PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG INTER-STATE COMMERCIAL DRIVERS IN JABI PARK, ABUJA, NIGERIA

BY

OYENIYI, OLUSEGUN SAMUEL
MEDICINE AND SURGERY, MBBS (ILORIN)
MATRIC NUMBER: 161696

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER IN PUBLIC HEALTH (FIELD EPIDEMIOLOGY PRACTICE) TO THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS, FACULTY OF PUBLIC HEALTH, UNIVERSITY OF IBADAN

FEBRUARY, 2014

DEDICATION

This study is dedicated to God Almighty for His guidance to all vehicle passengers and to all that have lost their lives or got injured during road traffic accidents due to complications of chronic medical conditions of hypertension and diabetes mellitus in a driver.

DEDICATION

This study is dedicated to God Almighty for His guidance to all vehicle passengers and to all that have lost their lives or got injured during road traffic accidents due to complications of chronic medical conditions of hypertension and diabetes mellitus in a driver.

CERTIFICATION

We certify that this research work was carried out by Dr Oyeniyi, Olusegun Samuel in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine University of Ibadan.

.....5/6/2014.....

Supervisor

Dr Ikeoluwapo Oyeneye Ajayi

MB;BS. (Ib), F.M.C.G.P. (Nig), F.W.A.C.P. (GP), M.Cl.Sc. (Canada), MPH (Ib), Ph.D. (Ib)

Department of Epidemiology and Medical Statistics

University of Ibadan

ACKNOWLEDGEMENTS

I wish to acknowledge the supports of the Lord God Almighty for the strength and His safety.

My special thanks go to Dr Ikeoluwapo Oyeneye Ajayi whose enormous knowledge and experience contributed to the success of this research, in addition are her combined outstanding qualities of meticulousness and motherliness in ensuring the success of this work. May God reward her and her family mightily. My thanks also go to Dr A. Fatiregun for his efforts and contributions towards success of the research. My indebtedness goes to Dr Dairo and Dr Fagbamigbe for their contributions especially in medical statistics which prepared me ahead for future work as a field epidemiologist.

I am very grateful to the Chairman, National Road Transport Workers Union of Nigeria Jabi Branch and other executive members who introduced me to other associations within the park. The executive members provided secluded space within the park to serve as research stand with confidentiality ensured. They also introduced us to the commercial drivers and encouraged them to participate in all parts of the study especially collection of blood samples. I will not conclude without mentioning the security given by the executive members for the research assistants and instruments during the study.

I wish to thank the National Coordinator, Non-Communicable Disease Programme of the Federal Ministry of Health and all the staff of the programme for their supports. The focal person on hypertension at the FMOH, Dr Alayo, is appreciated for his supports and the references he gave, few of the instruments (which had been used for related programme by the division before) used during the study were from the programme.

I am sincerely grateful to the Nigeria Field Epidemiology and Laboratory Training Programme (N-FELTP) for the mentorship especially Dr Patrick Ngugu and Dr Oladayo Biya of Nigeria Center for Disease Control and Center for Disease Control, USA respectively for providing the scholarship for the programme and logistics for this research.

I thank everyone in the cohort 3 class that contributed in one way or the other to the success of the study and for all the memorable times we shared. God bless you all.

At this juncture, I wish to warmly thank my mother, Mrs Comfort Oyeniyi; and wife, Mrs Felicia Aderonke Oyeniyi for being there when I was absent from home during the period of the study. Furthermore I would like to acknowledge the touch of my father of blessed memories for his guiding principles and love which are now a part of my life that I can not forget forever because they have become a spring board for success. May God give him eternal rest (Amen!). To my Uncle, Engineer Seye Ogunbiyi, for all your support financially and otherwise since I lost my father, may the good Lord destine your children for success in anything they lay their hands on.

To all whose names are not mentioned for one reason or the other their love will not be forgotten by my Father in Heaven and may He bless them all (Amen!).

ABSTRACT

Background: Hypertension is a leading cause of adult mortality globally and the incidences as well as its complications are on the increase in Nigeria. In many instances, it goes undetected in sufferers and may lead to cerebro-vascular accident (CVA) while driving; a human factor of road traffic accidents in Nigeria. High rate of road traffic accidents is a major public health concern in Nigeria with associated high disability and mortality. However, hypertension among commercial drivers has not been adequately studied. Thus, this study was carried out to determine the prevalence of hypertension and its risk factors among the inter-state commercial drivers in Jabi Park, Abuja.

Method: A cross-sectional survey was conducted among 398 inter-state commercial drivers selected using systematic sampling technique from a list of registered drivers at Jabi Park in Abuja. A structured interviewer-administered questionnaire was used to collect data on respondents' socio-demographic characteristics, driving frequency, physical activity, dietary habit, tobacco-use, vision, alcohol consumption and periodic health checks. Respondents' blood pressure, waist circumference, hip circumference, body weight and height were measured. Hypertension was defined as systolic blood pressure ≥140mmHg and diastolic blood pressure ≥ 90 mmHg. Waist-to-hip ratio (WHR) was classified as <0.85=low, 0.85 to < 0.90 = normal, > 0.90 to ≤ 0.95 =high, >0.95=obese, while Body Mass Index(BMI) (kg/m^2) was classified as underweight (<18), normal (18-<25), overweight (≥25-29.9) and obese (≥30), respectively. Fasting venous blood samples were collected to determine cholesterol and blood glucose levels. Data was analyzed using descriptive statistics, Chi square and logistic regression at p = 0.05.

Result: Respondents' mean age was 39.0±10.0 years and all were males. Majority (80.2%) were married and 46.0% had secondary education. About 43.0% drove for more than eight hours per day, 26.9% drove at least three days per week at more than eight hours per day, 35.0% used alcohol, 68.7% fed on carbohydrate meal per day, 94.3% fed on at least one egg weekly , 90.3% fed on fried meal daily and 22% smoked cigarette. Vision impairment was found among 38.5% and 51% reported engagement in physical activities. About 46.7% had never gone for any health checkup in their life time. Based on BMI and WHR measurements, 18.4% and 24.7% were obese respectively. Prevalence of hypercholesterolemia was 34.4%; hypertriglyceridemia, 46.0%; high density lipoproteinemia, 18.0%; low density lipoproteinemia, 42.0% and hyperglycaemia was 9.9%. Prevalence of hypertension was nine percent (9%). Hypertension was found among 51% of those with hyperglycaemia, 19.9% were obese, just above two percent (2.3%) were smokers and almost four percent (3.9%) of those who took alcohol. There was positive correlation between blood pressure among new cases of hypertension and BMI (r = 0.8). Obesity (AOR=6.2; CI=1.9-20.7), family history of hypertension (AOR=4.1; CI=1.9-8.0) and hypercholesterolemia (AOR=4.0; CI=1.2-13.2) significantly predicted occurrence of hypertension.

Conclusion: There was a high prevalence of hypertension and its risk factors among commercial drivers in Jabi park. Health awareness campaign should be encouraged to control hypertension and its risk factors. Regular screening programme will help in early detection of hypertension among commercial drivers.

Key Words: Prevalence of hypertension, Commercial drivers, Jabi Park, Abuja.

Word Count: 484

TABLE OF CONTENTS

CHAPTER THREE: METHODOLOGY

CHAPTER FOUR: RESULTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES

LIST OF ACRONYMS

ACE	-	Angiotensin Converting Enzyme
AIDS	-	Acquired Immune Deficiency Syndrome
ANOVA	-	Analysis of Variance
AOR	-	Adjusted Odds Ratio
ARB	-	Angiotensin Receptor Blocker
ATP	-	Adenosine TriPhosphate
BC	-	Before Christ
BMI	-	Body Mass Index
CHD	-	Coronary Heart Disease
CI	-	Confidence Interval
CCF	-	Congestive Cardiac Failure
CVD	-	Cardiovascular Disease
DASH	-	Dietary Approaches to Stop Hypertension
DBP	-	Diastolic Blood Pressure
DM	-	Diabetic Mellitus
ECG	-	Electrocardiogram
FCT	-	Federal Capital Territory
FH	-	Family History
FRSC	-	Federal Road Safety Corp
FMOH	-	Federal Ministry of Health
HIV	-	Human Immune Virus
HTN	-	Hypertension
HDL	-	High Density Lipoprotein
IHD	-	Ischeamic Heart Disease
JNC	-	Joint National Committee on Hypertension
LVH	-	Left Ventricular Hypertrophy
LDL	-	Low Density Lipoprotein
NCDs	-	Non- Communicable Diseases
NSAID	-	Non Steroidal Anti Inflammatory Drug

NAFDAC	-	National Agency for Food and Drug Administration Commission
NGO	-	Non Governmental Organization
NURTW	-	National Union of Road Transport Workers
OR	-	Odds Ratio
RTA	-	Road Traffic Accidents
SBP	-	Systolic Blood Pressure
TB	-	Tuberculosis
TG	-	Triglycerides
TC	-	Total Cholesterol
TPR	-	Total Peripheral Resistance
WHO	-	World Health Organization
WHR	-	Waist-to-Hip Ratio

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

The first mention of symptoms of hypertension was in the 6th century BC and the main treatment then was called the 'hard pulse disease' consisted in reducing the quantity of blood in a subject by the sectioning of veins or the application of leeches (Sushruta). The basis for measuring blood pressure was first established by Stephen in 1733 (Joint National Committee on Hypertension, 1997; Whitworth & World Health Organization, 2003). High blood pressure was first related to kidney disease and the first ever elevated blood pressure without complication from kidney disease (Fredrick, 2011).

Hypertension is one of the major non-communicable diseases in Nigeria of public health impact (Castelli 1984). Genetic and environmental factors are reported to play a key role in hypertension, 90% of which are better classified as idiopathic. High blood pressure in adults has a high impact on the economy and quality of life of individuals with important implications for resource expenditures (Castelli 1984).

Hypertension is a cardiac chronic medical condition in which the systemic arterial blood pressure is elevated. High blood pressure involves a systolic blood pressure of ≥140mmHg and diastolic blood pressure of ≥ 90 mmHg according to the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (Joint National Committee on Hypertension, 1993; Whitworth & World Health Organization, 2003)

Hypertension is classified as either primary (essential) hypertension or secondary hypertension. About 90 to 95% of cases are categorized as primary hypertension which

means high blood pressure with no obvious medical cause. The remaining five to ten percent of cases (secondary hypertension) are caused by other conditions that affect body organs.

Essential hypertension is the most prevalent type of hypertension, affecting 90 to 95% of hypertensive patients. Although no direct cause has been identified, there are many factors such as sedentary lifestyle, smoking, stress, visceral obesity, potassium deficiency (hypokalemia), obesity (more than 85% of cases occur in those with a body mass index greater than 25), salt (sodium) sensitivity, alcohol intake, and vitamin D deficiency that increase the risk of developing hypertension. Risk also increases with ageing, some inherited genetic mutations and having a family history of hypertension. An elevated level of renin, a hormone secreted by the kidney, is another risk factor, as is sympathetic nervous system over activity. Insulin resistance, which is a component of syndrome X (or the metabolic syndrome) is also thought to contribute to hypertension. Recent studies have implicated low birth weight as a risk factor for adult essential hypertension.

In secondary hypertension there is an identifiable cause. This type is important to recognize since it is treated differently to essential hypertension, by treating the underlying cause of the elevated blood pressure. Hypertension results in the compromise or imbalance of the pathophysiological mechanisms, such as the hormone-regulating endocrine system, that regulate blood plasma volume and heart function. Many conditions cause hypertension. Some are common, well-recognized secondary causes such as renovascular hypertension and Cushing's syndrome, which is a condition where the adrenal glands overproduce the hormone cortisol. Hypertension is also caused by

other conditions that cause hormone changes, such as hyperthyroidism, hypothyroidism and certain tumors of the adrenal medulla (e.g., pheochromocytoma). Other common causes of secondary hypertension include kidney disease, obesity/metabolic disorder, pre-eclampsia during pregnancy, the congenital defect known as coarctation of the aorta, and certain prescription and illegal drugs (Joint National Committee on Hypertension, 1997, Whitworth & World Health Organization, 2003)

High blood pressure may be symptomless and that is the reason the disease is referred to as 'silent killer' and where symptoms occur it may include severe headache, pounding in your chest, neck, or ears, shortness of breath, irregular heartbeat, nosebleed, dizziness, confusion, vision changes ,swelling or edema (fluid buildup in the tissues) and blood in your urine.

There are risk factors affecting essential hypertension. These factors include age greater than 40 years, smoking, alcohol consumption, lack of exercise, stress, consumption of high fatty diet, inadequate intake of vegetables and fruits, family history and high salt diets (Castelli, 1984; Gwatkin, Heuveline, 1999). Many of these correlates are common in commercial drivers. Hypertension is the number one killer disease among the Non-Communicable Diseases (NCD) in Nigeria. Visits to the park on many occasions at nights and during the day show many drivers smoking and drinking alcohol at will before embarking on a journey.

Human factor (age-related factors) is one of the causes of road traffic accidents though RTA is a combination of many variables (Akanbi et. al., 2009). The human factor accounts for up to 90% of accidents; in fact, the mechanical and environmental factors

are subservient to it (Gamji, 2006). It was estimated that the number of registered vehicles in Nigeria rose between 1988 and 2004 from 600,000 to 6,000,000. Despite the happiness and change of quality of family lives associated with owning a vehicle, its possession has made so many families bereaved of their breadwinners or lovely ones due to unprecedented rate of road traffic accidents (Chidoka 2013). As at 2001, Nigeria ranked second on the weighted scale of countries with very high road traffic crashes (Chidoka, 2013). Over 7,000 Nigerians die every year from road traffic crashes (Chidoka, 2013). Over 26,000 injuries were recorded at same period and from 2000 to 2002, the annual death toll from road crashes in Nigeria stood at more than 8,400 from about 17,000 road crashes. This is an average of one death in every two crashes nationwide. A total of 208,361 cases of road traffic crashes were recorded by FRSC from 1990 to 2001. these resulted in 81,657 deaths and 238,573 people injured (Chidoka. 2013).

Commercial drivers cause 40% of RTAs in Nigeria (Chidoka, 2013). There is associated high rate of complications that may lead to death of passengers due to auto-crash from occurrence during driving. Not less than 87,320 road users lost their lives between 1990 and 2001 alone, most victims being between 20 and 40 years of age bracket (Gamji. 2006). Commercial drivers undergo high stress, their diets are not controlled. smoke while on the wheel, drink alcohol before driving, may be drunk while driving and may not have time to do medical checkup (Chidoka, 2013). Some are already on treatment for hypertension but are not adherent to anti hypertensive treatment. Meanwhile they still drive passengers to long distance with high blood pressure and attendant risk of complication.

Hypertension is one of the age-related factors as a cause of chronic diseases in human (Gwatkin, Heuveline, 1999). It affects the highly productive populations of which the commercial drivers are inclusive. There is linkage to poverty with amplifying social inequality. The occurrence and complications of hypertension among the interstate commercial drivers in Jabi Motor parks could follow the increasing trend of non-communicable epidemics in the world if not controlled. (Beaglehole & Yach, 2003). The 2010 prevalence of hypertension in Africa was 45.7% according to a study carried out by Anastase et. al. in Littoral town of Cameron among semi urban population. The lifestyle (long distance driving, road side feeding, herbal and alcoholic drinks in the parks, smoking to stay awake) of these group of people predisposes them to the risk factors associated with hypertension. Hypertension, rheumatic heart disease and Cardiomyopathy are the main Non-Communicable Diseases (NCDs) that are of cardiovascular in origin. These diseases cause high death rate in Nigeria. Hypertension is number one heart disease. More than 22 million people in Nigeria are affected. Hypertension contributed to almost 60% of deaths in the world and 43% of the global burden of disease in 1999. The burden of hypertension for developing and newly industrialized countries is expected to rise by more than 60% by 2020, compared to a rise of less than 10% in developed countries. Four million, three hundred thousand (4.3 million) Nigerians above 15 years are hypertensive. Hypertension is more in urban than rural (Beaglehole & Yach, 2003).

The exponential increase of hypertension and its complication may be inevitable in the nearest future because of the increase in lifestyle-related risk factors resulting from social and economic changes. The increasing impact of globalization has also given momentum

to the increase in lifestyle-related risk factors. Increasing populations which increase the numbers of people transporting by road ultimately increase the numbers of drivers and vehicles for commercial driving.

A lot of resources have been committed to the control of communicable diseases (Malaria, HIV/AIDs, TB) through donations, grants and loans and has resulted in the decrease in prevalence and incidence (Beaglehole & Yach, 2003). Non-communicable diseases and injuries are now increasing on the alarming rate and if efforts are not given to the control of these group of diseases by year 2020 it may reach an exponential in prevalence and mortality from the complications of these diseases (Beaglehole & Yach, 2003).

1.2 Statement of Problem

Hypertension among commercial drivers needs urgent interventions by the authority because the commercial drivers are prone to the risk factors. The disease is controllable by early detection and timely intervention of management during routine medical checkups. Jabi park is known to transport many people from Abuja to all the states of the federation. Although the population health burden from hypertension is highly considerable, there have not been adequate studies conducted among commercial drivers on non-communicable diseases especially hypertension.

Hypertension is a leading cause of adult mortality globally and the incidences as well as its complications are on the increase in Nigeria. In many instances, it goes undetected in sufferers and may lead to catastrophic event, especially among hypertensive drivers while driving. Meanwhile high rate of road traffic accidents is a major public health concern in

Nigeria. Thus this study was carried out to determine the prevalence of hypertension and its risk factors among the interstate commercial drivers in Jabi park, Abuja

1.3 Significance of the Study

A comprehensive long-term approach to the control of hypertensive diseases has the potential to reduce risk factors in the population and in turn, disease, disability and death. The result from this study will be used to make recommendations to policy makers for positive interventions. The findings of the study will also create awareness and eventually reduce complications of hypertension among commercial drivers in Jabi Motor Park of Federal Capital Territory (FCT) thus reducing death from auto-crash accidents. We intend to persuade the commercial drivers in Jabi Motor Park during dissemination to have regular medical checkups and avoid the common risk factors associated with this disease and its complications. As a result unnecessary mortality from road traffic accidents which are due to hypertensive disease will be minimized in the park. The study will increase awareness of the disease among the National Union of Road Transport Workers. This research will contribute to the knowledge on the risk factors and how preventive measures that can be undertaken among commercial drivers.

1.4 Justification of the Study

Hypertension is a leading cause of adult mortality globally and the incidences, as well as its complications, are on the increase in Nigeria. In many instances, it goes undetected in sufferers and may lead to cerebro-vascular accident (CVA) while driving; a human factor of road traffic accidents in Nigeria. High rate of road traffic accidents is a major public health concern in Nigeria with associated high disability and mortality. However, hypertension among commercial drivers has not been adequately studied.

Simple extrapolations from a survey highlight road traffic injury as a neglected public health problem in Nigeria (Labinjo et. al., 2009). Everything about the human body is designed to be dynamic. The heart is just one of the muscles that move blood around the body, and it depends on movement of the rest of the body to help it move blood around. In other words, when body moves it helps the heart do its job. Commercial driving entails getting materials and persons from point A to point B as quickly as possible. So, commercial drivers sit for hours on end, depending on length of the journey, with very little or no movement. This forces the heart to do all the work to pump all the blood for all of the body, a task it was never designed to do (Ken, 2013). Hypertension is a product of cardiac input and peripheral resistance. There is regular increase in cardiac output from the Ken's (2013) study. Thus the exposures of commercial drivers to the risk factors of hypertension increase the chances of increasing the peripheral resistance therefore enhancing the product of cardiac output and peripheral resistance which is hypertension (Ken, 2013).

Road transportation is by far the commonest means of transportation in Nigeria compared to other means - air, rail and water. The technology has made life easy compared to the hitherto means of transportation such as animals. Nigerian economy, despite its harshness, has afforded millions of its populace the means to own cars making road traffic a major problem. Road Traffic Accidents cause 20% of injuries globally (Ghaffar, 2013). It was estimated that the number of registered vehicles in Nigeria rose from 600,000 in 1988 to 6,000,000 in 2004. Despite the happiness and change of quality of family lives associated with owning a vehicle, its possession has made so many families bereaved of their breadwinners or loved ones due to unprecedented rate of road traffic

accidents (Gamji, 2006). Over four million people may be injured and as many as 200,000 potentially killed as a result of road traffic crashes annually in Nigeria (Labinjo et, al., 2009). According to Federal Road Safety Commission not less than 87,320 road users lost their lives in road traffic accidents between 1990 and 2001 alone, most victims being between 20 and 40 years of age bracket.

Stressful and busy jobs like long distance driving are prone to hypertension. A commercial driver once carried a research team from the premises of the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan to the study field. On the way it was noticed that the driver was 'passing out' on the wheel steering. The vehicle was stopped and the driver was taken to a clinic and he was found to have blood pressure of 180/120 mmHg. Hypertensive encephalopathy has led to many auto-crashes and many deaths among drivers and passengers (Labinjo et. al., 2009). Thus regular screening will help reduce morbidity and mortality among the respondents.

Jabi park was chosen as a representative of a typical Nigerian interstate park where high proportion of FCT population and visitors travel by road to the 36 states of the federation. Not many people can afford to travel by air. Hypertension affects more of the high productivity sector of the population. Commercial drivers are group of people that fall within the productivity population. They help to move goods and services from one point of FCT to the other parts of the country. The commercial drivers contribute to the Gross Domestic Product in Nigeria. Hypertension and its complications, especially encephalopathy which is a sudden and fatal phenomenon, can occur while driving and may be one of the leading causes of accidents in FCT. Its prevalence among commercial

drivers in both developed and developing countries is not adequately documented. Hypertension and other non-communicable diseases are becoming endemic in Nigeria among the commercial drivers. Most data available are health facilities-base and are limited. The number of reviews and updates on hypertension and other non-communicable diseases is to be seen from the public health services view in the developed and undeveloped countries.

1.5 Research Questions

1. What is the prevalence of hypertension among interstate commercial drivers in Jabi Motor Park of FCT Municipal Area Council?
2. What are the common risk factors of hypertension among interstate commercial drivers in Jabi Motor Park of FCT Municipal Area Council?
3. What is the magnitude of strength of association between the common risk factors and hypertension?
4. What are the risk factors that predict the presence of hypertension among commercial drivers in Jabi Park?

1.6 Objectives

1.6.1. General Objective

To determine the prevalence of hypertension and its risk factors among commercial drivers in the Jabi Public Motor Parks in Abuja, Federal Capital Territory.

1.6.2 Specific Objectives

1. To determine the prevalence of hypertension among interstate commercial drivers in Jabi Park;

2. To identify the risk factors influencing hypertension among interstate commercial drivers in Jabi Park;
3. To assess the strength of association between the common risk factors and hypertension; and
4. To identify the predictors of hypertension among interstate commercial drivers in Jabi Park.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Background Information

Hypertension is a common health problem in developed countries and a major risk factor for cardiovascular diseases (CVD) (Castelli, 1984). Its prevalence is probably on the increase in developing countries where adoption of western lifestyles and the stress of urbanization both of which are expected to increase the morbidity associated with unhealthy lifestyles are not on the decline (Castelli, 1984). Genetic and environmental factors are reported to play a key role in hypertension, 90% of which are better classified as idiopathic. High blood pressure in adults has a high impact on the economy and on the quality of life of individuals with important implications for resource expenditures A number of studies revealing the prevalence of hypertension in populations of West African origin have been reported (Cooper et. al., 1997). In the year 2000 it was estimated that nearly one billion people or 26% of the adult population had hypertension worldwide. It was common in both developed (333 million) and undeveloped (639 million) countries. However rates vary markedly in different regions with rates as low as just above three percent (3.4%) men and almost seven percent (6.8%) women in rural India and as high as 68.9% men and 72.5% women in Poland (Cappuccio et. al., 1997).

In 1995 it was estimated that 43 million people in the United States had hypertension or were taking antihypertensive medication, almost 24% of the adult population. The prevalence of hypertension in the United States increased and reached 29% in 2004. It is more common in blacks and native Americans and less in whites and Mexican Americans. Rates increase with age, and is greater in the southeastern United States.

Hypertension is more prevalent in men (though menopause tends to decrease this difference) and those of low socioeconomic status. Over 90 to 95% of adult hypertension is essential hypertension. One of the most common causes of secondary hypertension is primary aldosteronism. The incidence of exercise hypertension is reported to range from one to ten percent (JNC-V (Joint_National_Committee_on_Hypertension; 1993).

2.2 History of Hypertension

Some cite the writings of Sushruta in the 6th century BC as being the first mention of symptoms like those of hypertension. Others propose even earlier descriptions dating as far as 2600 BCE. Main treatment for what was called the "hard pulse disease" consisted in reducing the quantity of blood in a subject by the sectioning of veins or the application of leeches. Well-known individuals such as The Yellow Emperor of China. Cornelius Celsus, Galen, and Hipocrates advocated such treatments. The modern understanding of hypertension was first described correctly as the systemic circulation of blood being pumped around the body by William Harvey (1657). The bases for measuring blood pressure were established by Stephen Hales in 1733. Initial descriptions of hypertension as a disease came among others from Thomas Young in 1808 and specially Richard Bright in 1836. The first ever elevated blood pressure in a patient without kidney disease was reported by Frederick Mahomed (1849–1884). It was not until 1904 that sodium restriction was advocated while a rice diet was popularized around 1940 (Joint_National_Committee_on_Hypertension, 1997).

Studies in the 1920s demonstrated the public health impact of untreated high blood pressure; treatment options were limited at the time, and deaths from malignant

hypertension and its complications were common. A prominent victim of severe hypertension leading to cerebral hemorrhage was Franklin D. Roosevelt (1882–1945). The Framingham Heart Study added to the epidemiological understanding of hypertension and its relationship with coronary artery disease. The National Institutes of Health also sponsored other population studies, which additionally showed that African-Americans had a higher burden of hypertension and its complications.[101] Before pharmacological treatment for hypertension became possible, three treatment modalities were used, all with numerous side-effects: strict sodium restriction, sympathectomy (surgical ablation of parts of the sympathetic nervous system) and pyrogen therapy (injection of substances that cause a fever, indirectly reducing blood pressure).

The first chemical for hypertension, sodium thiocyanate, was used in 1900 but had many side effects and was unpopular. Several other agents were developed after the Second World War, the most popular and reasonably effective of which were tetramethylammonium chloride and its derivative hexamethonium, hydralazine and reserpine (derived from the medicinal plant *Rauwolfia serpentina*). A randomized controlled trial sponsored by the Veterans Administration using these drugs had to be stopped early because those not receiving treatment were developing more complications and it was deemed unethical to withhold treatment from them. These studies prompted public health campaigns to increase public awareness of hypertension and the advice to get blood pressure measured and treated. These measures appear to have contributed at least in part of the observed 50% fall in stroke and ischemic heart disease between 1972 and 1994 (Joint_National_Committee_on_Hypertension. 1997).

A major breakthrough was achieved with the discovery of the first well-tolerated orally available agents. The first was chlorothiazide, the first thiazide which was developed from the antibiotic sulfanilamide, which became available in 1958. It increased salt excretion while preventing fluid accumulation. The British physician James W. Black developed beta blockers in the early 1960swhich were initially used for angina, but turned out to lower blood pressure. The next class of antihypertensives to be discovered was that of the calcium channel blockers. The first member was verapamil, a derivative of papaverine that was initially thought to be a beta blocker and used for angina, but then turned out to have a different mode of action and was shown to lower blood pressure. ACE inhibitors were developed through rational drug design; the renin-angiotensin system was known to play an important role in blood pressure regulation, and snake venom from *Bothrops jararaca* could lower blood pressure through inhibition of ACE. In 1977 captopril, an orally active agent, was described; this led to the development of a number of other ACE inhibitors.

2.3 Definition of Hypertension

Hypertension (HTN) or high blood pressure is a cardiac chronic medical condition in which the systemic arterial blood pressure is elevated. What that means is that the heart has to work harder than it should, to pump the blood around the body. Blood pressure involves two measurements - systolic and diastolic. Normal blood pressure is at or below 120/80 mmHg. The first figure is the systolic blood pressure, the pressure in the arteries when your heart is contracting. The second, or lower figure, is the diastolic blood pressure, which is the pressure in your arteries between heart beats. High blood pressure is anything above 140/90 mmHg. Hypertension is the opposite of hypotension

Hypertension is classified as either primary (essential) hypertension or secondary hypertension. About 90 to 95% of cases are categorized as "primary hypertension," which means high blood pressure with no obvious medical cause. The remaining five to ten percent of cases (Secondary hypertension) are caused by other conditions that affect the kidneys, arteries, heart or endocrine system (JNC-V. Joint_National_Committee_on_Hypertension, 1993).

Persistent hypertension is one of the risk factors for stroke, myocardial infarction, heart failure and arterial aneurysm, and is a leading cause of chronic kidney failure. Moderate elevation of arterial blood pressure leads to shortened life expectancy. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of associated health complications, although drug treatment may prove necessary in patients for whom lifestyle changes prove ineffective or insufficient. Risk factors for essential hypertension include age greater than 40 years, male, family history of hypertension, high salt diet in predisposed individuals, overweight/obesity, physical inactivity, excessive alcohol consumption, inadequate intake of vegetables and fruits, diets high in 'sleepy' fats T.

2.4 Signs and Symptoms of Hypertension

Mild to moderate essential hypertension is usually asymptomatic. Accelerated hypertension is associated with headache, drowsiness, confusion, vision disorders, nausea, and vomiting. These symptoms are collectively called hypertensive encephalopathy. Hypertensive encephalopathy is caused by severe small blood vessel congestion and brain swelling, which is reversible if blood pressure is lowered. This could have been responsible for many accidents by a commercial driver suffering from

hypertension. In secondary hypertension, some additional signs and symptoms suggest that the hypertension is caused by disorders in hormone regulation. Hypertension combined with obesity distributed on the trunk of the body, accumulated fat on the back of the neck (buffalo hump), wide purple marks on the abdomen (abdominal striae), or the recent onset of diabetes suggests that an individual has a hormone disorder known as Cushing's syndrome. Hypertension caused by other hormone disorders such as hyperthyroidism, hypothyroidism, or growth hormone excess will be accompanied by additional symptoms specific to these disorders. For example, hyperthyroidism can cause weight loss, tremors, heart rate abnormalities, reddening of the palms and increased sweating. Signs and symptoms associated with growth hormone excess include coarsening of facial features, protrusion of the lower jaw, enlargement of the tongue, excessive hair growth, darkening of the skin colour, and excessive sweating. Other hormone disorders like hyperaldosteronism may cause less specific symptoms such as numbness, excessive urination, excessive sweating, electrolyte imbalances and dehydration, and elevated blood alkalinity and also cause mental pressure ((Joint_National_Committee_on_Hypertension, 1997).

2.5 Classification of Hypertension

Blood pressure is usually classified based on the systolic and diastolic blood pressures. Systolic blood pressure is the blood pressure in vessels during a heart beat. Diastolic blood pressure is the pressure between heartbeats. A systolic or the diastolic blood pressure measurement higher than the accepted normal values for the age of the individual is classified as pre-hypertension or hypertension.

Table 2. 1: Showing the classification of hypertension

Classification	Systolic pressure	Diastolic pressure
	mmHg	mmHg
Normal	90–119	60–79
Prehypertension	120–139	80–89
Stage I	140–159	90–99
Stage 2	≥160	≥100
Isolated systolic hypertension	≥140	<90

Source: (AHA 2003) American Heart Association, 2003.

Hypertension has several sub-classifications, including hypertension stage I, hypertension stage II, and isolated systolic hypertension. Isolated systolic hypertension refers to elevated systolic pressure with normal diastolic pressure and is common in the elderly. These classifications are made after averaging a patient's resting blood pressure readings taken on two or more office visits. Individuals older than 50 years are classified as having hypertension if their blood pressure is consistently at least 140 mmHg systolic or 90 mmHg diastolic. Patients with blood pressures higher than 130/80 mmHg with concomitant presence of diabetes mellitus or kidney disease require further treatment. Hypertension is also classified as resistant to specific mode of treatment if medications do not reduce blood pressure to normal levels.

Exercise hypertension is an excessively high elevation in blood pressure during exercise. The range considered normal for systolic values during exercise is between 200 and 230 mmHg. Exercise hypertension may indicate that an individual is at risk for developing hypertension at rest.

Orthostatic Hypertension is an abnormal increase in blood pressure when a person stands up. Orthostatic hypertension can precede or coexist with essential hypertension and may also coexist with other disorders such as dysautonomia. In a population-based study, orthostatic hypertension was found to exist in one percent (1%) of the population (Joint_National_Committee_on_Hypertension, 1997).

2.6 Pathophysiology of Hypertension

Most of the mechanisms associated with secondary hypertension are generally fully understood. However, those associated with essential (primary) hypertension are far less understood. What is known is that cardiac output is raised early in the disease course, with total peripheral resistance (TPR) normal. Over time cardiac output drops to normal levels but TPR is increased. Three theories have been proposed to explain this:

1. Inability of the kidneys to excrete sodium, resulting in natriuretic factors such as Atrial Natriuretic Factor being secreted to promote salt excretion with the side effect of raising total peripheral resistance.
2. An overactive Renin-angiotensin system leads to vasoconstriction and retention of sodium and water. The increase in blood volume plus vasoconstriction leads to hypertension.
3. An overactive sympathetic nervous system, leading to increased stress response.

It is also known that hypertension is highly heritable and polygenic (caused by more than one gene) and a few candidate genes have been postulated in the etiology of this condition.

Recently, work related to the association between essential hypertension and sustained endothelial damage has gained popularity among hypertension scientists. It remains unclear, however, whether endothelial changes precede the development of hypertension or whether such changes are mainly due to longstanding elevated blood pressures.

2.7 Prevention of Hypertension

The degree to which hypertension can be prevented depends on a number of features including current blood pressure level, sodium/potassium balance, detection and omission of environmental toxins, changes in end/target organs (retina, kidney, heart, among others), risk factors for cardiovascular diseases and the age at diagnosis of pre-hypertension or at risk for hypertension. A prolonged assessment that involves repeated blood pressure measurements provides the most accurate blood pressure level assessment. Following this, lifestyle changes are recommended to lower blood pressure, before the initiation of prescription drug therapy. According to the British Hypertension Society, the process of managing pre-hypertension includes lifestyle changes such as the following:

1. Weight reduction and regular aerobic exercise (e.g., walking): Regular exercise improves blood flow and helps to reduce the resting heart rate and blood pressure.
2. Reduce dietary sugar

3. Reduce sodium (salt) in the body by disuse of condiment sodium and the adoption of a high potassium diet which rids the renal system of excess sodium. Many people use potassium chloride, salt substitute to reduce their salt intake.

4. Additional dietary changes beneficial to reducing blood pressure include the DASH diet (dietary approaches to stop hypertension) which is rich in fruits and vegetables and low-fat or fat-free dairy products. Research sponsored by the National Heart, Lung, and Blood Institute shows this diet to be effective. In addition, an increase in dietary potassium which offsets the effect of sodium has been shown highly effective in reducing blood pressure.

5. Discontinuing tobacco use and alcohol consumption, which is common among commercial drivers, has been shown to lower blood pressure. The exact mechanisms are not fully understood, but blood pressure (especially systolic) always transiently increases following alcobol or nicotine consumption. Abstaining from cigarette smoking reduces the risks of stroke and heart attack associated with hypertension.[54]

6. Vasodialators such as niacin.

7. Limiting alcohol intake to less than two standard drinks per day can reduce systolic blood pressure by between 2 to 4mmHg.

8. Reducing stress, for example with relaxation therapy, such as meditation and other mind-body relaxation techniques, by reducing environmental stress such as high sound levels and over-illumination can also lower blood pressure. Jacobson's Progressive Muscle Relaxation and biofeedback, such as device-guided paced

breathing, are also beneficial, although meta-analysis suggests it is not effective unless combined with other relaxation techniques.

9. Increasing omega 3 fatty acids can help lower hypertension. Fish oil is shown to lower blood pressure in hypertensive individuals. The fish oil may increase sodium and water excretion.

10. Caffeine raises blood pressure (Lane et. al., 2002).

2.8 Complications of Hypertension

Hypertension is the most important risk factor for death in industrialized countries. It increases hardening of the arteries, thus predisposes individuals to heart disease, peripheral vascular disease and strokes. Types of heart disease that may occur include myocardial infarction, heart failure and left ventricular hypertrophy. Other complications are hypertensive retinopathy and hypertensive nephropathy. If blood pressure is very high, hypertensive encephalopathy may result.

Silent stroke is a type of stroke (infarct) that does not have any outward symptoms (asymptomatic), and the patient is typically unaware they have suffered a stroke. Despite not causing identifiable symptoms, a silent stroke still causes damage to the brain, and places the patient at increased risk for a major stroke in the future. Hypertension is the major treatable risk factor associated with silent stokes (Joint_National_Committee_on_Hypertension, 1997).

2.9 Diagnosis of Hypertension

Hypertension is generally diagnosed on the basis of a persistently high blood pressure. Usually this requires three separate sphygmomanometer measurements at least one week

apart. Diagnosis often entails three separate visits to the physician's office Initial assessment of the hypertensive patient should include a complete history and physical examination. Exceptionally, if the elevation is extreme, or if symptoms of organ damage are present, then a diagnosis may be made and treatment started immediately.

Once the diagnosis of hypertension has been made, physicians will attempt to identify the underlying cause based on risk factors and other symptoms, if present. Secondary hypertension is more common in preadolescent children, with most cases caused by renal disease. Primary or essential hypertension is more common in adolescents and has multiple risk factors, including obesity and a family history of hypertension. Laboratory tests can also be performed to identify possible causes of secondary hypertension. and to determine whether hypertension has caused damage to the heart. eyes and kidneys. Additional tests for diabetes and high cholesterol levels are usually performed because these conditions are additional risk factors for the development of heart disease and require treatment.

Creatinine (renal function) testing is done to assess the presence of kidney disease, which can be either the cause or the result of hypertension. In addition. creatinine testing provides a baseline measurement of kidney function that can be used to monitor for side effects of certain antihypertensive drugs on kidney function. Additionally, testing of urine samples for protein is used as a secondary indicator of kidney disease. Glucose testing is done to determine if diabetes mellitus is present. Electrocardiogram (EKG/ECG) testing is done to check for evidence that the heart is under strain from high blood pressure. It may also show whether there is thickening of the heart muscle (left ventricular

hypertrophy) or whether the heart has experienced a prior minor disturbance such as a silent heart attack. A chest X-ray may be performed to look for signs of heart enlargement or damage to heart tissue (JNC-V ,Joint_National_Committee_on_Hypertension, 1993).

2.10 Treatment of Hypertension

Without treatment, hypertension can lead to blood vessel damage, heart attack or heart failure, stroke, kidney failure, and eye problems (Ken, 2010). Hypertension though affects all age groups, it reflects more in adults and increases with age (Cappuccio et. al., 1997).

The first line of treatment for hypertension is identical to the recommended preventive lifestyle changes which are dietary changes, physical exercise and weight loss. These have all been shown to significantly reduce blood pressure in people with hypertension. If hypertension is high enough to justify immediate use of medications, lifestyle changes are still recommended in conjunction with medication. Drug prescription should take into account the patient's absolute cardiovascular risk (including risk of myocardial infarction and stroke), as well as blood pressure readings, in order to gain a more accurate picture of the patient's cardiovascular profile. Different programmes aimed to reduce psychological stress such as biofeedback, relaxation and meditation are advertised to reduce hypertension. However in general, claims of efficacy are not supported by scientific studies, which have been in general of low quality.

Dietary-related factors in hypertension was first advocated around 1940. Also, the DASH diet (Dietary Approaches to Stop Hypertension) is a diet promoted by the

National Heart, Lung, and Blood Institute to control hypertension. A major feature of the plan is limiting intake of sodium and it also generally encourages the consumption of nuts, whole grains, fish, poultry, fruits and vegetables while lowering the consumption of red meats, sweets, and sugar. It is also "rich in potassium, magnesium, and calcium, as well as protein".

The second line of treatment is medications, collectively referred to as antihypertensive drugs which are currently available for treating hypertension. Reduction of the blood pressure by 5 mmHg can decrease the risk of stroke by 34%, of ischaemic heart disease by 21%, and reduce the likelihood of dementia, heart failure, and mortality from cardiovascular disease. The aim of treatment should be to reduce blood pressure to <140/90 mmHg for most individuals, and lower for individuals with diabetes or kidney disease (some medical professionals recommend keeping levels below 120/80 mmHg). If the blood pressure goal is not met, a change in treatment should be made as therapeutic inertia is n clear impediment to blood pressure control. Co-morbidity also plays a role in determining target blood pressure, with lower BP targets applying to patients with end-organ damage or proteinuria.

The first line antihypertensive supported by the best evidence is a low dose thiazide-based diuretic. Often multiple medications are needed to be combined to achieve the goal blood pressure. Commonly used prescription drugs include ACE inhibitors, alpha blockers, angiotensin II receptor antagonists, beta blockers, calcium channel blockers, diuretics (e.g. hydrochlorothiazide), direct renin inhibitors and Glyceryl trinitrates which has the activity of vasodilation, thus controlling high blood pressure.

Some examples of common combined prescription drug include:

1. a fixed combination of an ACE inhibitor and a calcium channel blocker. One example of this is the combination of perindopril and amlodipine, the efficacy of which has been demonstrated in individuals with glucose intolerance or metabolic syndrome.
2. A fixed combination of a diuretic and an angiotensin blocker - ARB.

Combinations of an ACE-inhibitor or angiotensin II receptor antagonist, a diuretic and an NSAID (including selective COX-2 inhibitors and non-prescribed drugs such as ibuprofen) should be avoided whenever possible due to a high documented risk of acute renal failure. The combination is known colloquially as a "triple whammy" in the Australian health industry. In the elderly treating moderate to severe high blood pressure decreases death rates in those under 80 years. In those over 80 years old, there was a decrease in morbidity but no decrease in mortality. The recommended BP goal is <140/90 mmHg with thiazide diuretics being the first line medication (JNC-V. Joint_National_Committee_on_Hypertension; 1993).

2.11 Economic Cost of Hypertension

The medical, economic and human costs of untreated and inadequately controlled high blood pressure are enormous. Adequate management of hypertension can be hampered by inadequacies in the diagnosis, treatment, and/or control of high blood pressure. Health care providers face many obstacles to achieving blood pressure control from their patients, including resistance to taking multiple medications to reach blood pressure goals. Patients also face the challenges of adhering to medicine schedules and making lifestyle changes. Nonetheless, the achievement of blood pressure goals is possible, and

most importantly, lowering blood pressure significantly reduces the risk of death due to heart disease, the development of other debilitating conditions, and the cost associated with advanced medical care (Joint_National_Committee_on_Hypertension; 1997).

The patients' mean monthly cost of treatment for hypertension was N1440±560 ($9.6±3.7), equivalent to 11% of their mean monthly household income was very interesting. Household catastrophic expenditures for care have commonly been described as costs exceeding ten percent (10%) of income. About 53% of the household of the patients incurred catastrophic expenditures. However, more recently, the World Health Organization (WHO) has defined catastrophic expenditures as costs exceeding 40% of household income after basic food needs have been met. It is recommended that, in addition to determining average costs as a proportion of average income, the proportion of patients/households who incur catastrophic costs due to hypertension care according the current WHO definition should be assessed as findings using the new WHO definition may differ (Ukwaja et. al., 2012).

The medical and economic costs of traffic accidents are estimated to be one to three percent of the gross domestic product of a country (IPEA, Institute of Applied Economic Research).

2.12 Hypertension Control Programme in Nigeria

Hypertension control programme in Nigeria is coordinated by the Non-Communicable Diseases (NCDs) Division of Federal Ministry of Health. Established in 1989 by the Federal Ministry of Health (FMOH) to be the arrow head for the response to prevention, early diagnosis, and control and provide proper management guidelines. There is an

epidemiological transition from communicable diseases to NCDs which is increasingly becoming an important contributor to the national diseases burden and therefore a major public health concern.

Non-communicable diseases (NCDs) are chronic diseases that are typically non contagious, non infectious and not transferred from person to person. They result from genetic or lifestyle factors (risk factors) and cause death, dysfunction, or impairment in the quality of life including injuries (RTI). NCDs are leading cause of functionary impairment and death worldwide. They account for more than thirty-three million (33.4m) deaths worldwide. Seventy-two percent (72%) of such deaths occur in developing countries including Nigeria. They are among the top ten causes of morbidity and mortality in Nigeria And adults are more affected except. SCD imposes heavy economic burden on individuals, societies and the health system. The goal of hypertension control programme in Nigeria is to reverse the increasing prevalence of hypertension, through programmes that will prevent, provide early detection, control and management of hypertension in Nigeria.

The specific objectives of the programmes are; to prevent and control hypertension risk factors, to provide management guidelines for the prevention and control of hypertension and their complications in Nigeria and, to generate a reliable data/information base, and provide an evidence-based national policy. The targets of the programme are to conduct national survey on hypertension as a basis for hypertension surveillance in Nigeria by the end of 2015, to develop evidence-based comprehensive hypertension policy and guideline for the prevention, and early diagnosis, control and management of

hypertension in Nigeria by the end of 2015. Other targets are to provide advocacy and awareness campaign on hypertension and their risk factors, to integrate hypertension into the PHC services which are presently ongoing, and to control road traffic injuries in collaboration with Federal Road Safety Corp on Alcohol/Substance use by drivers and domestication of the WHO Framework Convention on Tobacco Control in Nigeria.

The strategic plan of the hypertension control in Nigeria is based on the principles of promotion of healthy life style, early detection, prevention and control proper management, prevention of complications and surveillance. In the surveillance system, the flow of information is from the health facility to the Local Government Area and then to the Federal Ministry of Health. The feedback mechanism is through same flow to the health facility (Fig 2.2).

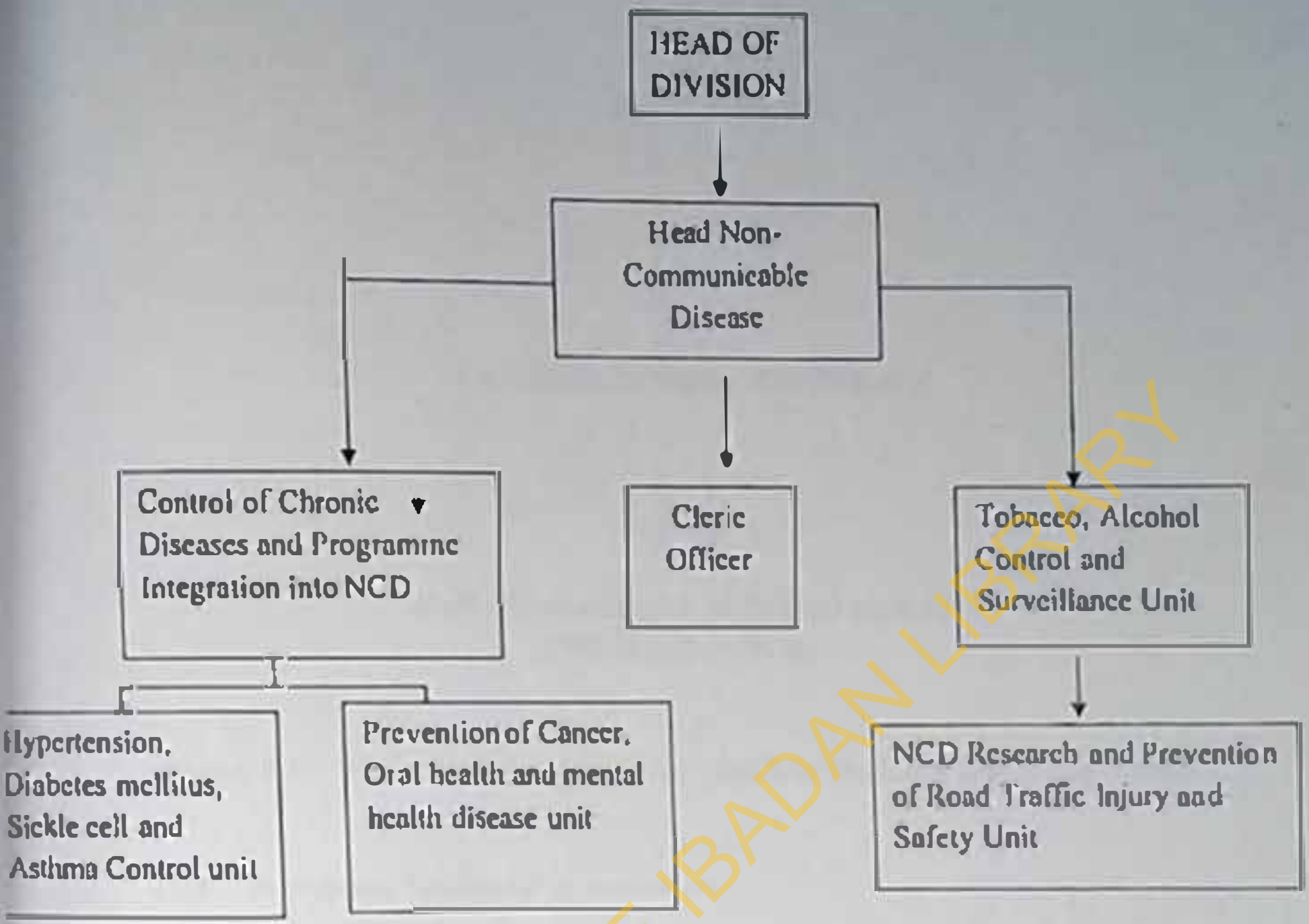


Figure 2.1: Non Communicable Disease Control Programme Organogram of Federal Ministry of Health

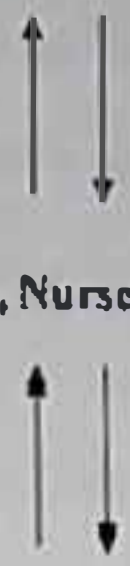


Figure 2.2: Flow of Information: Integrated Into the IDSR Reporting System

2.13 Prevalence Studies of Hypertension

The reported prevalence of hypertension in Nigeria rural population maged from five o seven percent and urban population was 17-20% among adults (Erhun et. al., 2005). Prevalence of hypertension in commercial drivers specifically was studied in places like Ibadan, Lagos, Cameroon, Ghana, Iran etc. The articles of the studies in Ibadan and Lagos are grail. The studies in Ghana and Cameroon were among the rural population, market women and civil servants. In Cameroon civil servants were the focus. The study in Iran was among the commercial drivers. There were anticipated challenges and limitations that were also encountered in these previous studies on commercial drivers. This may be due to the difficulty to have access to commercial drivers because they are always on the road or they are a group of people that may not be patient to give clients audience for study. Many auto-crash accidents might have occurred due to sudden death

stroke or transient ischemic attack while driving. The prevalence varies among these studies. The crude prevalence of hypertension has been documented as 11.2%. based on BP threshold of 160/95mmhg. with age adjusted rate being 9.3 (20.5%). This translates into approximately 4.33 million Nigerian hypertensive aged 15 and above (Ogah, et. al.; 2013). The prevalence of hypertension among the rural and urban population was five to seven percent and 17 to 20% respectively (Lawoyin et. al., 2002). However with the current definition of hypertension based on the recently published seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII) guidelines (2), many more Nigerians (20-25%) can be said to be hypertensive.

Hypertension is a common health problem in developed countries and a major risk factor for cardiovascular diseases (CVDs). Its prevalence is probably on the increase in developing countries where adoption of western lifestyles and the stress of urbanization both of which are expected to increase the morbidity associated with unhealthy lifestyles are not on the decline (Castelli, 1984). Genetic and environmental factors are reported to play a key role in hypertension, 90% of which are better classified as idiopathic. High blood pressure in adults has a high impact on the economy and on the quality of life of individuals with important implications for resource expenditures. A number of studies revealing the prevalence of hypertension in populations of West African origin have been reported (Gwatkin et. al., 1999). Not much has been done to determine the magnitude and epidemiological characteristics of this disease in Nigeria and to particularly assess other cardiovascular risk factors within the population. Effective interventions will require the assessment of the socio-economic magnitude and extent of

the burden of hypertension in the working class. To this end, a cross-sectional survey was carried out to estimate the current prevalence and distribution of hypertension and to determine the status of hypertension awareness and control among a working population

In n study carried out by the International Collaborative Study of Hypertension in Blacks (ICSHIB), the age-adjusted prevalence of hypertension in Nigeria was 14.5% (14.7% for men and 14.3% for women). Major target organ complications of hypertension such as left ventricular hypertrophy (LVH), diastolic dysfunction congestive heart failure (CCF), ischaemic heart disease (IHD) stroke and renal failure are well documented by various workers in Nigeria.

In the study of patterns of cardiovascular diseases in many centers in Nigeria, hypertension was ranked first. It is the medical illness most frequently diagnosed in elderly Nigerians. A study of 613 elderly Nigerians (398 women and 215 men) aged 65 to110 was carried out in a cohort at Ibadon. It was reported that cardiovascular disease was the commonest condition in this cohort and hypertension (27.8%) was the most frequent diagnosis (David et. al., 2000; Ogunniyi, 2009).

A cross sectional study was carried out to test the hypothesis stating that "differences in hypertension prevalence were primarily related to differences in socio-economic status". The higher prevalence of hypertension among the high socio-economic status Nigerian professionals was thought to be related to higher weight, caloric intake, westernization of diet, alcohol intake, sodium intake, cardiovascular reactivity, and stress due to job, migration, and change in SES, and to reduced potassium intake and physical activity. Commercial drivers whose lifestyle is though different from the civil servants are of

mixed socio-economic status. Civil servants were systematically sampled from civil service employee lists. Data were collected on blood pressure; urinary sodium, potassium, and protein; diet; anthropometry; electrocardiogram; serum insulin; stress in the work environment, migration history, and cardiovascular reactivity (David et. al., 2000).

In a retrospective observational study carried out among 659 bus drivers in Brazil to determine the prevalence of risk factors of obesity. Based on the criteria stipulated by the Guidelines for the Management of Arterial Hypertension from the European Society of Hypertension and European Society of Cardiology, 176 drivers (28.5%) were considered high normal and 41 (6.7%) were hypertensive considering systolic blood pressure. While based on diastolic blood pressure, 194 (31.5%) of the drivers were discovered to have hypertension (Innocent et. al., 2013).

Another study in the workplace of six ministries in Bendel State (now Edo and Delta States) of Nigeria was carried out among five hundred and fifty-nine (559) urban civil servants ages 25 to 54. Blood pressure, physical measurements, urinary protein and glucose, fasting blood glucose, and demographic data were collected at the workplace. Subjects were classified as senior staff (professionals or administrators) or junior staff (non-administrators). Among 172 male senior staff, the age-adjusted rate of hypertension (diastolic blood pressure > or = 90 mm Hg, systolic blood pressure > or = 140 mm Hg, or on an antihypertensive medication) was 43% and occurrence rose dramatically from 21 to 63% across age groups 25-34 to 45-54, respectively. Among 266 male junior staff, the age-adjusted rate of hypertension was 23%, and occurrence did not rise with age. Logistic

regression showed that body mass index (kg/m2), age, alcohol drinking, and being senior staff were all independently related to hypertension in men. On the other hand, the age-adjusted rate of hypertension in 121 women was 20% and was significantly related only to body mass index. The result of this study showed that male urban civil servants appeared to have a risk for hypertension similar to that of U.S. black males. The socio economic status of male civil servants is not related to commercial drivers as the male civil servants have consistently high socio economic status. Age, body mass index, alcohol drinking, and other unidentified factors related to higher socioeconomic status were strong determinants of hypertension in this population. Smoking is not a strong determinant factor of hypertension in civil servants. Lack of physical exercise was not assessed in the study while this factor will be assessed in this study (Guillot & Heuveline, 1999).

From a study which was carried out in Ibadan, it was reported that high blood pressure is also the most common condition associated with dementia in Nigeria. It is the commonest condition in senior executives and army non-commissioned officers. Army non-commissioned officers may have a related lifestyle with commercial drivers. Two autopsy studies have shown that hypertension is the commonest cause of sudden unexpected natural death. This study carried out 876 consecutive coroner's autopsies at Ibadan and found that the commonest cause of sudden natural death was cardiovascular, of which complications of hypertension constituted majority of cases (Olatunbosun, 2005). This finding was corroborated by Afigbe et. al.'s (2009) study. It has been shown that three percent of hypertensive Nigerians die each year. The population attributable risk has been put at seven percent. Sudden death can occur anywhere due to

cardiovascular diseases of which hypertension is number one killer disease. Commercial drivers can suffer from hypertensive encephalopathy which can lead to death even while driving.

In the study of patterns of cardiovascular diseases in many centers in Nigeria, hypertension was ranked first (Ogunniyi 2009). It is the medical illness most frequently diagnosed in elderly Nigerians. In a survey study carried out on civil service population in Ibadan, a major city in Southwestern Nigeria, nine hundred and ninety-eight (998) civil servants were selected by multistage sampling participated. Biosocial data including smoking history, alcohol use and level of physical activity; anthropometry, blood pressure and plasma glucose measurements were obtained. Diagnosis of hypertension was based on blood pressure of ≥160/95 mmHg or known hypertensive on treatment. The overall prevalence rate of hypertension was 10.3% (CI, 8.4%, 12.2%), rates of 13.9% and 5.3% were obtained in men and women respectively in spite of a much higher rate of generalized obesity in the latter. Hypertension was associated with higher salary grade level, but there was no relationship found with regular exercise, smoking and alcohol. Obesity (body mass index (BMI) ≥30 kg/m^2) was associated with hypertension only in women. A two-sided *t*-test demonstrated age, waist circumference, waist-to-hip ratio (WHR) and plasma glucose level as significant variables. In multivariate ANOVA models of systolic blood pressures, age, male gender and BMI were highly significant factors ($P < 0.0001$) and plasma glucose was also significant ($P < 0.016$). The same variables (except plasma glucose) were associated with diastolic blood pressure. In logistic regression models the variables which predicted hypertension were plasma glucose, age, gender and family history of diabetes. The biosocial determinants of

cardiovascular diseases of which hypertension is number one killer disease. Commercial drivers can suffer from hypertensive encephalopathy which can lead to death even while driving.

In the study of patterns of cardiovascular diseases in many centers in Nigeria, hypertension was ranked first (Ogunniyi 2009). It is the medical illness most frequently diagnosed in elderly Nigerians. In a survey study carried out on civil service population in Ibadan, a major city in Southwestern Nigeria, nine hundred and ninety-eight (998) civil servants were selected by multistage sampling participated. Biosocial data including smoking history, alcohol use and level of physical activity; anthropometry, blood pressure and plasma glucose measurements were obtained. Diagnosis of hypertension was based on blood pressure of ≥160/95 mmHg or known hypertensive on treatment. The overall prevalence rate of hypertension was 10.3% (CI. 8.4%, 12.2%), rates of 13.9% and 5.3% were obtained in men and women respectively in spite of a much higher rate of generalized obesity in the latter. Hypertension was associated with higher salary grade level, but there was no relationship found with regular exercise, smoking and alcohol. Obesity (body mass index (BMI) ≥30 kg/m^2) was associated with hypertension only in women. A two-sided t-test demonstrated age, waist circumference, waist-to-hip ratio (WHR) and plasma glucose level as significant variables. In multivariate ANOVA models of systolic blood pressures, age, male gender and BMI were highly significant factors ($P < 0.0001$) and plasma glucose was also significant ($P < 0.016$). The same variables (except plasma glucose) were associated with diastolic blood pressures. In logistic regression models the variables which predicted hypertension were plasma glucose, age, gender and family history of diabetes. The biosocial determinants of

hypertension in the urban black population were age, male gender, higher socio-economic status, BMI, plasma glucose, generalised and central adiposity. Regional fat distribution was a stronger predicter of hypertension than generalised obesity in the population (Olatunbosun, 2005).

In Ashanti, Ghana (West Africa) prevalence, detection, management and control of hypertension were assessed in 1, 013 men (n=385) and women (n=628), both aged 55 [SD 11] years, living in 12 villages in Ashanti, Ghana. Five hundred and thirty two (532) lived in semi-urban and 481 in rural villages. The participants underwent measurements of height, weight, and blood pressure (BP); and answered a detailed questionnaire. Hypertension was defined as BP ≥140 and/or ≥90 mmHg or being on drug therapy. Women were heavier than men. Participants in semi-urban areas were heavier and had higher BP (129/76 [26/14] versus 121/72 [25/13] mmHg; $P<0.001$ for both) than in rural areas. The prevalence of hypertension was 28.7% overall and comparable in men and women, but higher in semi-urban villages (32.9% [95% CI 28.9 to 37.1] versus 24.1% [20.4 to 28.2]), and increased with age. Detection rate was lower in men than women (13.9% versus 27.3%; $P=0.007$). Treatment and control rates were low in both groups (7.8% and 4.4% versus 13.6% and 1.7%). Detection, treatment, and control rates were higher in semi-urban (25.7%, 14.3%, and 3.4%) than in rural villages (16.4%, 6.9%, and 1.7%). Hypertension is common in adults in central Ghana, particularly in urban areas. Detection rates are suboptimal in both men and women, especially in rural areas. Adequate treatment of high BP is at a very low level. The study recommended for preventive strategies on hypertension control in Ghana (Francesco et. al., 2009). This

study corroborates with Oguniyi et. al. and Bello et. al. with average crude prevalence of 28.7%.

Mbanya et. al. did a study in Cameroon to look at prevalence of hypertension in rural and urban dwellers among males and females. World Health Organization definition (systolic blood pressure [SBP] ≥160, diastolic [DBP] ≥95 mmHg) was used in the study with Cameroonian subjects aged 25 to74. There were 746 individuals from a rural area (308 men, 438 women) and 1,052 (461 men, 591 women) from an urban area. The response rate was 95% and 91% for the rural and urban populations respectively. The age-standardized prevalence of hypertension was significantly higher in the urban than in the rural area. It was 16.4% (95% CI: 11.6–21.2) in urban men and 12.1% (95% CI: 7.9–16.2) in urban women, while it was 5.4% (95% CI: 2.9–8.0) in rural men and 5.9% (95% CI: 3.8–8.0) in women. These results indicate that hypertension is still uncommon in rural Cameroon but occurs frequently in the urban community, reaching a proportion comparable with industrialized urban communities (Mbanya, 2010).

Generally, bus and truck drivers are apparently more involved in metabolic syndrome and its complications due to their working conditions. The related impacts are not only harmful for driver's health, but also for others. In 2007 in Iran, 429 bus and truck male drivers were enrolled to this cross sectional study to examine the metabolic syndrome using ATPIII criteria. Statistical tests including Chi-Square test, T-student test and Pearson's correlation coefficient were used to analyze the data. It was found that hypertension and diabetes were seen in 42.9% and seven percent of the drivers respectively. Body mass index (BMI) in 41% of the drivers within the range of 25 to 30

was considered overweight and 23% of them were found to be obese. High triglyceride (53.4%) and low HDL-C levels (48.7%) were more common than other components of metabolic syndrome. A significant positive correlation was seen between BMI, diabetes, high blood pressure and metabolic syndrome ($p < 0.001$); but there was no positive correlation between metabolic syndrome and smoking ($p < 0.06$).

High prevalence of metabolic syndrome and other relevant risk factors for coronary heart diseases (CHD) were detected among the drivers. Based on these findings, it was recommended in the study to consider training programmes, establish pertinent health regulations, and focus on the metabolic syndrome complications in high risk group like the drivers to improve and maintain their quality of life and to promote their public health. In view of the review above the prevalence of hypertension in commercial drivers in Iran of 42.9% based on the specificity of studies to commercial drivers was used in this study to determine the sample size. It has also been found out that the unhealthy diets like high fatty food have not been included in all the studies carried out. This is the reason fasting blood cholesterol was assessed as a risk factor in this study.

2.14 Prevalence Studies of Risk Factors of Hypertension

The risk factors associated with hypertension range from smoking, alcohol consumption, unhealthy diets to lack of exercise. These risk factors are also found in high proportion with commercial drivers. Studies have been done in the general population of Nigeria, civil servants, market women, executives and within the hospital-based community. Studies in recent decades have demonstrated that workers in the transportation industry are at greater risk of an incorrect diet and sedentary behaviour. Bus drivers, in particular,

have higher mortality, morbidity, and absenteeism rates due to obesity. The occupation of driving is also associated with an increased risk of cardiovascular disease and an excessive risk of cerebrovascular disease, such as stroke. The risk factors that contribute to the development of cardiovascular disease are reported in clinical trials carried out in recent decades, including modifiable factors (hypertension, smoking habits, concentrations of HDL and LDL cholesterol, and type 2 diabetes) and no modifiable factors (age, gender, and genetic predisposition). Moreover, behavioural factors among professional drivers contribute considerably to the occurrence of traffic accidents. The World Health Organization estimates that the number of deaths due to traffic accidents will increase by 65% between the years 2000 and 2020, with this figure expected to be as high as 80% in developing countries (Ghaffar, 2013).

In a retrospective observational study carried out among 659 bus drivers in Brazil to determine the prevalence of risk factors of obesity by Doll et. al. (2002). Based on the BMI, 365 subjects (55.6%) were overweight and 124 subjects (19.6%) were obese (BMI > 30). One hundred and seventy-six (176) drivers (28.5%) were considered high normal and 41 (6.7%) were hypertensive considering systolic blood pressure. Based on diastolic blood pressure, 194 (31.5%) of the drivers had hypertension. Mean HDL cholesterol was 47.9 ± 9.5 mg/dL, with 138 subjects (21.7%) exhibiting levels below 40 mg/dL. Mean triglyceride level was 146.3 ± 87.9 mg/dL, with 219 subjects (34.4%) exhibiting levels above 150 mg/dL. Fasting glucose was above 100 mg/dL in 249 subjects (39.1%). Forty-five (45) subjects (7.1%) were considered prediabetic and 18 (2.8%) were considered diabetic (Fredriek, 2011).

In another study which involved a survey of 1,359 male and 1,469 female respondents. aged 15-64 years. multistage sampling was used for recruitment (PHCs/sub-centres/villages) in india. It was a household survey to determine the prevalence of risk factors o f non-communicable diseases. The results showed the age adjusted prevalence of daily smoked tobacco was 41% for men and 13% for women. Daily smokeless tobacco use was slightly above seven percent (7.1%) and slightly above one percent (1.2%) for men and women respectively. The prevalence of current alcohol consumption was 24.6% among men while none of the women reported consuming alcohol. The mean number of servings of fruits and vegetables per day was almost four (3.7) for men and almost three (2.7) for women. The percentage of people undertaking at least 150 minutes of physical activity in a week was 77.8% for men and 54.5% for women. Among men 9.0% had BMI > or = 25.0 compared to 15.2% among women (Krishnan et. al., 2008).

In a community study in Eritrea where a cross-sectional survey was conducted among all the ethnic groups with the WHO stepwise approach in 2006, hypertension was defined as blood pressure > or = 140/90 mmHg or a person on medication for hypertension, while diabetes based on medical history of the disease. Of the targeted sample size of two thousand four hundred and sixty (2,460). two thousand three hundred and fifty-two (2,352) responded. Respondents were distributed among the six regions of the country proportional to population size. A multistage cluster sampling technique was used. Males and females from 15 to 64 years of age were studied. Prevalence rates of hypertension, diabetes mellitus, obesity, smoking, alcohol consumption, physical inactivity, and low vegetable and low fruit consumption was assessed. In this study prevalence of daily smoking of slightly above seven percent (7.2%) with variations among age, sex, religion

and regions was revealed. A high prevalence of low fruit and low vegetable intake was observed at 84.7% and 50.6% respectively. Alcohol drinking was 39.6% level of physical activity was high (90%), and the prevalence of obesity was low at 3.3%. The prevalence of hypertension in the general population was 16%, while just above two percent (2.2%) were known diabetic patients. More than 80% of the hypertensive persons were not aware of their condition. No significant rural/urban or gender difference was seen in hypertension prevalence (Usman et. al , 2006)

A study carried out in India attempted to identify the prevalence and distribution of risk factors of non-communicable diseases among urban and rural population in Gujarat, India. Using the WHO stepwise approach, a cross sectional study was carried out among 1,805 urban and 1,684 rural people of 15-64 years age-group. Information on behavioural and physiological risk factors of non-communicable diseases was obtained through standardized protocol. High prevalence of smoking (22.8%) and the use of smokeless tobacco (43.4%) were observed among rural men compared to urban men (smoking-12.8% and smokeless tobacco consumption-23.1%). There was a significant difference in the average consumption of fruits and vegetables between urban (2.18±1.59 servings) and rural (1.78±1.48 servings) area. Prevalence of overweight and obesity was observed to be high among urban men and women in all age-groups compared to rural men and women. Prevalence of behavioural risk factors, overweight, and obesity increased with age in both the areas. Twenty-nine percent of the urban residents and 15.4% of the rural residents were found to have raised blood pressure, and the difference was found to be statistically significant ($p<0.01$). For both men and women, the prevalence of overweight and obesity, hypertension, and lack of physical activities were significantly higher in the urban

population while smoking, smokeless tobacco consumption, poor consumption of fruits and vegetables were more prevalent in the rural population (Aroor et. al., 2013).

2.15 Morbidity and Mortality of Hypertension

These data represent the principal social strata of African society. They include the range of previous estimates and provide a reference point for considering the burden of hypertension. The estimated distribution of the African population between the three sectors was 75% rural, 20% urban poor, and five percent (5%) urban salaried workers and elite. Based on a sub-Saharan population of 500 million, half of whom were older than 25, a hypertension prevalence of five to ten percent yielded 10-20 million cases. If annual mortality is 2%, and 5% of deaths result from hypertension, then approximately 250 000 deaths each year are preventable (Richard et. al., 1999).

2.16 Gaps Discovered in the Literature Review that Justified the Study

This study measured the subtypes of cholesterol (LDL, HDL, TG) among the study population that were not carried out among the studies in the literature review.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Location

Jabi Motor Park is located in Utako area of Abuja municipality and is the largest motor park in FCT. Jabi Motor Park is the largest park in FCT that ply all routes to the states of Nigeria from Abuja. The park is operated by National Union of Road Transport Workers (NURTW) which is an association body that looks into the welfare of the drivers. All drivers using Jabi Park are registered and an identity card is issued. The union is headed by a chairman. There are about 2,378 registered commercial drivers at Jabi Motor Park. The Jabi Motor park has many food vendors within it which are patronized by the commercial drivers. There are other traders selling cigarette and alcoholic drinks. There are night travels to the south western and the eastern part of Nigeria.

Abuja is known for being the best purpose-built city in Africa as well as being one of the wealthiest and most expensive. However, some populations live in the semi-developed city areas such as Karu, Nipape, Guzape, Kubwa, Lugbe and Mararaba in Nasarawa State.

Abuja municipality, FCT, had a population of 1.4 million people (National Population Commission, 2006 census). With an annual growth rate of slightly above nine percent (9.3%), the projected population for FCT for 2010 is two million people. FCT has a land area of 8,000 square kilometers. It is bounded on the north by Kaduna State, on the west by Niger State, on the east and south-east by Plateau State and on the south-west by Kogi State. Abuja's geography is defined by Aso Rock a 400-metre monolith left by water

erosion. The Presidential Complex, National Assembly, Supreme Court and much of the town extend to the south of the rock. "Aso" means "victorious" in the language of the now displaced Asokoro ("the people of victory"). Other sites include the Nigerian National Mosque and the Nigerian National Christian Centre. The city is served by the Nnamdi Azikwe International Airport, while Zuma Rock lies nearby.

Figure 3.1: Map of Nigeria and FCT showing Abuja municipality area council where the Jabi motor park located

Source: National Strategic Health Development Plan 2010-2015

3.2 Study Design

A descriptive cross-sectional study was carried out in Jabi Motor Park. This is a prevalence study that looked into the frequency of the risk factors and hypertension. It measures characteristic and other variables of interest as they exist in a defined population at one particular time. The presence or absence of disease and other variables (or, if they are quantitative, their level) was determined in each member of the study population (Commercial Drivers). The target population is a highly mobile population that the characteristic and variables (risk factors) of interest will be mostly evaluated using cross sectional study.

3.3 Study Population

The target population was the Interstate Commercial Drivers travelling from Abuja to and fro the 36 states of the federation.

3.3.1 Inclusion Criteria

All interstate commercial drivers who were 18 years and above, registered with the National Union of Road Transport Workers in the park at time of study were included.

3.3.2. Exclusion Criteria:

All interstate commercial drivers below 18 years, Private motor drivers, drivers without licenses and non-consenting drivers were excluded from the study.

3.4 Sample Size Determination

The studies on prevalence of hypertension carried out in Nigeria among commercial drivers have not been subjected to peer review hence the sample size used for commercial drivers in the motor parks was calculated based on average/prevalence of hypertension of 50% with a margin of error of five percent (5%) of 95% confident interval CI. The sample size was calculated using the following formula by kirsch and Lesley (1965).

$$n = \frac{z^2 * p * q}{d^2}$$

where n= minimum sample size

Za^2: standard normal deviate of α which corresponds to 95% confidence = 1.96.

P= average /prevalence of hypertension of 50% with a margin of error of 5% of 95% confident interval CI.

q= 1-p

d = desired precision set at 0.05

i.e d =0.05, p= 0.5, q=0.5

$$\text{Therefore } n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2}$$

$$= 0.9604/0.0025$$

$$= 384$$

The 10% non-response value was added: 384+38 = 422

3.5 Sampling Technique

Systematic sampling technique was used to select subjects for the study. The register booklets of the associations (NURTW, CDEA) were used to generate the sample frame of 2,378 commercial drivers. The study population (2,378) was divided with the sample size (422) to calculate the sampling interval (6). A random sampling by balloting from the first six numbers, based on the sampling interval, was picked at random to select the first respondent from which the sampling commenced. Each respondent was picked from the first case based on the sampling interval.

3.6 Study Instruments

a. Questionnaire: The World Health Organization sample instrument was adapted. This instrument was used to collect specific information on age, sex, level of education, marital status, occupational status, medical history, feeding habits, physical exercise, alcohol and smoking history, vision status, and laboratory parameters (blood pressure, height, weight, fasting blood cholesterol level, fasting blood glucose level) from respondents. An interviewer-administered structured questionnaire used to collect data is accessible in appendix 2.

b. Height meter: RGZ-120 (2012) model machine was used to measure the height of respondents.

c. Weighing machine: RGZ-120 (2010) model machine was used to measure weight in (kilogram) of respondents.

d. Lipid profile meter: LipidPro™ (Model No C2P12E08,2012) Manufactured by Infopia Co, Ltd,001 , Hogye – Dong, Dongan – Gu , Anyang, Kyunggi, 431-

080, Korea . It measured the fasting total cholesterol level, fasting high density lipoprotein, fasting low density lipoprotein and fasting triglycerides.

c. Spectrophotometer: Manufactured by England Company for Biotechnology Ltd. Spectrum lab 23A model, 2007. It has a wavelength range 340-950nm. The machine weight 6.5kg. The machine was used to measure the fasting total cholesterol level, fasting high density lipoprotein, fasting low density lipoprotein and fasting triglycerides.

f. Glucometer: Manufactured by Roche Diagnostic GmbH, Sandhofer Strasse 116,68305 Mannheim, Germany. Accu.chek (2011 model no CE 0088) machine was used to measure the fasting blood sugar.

g. Tape rule: was used to measure the waist and hip circumference. The hip circumference was measured at the anterior iliac spine landmark. The belts and trousers were drown down before measurement. The waist circumference was measured at the point of about 3-5cm below the umbilicus and round the abdomen.

h. Sphygmomanometer: Kris-Aloy and Home care manufactured by Medicare Instrument (WUXI) Ltd No 301 Xixin, Korea mercury models were used to measure the systolic and diastolic blood pressure.

3.7 Data Collection

Data collection started after ethical approval which was received (Appendix I).

3.7.1 Jabi Motor Park Entry:

The point of first contact of entry was to the chairmen and the executive members of the various associations in the park. The research team visited the executive members and

briefed them of the project and their role towards the success of the project in the park especially the cooperation of the commercial drivers. The chairman approved the space used for the project.

3.7.2 Administration of questionnaire:

A standardized questionnaire that included individual demography and exposure variables of all the identified risk factors was used to collect data from commercial drivers in the motor park (JNC-V, Joint_National_Committee_on_Hypertension; 1993) and (Whitworth & World Health Organization, 2003).

The administration of the questionnaire was done by research team of five researchers. The research assistants were trained before the commencement of the project. The team met at the end of each day and end of the week to review the processes if necessary based on the feedback from the field.

a. Laboratory Technicians: There were two technicians who were graduates of School of Health Technology Plateau State and Federal University of Technology Minna. One performed phlebotomy and carried out the tests using the mobile instruments on the field. The second carried out a quality control on the samples in the laboratory with spectrophotometer.

b. Interviewer: The interviewer was a medical record officer who graduated from University of Maiduguri. He interviewed the respondents before the measurements of the parameters.

c. Nurse: A registered nurse from the School of Nursing Delta State, he measured the parameters like waist and hip circumference, blood pressure, height and weight.

First, the standardized questionnaire which included a full range of response options, designed to identify the respondents' personal bio data, knowledge, attitudes and practices related to hypertension and its risk factors was designed. Prior to its use, a pretest study was carried out in Karu motor park of FCT among commercial drivers. The administered questionnaire was corrected based on the findings during pretesting. The Cronbach's Alpha value for the pre-tested questionnaire was five (5) using SPSS.

The first part of the questionnaire consisted of demographics such as age, gender, residence, educational level and the years of service in driving, numbers of wives and numbers of children.

The second part of the questionnaire comprised of items regarding their knowledge, attitudes and practices on the job as it relates to hypertension and the risk factors. The height, weight, waist circumference, hip circumference, lipid profile level, fasting blood sugar results were recorded into appropriate column of the questionnaire.

3.7.3 Measurement of Blood Pressure: The blood pressure was taken two times of at least24hrs apart with participants seating (Hamid et al. 2011). The blood pressure was taken on the left upper arm at the level of the heart. The average systolic which was at the first heart sound heard when deflating the sphygmomanometer cuff and diastolic blood pressure was at the disappearance of the second heart sound (Joint_National_Committee_on_Hypertension, 1997) and (Whitworth & World Health Organization 2003).

3.7.4 Measurement of Height: The respondents removed their footwear and the height was measured and figure recorded in meters using a height meter RCZ-120. (Joint_National_Committee_on_Hypertension, 1997) and (Whitworth & World Health Organization 2003).

3.7.5 Measurement of Weight: Calibrated flat weighing scale (RCZ-120) was used. The respondents removed all footwear, emptied the pockets and climbed on the weighing machine. The validation of the weighing scale was done by starting from zero before each measurement was carried out. The measurement was done in kilograms and recorded (Joint_National_Committee_on_Hypertension, 1997) and (Whitworth & World Health Organization, 2003).

3.7.6 Measurement of Waist Circumference: The subjects stood erect with relaxed abdominal muscles (expiration), arm at the side and feet together. The waist circumference was measured at the level of umbilicus to the nearest 0.5cm. The measurement was taken at the end of a normal expiration (Joint_National_Committee_on_Hypertension, 1997) and (Whitworth & World Health Organization, 2003).

3.7.7 Measurement of Hip Circumference: Hip circumference was measured at the point of greatest circumference around hips and buttocks, level of the anterior iliac spine, to the nearest 0.5cm. Each subject was standing and the research assistant squatted at his front. Both measurements were taken with a flexible, non-stretchable tape in close contact with the skin, but without indenting the soft tissue (UNC-V,

Joint_National_Committee_on_Hypertension; 1993) and (Whitworth & World Health Organization, 2003).

3.7.8 Measurement of Fasting Blood Cholesterol: Two methods were adopted:

a. Spectrophotometer method: The procedure was carried out under aseptic condition. Five (5) mls needle and syringe was used to carry out venepuncture on each respondent at the cubital veins. The samples were taken to the laboratory in an ice park to avoid heamolysis.

b. Lipid pro meter method: Lipid Profile meter test strips were inserted into the machine, the middle finger was cleaned with spirit swab. A lancet was used to do needle prick for two drops. The two drops fell on the test strip and the result was read within few minutes after collection of blood sample. The result showed the lipid profile high density lipoprotein , low density lipoprotein , triglycerides and total cholesterol respectively (Schneider, 2013b).

3.7.9 Measurement of Fasting Blood Sugar: A fasting two drops of blood sample were taken after maintaining sterility. The middle finger was cleaned with spirit swab. A lancet was used to do needle prick for two drops. The two drops fell on the test strip and the result was read within few minutes after collection of blood sample. The result showed the blood sugar level.

Note: The same needle prick blood sample was used for cholesterol and blood sugar level measurement as it depended on whichever one was done first (Schneider, 2013).

3.8 Data Management and Analysis

3.8.1 Data entry: Data quality was maintained by close supervision of the research assistants during collection by the researcher's academic supervisor and for completeness entry. Cleaning was done by the researcher with Epi info 3.5.3. The data were also exported into excel for coding and imported back to Epi info 7.

The descriptive and analytical statistics were done to explain socio-demographic variables for respondents. Univariate, bivariate and multivariate analyses were carried out. Risk factors were presented for frequencies. Proportions were calculated for the risk factors of hypertension and these were cross-tabulated with demographic characteristics and blood pressure of the respondents. Student t-test for quantitative data using bivariate correlation to determine the significance of between factor changes was carried out. Pearson's Chi square test was used to determine association between categorical variables with a p-value of <0.05 accepted as significant. Logistic models were used to determine the predictors of hypertension.

3.9 Ethical Considerations:

Ethical approval was collected on the 4th July, 2012 from Health Research Ethic Committee, Federal Capital Territory, Abuja. Before administration of the questionnaire, the purpose of the study was explained to each respondent, informed consents for the study was sought from the respondents and confidentiality of the information was assured that the name of the respondents did not appear on any of the documents of the study. The result was made available to respondents after testing the blood samples immediately before leaving the venue. There was no monetary compensation for this study. Each respondent collected one dustbin basket for his vehicle. Each interview took

between ten ant twenty minutes to complete. Respondents were told they could withdraw from the study at any time if they so wished. The phone contact of the principal investigator was on the laboratory result slips for reason of enquiries or for respondents to contact the principal investigator if he wanted to withdraw from the project. During data collection research clerk gave health tips on significant of regular medical checkups at intervals to the respondents. A separate counseling for the respondents that were found to be hypertensive and diabetes was given. Dietary control was also part of the health education.

Respondents that were found to be hypertensive without prior knowledge of their health status were provided with medications to reduce the blood pressure level and blood sugar level and were eventually referred to the hospital of their choice. For example one of the commercial drivers whose BP was 180/120 mmHg was preparing to drive to Lagos when the BP was measured. The result was disclosed to him through the study team counseling unit led by the research team leader. The result was also disclosed to the association by his permission for their intervention and he was stopped from driving to Lagos after loading while another driver drove the vehicle. He was placed on antihypertensive and referred to hospital of choice in Lagos.

Vehicle dust bin was given to each respondent as incentive.

CHAPTER FOUR

4.0 RESULT

4.1 Baseline Information

The results are presented in five parts, thus: findings of the socio- demographic characteristic, demographic distribution, medical characteristic prevalence of hypertension and diabetes mellitus, frequencies and proportions of the risk factors, associations between the risk factors and hypertension, predictors of hypertension among commercial drivers in Jabi Park.

4.2 Socio Demographic Characteristic of Respondents

There were 398 respondents that responded positively while 25 respondents were absent. Many respondents were in the age group 26-45 years and their mean age was 39.0±10.0 years with minimum of 18 years and maximum of 68 years. All were male respondents. The predominant age groups with most respondents were 132 (26-35) and 128 (36-45) which are the productive age. Out of the respondents interviewed, majority 323 (80.6%) were married, one (0.2%) was divorced and 78 (19.6%) were single. Of the respondents, 319 (80.2%) had wives outside. Three hundred and thirteen (98.5%) had one wife while six (1.5%) had more than one wife. Two hundred and seventy-five (69.1%) respondents had more than four children. Many of the respondents attained secondary (46%) and primary (35.2%) school education. Few drivers had tertiary, mission and western education 54(13.5%). The respondents with non-formal education were 21(5.3%).

Table 4.1: Socio Demographic Distribution (N=398)

Characteristic	Frequency	Percentage (%)
Age		
16-25	34	8.6
26-35	132	33.2
36-45	128	32.2
46-55	81	20.4
56-65	20	5.0
66-75	2	0.5
Marital status		
Single	78	19.6
Married	319	80.2
Divorced	1	0.3
Number of Wives		
>1	6	1.5
1	313	98.5
Numbers of children		
>4	275	69.1
≤4	123	30.9
Educational status		
None	21	5.3
Primary	140	35.2
Secondary	183	46.0
Tertiary	54	13.5

4.3 Frequency Distribution of Respondents according to Routes and States of Origin in the Geopolitical Zone

There were three hundred and ninety eight respondents which participated in the study that spread across all the geopolitical zones in Nigeria. Thirty (7.7%) were from the North east, 108 (35%) were from the North Central, 55 (14.5%) were from the South East, 37 (14.5%) were from the South South, 84 (21.2%) were from the South West and 75 (18.9%) were from North West. The commercial drivers also plied the routes within the geopolitical zone of their states of origin to and from Abuja.

Table 4.2.1 Frequency distribution of respondents according to states routes plied by respondents from Abuja in the North of Nigeria

Characteristics	Frequency	Percentage (%)
North West States		
Sokoto	5	1.25
Kebbi	2	0.50
Zamfara	2	0.50
Katsina	18	4.50
Kano	44	11.00
Jigawa	4	1.00
North East States		
Yobe	1	0.25
Borno	15	3.75
Adamawa	4	1.00
Gombe	0	0.00
Bauchi	7	1.75
Taraba	3	0.75
North Central States		
Kwara	21	5.25
Kogi	28	7.00
Benue	0	0.00
Nassarawa	7	1.75
FCT	0	0.00
Niger	11	2.75
Kaduna	29	7.25
Plateau	12	3.00

Table 4.2.2 Frequency distribution of respondents according to states routes plied by respondents from Abuja in the South of Nigeria

Characteristics	Frequency	Percent (%)
South West States		
Oyo	35	8.75
Osun	29	7.25
Ekiti	3	0.75
Ondo	12	3.00
Ogun	4	1.00
Lagos	1	0.25
South South States		
Bayelsa	0	0.00
Delta	7	1.75
Edo	18	4.50
Rivers	1	0.25
Akwa Ibom	2	0.50
Cross Rivers	9	2.25
South East States		
Imo	12	3.00
Abia	8	2.00
Anambra	15	3.75
Ebonyi	7	1.75
Enugu	13	3.25
Total	398	100

4.4 Work-related Characteristics of the Respondents

All the drivers were males of which 217 (54.5%) hired the vehicles they used before the study. Many of the drivers 244 (61.3%) drove cars, 115 (28.9%) drove mini-buses, 33 (8.9%) drove trucks, four (1.15) drove luxurious-buses and two (0.5%) drove tankers. Of the commercial drivers, 164 (41.2%) had been driving for more than 20 years. In the three months before the study, 200 (50.2%) of the drivers drove to more than ten states in Nigeria for economic purpose. Half of the respondents199 (50%) drove more than eight hours per day in the months prior to the study. Respondents who worked for more than three days a week were 225 (56.3%). Monthly average take home from driving was the only variable used to measure socio-economic status of the respondents of which 43(10.8%) reported that their monthly income was less than ₦5,000:00. A hundred and fifty-six (39.2%) reported between ₦ 5,000 and ₦ 15,000, eighty-eight (22.2%) reported between ₦ 16,000 and ₦ 25,000, thirty-three (8.3%) reported between ₦ 26,000 and ₦ 35,000, thirty-three (8.3%) reported between ₦ 36,000 and ₦ 45,000 and forty-four (11.1%) reported more than ₦ 45,000 (Table 4.3)

Table 4.3 Frequency distribution of respondents according to work related characteristics (N=398)

Characteristics	Frequency (%)	No of respondents that were hypertensive
Years of driving		
<5	63(15.8)	0
5-10	119(29.8)	3
11-15	52(13)	4
16-20	53(13.3)	6
21-25	31(7.8)	8
26-30	27(6.8)	7
30	53(13.3)	9
Types of vehicles used		
Car	244(61.3)	14
Mini bus	115(28.9)	9
Lorries	33(8.9)	8
Luxurious	4(1.1)	4
Others	2(0.5)	2
Number of states drove to last 3 months		
<5	198(49.8)	10
6-10	167(42.0)	12
11-15	18(4.5)	7
16-20	14(3.5)	7
21-25	1(0.3)	1
Hours drove/trip		
<4	27(6.8)	3
4-7	171(43.1)	5
8-10	102(25.7)	11
11-14	65(16.4)	8
>14	32(8.6)	10
Owner of vehicle		
Driver	181(45.5)	17
Hired	217(54.5)	20
No of days drove /week		
<4	173(43.7)	12
≥4	225(56.3)	25

Table 4.4 Frequency distribution of respondents according to the monthly Income (N=398)

Monthly Income in Naira	Frequency (%)	No of respondents that were hypertensive
≤5000	43(10.8)	8
6,000-15,000	156(39.2)	8
16,000-25,000	88(22.2)	9
26,000-35,000	33(8.3)	5
36,000-45,000	33(8.3)	3
>45,000	44(11.1)	4

4.5 Medical History of the Respondents

All the respondents were aware of hypertension as a disease. A hundred and ninety-one (48.2%) respondents reported they were in good health while four (1.0%) reported poor health and still driving passengers to long distance. Of the respondents, twenty-one (5.2%) reported they were hypertensive, thirty (7.5%) had diabetic mellitus and thirty four (8.5%) reported that they had vision impairments. Eighty-seven (18.75%) respondents reported that they had family history of hypertension of which 18 (4.5%) had hypertension. Thirty-eight (9%) reported having family history of diabetes mellitus while another 39 (9.1%) had family history of obesity. Forty (10.1%) of the commercial drivers with family history of hypertension traced it to their mothers, 25 (6.3%), their fathers, one respondent (0.4%), both parents; , four respondents (1.01%), grandparents, and twenty-two respondents (6.3%), aunts/uncles . Most respondents 277(69.5%) had never gone for any medical checkup in any health facility (Table 4.5).

Table 4.5. Frequency distribution of respondents according to medical history

(N=398)

Characteristics	Frequency	Percentage (%)
Self reported health status		
Good	191	48.2
Fair	200	50.5
Poor	4	1.0
Did not know	1	0.3
Reported chronic medical illness		
Yes	77	19.3
No	321	81.7
Family history of diapicles mellitus		
Yes	38	9
No	360	91
Family history of obesity		
Yes	39	9.8
No	359	90.2
Family history of hypertension		
Yes	87	18.7
No	311	81.3
Family members with high blood pressure		
Father	23	6.3
Mother	38	10.1
Grand parents	4	1.0
Both parents	1	0.3
Aunt/Uncle	21	5.6
None	304	76.8
Last check up in the hospital		
None	187	47.0
<1 yr	87	21.9
≥1yr	124	31.3

4.6 Prevalence of Hypertension among the Respondents

The number of new cases found during the study was 16 (4.0%). Twenty-one respondents (5.0%) were hypertensive before the study and were on medication. The prevalence of hypertension among the interstate commercial drivers in Jabi park Abuja was 37 (9.0%). Hypertension was more prevalent among the age range 36 to 65(Table 4.5.1). There was a linear correlation(r=0.8) between systolic blood pressure and body mass index (Fig 3).

4.7 Prevalence of Diabetes Mellitus among the Respondents

The number of known diabetes was 30 (7.6%) while nine (2.3%) were detected during the study. The prevalence of diabetic mellitus among the respondents was 39 (9.9%).

Table 4.6: Age distribution among the respondents with hypertension (N=398)

Age	Hypertension (%)	No hypertension (%)
16-25	0	34(9.5)
26-35	0	131(36.7)
36-45	11(2.8)	121(33.9)
46-55	13(3.1)	74(20.7)
56-65	13(3.1)	19(5.3)
66-75	0	2(0.56)
	37(9.0)	361(91)

Table 4.6.1: Frequency distribution of blood sugar among the respondents N=398)

Characteristics	Frequency	Percent (%)
Diabetes mellitus		
Yes	39	9.9
No	359	91.1
Total	389	100

Table 4.6.2: Incidence of Diabetic Mellitus among the respondents (N=398)

Characteristics	Frequency	Percent (%)
Diabetes mellitus		
Known DM	30	2.3
New cases	9	7.6
Total	39	9.9

4.8 Frequency Distribution of Respondents according to Risk Factors of Hypertension

In this study the number of respondents that smoked was 86 (22%) of which wo (2.3%) were hypertensive. Sixty-eight (75.6%) of the respondents smoked smoked ciggarret, nineteen (22.1%) reported smoking marijuana and two (2.3%) reported smoking tobbacco-pipe. It was reported that eight (9.6%) took <2 sticks per day, 32 (38.1%) took between two and five sticks per day, 23 (27.7%) took bewteen six and ten sticks per day and 24 (24.1%) took more than ten sticks per day. Sixty-one (70.9%) respondents reported smoking while driving (Table 4.7).

Physical inactivities 204 (51%) were common among the respondents. Among the respondents that did physical activities 87 (42.7%) reported walking, 47 (23.1%) reported jogging, 58 (28.4%) reported athletics and 12(5.9%) reported gymnastics (Table 4.10). Most (81.1%) of the respondents ate more than three t times per day. Two hundred and thirty-three (58.7%) respondents ate more carbohydrate food at each meal. 15 (3.8%) took cereals, 28 (7.1%) took meat at every meal. 22 (5.5%) took milk containing meal. 26 (6.6%) took fruits frequently during meal and 73 (18.4%) took vegetable frequently before the study period (Table 4.9).

In this study it was found out that among the respondents, 141 (35%) that took alcohol at least one bottle per day five (3.9%) were hypertensives. Among the respondents who took alcohol 48 (34.3%) drank daily, 56(40%) drank twice weekly, 22 (15.7%) drank thrice weekly, while 11(7.9%) were not regular. Majority (72.3%) of those that drank alcohol reported taking one to three bottles of beer per day in themonths prior to the

study. No respondents reported drinking before driving but 109 (77.9%) reported getting drunk in the 30 days before the study (Table 4.8).

Table 4.7: Frequency distribution of respondents according to pattern of smoking before the study (N=398)

Characteristics	Frequency	Percentage (%)
Smoked		
Yes	86	21.7
No	311	78.3
Type of substance smoked		
Cigarette	65	75.6
Marijuana	19	22.1
Tobacco – pipe	2	2.3
Number sticks of cigarette and marijuana smoked per day		
<2	8	9.6
2-5	31	38.1
6-10	23	27.7
>10	24	24.1
Smoked and drove		
Yes	61	70.9
No	25	29.1

Table 4.8: Frequency distribution of respondents according to alcoholic drinking pattern before the study. (N=398)

Characteristics	Frequency	Percent (%)
Alcohol		
Yes	141	35.0
No	257	65.0
How often they took alcohol		
Daily	48	34.3
Twice weekly	56	40.0
Thrice weekly	22	15.7
Alt days	2	1.4
Not regular	11	7.9
Refuse	1	0.3
Numbers of bottle taken per day last 1 month		
1	44	31.4
2	35	25.0
3	25	17.9
4	19	13.6
5	13	9.3
Smoking and driving		
Yes	2	1.4
No	138	98.6
Ever drunk		
Yes	109	77.9
No	31	22.1

Table 4.9 : Frequency distribution of respondents according to feeding habits and hypercholesterolemia before the study (N=398)

Characteristic	Frequency (%)	Numbers of respondents with hypercholesterolemia
Number of times ate per day last 1 month		
≤3 times	92(23)	26
>3 times	306(77)	100
Frequently eaten class of food		
Carbohydrate	233(58.7)	71
Cereals	15(3.8)	2
Meat	28(7.1)	15
Milk	22(5.5)	6
Fruits	26(6.6)	10
Vegetable	73(18.4)	22

Table 4.10: Frequency distribution of respondents according to how frequent food was eaten before the study

(N=398)

Characteristic	Frequency	Percent (%)
Freq ate green vegetable last one month		
Daily	351	92.1
Weekly	24	6.3
Occasionally in a month	6	1.6
Freq ate fruits last one month		
Daily	340	96.6
Weekly	10	2.8
Occasionally in a month	1	0.3
Freq ate eggs last one month		
Daily	4	1.4
Weekly	361	94.3
Occasionally in a month	18	4.2
Never	2	0.5
Freq ate fried meat last one month		
Daily	324	90.8
Weekly	25	6.9
Occasionally in a month	11	3.1
Freq ate fried fish last one month		
Daily	332	91.5
Weekly	24	6.6
Occasionally in a month	7	1.9

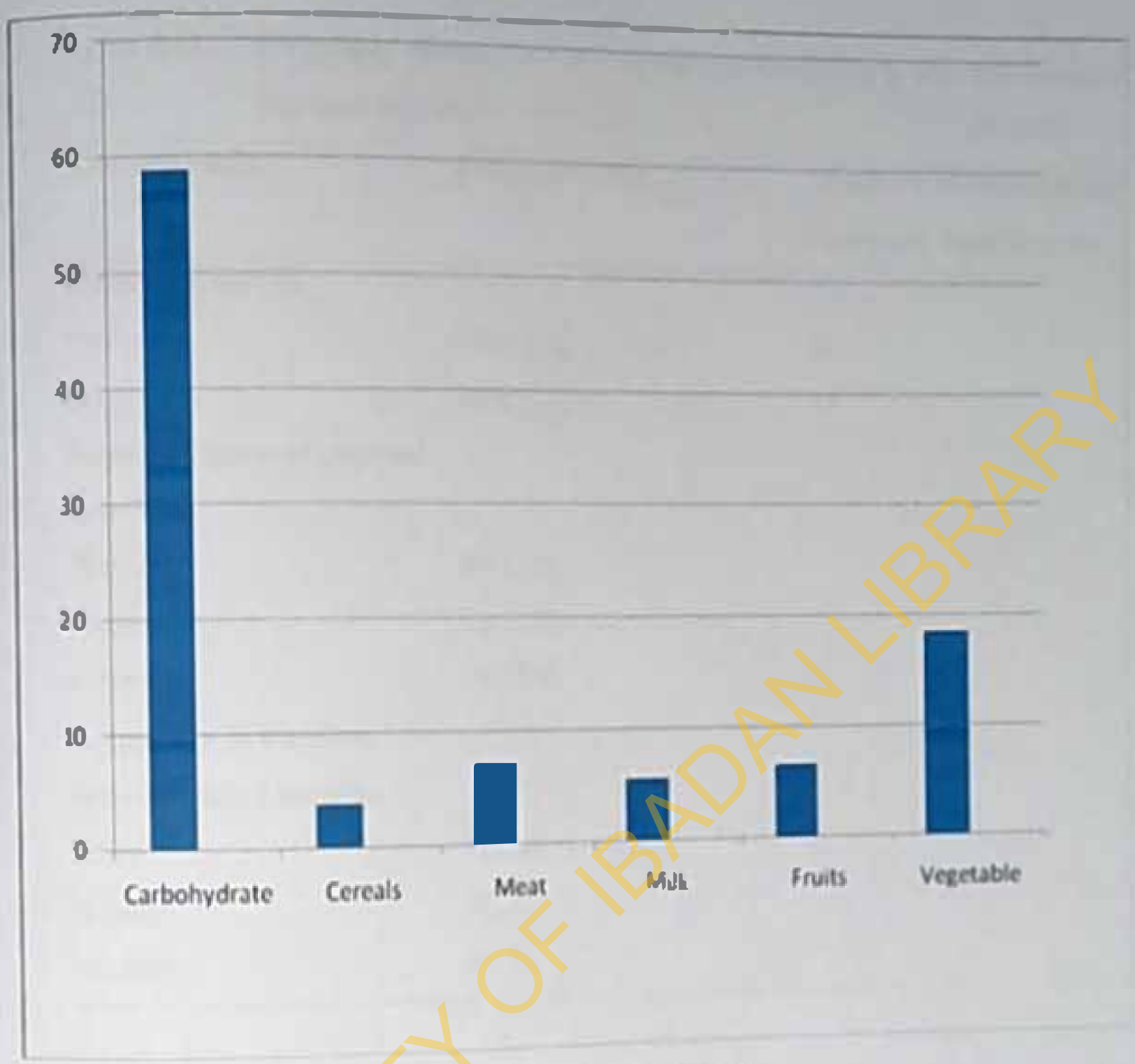


Fig 4.2: Most Frequently Eaten Class of Food by the Respondents

Table 4.11 Frequency distribution of respondents according to characteristics of physical activities

(N=398)

Characteristic	Frequency (%)	Numbers of respondents that were hypertensive
Physical Exercise		
Yes	194(49.0)	20
No	204(51.0)	17
Reported types of physical activities		
Walking	89(42.7)	
Jogging	47(23.0)	
Athletics	58(28.4)	
Frequency of Physical activities last 3 months		
Daily	185(96.5)	
Weekly	5(2.5)	
Monthly	4(1.0)	

4.9 Visual Characteristics of the Respondents

Fifty-five (13.9%) respondents reported that they found it difficult to see near objects. Less number, 26(6.3%), of respondents reported inability to see far objects while 69 (17.4 %) had difficulty seeing prints. Despite these levels of difficulties and the nature of the job of the respondents, 268 (67.5%) conceded never visiting any health facility for eye check up and drove till the time of study (Table 4.11).

Table 4.12 Frequency distribution of respondents according to reported vision status before the study (N=398)

Characteristic	Frequency	Percentage (%)
Near vision		
No difficulty	342	86.2
Difficulty	29	7.3
Very difficult	26	6.6
Blind	0	0
Far vision		
No difficulty	371	93.5
Difficulty	12	3.0
Very difficult	14	3.3
Blind	0	0
Prints vision		
No difficulty	328	82.6
Difficulty	21	5.3
Very difficult	48	12.1
Blind	0	0
Last time did eye tests		
< 1 month	20	5.1
1-12 months	26	6.6
1-2 years	7	1.8
>2years	67	16.9
Never	268	67.5
Refused	10	2.3

4.10 Frequency Distribution of Respondents according to measured Risk Factors of Hypertension

Obesity was assessed using the body mass index and waist-to-hip ratio Twelve (3.0%) of the respondents were underweight (BMI). The overweight respondents with BMI 25 to <29 were 137 (35.8%), with WHR 0.90 to <0.95 being 102 (25.7%) Seventy-five(18.4%)repondents were obese, BMI ≥ 30kg/m^2 while 99 (24.7%) were obese with waist-to-hip ratio > 0.95 assessment (Tables 4.12 & 4.13). The prevalence of total hypercholesterolemia among the respondents was 129 (34.4%), hypertriglyceridemia, 183 (46%); high density hyperlipoproteinemia, 72 (18%); and low density hyperlipoproteinemia, 168(42%) (Table 4.9.6).

BMI below 25kg/m^2 had systolic blood pressure below 130mmHg

Table 4.13 Frequency distribution of respondents by Body Mass Index(BMI).

Variables	Frequecy	Percent(%)
BMI(Kg/m^2)		
Under weight <18	12	3.0
Normal 18<25	174	43.3
Over weight ≥25-29.9	137	35.3
Obese ≥30	75	18.4
Total	398	100.0

Table 4.14 Frequency distribution of respondents by Waist to Hip ratio (WHR)

Variables	Frequency	Percent(%)
Waist to Hip ratio		
Under weight <0.85	82	20.7
Normal 0.85<0.90	115	29.0
Over weight 0.90≤0.95	102	25.7
Obese >0.95	99	24.7
Total	398	100.0

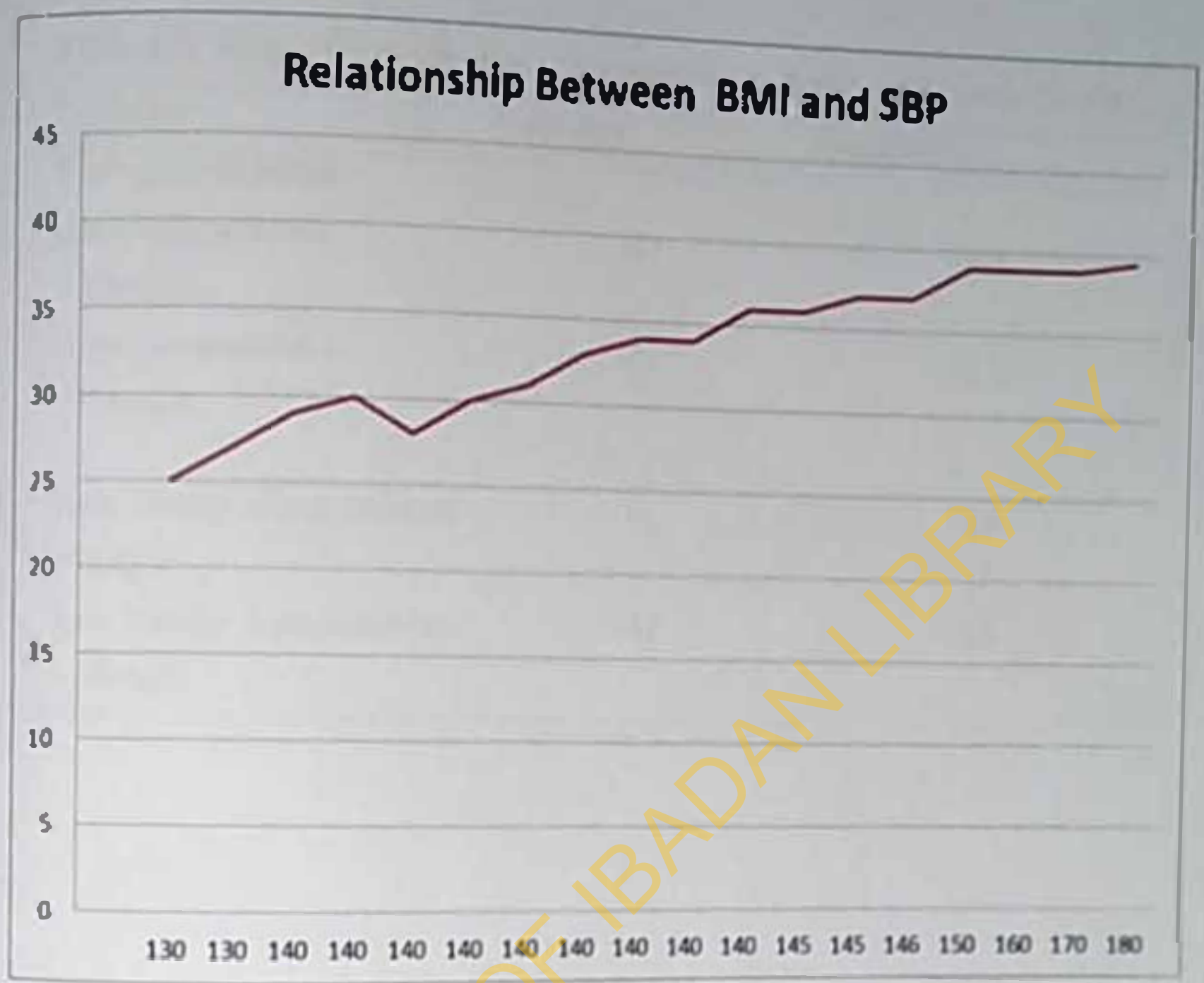


Figure 4.3: Relationship between Systolic Blood Pressure and Body Mass Index among the new cases during the study (r=0.8)

Table 4.15 Frequency distribution of respondents by Lipid profile status (N=398)

Variables	Frequency	Percents(%)
Fasting Lipid profile		
Hypertriglyceridemia >138mg/dl	183	46.0
Hypercholesterolemia >173mg/dl	129	34.4
High Density Lipoproteinemia >72mg/dl	72	18.0
Low Density Lipoproteinemia >170mg/dl	168	42.0

Table 4.16 Risk factors affecting hypertension among the respondents

Variable	Frequency(%)	OR	95%CI		p-value
			Lower	Upper	
Physical in activities					
Yes	194(49)	1.3	0.6	2.6	0.61
No	204(51)	1			
Obesity					
BMI≥30Kg/m^2	66(16.6)	11.4	3.8	34.6	0.002*
BMI<30Kg/m^2	332(83.4)	1			
WHR > 0.95	98(24.7)	13.6	3.7	49.3	0.001*
WHR < 0.95	300(75.3)	1			
Overweight					
BMI > 25-29.9	146(36.8)	1.6	0.5	5.1	0.60
BMI ≤25	186(46.3)	1			
WHR 0.9-≤0.95	102(25.7)	2.3	0.6	11.2	0.35
WHR <0.9	197(49.7)	1			
Alcohol intake					
Yes	141(35.0)	1.0	0.4	3.3	0.90
No	257(65.0)	1			
Smoking					
Yes	86(21.7)	4.0	0.5	30.9	0.26
No	311(78.3)	1			
Age					
≥40 years	176(44)	3.6	1.2	11.6	0.02*
<40 years	221(56)	1			
Hyperglycemia					
Yes	39(9.9)	1.0	0.2	3.2	0.9
No	359(90.1)	1			

*Significant variables with p < 0.05.

Table 4.17 Risk factors affecting hypertension among the respondents

Variable	Frequency(%)	OR	95%CI		p-value
			Lower	Upper	
No of Feeding per day					
≤ 3 x/day	76(18.9)	1			
>3 x / day	322(81.1)	1.5	0.4	5.3	0.8
Family history of hypertension					
Yes	74(18.6)	13.7	6.0	33.1	0.001*
No	324(81.3)	1			
Hypercholesterolemia					
Yes	129(34.4)	4.1	1.5	13.2	0.001 *
No	269(64.5)	1			
Hyper triglyceridemia					
Yes	183(46.0)	1.0	0.6	2.4	0.9
No	215(54.0)	1			
High Density Hyper Lipoproteinemia					
Yes	72(18)	18.2	8.6	43.0	0.001*
No	326(82)	1			
Low Density Hyper Lipoproteinemia					
Yes	168(42)	2.8	1.4	58.0	0.006*
No	230(58)	1			

*Significant variables with $p < 0.05$.

4.11 Risk Factors Associated with Hypertension among Respondents

The risk factors were cross tabulated with hypertension. Obesity was assessed with Body Mass Index (OR=11, 95%CI= 3.8-34.6). Obese commercial drivers , BMI, were 11 times at risk of developing hypertension. Obesity was also measured by waist-to-hip ratio (OR=13,95%CI=3.7- 49.6). Obese commercial drivers,WHR, were 13 times at risk of developing hypertension and both obesity by BMI and WHR were significantly associated with hypertension. Respondents of Age≥ 40years (OR=4,95%CI =1.2-11.6) were four times at risk of developing hypertension among the respondents and were significanly associated with hypertension.

The reported positive family history of hypertension (OR=4.1, 95% CI=1.97,8.05) was four times at risk of developing hypertension among the respondents and was significantly associated with hypertension. Greater numbers had hypertension reported in maternal family history. The respondents with hypercholesterolemia (OR=4.5. 95% CI=1.51,13.20) were more than four (4.5) times at risk of developing hypertension. Hypercholesterolemia was significantly associated with hypertension among the respondents. The respondents with high density hyper lipoprotein (OR =18.2, 95% CI= 8.6-43.0) were 18 times at risk of developing hypertension and were significantly associated with hypertension. Also the respondents with low density hyper lipoproteinemia (OR=2.8 ,95% CI = 1.4 – 58.0) were more than two (2.8) times at risk of developing hypertension and were significantly associated with hypertension (Table 4.15).

4.11 Risk Factors Associated with Hypertension among Respondents

The risk factors were cross tabulated with hypertension. Obesity was assessed with Body Mass Index (OR=11, 95%CI= 3.8-34.6). Obese commercial drivers , BMI, were 11 times at risk of developing hypertension. Obesity was also measured by waist-to-hip ratio (OR=13,95%CI=3.7- 49.6). Obese commercial drivers,WHR, were 13 times at risk of developing hypertension ond both obesity by BMI and WHR were significantly associated with hypertension. Respondents of Age≥ 40years (OR=4,95%CI =1.2-11.6) were four times at risk of developing hypertension among the respondents and were significanly associated with hypertension.

The reported positive family history of hypertension (OR=4.1, 95% CI=1.97,8.08) was four times at risk of developing hypertension among the respondents and was significantly associated with hypertension. Greater numbers had hypertension reported in maternal family history. The respondents with hypercholesterolemia (OR=4.5. 95% CI=1.51.13.20) were more than four (4.5) times at risk of developing hypertension. Hypercholesterolemia was significantly associated with hypertension among the respondents. The respondents with high density hyper lipoprotein (OR=18.2, 95% CI= 8.6-43.0) were 18 times at risk of developing hypertension and were significantly associated with hypertension. Also the respondents with low density hyper lipoproteinemia (OR=2.8 ,95% CI = 1.4 – 58.0) were more than two (2.8) times at risk of developing hypertension and were significantly associated with hypertension (Table 4.15).

4.11 Risk Factors Associated with Hypertension among Respondents

The risk factors were cross tabulated with hypertension. Obesity was assessed with Body Mass Index (OR=11, 95%CI= 3.8-34.6). Obese commercial drivers , BMI, were 11 times at risk of developing hypertension. Obesity was also measured by waist-to-hip ratio (OR=13,95%CI=3.7- 49.6). Obese commercial drivers,WHR, were 13 times at risk of developing hypertension and both obesity by BMI and WHR were significantly associated with hypertension. Respondents of Age≥ 40years (OR=4,95%CI =1.2-11.6) were four times at risk of developing hypertension among the respondents and were significanly associated with hypertension.

The reported positive family history of hypertension (OR=4.1, 95% CI=1.97,8.08) was four times at risk of developing hypertension among the respondents and was significantly associated with hypertension. Greater numbers had hypertension reported in maternal family history. The respondents with hypercholesteriolemia (OR=4.5, 95% CI=1.51,13.20) were more than four (4.5) times at risk of developing hypertension. Hypercholesterolemia was significantly associated with hypertension among the respondents. The respondents with high density hyper lipoprotein (OR =18.2, 95% CI= 8.6-43.0) were 18 times at risk of developing hypertension and were significantly associated with hypertension. Also the respondents with low density hyper lipoproteincamia (OR=2.8 ,95% CI = 1.4 –58.0) were more than two (2.8) times at risk of developing hypertension and were significantly associated with hypertension (Table 4.15).

Physical inactivities, smoking, feeding >3 times/day, alcohol intake, hyperglycemia and hypertriglyceridemia had positive associations with hypertension but were not statistically significant with hypertension (Table 4.15).

4.12 Predictor Factors of Hypertension among Respondents

Logistic regression revealed that age ≥ 40 years of the respondents was not likely to predict hypertension among commercial drivers. Obesity with BMI ≥ 30Kg/m^2 (Adjusted Odds Ratio (AOR)= 6.23;95%CI= 1.88-20.71) was more than six (6.2) times more likely to develop hypertension than respondents with BMI<30kg/m^2. Obesity with waist-to- hip ratio of > 0.95 (AOR)= 6.4,95%CI=1.54-27.0) was more than six (6.4) times more likely to develop hypertension than respondents with WHR < 0.95. Respondents with reported positive family histroy of hypertension (Adjusted Odds Ratio . (AOR)= 1.7,95%CI=0.48-6.49) were more than one (1.7) times more likely to develop hypertension than those with no family history. Respondents with hypercholesterolemia (AOR=4.0;95%CI= 1.24-13.18) were four times more likely to develop hypertension than the respondents with normal cholesterol level. Positive family history of hypertension, obesity and total cholesterolemia were predictors of hypertension among the interstate commercial drivers in Jabi Park, Abuja (Table 4.16).

Table 4.18: Logistic Regression of the significantly associated risk factors of Hypertension

Variables	Adjusted Odds Ratio	95% C.I.		Coefficient	S. E.	Z Statistic	p-value
		Lower	Upper				
Age≥ 40 years	1.5631	0.4150	5.8874	0.4467	0.6766	0.6602	0.5091
Age<40years	1						
Positive FH	1.6740	0.4823	6.1864	0.4998	0.6124	0.6801	0.0101*
No FH	1						
Obese WHR>0.95	6.4422	1.5371	26.9994	1.8629	0.7311	2.5480	0.0108*
WHR <0.95	1						
TC Hyper	4.0433	1.2400	13.1837	1.3971	0.6030	2.3167	0.0205*
Normal TC	1						
HDL	3.3416	0.5857	19.0653	1.2065	0.8885	1.3579	0.1745
Normal HDL	1						
Obese BMI≥30kg/m^{21}	6.2313	1.8754	20.7046	1.8296	0.6127	2.9863	0.0028*
BMI<30Kg/m2	1						

*Significant variables with p < 0.05

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Prevalence of Hypertension among the Respondents

The prevalence of hypertension among the respondents was nine percent (9%) in this study. This is in contrast with the national survey report 2009 (Whitworth & World Health Organization, 2003) where the prevalence of hypertension in the rural and urban were five to seven percent (5- 7%) and seventeen to twenty percent (17-20%) respectively. The site of study can be said to be a semi urban.

A work study of prevalence of hypertension was carried out in southwestern community among the rural community where the prevalence was 21% (Erhun et. al., 2005). In the some study prevalence of hypertension among those diabetic was just almost two percent (1.9%). In this study the prevalence of hypertension among the diabetes mellitus respondents was just slightly above five percent (5.1%). Its prevalence is probably on the increase in developing countries where adoption of western lifestyles and the stress of urbanization both of which are expected to increase the morbidity associated with unhealthy lifestyles are not on the decline (Castelli, 1984). Prevalence of hypertension among the respondents is of public health significance.

In contrast to the cross sectional study carried out in Iran among the 345 commercial drivers where the prevalence of hypertension was (Hamid et al. 2011) was 42.9% which was more than nine percent prevalence in this study. The prevalence of diabetic mellitus was seven percent (7%) in the study in Iran but it was ten percent (10%) in this study. Ogunniyi (2009) and Beaglehole and Yach (2003) reported in a cohort study in Ibadan a

prevalence of 27.8% in hypertension. In a study by Ogunniyi (2009) in Ibadan among civil servants it was found out that there were no association between alcohol intake, smoking, physical activities and hypertension unlike in this study where hypertension is associated with these factors significantly except smoking.

BMI is one of the most accurate ways to determine when extra body weights translate into health risks; the higher the BMI, the greater the risk of developing health problems. Cardiovascular disease and high blood pressure have been linked with overweight. Reports that SBP and DBP are found to increase linearly over BMI range have been made (Doll et. al., 2002). Obesity, now recognized as an independent risk factor for cardiovascular disease, is closely associated with hypertension (Wofford et. al., 2002). The result in this study also shows a linear relationship between BMI and Systolic hypertension (Fig 3) in line with Doll et. al. (2002) and Wofford et. al.(2002) studies.

The results emphasize the need for some lifestyle modifications in the affected respondent population. Body weight reduction via dietary interventions and calorie restriction are a practical step to reduce BP in the overweight, obese and extremely obese hypertensive population.

5.1.2 Prevalence of Hypercholesterolemia among the Respondents

Dietary, genetic and physical in-activities were risk factors to hyperlipideamia (Bhatnagar et. al., 2008). The rate of high total cholesterol in the United States in 2010 was about 13% which was less than 17% in 2000 in the similar study carried out at different time. In this study the average total cholesterol was 34.4% which was higher than the average level in United State of America. The average cholesterol level in Nigeria is less than 200mmol/L (Fredrick, 2011). This study shows 322 (81.1%) respondents ate more than three times per day while only 65 (8.4%) ate vegetable regularly which contains anti oxidants that reduces the risk of having hypertension (Bhatnagar et. al., 2008). About 68.7% fed on carbohydrate meal per day, 94.3% fed on at least tone egg weekly, 90.3% fed on fried meal daily. The high intake of saturated fat as indicated above in the diets corresponds with the prevalence of the lipid profile among the respondents. The prevalence of hyper triglycerides TG 183 (18%), high density lipoprotein, HDL, 72(18%) and Low Density Lipoprotein 168 (42%) were recorded among the respondents. All the above factors have been implicated in this study. The prevalence of obesity, hypertriglyceride, high density hyper lipoproteinemia in this study was less than the prevalence in the study in Iran (Hamid et. al., 2011) because of the difference in lifestyles as stated above.

The prevalence of hypertension and its risk factors is probably on the increase in developing countries where adoption of western lifestyles and the stress of urbanization both of which are expected to increase the morbidity associated with unhealthy lifestyles (Castelli, 1984). The information extracted from this study data in this study shows that obesity and hypercholesterolemia are statistically significant and are predictors of

hypertension in the respomdents. Age ≥ 40 was a confounder between obesity, hypercholesterolemia and development of hypertension.

5.1.3 Socio-demographic Characteristics of the Respondents

The prevalence of hypertension and its risk factors is affected by the socio demographic characteristics of the respondents. In this study majority of the respondents were between 26 and 45 years which corresponds to the productive age group of a nation and also indicates that the respondents contributed to the National Gross Domestic Product. All the respondents were males majority of whom were married. Out of the married respondents, one fifth were polygamous of which two thirds had more than four children. This level of dependants reduced the economic empowerments and would reduce ability for medical checks and treatments when ill, thus this may increase the number of non-compliance and uncontrollable high blood pressure.

This could also explain the reason for two thirds of the respondents living on hired vehicles. Considering the socio-economic challenges facing families in Nigeria, there are indications that higher number of children will increase stress though the respondents' monthly salary appeared to increase with the number of children and psychological stress has been related to higher blood pressure and unfavourable cardiovascular profile (Fauvel et. al., 2001). There is moderate support for psychological factors as predictors of hypertension development, with the strongest support for anger, anxiety, and depression variables. Pooled effects for these factors are of sufficient magnitude to suggest potential clinical, as well as statistical relevance (Rutledge & Hogan, 2002). The view of Fauvel et.

al. and Rutledge and Hagan et. al. above applies to this study as increased numbers of children, wives and other dependants posed a psychological stress on the respondents.

Most respondents already had more than 20 years of driving commercial vehicles of which majority used cars. Higher proportion of the respondents drove to at least to ten states in the last three months prior to the study sat four to ten hours per day for more than four days per week before the study. This was to meet up with the economic need and it impacted a reasonable stress on the respondents. This explains reduced time either to rest or for physical exercise. Stress is a major exacerbating factor of complications of hypertension (Richard et. al., 1999). This can lead to hypertensive encephalopathy and mortality due to auto-crash if not controlled during driving. More of the respondents had secondary education while few were illiterate. The knowledge about hypertension by the respondents was from the adverts, talks from electronic media in local dialects and discussions on the topics around them.

5.1.4 Economic Characteristics of the Respondents

The socio-economic status of a commercial driver will determine the purchasing power and indirectly affect the risk factors of hypertension and its management. High blood pressure in adults in turn has a high impact on the economy and on the quality of life of individuals with important implications for resource expenditures (Wolford et. al., 2002).

Despite the above explanation, majority lived on less than one US dollar per day which is below poverty line of at least one dollar per day (Whitworth & World Health Organization, 2003). Families could be impoverished with this economic, social and health burden. Costs of treating hypertension in Nigeria are 10 to15 cents (US$) per

tablet, yielding annual expenditure of $36 (₦5, 400) for treatment with one drug only. Assuming one needed to treat 50 courses, the cost of drugs alone to prevent one death would be $1800 (₦270, 000) in Africa (Richard et. al., 1999). This is far from the situation of the respondents where 43 (10.8%) were poor, lived on less than one US dollar per day. Of these poor respondents eight (2%) were hypertensive. Majority, 244(61.4%), were mid-socio-economic class living between one and just above five (5.5) US dollar per day. Of this middle class, 17 (4.25%) were hypertensive. The middle class contributed to half of the prevalence of hypertension among the respondents.

5.1.5 Medical History Characteristics of Respondents

Majority of the respondents reported that their health status was good and fair for driving. Despite the reported health status more than half of the respondents were on continuous medication either as herbs or medicine. Those on medicine knew they had chronic illness like hypertension, diabetic mellitus, eye problems and arthritis. Those that took herbs reported taking it for fitness not minding the side effects and toxicity to organs like kidneys, liver, pancreas and the brain. This study shows that one quarter of respondents had family history of hypertension while one tenth had family history of diabetes mellitus. This is in line with the study that was carried out by Richard et. al. (1999) that looked into the epidemiology of hypertension in Sub Saharan Africa where in contrast found out that obesity and family history of hypertension contributed ten percent (10%) to development of hypertension. In this study family history of hypertension contributed almost five percent (4.5%) to the prevalence of hypertension.

Positive family history of hypertension in mother contributed the highest to the prevalence of hypertension. Other relations that contributed to hypertension accordingly

in this study were Father and Aunt/Uncle that were hypertensive. Economically the respondents also needed to take care of relations that were hypertensive, thus increasing the expenditure. The study shows that about half of the respondents had never gone for any medical checkup since they commenced the job. It should be noted that hypertension is a silent killer disease which needs to be detected early.

With the attitude of lack of medical checkups, the respondents were prone to complications of hypertension because of inability to detect early. During the conduct of the study, one of the respondents that never went for checkups had loaded his vehicle and was about to drive to Lagos when the research assistant discovered that his BP was 210/130mmHg. The chairperson of the park branch of National Road Transport Workers of Nigeria was informed. Consequently, the chairperson stopped the concerned driver from driving. Drugs were bought for him and he was advised to be on strict rest. He was followed up for two days and eventually referred to a medical facility in Lagos.

Co-morbidity is common among cardiovascular diseases. Among the respondents, 98 (24.7%) were obese and 48 (12.1%) were hypertensive. Out of the thirty-nine (9.9%) diabetic respondents 15(3.7%) were also hypertensive. The study shows that the respondents were not doing regular checkups in the hospital. It was reported that 187 (46.5%) reported never having any opportunity for medical checkups since they started commercial driving. About 88 (22%) saw a doctor for checkups in the one year before the study while 123 (31.5%) saw a doctor for checkups in the two or more years preceding the study.

5.1.6 Prevalence of Obesity among the Respondents

In this study the rate of physical inactivities among the respondents was 51% of which 81.1% ate more than three times per day. These respondents had had more than 20 years of driving commercial vehicle. A higher proportion of the respondents who drove to at least to ten states in the three months sat four to ten hours per day for more than four days per week before the study. These features could have made the respondents to be susceptible to obesity and increased lipid profile. The prevalence of overweight and obesity in this study by BMI were 18.4% and 25.7% respectively. While the prevalence of overweight and obesity in this study by WHR was 24.7% and 35.3% respectively. The reported positive family history of obesity was 39 (9.2%). These results were within the range of a study of a systematic review of 75 papers published on the prevalence of obesity in Nigeria where the prevalence of overweight and obesity were in the range of 20.3% -35.1% and 8.1%-22.2% respectively (Innocent, 2012).

In a cross sectional study carried out among the civil servants of in the University of Ife it was found that hypertension and obesity were associated with increase BMI greater than 30 and increased salary grade level (Ogunniyi, 2009). In a prevalence study carried out among the students in Nigerian University it was found that 28.7% of male adults in Nigeria took alcohol (Whitworth & World Health Organization, 2003). In this study 141 (35%) male adults took alcohol which is higher than the WHO 2004 report. It seems that alcohol intake may be on the increase because of increase in urbanization. This study shows that Body Mass Index has a linear relationship with systolic and diastolic hypertension.

5.1.7 Limitations

There were limitations to the study. The study was done within one motor park which may not be truly representative of all the motor parks or commercial drivers in FCT. This was due to financial constraints as it is more costly to do the study in all the motor parks.

Secondly due to the nature of jobs there were few samples that needed repeating the analysis but the respondents had travelled out of Abuja and could not be contacted through the phone numbers before writing up the report.

Thirdly financial constraints and non regular availability of the lipid profile strips in Abuja made the study to lose few respondents also prolonged study time.

The BP was taken only two times with intervals of two days instead of three times with interval of three to four days (Joint_National_Committee_on_Hypertension, 1997) and (Whitworth & World Health Organization, 2003).

5.2 Conclusions

The prevalence of hypertension (9%) among commercial drivers in Jabi is high relative to national figure of five to seven percent (Whitworth & World Health Organization, 2003). The prevalence of risk factors was high among the commercial drivers. Possible complications can make the respondents need urgent attentions because of many people they carried as passengers while driving. Most of the risk factors (alcohol intake, physical inactivity, hyperglycemia and all the lipid profile sub types) were positively associated with hypertension. Smoking and feeding habits of >3 times per day were not associated with hypertension. Obesity, hypercholesterolemia, reported positive family history of

hypertension and Age ≥ 40years old were positively associated and statistically significant with hypertension among the respondents.

Body Mass Index of the respondents correlated linearly with systolic and diastolic blood pressure. Obesity, genetic factor and hypercholesterolemia were the predictor factors of hypertension in the respondents. Age greater than 40 years was an effect modifier between obesity, hypercholesterolemia and hypertension in this group of people. All the respondents that were hypertensive had visual impairments which could be a complication of the high blood pressure.

5.3 Recommendations

The following recommendations were made based on the findings:

1. Non-Communicable Disease Programme of the Federal Ministry of Health should intensify the implementation of strategic policy documents on the hypertension control and prevention in Nigeria by motivating drivers to understand the risk factors of hypertension, regular medical checkups for early detection of hypertension, control strategies and life style modifications as preventive measures.
2. In line with the national strategies of Non-Communicable diseases Information Education Communication materials about the preventive practices against the risk factors of hypertension especially the predictor factors, need for early detections, control and need for drug compliance and regular eye tests to improve vision should be given to the commercial drivers.

3. The Federal Government through the Federal Road Safety Corp should formulate and implement a policy to make it mandatory for commercial drivers to collect certificate of medical fitness once per year from designated health facilities as one of the vehicle particulars.
4. State Governments and Non-Governmental Organizations like Hypertension and Diabetic Society of Nigeria should endeavour to increase constant public awareness on control and early case detections and disease prevention among the endemic group of the society like the commercial drivers.
5. Commercial Drivers' Associations like National Union of Road Transport Workers of Nigeria should promote physical activities by organizing regular work-up and awareness creation on dietary control for the members to reduce the prevalence of the predictor factors.

REFERENCES

AHA, (American Heart Association), 2003. American Heart Association, 2003. *Lancet*, vol 34 pp.363

Akanbi, O.G., Charles-Owaba, O.E. & Oluleye, A.E., 2009. Human factors in traffic accidents in Lagos, Nigeria Disaster Prevention and Management. *Iss*, vol 18, pp.397-409.

Aroor, B., Trivedi, A. & Jain, S., 2013. Prevalence of Risk Factors of Non.communicable Diseases In a District of Gujarat, India. *Journal of Health Population and Nutrition*, vol 2 pp31-35.

Beaglehole, R. & Yach, D., 2003. Globalisation and the prevention and control of non-communicable disease: the neglected chronic diseases of adults. *Lancet*, vol 30 pp362-389.

Bhatnagar, D., Soran, H. & Durrington, P.N., 2008. Hypercholesterolaemia and its management. *BMJ*, vol 3 , p.337-340.

Cappuccio, F.P. et al., 1997. Management of cardiovascular risk factors in different ethnic groups in south London. *Heart*, vol 6, pp.555-563.

Castelli, W.P., 1984. Epidemiology of coronary heart disease. The Framinghan Study. *American Journal of medicine*, vol 76, pp.4-12.

Chidoka, A.C., 2013. Road Traffic Accident in Nigeria. *Tribune pp34*.

Cooper, R. et al.,1997. The prevalence of hypertension in seven populations of west African origin. *Am J Public Health*, vol 2, pp.160 – 180.

David, M. et al., 2000. The Relationship Between Body Weight and the Prevalence of Isolated Systolic Hypertension in Older Subjects. *J Clin Hypertens*, vol 2, pp.248-252.

Doll, S. et al., 2002. Body mass index, abdominal adiposity and blood pressure: consistency of their association across developing and developed countries. *International Journal of Obesity*, vol 26, p.1857-4900.

Erhun et al., 2005. Prevalence of normotension (NH), diastolic hypertension (DH), systolic hypertension (SH), diastolic/systolic hypertension (DSH) nd isolated systolic hypertension (ISH) with body mass index in a University community in south west Nigeria. *African Journal of Biomedical Research*, vol 8, p.17-19.

ERHUN, W.O. et al., 2005. Prevalence of Hypertension in a University Community in South West Nigeria. *African Journal of Biomedical Research*, vol 8, pp.15-18. Available at: http://www.bioline.org.br/md.

Fauvel, J.P. et al., 2001. Perceived job stress but not individual cardiovascular reactivity to stress is related to higher blood pressure at work. *Hypertension*, vol 1, pp.71-75.

Fredriek, O.A., 2011. Standards of Medical Care in Diabetes. *Lancet* vol 40 pp 3428-3431.

Gamji, A., 2006. Secondary prevention of ischaemic cardiac events. *Clin Evid*, vol 15. pp.195-228.

Ghalfar, A., 2013. Road traffic injuries. *WHO Fact Sheets* vol 4 pp 358.

Gwatkin, D., Guillot, M. & Heuveline, P., 1999. The burden of disease among the global poor. *Lancet*, vol 354, pp.586-589.

Gwatkin, D. Guillot, M. Heuveline, P., 1999. The burden of disease among the global poor. *Lancet*, vol 354, pp.586-589.

Hamid, R.S. et al., 2011. Prevalence of metabolic syndrome in bus and truck drivers in Kashan, Iran. *BioMed Central*, vol 3, pp 340-345.

Innocent, I.C. et al., 2013. Prevalence of overweight and obesity in adult Nigerians – a systematic review. *African Journal of Biomedical Research*, vol 6, pp.43–47.

Joint_National_Committee_on_Hypertensio), J.-V., 1997. Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Arch Intern Med*, vol 157, pp.2413–2446.

JNC-V (Joint_National_Committee_on_Hypertension), 1993. Detection, Evaluation, and Treatment of High Blood Press. *Arch Intern Med*, vol 153, pp.154–183.

Krishnan, A. et al., 2008. Prevalence of risk factors of non- communicable diseases. *Indian J Public Health*, vol 52(3), pp.117–124.

Labinjo, Juillard, C. & Kobusingye, O.C., 2009. Conventional treatment and relative risk of the rate of fatal and non-fatal injuries. *Lancet*, vol 340; pp76-95.

Lane, J.D. et al., 2002. Caffeine affects cardiovascular and neuroendocrine activation at work and home. *Psychosom Med*, vol 4, pp.595–603.

Lawoyin, T.O., Asuzu, M.C. & Karfman, J., 2002. Prevalence of cardiovascular risk factors in an African urban inner city community. *African Journal of Biomedical Research*. vol 2;pp320-321

Mbanya, G.D., 2010. Prevalence of hypertension in rural and urban dwellers among males and females. *African Journal of Biomedical Research*.vol 3; pp 230-235

Ogah, O.S. et al., 2013. *Prevalence of overweight and obesity in adult Nigerian- a systemic review vol 5;p 4-5*

Ogunniyi, O.O., 2009. Patern of cardiovascular disease in Nigeria. *African Journal of Biomedical Research*.vol 8;pp 56-67

Olatunbosun, J.I., 2005. Prevalence of hypertension among civil servant in Ibadan. *African Journal of Biomedical Research*.vol 2 ;p89.97

Richard, S. et al., 1999. Hypertension treatment and control in sub-Saharan Africa: the epidemiological basis for policy. *Lancet*,vol 34;pp 353-367.

Rutledge, T. & Hogan, B.E., 2002. A quantitative review of prospective evidence linking psychological factors with hypertension development. *Psychosom Med*. vol 5, pp.758–756.

Schneider, C., 2013a. Test Your Blood Glucose. *DiabetesCare.net* vol1;p54-55.

Schneider, C., 2013b. Watch Your Blood Piessure and Cholesterol. *DiabetesCare.net*. vol 1;p60-63

Ukwnja, K.N. et al., 2012. The economic burden of tuberculosis care for patients and households in Africa: a systematic review. *Int J Tuberc Lung Dis*, vol 16(6), pp.733–739.

Usman, A. et al., 2006. Prevalence of non-communicable disease risk factors in Eritrea. *Spring*, vol 16(2), pp.542–546.

Whitworth, J.A. & World Health Organization, I.S. of H.W.G., 2003. World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. *J Hypertens*, vol 21(11), pp.1983–1992.

Wofford, M.R. et al., 2002. Therapeutic considerations in the treatment of obesity hypertension. *J Clin Hypertens*, vol 3, pp.189–196.

APPENDIX 1

ETHICAL CLEARANCE

FEDERAL CAPITAL TERRITORY
HEALTH RESEARCH ETHICS COMMITTEE

Research Unit Room 10, Block A Annex, HHSS
FCT Secretariat No 1 Kapital Drive Area 11, Garki Abuja

Name of Principal Investigator: Dr Oyeniyi Olusegun Samuel
Address of Principal Investigator: Dept of Public Health, Federal Ministry of Health, Federal Secretariat, Abuja
Date of receipt of valid application: 5/06/2012

NOTICE OF APPROVAL AFTER COMMITTEE REVIEW
Protocol Approval Number: FHREC/2012/06/21/04-07-12

TITLE: Prevalence of Hypertension and its risk factors among Commercial Drivers in Jabi Utako motor park of Federal Capital Territory, Abuja

The research described in the submitted proposal has been reviewed.

Documents Reviewed:
(1) Application form including:
• Curriculum Vitae of the Investigator
(2) Research Protocol
• Consent Form
• Research Information Sheet
• Questionnaire

On the basis of the review, the referral application has been approved by the Committee. FHREC's subsequent changes are not permitted in the research without prior approval by the FHREC.

The approval dates from 04/07/2012 to 03/07/2013. Note that no participant enrolled or activity related to the research may be undertaken outside of these dates. All information presented to those used in this study must carry FHREC approval protocol approval number and duration of FHREC approval of the study.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly. The FHREC reserves the right to monitor progress of your research and withdraw approval without previous notification.

It is solely your responsibility to endeavor to submit your annual report to the FHREC early to allow for timely renewal and avoid disruption of your research. At the end of the research activity, the final report of the research should be forwarded to FHREC for record purposes.

Ikwuebiala S. Adom
Secretary, FHREC
July 4, 2012

APPENDIX 2

QUESTIONNAIRE FOR CROSS SECTIONAL STUDY ON PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG INTERSTATE COMMERCIAL DRIVERS IN JABI PARK, ABUJA.FCT

QUESTIONNAIRE - PART 1

Introduction

I am a public health officer from the Nigeria Field Epidemiology Training Programme of the Dept of Epidemiology and Medical Statistic , University of Ibadan. I am carrying out a study to determine the prevalence of hypertension and its risk factors among interstate commercial drivers in FCT Abuja. The study will be used to make recommendations, policy and plan interventions . All data will be handled with strict confidentiality. No names will be required.

Questionnaire number.....

Phone number.....

Date.....

Section A: DEMOGRAPHIC/PERSONAL SPECIFICATION

QA1 How old are you in your last birthday? _____

QA2 Sex 1. Male ☐
2. Female ☐

QA 3 What is the highest level of education you attained 1. Primary 2. Secondary 3. Tertiary 4. None

QA4 What is your state of origin.....

QA5 What is your marital status 1. Single 2. Married 3. Cohabiting 4. Divorce 5. Widowed 6. Others

QA6 How many wives do you have.....

QA7 How many children do you have.....

SECTION B

B. OCCUPATIONAL STATUS

QB8 For how many years have you been driving commercial vehicle?

a.<5 b. 5- 10 c. 10 - 15 d. 15 - 20 e. 20- 25 f. 25- 30 g. >30

QB9 What is your type of vehicle

1. Car
2. Mini Bus
3. Truck

4. Tanker
5. Luxurious Bus

QB10 How much is your take home averagely per month from driving

a. < 5,000
b. 5,000 – 15,000
c. 16,000 - 25,000
d. 26,000- 35,000
e. 35,000- 45,000
f. >45,000

QB11 How many states have you driven to in the last 3 month

a. <5
b. 6-10
c. 11-15
d. >15

QB12 How many hours on the average do you drive for on one trip/day?

.....

QBC13 How many days do you work in a week?.....

QB14 Are you the owner of the vehicle you are driving a. Yes b. No

SECTION C: MEDICAL HISTORY

QC15 How can you rate your health? A. Good b. Fair c. Poor d. Do not know e. Refused

QC16 Are you on any continuous medication for any illness a. Yes b. No c. Herbs

If No go to Q19

QC17 What is the name of the illness a. Hypertension b. Diabetes c. Cancer d. Arthritis e. Sickle Cell Disease f. Eye problem. g. Malaria

QC18 When was it diagnosed .....

QC19 Does anyone in your family have hypertension a. Yes b. No

QC20 Does anyone in your family have diabetics a. Yes b. No

QC21 Does anyone in your family have obesity a. Yes b. No

QC22 Which of your family members has high blood pressure a. Father b. Mother c. Grand Father d. Grand Mother e. Aunt/ Uncle f. None

QC23 When did you last do check up in a hospital

a. < One year ago
b. Two years ago
c. Three years ago
d. Four years ago
e. More than Five years ago
f. Never

SECTION D: FEEDING HABITS

QD24 How many times did you eat per day in the last one month. ?..... .....' ..

QD25 What is the most frequently eaten class of food

a. (Carbohydrate) Bolus
b. Cereals
c. Meat
d. Milk
e. Fruits
f. Vegetable

QD26 In the past one month , how many times did you eat green vegetable.

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QD27 In the past one month , how many times did you eat orange fruits .

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QD28 In the past one month , how many times did you eat eggs.

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QD29 In the past one month , how many times did you eat fried meat .

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QD30 In the past one month , how many times did you eat fried Fish.

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QD31 In the past one month , how many times did you eat Snacks on the road while driving..

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

SECTION E: PHYSICAL EXERCISE

QE32 During the past month, other than your regular job, did you participate in any physical activities or exercises such as jogging, gymnastics, running, calisthenics, golf, gardening, or walking for exercise?

1. Yes.....
2. No.....
3. Refused

If NO skip to Section F

QE33 What type of physical activity or exercise did you spend the most time doing during the past month?

1. Walking
2. Jogging
3. Athletics
4. Gymnastics
5. Others (Specify).....

QE34 How many times did you take part in this activity during the past 3 month?

1. ..... per day
2. ..... Per week
3. ..... Per month
4. Never
5. Refused

QE35 And when you took part in this activity, for how many minutes or hours did you usually keep at it?

1. ..... minutes
2. .....Hour(s)
3. .....Don't know / Not sure
4. ..... Refused

SECTION F: Alcohol Consumption

QF36 Do you take alcohol Yes No

If No go to T42

QF37 When did you start taking alcohol.....

QF38 How frequently do you take alcohol

Daily, Twice wkly, Thrice wkly, Alt day wkly, Not regular, Do not know, Refuse

QF39 During the past 30 days how many bottle per day did you take.

1, 2, 3, 4, 5, Don't know, Refuse, None

QF40 During the past 30 days ,how many times have you drank before you drove?.....

a. Donot drink before driving

b. Cannot remember

QF41 Have you ever been drunk of alcohol

Yes

No

SECTION G:. Smoking

i. QG42. Have you ever smoked? 1. Yes 2. No

If No go to Section H

QG43 Which type of these do you smoke?

Ciggarret, Marijuana, Cocaine, Tobacco , None

QG44 For how long have you smoked?.....

QG45 Are you currently smoking? Yes No

QG46 During the past 30 days, about how many sticks of cigarette did you take on the average per day? .....

QG47 Do you smoke while driving 1. Yes..... 2. No.....

SECTION H: Visual Impairments

Now I would like to ask you questions about your vision. These questions are for all respondents regardless of whether or not you wear glasses or contact lenses. If you wear glasses or contact lenses, answer questions as if you are wearing them.

QH48 How much difficulty, if any, do you have in recognizing near object?

1 No difficulty

2 Difficulty

3 Very difficulty

QH49 How much difficulty, if any, do you have in recognizing distant object?

1 No difficulty

2 Difficulty

3 Very difficulty

QH50 How much difficulty, if any, do you have reading print in newspapers, magazines, recipes, menus, or numbers on the telephone? Would you say

1 No difficulty

2 Difficulty

3 Very Difficulty

QH51 When was the last time you had your eyes examined by any doctor or eye care provider?

1 Within the past month (anytime less than 1 month ago)|

2 Within the past year (1 month but less than 12 months ago)

3 Within the past 2 years (1 year but less than 2 years ago)

4 2 or more years ago

5 Never

6 Not Remember / Not sure

7 Refused

SECTION 1: MEASUREMENTS

Q152Identification number.....

Q153 Phone number.....

Q154 Waist circumference

cm.....

Q155 Hip circumference

cm.....

Q156 Weight

Kg.....

Q157 Height

m.....

Blood pressure sitting.

•	• 1st	• 2nd	• Average
Q158 Systolic	•	•	•
Q159 Diastolic	•	•	•

Fasting Blood samples for total cholesterol

Q160

Triglycerides.....

Q161 High Density

Lipoprotein.....

Q162 Low Density

Lipoprotein.....

Q163 Total

Cholesterol.....

Fasting Blood Sugar

Q164 .....mg/dl

APPENDIX 3

RESPONDENTS CONSENTS FORM FOR CROSS SECTIONAL STUDY : PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG COMMERCIAL DRIVERS IN JABI MOTOR PARK IN ABUJA, FCT.

Patient Information and Consent Form

Good morning/afternoon/evening. My name is Dr Oyeniyi Olusegun Samuel working with Nigerian Field Epidemiology and Laboratory Training Programme and a master student of University of Ibadan. We are conducting a study on prevalence of Hypertension and its risk factors among interstate commercial drivers in Jabi Motor Park Abuja, FCT.

We would very much appreciate your participation in this study.

A. Purpose of the study

The objective of the study is to determine the prevalence and the risk factors of hypertension among the interstate commercial drivers in Jabi Motor Park Abuja, FCT. Hypertensive encephalopathy is a severe complication of hypertension that can occur at any time while driving if the disease is not controlled. Uncontrolled hypertension can lead to hypertensive encephalopathy if occur while driving can cause auto crash

B. Procedures to be followed

If you agree to participate in the study, you will be assigned a study number. We will ask you some questions about your health. We will take about 2 drops of blood from you. Your name will not appear on any specimens or study forms.

C. Voluntary participation

A decision not to participate or to withdraw from participation will not affect the you in any way. Even if you do agree to become a study participant, you can withdraw from study at any time (verbally).

D. Discomfort and risks

Your may feel a small amount of discomfor. or have a small amount of bruising on your finger where the blood was taken. The procedure will be done using a rapid diagnostic kit to detect fasting blood level of cholesterol and sugar. It's a routine procedure done in most health facilities and should not cause any harm especially when done by a qualified medical personnel, which is the case in this study.

E. Benefits

You would be able to know whether you are hypertensive or not. Also other variable that you will know about your health are: Height, Weight, BMI status, and cholesterol level. The results will made available to you after testing the blood samples immediately before leaving the venue.

F. Compensation

There will be no monetary compellsation for this study.
Each driver will collect one dustbin basket each for his vehicle.

G. Confidentiality Statement

The records concerning your participation will be used only for the purpose of this research project. Your name will not be used on any study forms or labels on laboratory specimens or in any report resulting from this study. At the beginning of the study, we will give you a study identification number and this number will be used on the forms. Any information obtained in connection with this study will be kept strictly confidential

Only members of the study team (doctors, nurses, laboratory scientists) will have access to information of your participation with your study number.

II. Questions and freedom to withdraw from the study

. The survey usually takes between 10 minutes to complete. You may withdraw from the study at any time . You may contact any ofthe research assistants/health worker If you have questions about the research or call Dr Oyeniyi Olusegun Samuel with this number 08133294204.

I. Results publication

Data from the study will be analysed. The results and the explanation of its implications will be given to your association and other stakeholders.

The information you provide will help the government to plan health services and intervention before driving.

Finally, participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, we hope that you will participate in this survey because your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature/thumb print of participant _____ **Date:** _____

APPENDIX 4

RESEARCH ON PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG DRIVERS IN JABI PARK , ABUJA , FCT.

RESULT SLIP

Identification number.....

Phone number.....

Waist circumference cm.....

Hip circumference cm.....

Weight Kg.....

Height m.....

Fasting Blood samples for total cholesterol

.....

Triglycerides.....

.....

High Density Lipoprotein.....

Low Density Lipoprotein.....

Total Cholesterol.....

Fasting Blood Sugar mg/dl.....

Date.....

.....

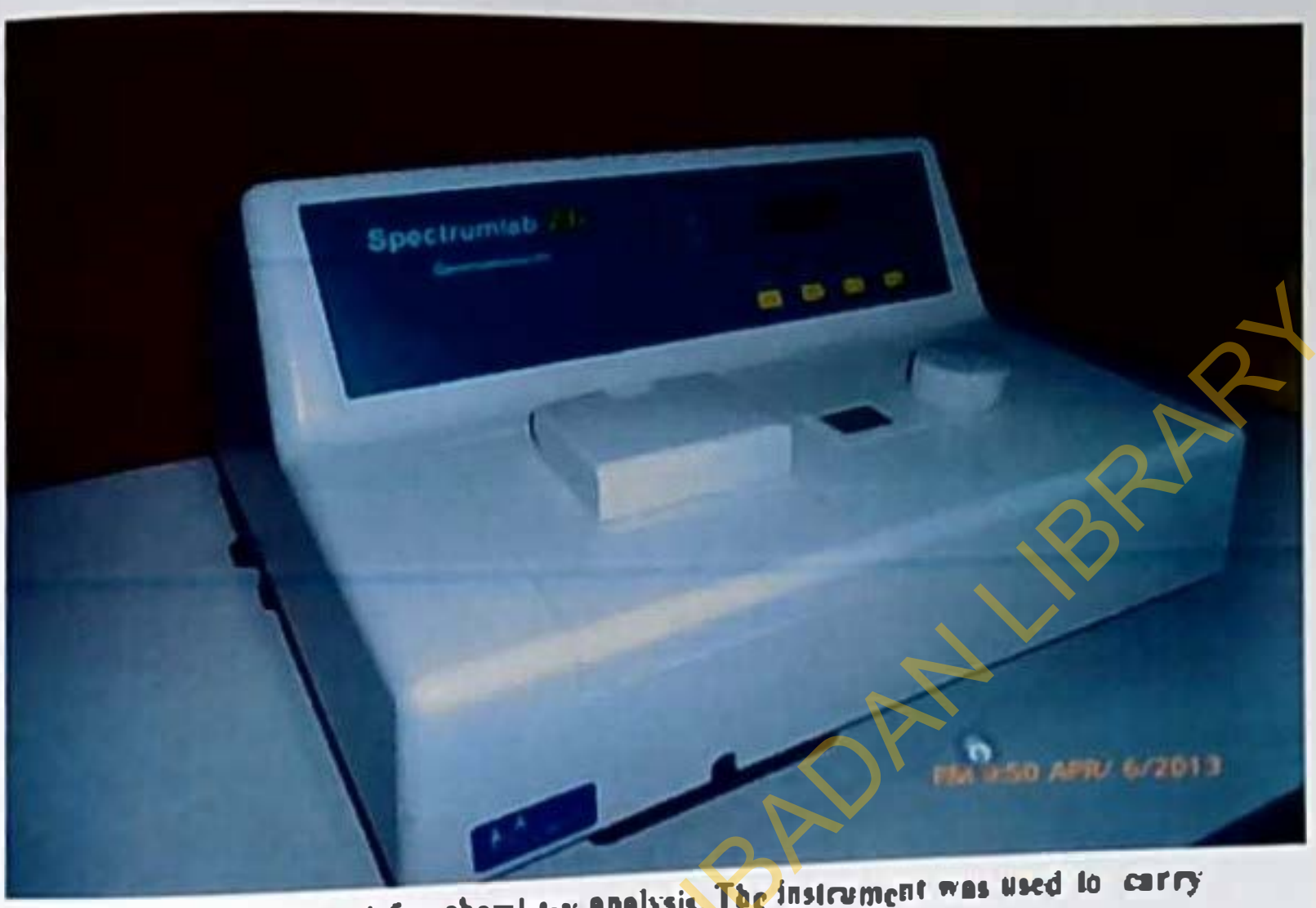
Signature.....

.....

APPENDIX 5

Spectrophotometer used for chemistry analysis. The instrument was used to carry out analysis for lipid profile and quality control in this study.

APPENDIX 5



Spectrophotometer used for chemistry analysis. The instrument was used to carry out analysis for lipid profile and quality control in this study.

APPENDIX 6

Lipid profile meter machine for analysis of cholesterol subtypes in this study.

APPENDIX 7

Research team at Jabi Park Abuja

APPENDIX 8

The supervisor, Dr Ikeoluwa Ajayi , Dr Oyeniyi PI, and Research assistant (sitting)during a supervisory visit by the supervisor to the research site in Jabi park.

APPENDIX 9

Advocacy visit to the chairman National Union of Road Transport Workers of Nigeria Jabi Branch Secretariat Abuja by Dr Ikeoluwa Ajayi