of Nasarawa State highlighting Lafia LGA**

### **3.2 Study Design**

A cross-sectional community based study conducted from January to March 2014 in Chiroma community, Lafia, Nasarawa State, Nigeria.

### **3.3 Study Population**

The population for the study consisted of adults aged 18 years and above in Chiroma Community, Lafia, Nasarawa State, Nigeria.

### **3.4 Inclusion Criteria**

Residents, both males and females of Chiroma Community, Lafia, Nasarawa State, Nigeria who were 18years and above were recruited.

### **3.5 Exclusion Criteria**

Residents of Chiroma Community, Lafia, who travelled away and those women who were pregnant during the study were excluded.

Residents of Chiroma Community who were too ill (e.g. with high fever, etc) to participate and those who qualified but did not consent, were excluded from the study

### 3.6 Sample Size

The sample size was 393. It was obtained using the formula as follows:

$$n = \frac{Z^2 pq}{d^2}$$

Where;

n = required sample size

Z = 1.96 = standard normal deviate (1.96) for a 2 sided test at the 0.05 level.

P = Expected proportion in the population = 36% (0.36).<sup>4</sup>

q = the complementary probability (1 - p) = 1 - 0.36 = 0.64

d = absolute precision = 5% (0.05)

$$n = 1.96^2 \times 0.36 \times 0.64$$

---

$$0.05^2$$

$$= \underline{\underline{354}}$$

10% non response rate(NR) = 10/100 = 0.1

$$n = \frac{nx1}{1 - NR}$$

$$n = \frac{354 \times 1}{1 - 0.1} = \frac{354}{0.9} = 393$$

Final sample size = **393**

### **3.7 Sampling Technique**

Multistage sampling method was used.

#### **Method**

**Stage 1.**Lafia metropolis is made up of 4 Communities out of which Chiroma Community was selected by simple random sampling by balloting.

**Stage 2.**Chiroma Community, Lafia is made up of 11 settlements out of which 3 settlements were selected by balloting, since the settlements were not up to twelve to give  $\frac{1}{4}$ .

**Stage 3.**Equal allocation of participants was done to the selected settlements. That is, the total sample size of 393 was divided by 3 to get 131 participants for each of the three settlements equally as shown in Table 4.1.

At the center of each of the settlements a bottle was spun to obtain the direction to the first house and a household from the first house was selected using simple random sampling. After then the house whose door is nearest to the last one was contiguously selected and households selected randomly until the sample size for each settlement was obtained.

**Stage 4.**At the household level one participant was selected among the adults representatives of the household by simple random sampling until the required sample size was obtained.

### **3.8 Study Instruments**

The instrument used in this study was a pretested interviewer administered semi-structured questionnaire. Four research assistants were trained on how to administer the questions.

The questionnaire was modified on the validated WHO stepwise approach to chronic diseases risk factors surveillance instructions.<sup>86</sup>

The questionnaire was divided into four sections: section one comprised of the socio-demographic data of the participants such as age, sex, marital status etc, section two consisted of questions assessing the knowledge of participants on hypertension, section three dealt with lifestyle measurement and other risk factors for hypertension, section four comprised of physical measurements e.g. measurement of height, weight and blood pressure of participants according to the WHO stepwise approach to Chronic disease risk factors surveillance instruction V2.1.<sup>86</sup>

### **3.9. Data Collection**

Three hundred and ninety three (393) questionnaires were administered. Four (4) trained research assistants (two nurses and two community health officers) were employed to administer the questionnaires.

### **3.10. Data Management**

#### **(a) Measurement of variables**

**Exposure variables:** The exposure variables were the socio-demographic, knowledge of hypertension, socio-economic, lifestyle and physical characteristics of participants.

**Outcome variables:** The outcome variables included the blood pressure status of participants which were either hypertensive, or non hypertensive, satisfactory or unsatisfactory knowledge of hypertension.

Weight of each participant was measured to the nearest 0.1kg using a weighing scale by Balsam Medtech manufacturers. Their heights were measured to the nearest 0.1m using a height measuring scale by Chaoqunliangju CO., LTD. Blood pressure (BP) in millimeter of mercury (mmHg) was measured to the nearest 2mmHg, on the left mid upper arm with subjects seated quietly after five minutes of rest with the arm and back supported using stethoscope and

a standard mercury sphygmomanometer with an appropriate sized arm cuff. Systolic BP (SBP) was recorded at Korotkoff phase 1, while diastolic BP (DBP) was recorded at phase 5. Three consecutive readings of blood pressure were taken on the same arm, at interval of five minutes after the five minutes rest. The mean of the 3 measures was used for analysis. Similar methodology was used in previous studies<sup>[47,72,86,87]</sup> Hypertension was defined as systolic blood pressure (SBP) of 140 mm Hg or greater, diastolic blood pressure (DBP) of 90 mm Hg or greater or self reported current treatment for hypertension with antihypertensive medication.<sup>56</sup>

Scores were assigned to the responses in order to grade the knowledge of the participants on hypertension. Yes response scored 1 mark, while No and Don't know response scored no mark. The correct responses for each participant were summed up and the average score for total responses was calculated to be 10.0.

Participants were grouped into two based on their final score. Those with scores below the average score were considered as having unsatisfactory knowledge while those with scores equal or above average score were said to have satisfactory knowledge of hypertension<sup>88</sup>.

#### **(b) Statistical Analysis**

Data were entered, checked, cleaned and analyzed using Epi- info version 3.4.3. Results were presented as proportions, means and rates. Responses to the knowledge questions were scored. Univariate analysis of result was done to obtain the frequencies and percentages, using Epi-Info version 3.4.3. Bivariate analysis was done to determine relationship between factors associated with risks, e.g. obesity, diabetes, smoking, salt intake, age etc and hypertension using chi-square tests. Significant associations were presumed if  $P < 0.05$ . Multiple Logistic regression analysis was carried out to control for confounding factors by many variables simultaneously using Epi-Info version 3.4.3.

The logistic regression involves the relationship between exposure and disease and other variables that may confound or modify the effect of exposure.

### **3.11 Ethical Consideration**

Ethical clearance was obtained from the Ethical Clearance committee of Nasarawa State Ministry of Health. The community leaders were adequately briefed about the nature of the study carried out in their community and their permission was obtained. Participation in the study was voluntary and informed written consents were also obtained from the participants. Each participant was adequately briefed as to the nature of their participation in the study and their confidentiality was assured. All information gathered was treated with utmost confidentiality.

### **3.12 Limitations**

Analytical laboratory methods for determining risk factors were not done, instead, the life style, physical measurements and socio-demographic characteristics were used to determine the factors associated with risks using WHO stepwise guide.<sup>86</sup>

Some household heads did not give consent for members of their households especially the females like wives and daughters to participate. Their opinions as gate-keepers were respected and complied with and the researcher moved to the next house.

## CHAPTER FOUR

### RESULTS

#### 4.1 Socio-demographic characteristics of the participants

**Table 4.1: Socio-demographic characteristics of participants in Chiroma community, Lafia, 2014.**

<b>Variable</b>	<b>Frequency (N= 393)</b>	<b>Percentage (%)</b>
<b>Age (Yrs)</b>		
< 20	110	28.0
20 – 29	141	36.0
30 – 39	63	16.0
40 – 49	42	10.0
50 – 59	22	6.0
≥ 60	15	4.0
<b>Sex</b>		
Male	245	62.0
Female	148	38.0
<b>Marital Status</b>		
Married	257	65.0
Never married	92	24.0
Divorced	25	6.3
Cohabiting	3	0.7
Separated	16	4.0

A total of 393 of participants comprising 245 (62%) males and 148 (38%) females were studied. Majority of the participants were in the age group 20 – 29 years and 257(65%) were married as shown in Table 4.1.

**Ttable4.1: Socio-demographic characteristics of participants in Chiroma community, Lafia, 2014 cont'd**

<b>Variable</b>	<b>Frequency (N= 393)</b>	<b>Percentage (%)</b>
<b>Religion</b>		
Islam	271	69.0
Christian	115	29.0
Traditional	7	2.0
<b>Work status</b>		
Government Employee	154	39.0
Non Government Employee	72	18.0
Self Employed	82	21.0
Unemployed	7	2.0
Student	60	15.0
Home maker	18	5.0
Retired	0	0
Others	0	0
<b>Tribe</b>		
Hausa	133	34.0
Alago	86	22.0
Eggon	68	17.0
Kambari	61	15.0
Others	45	11.0

Table 4.1Above showed that 154 (39%) of the participants were government employees and 82(21.0%) were self employed, 133 (34%) were Hausa, followed by 68(22.0%) Alago by tribe and 271(69%)were Muslims which were followed by 115(29.0%)Christians.

**Table 4.1: Socio-demographic characteristics of participants in Chiroma community, Lafia, 2014 cont'd**

<b>Variable</b>	<b>Frequency (N= 393)</b>	<b>Percentage (%)</b>
<b>Education</b>		
Non formal	20	5.1
Primary	26	6.6
Secondary	65	16.5
Tertiary	282	71.8
<b>Settlement</b>		
Sabon Pegi	131	33.3
Anguwan Doka	131	33.3
Anguwan Kasuwan Tumatur	131	33.3

Table 4.1 Showed that 282(71.8%) had tertiary education, 65(16.5%)had secondary education,26(6.6%)had primary education and 20(5.1%)of participants had non-formal education. The three selected settlements for the research were Sabon Pegi, Anguwan Doka, and Anguwan K.Tumatur each with 131(33.3%) participants respectively.

## 4.2 Knowledge assessment

**Table 4.2.1: General Knowledge on Hypertension among participants in Chiroma, Lafia, 2014**

Variable	Frequency (N = 393)	Percentage%
<b>Ever heard of hypertension</b>		
Yes	369	93
No	26	7
<b>Source of Information</b>		
Hospital	233	59
Media	74	19
School	58	15
Other	16	3
<b>Seen One Hypertensive</b>		
Yes	313	80
No	80	20
<b>Hypertension deadly</b>		
Yes	344	89
No	49	11
<b>Age Commonly Affected</b>		
< 20yrs	16	4.1
20 – 29	39	9.9
30 – 39	110	28.0
40 – 49	140	35.6
50 – 59	64	16.3
≥60	24	6.1
<b>HTN Preventable</b>		
Yes	291	74.0
No	102	26.0
<b>Having diabetes</b>		
Yes	58	15.0
No	335	85.0

Among the participants 369(93%) heard about hypertension, 233(59%) got information about hypertension in the hospital and 313(80%) of the participants had seen one who suffered from hypertension, and Age group commonly affected was 40-49 years as indicated by 140(36%) of participants ,while 291(74%) agreed that hypertension is preventable and 58(15%) indicated that they had diabetes as shown in Table 4.2.

**Table 4.2.1: General knowledge of hypertension among participants in Chiroma, Lafia 2014.**  
Cont'd

<b>Variable</b>	<b>Frequency (N=393)</b>	<b>Percentage( %)</b>
<b>Ever had raised BP</b>		
Yes	125	31.8
No	268	68.2
<b>HTN Treatable</b>		
Yes	269	68.4
No	124	31.6
<b>Sex common for hypertension</b>		
Male	228	58.0
Female	165	42.0
<b>Family history of HTN</b>		
Yes	202	51.3
No	146	37.2
Don't know	45	11.5
<b>Ever visited herbalist for HTN</b>		
Yes	59	15.0
No	324	85.0

Table 4.1 Above showed that 125 (31.8%) of participants agreed that they ever had raised blood pressure and 269(68.2%) also indicated that hypertension is treatable while 228(58%) of the participants agreed that hypertension was more common among male than female sex, 202(51.3%)agreed that they had family history of hypertension and 59(15%) had received traditional remedy for hypertension.

**Table 4.2.2: Common risk factors, signs and symptoms, complications and treatment of hypertension by participants in Chiroma Laifia, 2014**

<b>Variable</b>	<b>Frequency (N = 393)</b>	<b>Percentage%</b>
<b>Common Risk Factors</b>		
<b>Smoking</b>		
Yes	91	23.2
No	302	76.8
<b>Alcohol</b>		
Yes	88	22.4
No	305	77.6
<b>Obesity</b>		
Yes	124	31.6
No	269	68.4
<b>Stress</b>		
Yes	126	32.1
No	263	67.9
<b>Ageing</b>		
Yes	130	33.1
No	263	66.9
<b>High salt intake</b>		
Yes	107	27.2
No	286	72.8
<b>Genetic</b>		
Yes	119	30.3
No	294	69.7
<b>Pregnancy</b>		
Yes	72	18.3
No	321	81.7
<b>Fatty food intake</b>		
Yes	56	14.2
No	337	85.8
<b>Common sign and symptoms</b>		
<b>Headache</b>		
Yes	223	56.7
No	170	42.7
<b>Dizziness</b>		
Yes	186	47.3
No	207	52.7
<b>Heart beating</b>		
Yes	128	32.6
No	265	67.4
<b>Unclear vision</b>		
Yes	53	13.5
No	340	86.5

**Table 4.2.2: Continued**

<b>Variable</b>	<b>Frequency (N = 393)</b>	<b>Percentage%</b>
<b>Complications</b>		
Heart Failure		
Yes	152	38.7
No	241	61.3
<b>Kidney failure</b>		
Yes	26	6.6
No	367	93.4
<b>Diabetes</b>		
Yes	60	15.3
No	333	84.7
<b>Blurred vision</b>		
Yes	94	23.9
No	299	76.1
<b>Stroke</b>		
Yes	190	48.3
No	203	51.7
<b>Death</b>		
Yes	126	32.1
No	267	67.9
<b>Treatment</b>		
Drug		
Yes	135	34
No	258	66
<b>Reduced salt for HTN</b>		
Yes	166	42
No	227	58
<b>Loss weight</b>		
Yes	150	38
No	243	62
<b>Stop smoking</b>		
Yes	159	40
No	234	60
<b>Start or do mere</b>		
Exercise		
Yes	176	46
No	214	54

Table 4.2.2 Showed 130(33.1%) participants agreed that the common cause of HTN was aging, followed by stress, and 56.7% agreed that the common signs and symptoms was headache followed by dizziness while 48.3% participants also agreed that the common complication was

stroke followed by heart failure and many of the participants agreed that treatment could be achieved through exercise, reduced salt intake, stopping smoking and taking drugs respectively.

**Figure 3: Level of Knowledge of Hypertension among participants in Chiroma Community, Lafia, Nasarawa State, 2014**

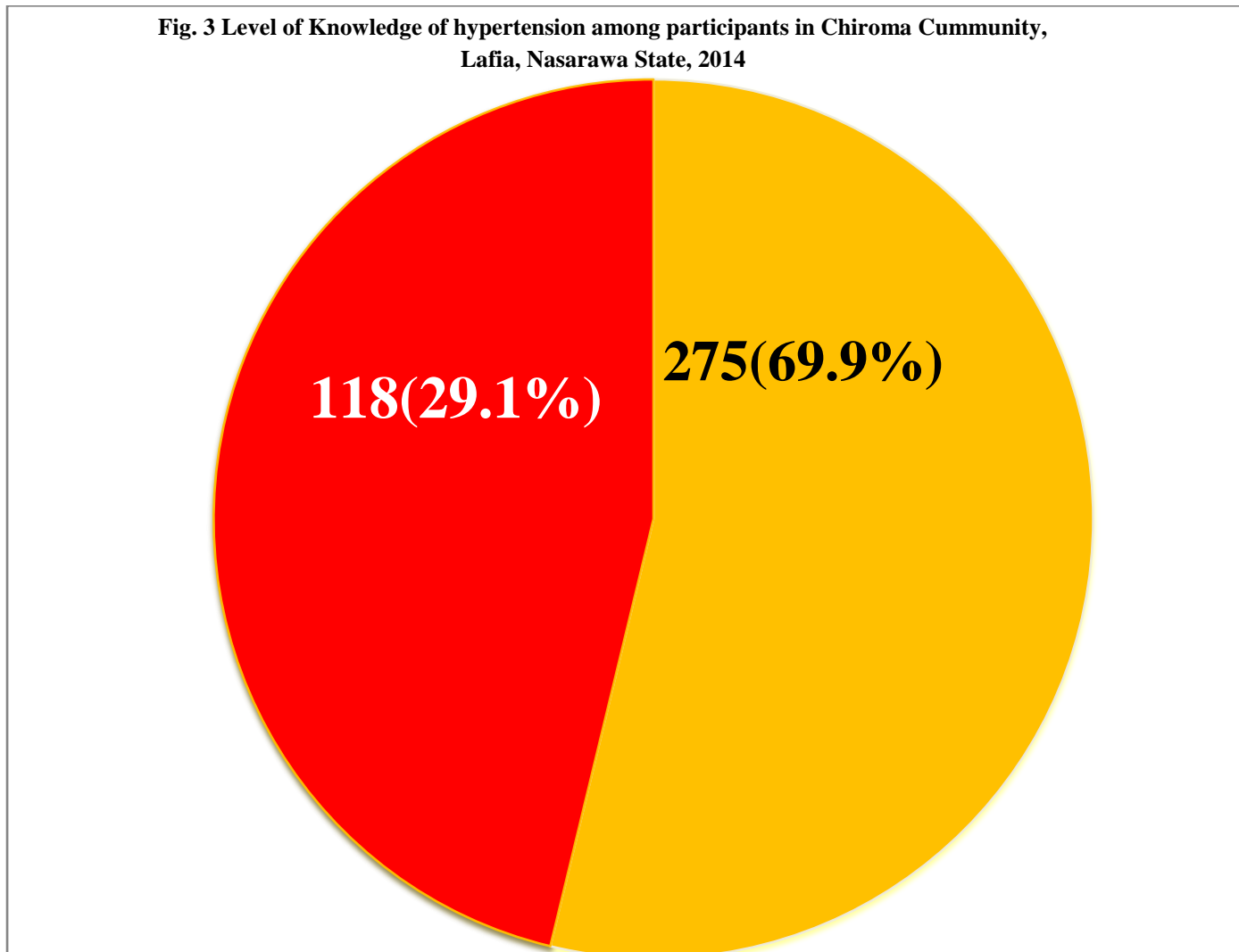




Fig.3 Showed that almost seventy percent of the participants had Satisfactory knowledge of hypertension.

Key:

-  Satisfactory knowledge
-  Unsatisfactory knowledge

### 4.3: Behavioral measurement (lifestyle)

**Table 4.3.1: Modifiable (behavioral) factors of hypertension among Participants in Chiroma, Community, Lafia, 2014**

<b>Variable</b>	<b>Frequency (N = 393)</b>	<b>Percentage %</b>
<b>Smoking</b>		
Yes	76	19
No	317	81
<b>Alcohol Intake</b>		
Yes	56	14
No	337	86
<b>Vigorous Sport</b>		
Yes	98	25
No	295	75
<b>Diabetes</b>		
Yes	58	15
No	335	85
<b>Stress</b>		
Yes	126	32
No	267	68
<b>High Salt Intake</b>		
Yes	107	27
No	286	73
<b>Age started smoking</b>		
10 – 19	26	6.6
20 - 29	30	7.6
30-39	9	2.3
No	328	83.5
<b>Hours of sedentary life per day</b>		
0	152	39
< 1.00	34	9
1.00-5.00	173	44
5.01-10.01	30	7
15.03-20.03	1	0.3

Among participants 76(19%) agreed that they smoke tobacco products,56(14%) consumed alcohol and 173(44%) spend 1-5hours sitting or reclining in a typical day as shown in Table 4.3.1.

**Table 4.3.2: Weight (Kg), height (M) and body mass index (BMI) of participants in Chiroma Community, Lafia, 2014.**

<b>Variable</b>	<b>Frequency (N = 393)</b>	<b>Percentage</b>
<b>Weight (Kg)</b>		
<44	21	5.3
45-54	34	8.7
55-64	95	24.2
65-74	97	24.7
75-84	96	24.4
85-94	43	10.9
>94	7	1.8
<b>Height (M)</b>		
1.5 – 1.9	340	86.5
2.0 – 2.4	23	5.9
2.5 – 3.4	24	6.1
>3.4	6	1.5
<b>BMI (Kg/m<sup>2</sup>)</b>		
<18.50	62	15.7
18.50-24.99	132	33.6
25.00-29.99	106	27.0
≥ 30	93	23.7

Table 4.3.2 Showed that 97(24.7%) of participants weighed 65-74Kilograms (Kg) bodyweight and majority were in height group of 1.5 -1.9 meters . The body mass index (BMI) of participants indicated that 62(15.7%)of participants were underweight, and132(33.6%)were of healthy weight, while 106(27%)were overweight and 93(23.7%) were obese.

## Diet

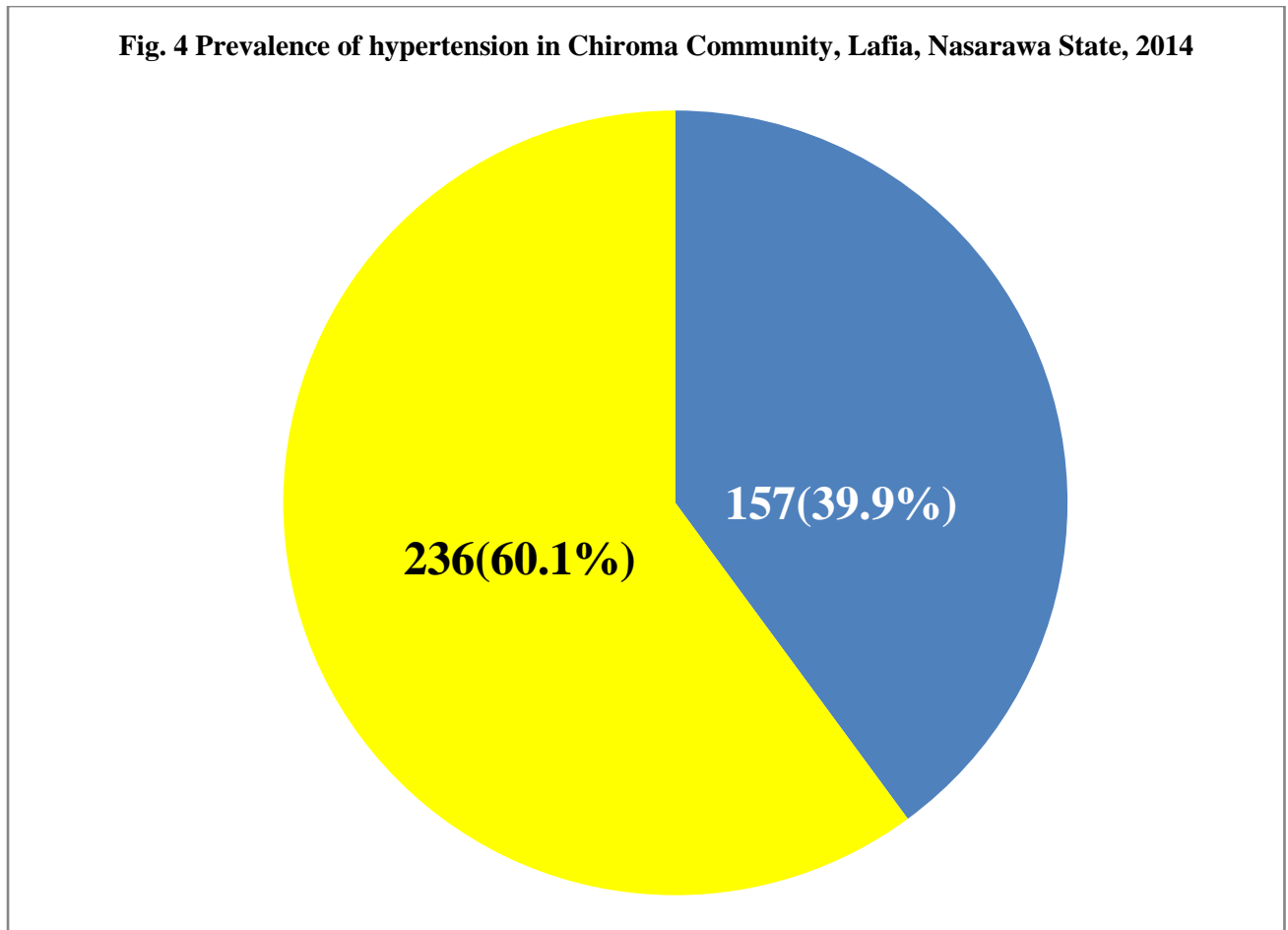
**Table: 4.3.3 Responses on using fruit, vegetable and oils or fats by participants**

Variable	Frequency (N = 393)	Percentage %	Ratings
<b>Days vegetable eaten</b>			
0 – 3	270	68.7	Inadequate
4 – 7	123	31.3	Adequate
<b>Days fruit eaten</b>			
0 – 3	221	55.3	Inadequate
4 – 7	172	44.7	Adequate
<b>Oil or fat used in house hold</b>			
Vegetable oil	84	21.4	Low
Palm oil	278	70.7	Very High
Animal fat	15	3.8	Very Low
Margarine	16	1.4	Very Low

Table 4.3.3. Showed that 270(68.7%)of participants were used to eating inadequate vegetable per week and 221(55.3%) had eaten inadequate fruits per week while a very high percentage(70.7%)used palm oil in their households as compared to a lower percentage(21.4%) of users of vegetable oil.

#### 4.4 Prevalence of hypertension

**Fig. 4 Prevalence of hypertension in Chiroma Community, Lafia, Nasarawa State, 2014**



**Fig.4:** Showed that the prevalence of Chiroma Community, Lafia was 39.9% which represented 157 participants being hypertensive.

**Key:**

 **Hypertensive**

 **Non hypertensive**

**Table 4.4: Socio-demographic factors associated with hypertension among participants in Chiroma Community Lafia, 2014.**

Variable	Hypertensive	Non hypertensive	Crude OR(95%CI)	P-Value
<b>Age</b>				
≥40	55 (41.4%)	49 (19.7%)	2.9(1.81-4.58)	<0.001
≤39	78 (58.6%)	200(80.3%)		
<b>Gender</b>				
Male	82(61.2%)	159(63.9%)	1.12(0.73- 1.73)	0.68
Female	52(38.8%)	90(36.1%)		
<b>Education</b>				
Low	7 (8.9%)	23(15.3%)	0.54(0.22-1.31)	0.24
High	72(91.1%)	127(84.7%)		
<b>Marital status</b>				
Married	96(85.7%)	156(92.3%)	0.5(0.23-1.09)	0.11
Unmarried	16(14.3%)	13(7.7%)		
<b>Occupation</b>				
Unemployed	26(35.1%)	55(35.3%)	0.99(0.56-1.78)	0.90
Employed	48(64.9%)	101(64.7%)		

Table 4.4 shows that gender, educational level, marital status and occupation of participants were not statistically significant risk factors of hypertension. However, participants Age≥40years (p-value<0.001) were 2.9 times more likely to be hypertensive than those at age ≤ 39 years.

**Table 4.5: Life style factors associated with hypertension of participants in Chiroma Community Lafia, 2014.**

<b>Variable</b>	<b>Hypertensive</b>	<b>Non Hypertensive</b>	<b>Crude OR (95%CI)</b>	<b>P-Value</b>
<b>Smoking</b>				
Yes	40 (29.9%)	29 (11.8%)	3.17 (1.8-5.42)	<0.001
No	94 (70.1%)	216 (88.2%)		
<b>Alcohol intake</b>				
Yes	31(23.1%)	24 (9.6%)	2.82(1.58-5.05)	<0.001
No	103 (76.9%)	225 (90.4%)		
<b>Diabetes</b>				
Yes	39 (29.1%)	17(6.8%)	5.60(3.02-10.39)	<0.001
No	95 (70.9)	232 (93.21%)		
<b>Body Weight (kg)</b>				
≥70	82 (61.2%)	125 (50.4%)	1.6 (1.04-2.38)	<0.04
≤69	57 (38.8%)	123 (49.2%)		
<b>Obesity</b>				
≥30kg/m <sup>2</sup>	38 (28.4%)	63 (25.3%)	1.17(0.73-1.87)	0.52
≤25kg/m <sup>2</sup>	96 (71.6%)	186 (74.7%)		
<b>Salty food intake</b>				
Yes	111(83.5%)	22 (16.8%)	0.78 (0.45-1.36)	0.46
No	192 (79.8%)	50 (20.2%)		
<b>Vigorous work</b>				
Yes	30 (22.4%)	104(77.6%)	1.6 (0.93-2.73)	0.11
No	38 (15.3%)	211(84.7%)		
<b>Lack of exercise</b>				
Yes	14 (10.4%)	33 (13.3%)	0.76(0.39-1.48)	0.53
No	120 (89.6%)	21 (86.7%)		
<b>Family history</b>				
Yes	88 (65.7%)	109(44.1%)	2.4 (1.57-3.75)	<0.001
No	46 (34.3%)	139 (55.9%)		

The Bivariate analysis for the risk factors of hypertension in Chiroma Community, Lafia indicated that there is a statistically significant association between bodyweight, family history of hypertension, alcohol consumption, diabetes, smoking independently and hypertension as shown in Table 4.5.

**Table 4.6: Logistic Regression of Significant Variables of Hypertension in Chiroma Community Lafia, 2014.**

<b>Exposure</b>	<b>AOR</b>	<b>95% CI</b>	<b>P-Value</b>
<b>Age</b>	0.36	0.22-0.60	<0.001
≥40			
≤39			
<b>Diabetes</b>	4.85	2.56-9.18	<0.001
Yes			
No			
<b>Family history</b>	0.41	0.27-0.64	<0.001
Yes			
No			
<b>Smoking</b>	2.59	1.44-4.67	0.002
Yes			
No			
<b>Alcohol intake</b>	1.61	0.82-3.13	0.1613
Yes			
No			
<b>Body weight</b>	0.91	0.57-1.45	0.680
≥30kg/m <sup>2</sup>			
≤25kg/m <sup>2</sup>			

After the logistic regression analysis family history of hypertension, smoking, age and diabetes showed P-value <0.05 respectively as shown in Table 4.6 above.

## CHAPTER FIVE

### 5.0. DISCUSSION

The prevalence of 39.9% in Chiroma community, Lafia is higher than those reported in F.C.T Abuja with the prevalence of 22.7% in 2013, in North central Nigeria,<sup>72</sup> and in Dakace near Zaria in Northern Nigeria with prevalence of 35.6% in 2013,<sup>4</sup> and in Sokoto it was 29.1%,<sup>46</sup> showing lower prevalence. A similar study done in crisis stricken Maiduguri in 2014 also showed overall hypertension prevalence of 32.3% with a higher prevalence among women than men, 46.1% and 34.5% respectively.<sup>47</sup> Similar studies were also conducted in Nsukka 2010,<sup>30</sup> with the prevalence of 21.7% and 27.8% in Bayelsa in 2012,<sup>36</sup> 27% in Idikan,<sup>4</sup> all in southern Nigeria, each indicating a lower prevalence than the one obtained in this study. However, Similar studies were conducted in a tribal population in Kerala State, India in 2012, and the prevalence was 40%,<sup>3</sup> and across the WHO African region, the prevalence of raised blood pressure was highest in Africa, where it was 46% for both sexes combined.<sup>10</sup> And it was reported that the number of adults with hypertension in 2025 was predicted to increase by about 60% to a total of 1.56 billion globally.<sup>11</sup> The differences in prevalence could be as a result of increase population especially by rural migration to urban cities in search of greener pastures with urban lifestyle, increasing family history of hypertension and adult aging. This study conducted in the state capital of Nasarawa State which is an urban population with urban lifestyle e.g. intake of salty and fatty foods, sedentary life, overweight and obesity while the study areas like Dakace near Zaria and Idikan are rural or semi urban populations respectively.

The risk of hypertension in this study is 2.4 times higher among those with a family history, this corroborates the finding in a Belgian study which reported that hypertension was significantly associated with a positive family history of hypertension in the whole population (68.9% vs 48.7%) and in <65year old patients (72.5% vs 39.5%).<sup>78</sup> The prevalence of hypertension among patients with positive family history of hypertension (68.9%), was higher

than among those patients without a family history (31.1%).<sup>78</sup> Subjects with a positive family history of hypertension are more likely to be hypertensive as genetic factors account for one third to half of the risk for hypertension.<sup>78</sup>

In this study smokers had 3.2 times higher risk of hypertension. This outcome is similar to a study conducted in Enugu (2008) in which the predictors of currently smoking, the male sex, being aged more than 23years, and having a low perception of tobacco harm significantly increased the risk of hypertension respectively.<sup>40</sup>

Age was used to predict the prevalence of hypertension in which 100% Responses and 100% follow ups analysis showed an estimated prevalence of 17.3% (at 95% CI 16.8 – 17.8) in Kenya, and 27.8% (at 95% CI 27.3 -28.3) in Namibia,<sup>15</sup> similarly a significant association between age and hypertension was shown in this study where those aged  $\geq 40$  years were 2.9 times more at risk of hypertension than those aged  $\leq 39$  years. In a similar study carried out in Maiduguri North Eastern Nigeria in 2014, among the predictors of hypertension, age  $> 40$  years (OR 4.92, 95% CI 3.83 -6.33) was found to be significant with odd ratio higher than the one reported in this study. However, in a similar study in Korea, age of  $\geq 60$  years were found to be 2.13 (95% CI, 1.14-3.99) times more likely to be hypertensive than those  $\geq 19$  and the relationship between the age and hypertension was statistically significant.<sup>79</sup> Hypertension therefore, increases with advancing age as an individual gets older the more is at risk of developing high blood pressure.

Those participants that were diabetics had 5.6 times higher at risk of hypertension than those not diabetic. This study showed higher odds ratio than OR 1.5 reported in a similar study in India.<sup>77</sup> The much difference in the risk of developing hypertension in two areas of studies may be attributed to being a vegetarian or not. The Indians are more of vegetarians consuming plenty vegetables and fruits with high potassium intake, including omega-3 or n-3 fatty acids which are associated with blood pressure reduction while the population of this study eats a

larger variety of calorie dense food staples with saturated fatty foods, high sugar intake and oil which may predispose them to both diabetes and hypertension.

The findings also showed that alcohol consumption had 2.8 times higher risk of hypertension which was twice that reported in a similar study in India where alcohol consumption had 1.4(CI=1.17 – 1.73) times higher risk of hypertension. A similar study carried out in Korea reported that  $\geq 19$  drinks of alcohol per week was statistically significant with OR=1.97(95%CI,1.18 – 3.29),<sup>79</sup> similarly, a positive association between the prevalence of hypertension and alcohol consumption of  $\geq 19$  drinks per week was found for patients aged  $\geq 60$  years with OR = 2.47,(95%CI, 1.21 – 5.05) but not in patients  $<60$  years OR= 1.54 (95% CI, 0.72 -3.32).<sup>79</sup> Light to moderate alcohol consumption from 4 to 10 drinks per week was significantly associated with decreased risk of hypertension in subjects aged  $<60$  years OR=0.32, (95%CI 0.11 – 0.97) but not in subjects aged  $\geq 60$  years OR= 0.70, (95%CI,0.31 – 1.58).<sup>79</sup> These differences showed that the more an individual drinks or consumes alcohol the more likely the risk of developing hypertension.

The finding also showed that bodyweight  $\geq 70$ Kg had 1.6( 95%CI,1.01 -2.38) times higher risk of hypertension which is similar to 1.7 times reported in India as the risk of hypertension among overweight/obese subjects.<sup>3</sup> A similar study carried out in Ghana showed a similar risk of overweight at OR= 1.85 (95%CI, 1.02 – 3.34).<sup>63</sup> Overweight and obesity are major predictors of elevated fasting glucose and hypertension.<sup>71</sup> There is consistent relationship between body mass index (BMI) and hypertension within age groups in males and females which shows higher trend of hypertension with increasing body mass index.<sup>82</sup> Over dependence of the study population on the diets most richly in calories and high in saturated fats with lack of physical activities may expose them to the high risk of increasing body weight leading to overweight, obesity and hypertension.

Patriarchal culture allows the male head of household to determine the extent of participation of female members of the family; hence the reduced participation of females in this study.<sup>58</sup>

The married majority observed in this study may be explained by the practice of early marriage in Northern Nigeria where the average age at first marriage is 15 years for females.<sup>58</sup>

Several of our rural communities have over the years witnessed rural–urban migration due to concentration of better social amenities in urban centers, and the search for better job by the younger people<sup>68</sup> thus, exposing them to many fast food restaurants serving meals with high salt and sugar content- often also containing saturated fats.<sup>31</sup> Similarly, the study area is within a capital city with urban oriented populations facilitated by migration from the rural areas who were also exposed to high salt and sugar, saturated fats .and oily fast foods, with bottled drinks and sedentary lifestyle resulting into overweight and obese population having higher risks of developing hypertension.

Among the participants studied 59% had their source of information about hypertension from hospital and 36% agreed that the age range commonly affected by hypertension was age 40-49 years. This finding is similar to the one reported in China which indicated that age commonly with hypertension and highly informed of their status were those of age 50 years and older.<sup>34</sup> These may be due to their regular visits for their blood pressure checkups and received health information's on their health status which goes along way in the prevention and control of hypertension.

The participants alluded that common causes of Hypertension were: Aging, stress, obesity, genetic, high salt intake, smoking and alcohol, pregnancy, fatty food intake, lack of exercise, sedentary lifestyle and diabetes respectively. This is in line with the National survey carried out in Nigeria in 2013 which showed diabetes mellitus, obesity, alcohol intake, physical inactive, stress ,increased salt intake cigarette smoking, urban living,

advancing age, financial tendency, kidney disease, ethnicity and socio-economic status as the risk factors for hypertension.<sup>1</sup>

The findings also showed that majority of participants agreed that headache was the most common symptom of hypertension, followed by dizziness, heart beating and unclear vision. This is in line with the study of the National Institute for Health (NIH) of the United States (US) in which it was reported that malignant hypertension is a dangerous form of very high blood pressure which showed symptoms like, severe headache, nausea or vomiting, confusion, vision changes and nose bleeding.<sup>24</sup> George (2013) also reported that the symptoms of extremely high blood pressure may lead to some symptoms like, severe headache, fatigue or confusion, dizziness, nausea, problems with vision, chest pains, breathing problems, irregular heartbeat, and blood in the urine.<sup>61</sup>

The study also showed that 48.3% of participants agreed that stroke was the most common complication followed by heart failure, sudden death, blurred vision, diabetes and kidney disease. This is similar to the report of the study conducted in 2013 at Dakace, Zaria on clustering of cardiovascular disease risk factors in semi-urban population in Northern Nigeria in which it was reported that hypertensive heart disease and stroke in the developing countries are the emerging first and second leading cause of death.<sup>4</sup> In a similar study hypertension was reported to be the driver of CVD in Africa where it is a major independent risk factor for heart failure, stroke and kidney diseases.<sup>62</sup> Thus, it was also reported that hypertension is significantly associated with the increased morbidity and mortality rate from cerebrovascular diseases, myocardial infarction, congestive heart failure and renal insufficiency.<sup>77</sup>

In this study, a higher proportion of participants agreed that hypertension is preventable. In a similar study conducted in Maiduguri in 2014, it was reported that hypertension is indeed the greatest preventable cause of death and one of the most important modifiable risk factors for cardiovascular diseases.<sup>47</sup> This could be achievable by important lifestyle changes which

include losing weight, quitting smoking, eating a healthy diet, reducing sodium intake, exercising regularly, and limiting alcohol consumption.<sup>24</sup>

The majority of participants (68%) also agreed that use of medicines, followed by reduced fatty food intake, use of diet, and regular exercise could prevent and treat raised blood pressure. A similar plan of lifestyle and dietary changes that control and treat essential hypertension may include weight loss, relaxation techniques, regular exercise, and reduced saturated fat intake.<sup>18</sup> The goal of treatment is to reduce blood pressure so that the patient will lower the risk of complications and improve the quality of life.<sup>23</sup>

Among the participants 15% took traditional remedies for hypertension a dire health need; as hospital drugs were neither accessible nor affordable. However, 34% of participants were on treatment for raised blood pressure using drugs prescribed by a doctor or any other health worker. This finding is higher than the proportion of hypertensives on treatment in similar studies conducted in Nigeria; in which the rates of doctor prescribed antihypertensive usage were 21% and 18.6% as reported by Ekwunife et al, and Oladapo et al, working independently.<sup>44</sup> It was lower than the findings in China where 36.2% were treated<sup>56</sup> and 63.3% were reported to be on antihypertensive treatment in Jordan.<sup>57</sup> The difference in treatment levels might be as a result of increased awareness of hypertensive status of the people of the two more developed countries with better access to health care than Nigeria.<sup>58</sup>

In this study 19% of the participants were smokers and this is higher than 14.1% reported in Lagos State survey, 2003,<sup>37</sup> and 13.23% in Nsukka,<sup>69</sup> but lower than 21.0% in Enugu, 2008,<sup>40</sup> 21.2% in Dengkil, Malaysia, 2013.<sup>75</sup> It is still lower than the national and continental rates of 34.8% and 38.4% for Nigeria and Africa respectively, (WHO 2008).<sup>37</sup> Seven percent started smoking between the ages of 10 and 19 years, which is lower than the 20 year national age of commencement of smoking for 47.4% in Nigeria.<sup>37</sup> On the contrary, age range of commencement of tobacco use was 13 to 15 years in other parts of Nigeria. The rate of tobacco

use in this age range was 11.4 % and 5.5% for boys and girls respectively as the overall prevalence was 6.2% in Kano on a national background rate of 8.9%.<sup>53</sup> Ghana, and Lebanon reported a tobacco use rate of 22% and 79.6% in that order.<sup>37</sup> The risk of CVD morbidity and mortality is very much elevated with a drop in the age of commencement of smoking.<sup>76</sup>

Cigarette smoking, one of the leading causes of preventable morbidity and mortality in the world is responsible for 17% – 30% of all deaths from cardiovascular illness.<sup>76</sup> There is a general increase in smoking habit Nationwide. The onset of smoking at youth is linked to a trending adoption of tobacco for recreational use, it engenders a feeling of belonging among affected youth, amplifying peer pressure. Temporary mood elevation, in a milieu of smoking friends triggers a need or repetitive smoking with consequent dependence and addiction with age. Lifestyle modification measures including quitting smoking are the most important steps to decrease the risk of coronary artery diseases and heart attack.

This study showed that 14% of participants consumed alcohol. This is higher compared to 12.24% reported in Nigeria.<sup>69</sup> However it was lower than 73% alcohol consumption reported in a study in Imo state.<sup>68</sup> In a WHO Global burden of disease study 16% of all hypertension diseases was attributed to alcohol.<sup>80</sup> The study reported that blood pressure level was higher in subjects who took alcohol.<sup>68</sup> Alcohol is therefore a major risk factor for the elevated blood pressure and the subsequent development of hypertension.<sup>80</sup> Alcohol abuse increases blood pressure and it has been shown that hypertension is difficult to be controlled in patients with a daily consumption of more than two alcoholic drinks. In this regard alcohol consumed attenuates the antihypertensive agent action.<sup>77</sup>

The findings in this study showed that 15% of participants were diabetic which indicated higher a prevalence than the 2.7% reported nationally.<sup>37</sup> It was also higher than 1.4%, 3.0% and 0.6% reported in rural Kwara, urban Lagos(2003) and rural Mangu, Plateau State (1990)respectively by the NCD National surveys.<sup>37</sup> It was also higher than the diabetes

prevalences of Giwa and Dakace which were 1.6% and 2.0% accordingly.<sup>4</sup> Globally it is projected that the prevalence of diabetes as a risk factor of hypertension will rise from 2.8% in 2000 to 4.4% in 2030 translating to 171 million in 2000 to 366 million in 2030.<sup>38</sup> The number of people with diabetes is increasing due to increasing intake of highly refined carbohydrates, rapid population growth, urbanization, population aging, and increasing prevalence of overweight, obesity and physical inactivity.

The study also showed that only 27% of participants agreed that high salt intake predisposes one to hypertension. In a similar study 70% spread table salt in food and 75% of participants took salty foods.<sup>68</sup> In a study conducted on 14 normotensive volunteers, experimental diets containing 1200-1600mmol/day of sodium raised blood pressure in all subjects within three days.<sup>84</sup> Salt supplements given to 13 chimpanzees that were previously living on salt-free diet produced an average rise in systolic blood pressure of 33mmHg over a 20-month treatment period (blood pressure in the control group did not change). Blood pressure returned to baseline values in all animals during the six month period following cessation of salt supplementation. He and MacGregor<sup>84</sup> conducted a meta-analysis of randomized control trials testing interventions that reduced salt intake for four or more weeks. Individuals classified as hypertensive achieved a median reduction in sodium excretion of 78mmol/day and a fall in systolic blood pressure of 5mmHg.<sup>84</sup> Individuals classified as normotensive achieved a median reduction in sodium excretion of 74mmol/day and a fall in systolic blood pressure of 2 mmHg.<sup>84</sup> The authors concluded that lower salt intake was associated with achievement of lower blood pressure (with the daily intake range of 3- 12g salt/day).<sup>84</sup> Dickson et al<sup>84</sup> also found advice to restrict dietary sodium reduced systolic blood pressure by 5mmHg in hypertensive subjects participating in short – to long-term interventions.<sup>84</sup>

A high intake of sodium is common in Africa, particularly in poor settings, as it is used to preserve food or to make food tastier.<sup>16</sup> Substantial amounts of salt are added to food, while

cooking and monosodium glutamate-based flavouring cubes or salts are widely used to give taste to food.<sup>16</sup> In addition to a high salt intake, people in sub-Saharan Africa frequently eat small amounts of fruits and vegetables resulting in low potassium intakes.<sup>16</sup> Bread is a staple food for many people in the continent, especially in Nigeria and it contains high salt levels.<sup>16</sup> Salt facilitates the baking process of bread. In another study in south Africa Charlton et al<sup>16</sup> reported that between 33 and 46 of total Na intake was discretionary, while bread was the single greatest contributor to Na intake of the non-discretionary sources in all population groups.<sup>16</sup> Excess salt intake is another risk factor of hypertension as majority of the participants like salty food and spread table salt on food respectively. This may be traceable for transition to the Western feeding habit which was more likely to be adopted by the study population.

In the findings 7% of the participants had 5 - 10hrs of sedentary life daily which is a great risk factor to hypertension. This can contribute to increased body weight resulting in overweight and obesity. It was also found that 24.7% had 65 - 74kg body weight and 24.4% had 75 – 84kg body weight and the mean body weight of the participants was 67.0kg body weight. In a Shanghai Men's Health study of Chinese men aged 40 – 74 years, it was reported that both systolic BP (SBP) and diastolic BP (DBP) increased linearly across the whole range of weight gain since age 20.<sup>85</sup> This showed that evidence exists that body weight and weight gain are major determinants of rise in blood pressure (BP) that commonly occur with aging.<sup>85</sup> Body fat distribution has also been shown to contribute to the genesis of obesity – hypertension syndrome.<sup>85</sup> This is therefore, emphasizing the importance of weight control throughout adulthood in preventing high BP.

The proportion of participants who were overweight in this study is 27% and 23.7% were obese. These findings are higher than those found in obesity prevalence study in Dakace with 22.9% overweight and obesity of 8.0%,<sup>4</sup> 22.0% obesity in urban population in Bayelsa State,<sup>36</sup> and 12.5% overweight and 8% obese reported in the study in Imo state.<sup>68</sup> However, the

overweight proportion in this study was lower than the overweight prevalence of 36.3% in Lagos during the National survey on Non communicable diseases in 2003,<sup>37</sup> the prevalence of overweight(28.9%) and obesity(28.1%) in Sokoto,<sup>46</sup> 35% overweight among Hausa-Fulani diabetics in Nigeria.<sup>38</sup> and 65% overweight among hypertensive patients in Mumbai, India.<sup>70</sup> Hypertension is more common in overweight and obese group in both male and females.<sup>82</sup>High incidence of body mass index (BMI) may be closely related to diet and socio-economic conditions. The diet factor was mainly attributed to the involvement in social activities such as wedding parties, where the diet is mostly rich in calories and high in fat. Other factors may include the lack of physical activities and low energy expenditure.

The findings also show that 21.6% of participants eat fruits only once in two days in a week. 13.7% only once in a week and 11.3% took fruits only in three days in a week. While 22.9% eat vegetable only in two days per week and 13.5% only once and 23.9% eat vegetables in three days per week. The vegetarians are been attributed to high potassium intake, moreover, omega-3 or n-3 fatty acid are been associated with blood pressure reduction. In a DASH study, it has been shown that the combined effect on blood pressure of low sodium intake and of high fruits and vegetables intake and of the intake of low fat dairy product where greater than the effect of an individual change. The above changes result in a reduction of systolic blood pressure of -8.1 to -6.0 mmHg in hypertensive subject belonging in the age group of 55 – 76yrs old.<sup>77</sup>

The finding that 9.7% of participants do not eat fruit at all and 8.4% do not eat vegetable at all in their diet were lower than 13.7% fruit not eating at all and 32.7% not eating vegetable at all reported in Nigeria.<sup>37</sup> The main reason for the differences may be due to fact that the area of this study and its surrounding communities are agrarian and blessed with various kinds of fruits and vegetables of which most of the people come across and utilize different types of fruits and vegetables for food all the year round.

The findings also show that majority of participants most often use palm oil in the house hold and 19% used vegetable oil. Palm oil is known to contain high saturated fatty acids (42%) and saturated fat has been linked to raised cholesterol level in the blood leading to increase risk of cardiovascular diseases especially hypertension. <sup>18</sup> Excessive palm oil consumption by the study population therefore may lead to increased in body weight resulting in overweight and obesity which are great risk factors of developing hypertension.

Hypertension prevalence increases with advancing age and is higher in men than in women until the age of 55years old, however, it is slightly higher in postmenopausal women.<sup>77</sup> Most epidemiological studies indicate that the prognosis in women is better than in men.<sup>81</sup> This finding showed that 53% of participants agreed that males are more affected than females. This is in line with the report that women on the average tend to have lower blood pressure than men.<sup>2</sup> Reports also indicated that more Nigerian men suffer high blood pressure than their female counterparts due to reason attributed to lifestyles like sedentary lifestyle, high fatty food intakes, smoking and alcohol consumption.<sup>7</sup> However, a similar study conducted in Maiduguri in 2014 showed a high prevalence of hypertension among women than men with 46.1% and 34.5% respectively.<sup>47</sup> This could be as a result of stress, fear of the unknown and hormonal changes women faced in the crisis area of Maiduguri nowadays.

The suggestions of participants on regular blood pressure check up and education are also in line with the report of the findings which stated that the problem caused by hypertension are made worse when people are not aware of the necessity for or unable to afford regular blood pressure checks and blood pressure control is a global challenge, adequate and appropriate health education is a global useful tool.<sup>9</sup> About 33% of people do not know that they have high blood pressure, for this reason, therefore it is advisable to go for screening even when no symptoms are present. There is the need to promote

more awareness of the causes and consequences of high blood pressure, as well as how it can be prevented.<sup>8</sup>

The study also showed that only 25% of the participants engaged themselves in vigorous sports.. This finding was lower compared to 41.1% for those engaged in physical activity with recreation five times a week as reported in Nigeria by WHO, 2000.<sup>37</sup> The lower percentage of participants in this study could be attributed to the fact that majority of participants were government employees who are in the white collar jobs with very low interest in physical activities, sporting or fitness and high sedentary lifestyles.

In this study it was found that 51% had family history of hypertension. This is even lower than 68.9% reported in a similar study in Belgium.<sup>78</sup> A family history of high blood pressure is a risk factor for developing high blood pressure. Having one or more close family members with hypertension before the age of 60years means the individual has two times the risk of having hypertension also. A strong family history means the person has 3 or more relatives who had high blood pressure before the age of 60 years. <sup>73</sup>The high prevalence of family history of hypertension in the two study populations may be attributed to increase reproduction, population growing with genetically inherited family members and aging.

In the study majority of the participants had satisfactory knowledge of hypertension higher than that of a similar study carried in Ido-Ekiti in 2011 which recorded less than47.1% of participants who had good knowledge.<sup>83</sup> A similar study was also done in an urban slum in Mumbai, India which recorded a poor knowledge of 83.4% of participants.<sup>70</sup>The reason for poor knowledge of hypertension may be attributed to the poor accessibility to health facilities as compared to the participants in this study.

Ninety three (93%) knew about hypertension which is higher than 71.1% reported in a similar study in Ahmadu Bello University Teaching Hospital,(ABUTH) Zaria,Nigeria,<sup>9</sup> 78% and 71%

reported in two other separate studies from U.S.A.<sup>33</sup>This finding on the other hand contrasts with very poor knowledge rates from other parts of Nigeria and Africa with 40.3% for men and 27.7 % for women,<sup>35</sup> 29.4%<sup>30</sup>, 18.5%<sup>32</sup> and 14.81%.<sup>35</sup> Compared to this study these poor knowledge rates may be a reflection of the differences in the study populations and general apathy towards medical checkup and health information. Knowledge on hypertension depends on such factors as age, access to primary medical care, level of income, overweight/obese, recent BP measurement and smoking status<sup>9</sup> as seen in Chinese study,<sup>34</sup> patients who were 50 years and above, women married, higher income, former smokers, overweight/obese and those who had recent BP measurements tend to know more about hypertension. However, low level of education and combination of language /communication barrier could have played an important role in not getting desired coverage rates.

Majority of participants 89% agreed that hypertension could come out with deadly complications which was higher than 74.3% reported in ABUTH, Zaria.<sup>9</sup> The differences may be as a result of high level education and awareness of the participants of this study compared to the low level of education of those studied in Zaria as was reported that majority of the participants were uneducated housewives.<sup>9</sup> Hypertension is a non communicable silent killer disease.<sup>7</sup> It is a silent killer because it does not show signs or symptoms till it might be too late.<sup>7</sup> W.H.O in 2013 also reported that raised blood pressure is estimated to cause 7.5 million death worldwide.<sup>11</sup>

## CHAPTER SIX

### 6.0. CONCLUSION AND RECOMMENDATIONS

#### 6.1. Conclusion

The prevalence of raised blood pressure or hypertension is high in Chiroma community, Lafia, Nasarawa State Nigeria. This calls for a great concern and effort to prevent and control the emerging disease. The study showed that there is great relationship between family history, diabetes mellitus, age, smoking of cigarettes independently and hypertension.

Majority of the participants depend on palm oil for their household cooking, followed by those who use vegetable oil and a high number of the participants showed high body weight, overweight and obesity which are great predisposing factors to hypertension.

The use of vegetable and fruits by the community was inadequate as only very few take them for even four to seven days in a week. This implies that many people in the community may not have adequate potassium, calcium, magnesium and omega-3 found in these products that are associated with blood pressure reduction and their dependant on highly fatty and oily foods may predispose them to raised blood pressure. There is high knowledge and awareness among the participants but with low regular BP check up visits to health facilities.

#### 6.2. Recommendation

1. The State Ministry of Health in collaboration with Health Management Board and LGAs should increase awareness campaigns on hypertension and its complications to the public to enable them prevent and even control the menace of the disease.
2. Media houses should inform and educate the public on the importance of regular blood pressure checkups especially for adults 40 years and above to enhance

monitoring of raised blood pressure. People should be mobilized to engage in indoor moderate sports, fitness or recreational activities as ways of encouraging body exercise.

3. Media house should also enlighten and encourage parents to monitor their young ones and prevent them from taking to bad habits of alcohol intake and smoking cigarette that will endanger their body health exposing them to hypertension.
4. Herbal or Traditional remedies for the treatment of hypertension should be studied and synthesis through researches by our higher research institutions, Universities and pharmaceutical companies to enable us have alternative, affordable and effective hypertensive drugs with lesser side effects.

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## APPENDIXES

### Appendix1.

Ahmadu Bello University,

Zaria, Nigeria.

01/01/2014.

Dear respondent(s),

#### Questionnaire

The researcher is a student of Ahmadu Bello University, Zaria, Nigeria, undertaking a Master's degree programme (MPH) in field Epidemiology, carry out a research on the

Topic: **”prevalence and factors associated with hypertension among adults in Chiroma Community, Lafia, Nasarawa State, Nigeria”**.

The researcher is soliciting for your co-operation and sincerity in answering the questions. Any information provided will be treated with respect and confidentiality and shall be used only for research purpose.

Thank you very much for your co-operation.

Yours faithfully,

**(Abdullahi H. Ahmed).**

**INSTRUCTIONS:** Tick and write where necessary.

Step 1 Demographic information

Core: Demographic information

1. Community Name-----

2. Settlement Name.-----

3. Sex        Male      Female

4. Religion    Islam      Christianity      Traditional

5. Date of Birth-----

6. How old are you -----

7. In total how many years have you spent at school or in full-time study (excluding pre-school)?

-----

8. What is the highest level of Education you have completed?

No formal Schooling     Less than primary School

Primary School                     Secondary School

High School                     College/ University

Postgraduate Degree     Others

9. Tribe        Hausa     Alago     Eggon     Kambari     Others

10. Marital Status   Never Married    Married    Separated    Divorced

Widowed    Cohabiting    Others

11. Main Work Status

Government Employee    Non Governmental Employee    Self Employed

Non Paid    Student    Home Maker    Retired    Unemployed

Others

12. How Many People older than 18 Years, including yourself live in your Household? -----

-----

## **Step II: Assessing Knowledge of participants on Hypertension**

### **CORE: Assessing Knowledge**

13. Have you ever heard of Hypertension? Yes    No

14. Where do you get your information about Hypertension from?

Hospital    Media    School    Don't know    Others

15. Is Hypertension a Deadly disease?   Yes    No

16. What are the common causes of Hypertension in your area?

Smoking    Alcohol    Obesity    Lack of exercise    High salt intake

Stress    Ageing    Diabetes    Sedentary lifestyle    Genetic

Contraceptives    Pregnancy    Fatty food intake    Don't know

17. Have ever gone to a clinic for a regular check up especially on Hypertension? Yes

No

18. Have you ever suffered from Hypertension? Yes  No

19. Have you ever seen one who suffered from Hypertension? Yes  No  Don't know

20. Do have any family history of Hypertension (from any of the parents)?

Yes  No  Don't know

21. What do you think are the possible common signs and symptoms?

Headache  Dizziness  Heart beating  unclear vision

Don't know

22. Can Hypertension be prevented? Yes  No

23. Can one who suffered from Hypertension be treated? Yes  No  Don't know

24. What sex do you think Hypertension is common? Female  Male  Don't know

25. Do think there are complications associated with Hypertension? Yes  No

Don't know

26. Which of the following complications are common in area?

Heart failure  Kidney failure  Diabetes  Blurred vision

Stroke  Death  Don't know

27. How do you think that Hypertension could be treated or prevented?

Use of drug  Use of diet  Regular exercise  Reduce fatty food  don't know

28. Mention other ways we can prevent and control Hypertension

.....

29. Does patient with Hypertension have socio-economic breakdown Yes  No

30. What ages are commonly affected or die from Hypertension .....years

31. Do you think taking salty foods leads or predisposes one to Hypertension? Yes  No

### Step III: Behavioral Measurement (Lifestyle)

#### Core: Tobacco Use

32. Do you currently smoke Tobacco products such as Cigarettes, cigar or pipes? Yes  No

33. Do you currently smoke Tobacco products daily? Yes  No

34. How old were you when you started smoking daily? ..... Years

35. Do you remember how long ago it was? .....

36. On average how many of the following do smoke?

Manufactured Cigarettes.....

Hand rolled cigar .....

Pipe full of Tobacco .....

Don't know .....

Others .....

**CORE: Alcohol Consumption.**

37. Have you ever consumed and alcoholic drink, such beer, wine, spirit, or burkutu? Yes

No

38. Have you consumed Alcoholic drink within last 12months? Yes  No

39. During the pasted 12 months how frequent, have you had at least one Alcoholic drink?

Daily  5-6 days per week  1-4 days per week  1-3 days per month

Less than 1 day in month

40. Have you consumed an Alcoholic drink within the past 30days? Yes  No

41. During the past 30 days on how many occasions do you have at least one Alcoholic drink?.....

**CORE: Diet**

42. In typical week, on how many days do you eat fruit? .....

43. How many serving of fruit do you eat on one of those days? .....

44. In a typical week, on how many days do you eat vegetables?.....

45. How many serving of vegetable do you eat on one of those days?.....

46. What type of oil or fat is most often use for me meal preparation in your household?

Vegetable oil  Palm oil  butter  margarine  non in particular

Non used  others  don't k now

47. On average, how meals per week do you eat that were not prepared at a home? (By me I mean breakfast, lunch and diner) .....

**CORE: Physical Activities**

48. Does your work involve-intensity activities that cause large increase in breathing or heart rate like (lifting heavy loads, digging or construction work for at least ten munities? Yes   
No

49. In a typical week, on how many days do you do vigorous-intensity activities as part of your work?

No of days .....

50. How much time do you spent doing vigorous-intensity activities on a typical days?

.....Hrs:..... Mins

51. Does your work involve moderate-intensity activities that cause small increase in breathing or heart rate such as (brisk working or carry light load) for at least ten minutes continuously?

Yes  No

52. In a typical week, on how many days do you moderate-intensity activities as part of your work?

No of Days.....

53. How much time do you spend doing moderate-intensity activities at work on a typical days?

.....Hrs .....Mins

**Travel to and fro Place:**

54. Do you walk or use bicycle for at least ten minutes continuously to get to and from places?

Yes  No

55. In a typical week on how many days do you work or use a bicycle for at least ten minutes continuously to get to and from places? No of days.....

56. How much time do you spend walking or bicycling for travel on a typical day?  
..... Hrs ..... Mins

**Recreational Activities:**

57. Do you do any vigorous intensity sports, fitness or recreational activities that cause large increase in breathing or heart rate like (running or football) for at least ten minutes continuously? Yes  No

58. In a typical week, on how many days do you do vigorous-intensity sport, fitness or recreational Activities? No of days .....

59. How much time do you spend doing vigorous-intensity sport, fitness or recreational activities on a typical day?..... Hrs.....Mins

60. Do you do any moderate- intensity sports, fitness or recreational activities that cause a small increase in breathing or heart rate such as brisk walking, swimming etc for at least ten minutes continuously? Yes  No

61. In a typical week, on how many days do you do moderate-intensity sport, fitness or recreational activities? No of days.....

62. How much time do spend doing moderate-intensity sport, fitness or recreational activities on a typical day?..... Hrs ..... Mins

**Sedentary Behavior**

63. How much time do you usually spend sitting or reclining on a typical day? .....  
Hrs.....Mins

**Core: History of Raised Blood Pressure:**

64. Have you ever had your blood pressure measured by a doctor or other health worker?

Yes  No

65. Have you ever been told by a doctor or other health worker that you have raised blood pressure or Hypertension? Yes  No

66. Have you been told in the past 12 months? Yes  No

**Expand: History of Raised Blood Pressure:**

67. Are you currently receiving any of the following treatment for high blood pressured prescribed by a doctor or any other health worker?

a. Drugs (medication) that have been taking in the past two weeks – Yes  No

b. Advice to reduce salt intake - Yes  No

c. Advice or treatment to loss weight Yes  No

d. Advice or treatment to stop smoking Yes  No

e. Advice to start or do more exercise - Yes  No

68. Have you ever seen a traditional healer for raised blood pressure or Hypertension?

Yes  No

69. Are you currently taking any herbal or traditional remedy for your raises blood pressure? Yes  No

**CORE: History of Diabetes**

89. Have you ever had your blood sugar measured by a doctor or other health worker? Yes  No

71. Have you ever been told by a doctor other health worker that you have raised blood pressure or diabetes? Yes  No

72. Have you been told in the past 12 months? Yes  No

**Step IV: Physical Measurements**

**CORE: Height and Weight**

73. Interviewer ID.....

74. Device IDs for height and weight

Height .....

Weight .....

75. Height in meter (M).....

76. Weight in Kilograms (Kg).....

77. For woman: Are you pregnant? Yes  No

Core: waist

78. Device ID for waist.....

79. Waist circumference in Meter (M).....



**Check List**

Participant Identification

Number.....

Questionnaire on

**“Prevalence and Factors Associated with Hypertension among adults in Chiroma Community, Lafia, Nasarawa State, Nigeria”**

**S/N LOCATION AND DATE**

- 1. Settlement Name .....
- 2. Community Name .....
- 3. Interviewer ID .....
- 4. Date of Completion of the Instruction .....
- 5. Consent has been read on obtained .....
- 6. Interview Language .....
- 7. Time of Interview .....
- 8. Family Name .....
- 9. First Name .....

## **Appendix 2:**

### ***PARTICIPANT INFORMATION/ CONSENT LEAFLET***

I *Abdullahi Habibat Ahmed*, intend to carry a research titled *prevalence and factors associated with hypertension among adults in Chiroma Community, Lafia Nasarawa State, Nigeria*.

#### **Background**

Hypertension is a silent killer disease known all over the world, people with hypertension spend a lot of money for the rest of their lives; some of those drugs come with complex side effects which must also be treated. There are some conditions used to prevent hypertension, since prevention is better than cure.

Hypertension if not treated can cause different kind of diseases like kidney disease, heart failure, heart attack and stroke.

This study, intends to identify conditions that influence hypertension and its severity. To this end, you will be required to submit yourself for a short interview that will last about thirty (30) minutes and examination will be conducted on you especially measurement of blood pressure to determine whether you are hypertensive or not.

The advantage of participating is that you will be provided an opportunity to find whether you have hypertension. If you have being found to have this disease, you will immediately be referred to a Doctor for optimal care; you will also be advice on how to look after yourself to prevent hypertension and its complications you will also be informed on the causes of hypertension and its complications.

You are free to participate and have the right to refuse participation, if you decline to participate you will not suffer any adverse consequences, you have a right to continue or decline at any point.

All results will be protected appropriately in passwords software and high confidentiality will be maintained. Such information will be disseminated anonymously in scientific gathering and conferences.

Name: Abdullahi Habibat Ahmed

Address: Ahmadu Bello University, Zaria

Tel No: 08058700455

Email:ahmedah1612@yahoo.com

Signature page

I ....., do willingly agreed to participate without any compulsion, I have been made to understand the risk associated with participation. I indicate my willingness to participate below

Name of participant.....

Signature or ThumBPrint .....

Tel No: .....

Witness.....

Signature or ThumBPrint.....

**Appendix 3:**

**PARTICIPANT’S CONSENT LEAFLET  
HAUSA VERSION**

**(TAKARDAN YARDAN SHIGA BINCIKEN CIWON HAWAN JINI DA  
MATSALOLIN SHI)**

Domin Nazarin Hawan jinni a Chiroma, Lafia, Nasarawa, State, Nijeriya, 2014,na *Abdullahi Habibat Ahmed* daga Jami’ ar Ahmadu Bello , Zariya, Nijeriya.[ **Wayar Tafi da Gidanka:** 08058700455 }.

Ni ..... na yarda cewa  
zan tsaya ayi wannan aikin binciken hawan jinni da ni babu daule a ciki. Na gamsu da bayanai  
game da matsalolin da suke tattare da shi aikin da kuma amfaninsa garemu gabaki daya. Na  
yarda zan sa hannu kamar haka:-

Sunnan wanda ya/ta Amince da yi: .....  
.....

Sa hannun mai amincewa: .....

Telifon: .....

Sunan Shaida: .....

Sa hannun mai shaida: .....

**Appendix 4:**

***ETHICAL CLEARANCE***

**NASARAWA STATE OF NIGERIA**

**MINISTRY OF HEALTH**

**H**

*Ministry of  
Health*

*Headquarters Private Mail Bag  
032-Lafia, Nasarawa State E-  
mail: nsmolafia@yahoo.com*

In replying, please quote reference and date  
All correspondence should be directed to  
the commissioner



Telephon: \_\_\_\_\_

**S/MOH/843**

17<sup>th</sup> January, 2014

Abdullah! H. Ahmed,

Department of Community Medicine

Ahmadu Bello University,

Zaria.

**Re: APPLICATION FOR ETHICAL CLEARANCE**

Reference to your letter of 17<sup>th</sup> December, 2013 to conduct a study titled" Prevalence and factors associated with hypertension among adults in Chiroma Community, Lafia, Nasarawa State, Nigeria", I am directed to convey the Ministry's approval for the conduct of the study.

2. Accordingly, you are to strictly adhere to the methodology in your proposal and to also seek permission from the Community leader and the health facilities that you will use.
3. At the end of the study, you must forward two copies of the report to the ministry for our record, please.

  
**Dr. Ekom G. Haruna.**

Ag, Director Clinical  
Services, For: Honourable  
Commissioner