

**PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG
CIVIL SERVANTS, IN KANO STATE, NIGERIA**

BY

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ATTESTATION

I declare that the work in the dissertation entitled “Prevalence and determinants of hypertension among civil servants in, Kano state, Nigeria” was performed by me in the Department of Community Medicine, Ahmadu Bello University, Zaria under the supervision of Dr A.A. Aliyu. The information derived from the literature has been duly acknowledged. No part of this dissertation was previously presented for another degree or diploma at any university.

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CERTIFICATION

I certify that the work for this dissertation entitled “Prevalence and determinants of hypertension among civil servants in Kano state, Nigeria” by Imam Wada Bello meets the regulation governing the award of the degree of Masters of Public Health in Field Epidemiology of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to my beloved mother Hajiya Fatima Ahmad Baffa, late father Alhaji Wada Bello and late brothers Zakiyyu Wada and Murtala Wada who guided and supported my entire medical career and to my loving family who gave me moral support during the two years of this didactic study.

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LIST OF ACRONYMS

| | | |
|--------|---|--|
| ABU | - | Ahmadu Bello University |
| AKTH | - | Aminu Kano Teaching Hospital |
| BMI | - | Body mass Index |
| BP | - | Blood Pressure |
| CI | - | Confidence Interval |
| CVD | - | Cardiovascular diseases |
| CDC | - | Centre for Disease Control |
| DM | - | Diabetes Mellitus |
| DBP | - | Diastolic Blood Pressure |
| FMoH | - | Federal Ministry of Health |
| HTN | - | Hypertension |
| HH | - | Household |
| LGA | - | Local Government Area |
| LMIC | - | Low and Middle Income Countries |
| MPH | - | Masters in Public Health |
| NFELTP | - | Nigeria Field Epidemiology and Laboratory Training Programme |
| NR | - | Non-response Rate |
| OR | - | Odds Ratio |
| ORAC | - | Operational Research Advisory Committee |
| PHC | - | Primary Health Center |
| SBP | - | Systolic Blood Pressure |
| SCHEW | - | Senior Community Health Extension Officer |
| SRS | - | Simple Random Sampling |
| US | - | United State |
| WHO | - | World Health Organization |

SUMMARY

Hypertension or high blood pressure is a leading cause of cardiovascular disease (CVD) worldwide. The proportion of the global burden of disease attributable to hypertension has significantly increased from about 4.5 per cent in 2000 to 7 per cent in 2010. This makes hypertension the single most important cause of morbidity and mortality globally and highlights the urgent need of action to address the problem.

Aim of the study was to assess level of awareness and knowledge, determine the prevalence, modifiable and non-modifiable risk factors of hypertension among civil servants in Kano State. Cross-sectional descriptive study was conducted in which 520 respondents were recruited using multi-stage sampling technique. Modified WHO-STEPS semi-structured interviewer administered questionnaire was adapted for the study. Data was collected on Knowledge, socio-demographics, Behavioural, Physical (Anthropometric measurements) and biochemical variables. Blood pressure was measured and 5mls of blood was collected to determine the blood sugar and lipid profile. Data was analysed using Epi-info version 3.5.4.

Of the 520 respondents, males were 438(84.2%) while 82(15.8%) are females. The age of respondents ranged from 18- 65 with a mean of 43 ± 9.9 years. Highest level of education was 170 (32.7%) and median income of ₦50,000 (₦12,000-350000). The prevalence of Systolic and Diastolic hypertension were 138(26.5%) and 183(35.2%), diabetes mellitus 30(5.8%), Obesity 48(9.2%) and overweight 142(27.3%). Generally knowledge of determinants and risk factors was poor among respondents as only 0.8% had a good knowledge. Being male and hypertensive (OR: 1.14; 95% CI: 0.66-1.98), being diabetic and hypertensive (OR: 1.92; 95% CI: 0.90-4.09), being older than 40years and having systolic hypertension (OR: 4.80; 95% CI: 2.81-8.21), being a current smoker and hypertensive (OR: 1.80; 95% CI: 1.04-3.12) were found to be significant risk factors for hypertension a major cardiovascular disease. Multivariate analysis revealed being older than 40 years (AOR: 4.10; 95% CI: 2.44 - 7.11), having BMI >30(AOR: 2.47; 95% CI: 1.57 - 3.66), lack of physical activity (AOR: 2.31; 95% CI: 1.24 - 5.04), high serum uric acid (AOR: 3.21; 95% CI: 1.55- 6.59) as independent risk factors of hypertension.

The study revealed low level of knowledge on hypertension which is a major cardiovascular risk factor among study participants. A BMI greater than 30(obesity), lack of vigorous physical activity were the major modifiable risk factor while age greater than 40 years was found to be the non-modifiable risk factor of hypertension among the civil servants of Kano State. It is recommended that Sensitization Campaigns of civil servants to embark on regular medical checkups and exercises.

Key Words: Hypertension, Prevalence, Determinants, Cardiovascular Disease, Civil servants, Kano

CHAPTER ONE

INTRODUCTION

Cardiovascular diseases are illnesses that involve the blood vessels (veins, arteries and capillaries) or the heart, or both - diseases that affect the cardiovascular system. Cardiovascular disease (CVD) is any abnormal condition of the heart or blood vessels (arteries, veins) such as coronary heart disease (CHD), stroke, peripheral vascular disease, congenital heart disease, endocarditis, and many other conditions. Many cardiovascular diseases are preventable.

Hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated. It contributes to the burden of heart disease, stroke, kidney failure, and premature death and disability. Hypertension rarely causes symptoms in the early stages and many people are undiagnosed.¹

1.1 Background of the Study

Hypertension or high blood pressure is a leading cause of cardiovascular disease (CVD) worldwide.² The proportion of the global burden of disease attributable to hypertension has significantly increased from about 4.5 per cent in 2000, to 7 per cent in 2010.³⁻⁴ This makes hypertension the single most important cause of morbidity and mortality globally and highlights the urgent need of action to address the problem.⁵ Hypertension was mainly associated with more affluent regions of the world. However, the condition is increasingly emerging in low and middle-income countries (LMICs)⁶⁻⁷ where health resources are scarce and stretched by a high burden of infectious diseases such as Malaria, Tuberculosis and HIV, where awareness and treatment levels on hypertension control are still very low.⁷

Currently, the global burden of hypertension is greatest in Low and Middle-Income Countries where it affects about 1 in every 5 of the adult population.⁸ By 2025, almost 3 out of every 4 people with hypertension will be living in LMICs. The absolute numbers affected by hypertension in LMICs are therefore considerably higher and are likely to increase as globalization and economic advancement usher in urbanization and longer life expectancy in these countries.⁹

In Africa, communicable diseases and maternal, perinatal and nutritional accounted for the greatest burden of morbidity and mortality.¹⁰ This burden is fast shifting towards chronic non-communicable diseases, and by extension CVDs. This phenomenon is what is being termed as a "double burden of disease".¹¹ Non-communicable disease (NCD), include cardiovascular diseases (CVDs), cancers, diabetes mellitus, chronic respiratory diseases and other chronic diseases account for more than three-fifths (61%) of the estimated 58 million deaths worldwide in 2005 and about half (46%) of the global burden of diseases. WHO projects that of 64million people who will die in 2015, 42 million will die of chronic diseases unless urgent action is taken.¹²

Hypertension was once thought to be non-existent in African societies in the first half of the twentieth century; estimates now show that in some settings in Africa more than 40 percent of adults have hypertension.¹³ The prevalence of hypertension has increased significantly over the past two to three decades.¹⁴ There were approximately 80 million adults with hypertension in sub-Saharan Africa in 2000 and projections based on current epidemiological data suggest that this figure will rise to 150 million by 2025.⁹

Further, there is evidence that indicates that related complications of hypertension, and in particular stroke and heart failure are also becoming increasingly more common in this region ¹⁵⁻
¹⁶. These trends have been strongly linked with changes in individual and societal lifestyle such as an increase in tobacco use, excessive alcohol consumption, reduced physical activity and adoption of "Western" diets that are high in salt, refined sugar and unhealthy fats and oils.

The economic impact with regard to loss of productive years of life and the need to divert scarce resources to tertiary care is substantial.¹ Health and disease patterns change over time in societies depending, among other factors, on the degree of changes in population structure and the rate of economic development, to result in the so-called epidemiological transition.¹⁷ The 'epidemiologic transition' provides a useful framework for understanding changes in the prevalence, determinants and patterns of disease as a result of societal and socioeconomic developments in different countries and regions of the world.¹⁸ As societies develop, although communicable diseases such as tuberculosis prevail, non-communicable diseases become more prevalent, particularly in urban populations. This is a result of changes in environmental and behavioural determinants such as increasing tobacco use, increasing fat and calorie consumption, and decreasing physical activity and longer periods of exposure to these determinants because of longer life expectancy. Studies have shown that taking of fruits and vegetables, physical activity, avoiding tobacco and reduce alcohol intake significantly reduces the risk of developing cardiovascular diseases.¹⁹ However, in Nigeria, due to economic challenges, people are predisposed to having CVDs due to inadequate intake of fruit and vegetables, overweight, obesity and physical inactivity as well as unhealthy lifestyles (such as tobacco and excessive alcohol intake), which approximately USD \$150 billion is believed to be spent globally in direct

cost in addressing hypertension and its antecedent complications, with cases of hypertension expected to rise as population ages.²⁰

1.2 Problem Statement

The proportion of the global burden of disease attributable to hypertension has significantly increased from 4.5% in the year 2000, to 7% in 2010.²¹ Early diagnosis of hypertension is important in order to avoid potentially life threatening complications. Hypertension is also high in people with risk factors like tobacco use, physical inactivity, unhealthy diet, obesity, diabetes, high cholesterol, low socioeconomic status and family history.²² The growing burden of non-communicable diseases worldwide according to WHO 2012 report, hypertension causes around half of all stroke and heart disease related deaths. About 7.1 million or 6% of deaths worldwide was attributed to hypertension. High blood pressure (BP) is responsible for 49% of Ischemic heart disease and 62% of cerebrovascular disease.^{21,22} A systematic review revealed that hypertension is one of the most important public health issues in sub-Saharan Africa (SSA), particularly in urban areas, with evidence of considerable under-diagnosis, inadequate treatment and control. In Sub-Saharan Africa, Despite their growing prevalence of hypertension and other cardiovascular disease were not given due attention. An increasing burden of hypertension in this region is likely to result in increasingly poor outcomes, as very few people receive adequate treatment, and achieve their goal BP.²³ Hypertension is now recognized as one of the most common causes of cerebrovascular diseases accounting for about 40% of cerebrovascular diseases on the African continent.²⁴ There is an urgent need to develop strategies to prevent, diagnose, and treat hypertension more effectively in Africa.²⁴ In Africa now, approximately 80 million adults are hypertensive and projections based on current epidemiological data suggest that this figure will rise to 150 million by 2025.²⁵

In a study done in Northwest Nigeria by Mukadas,²⁶ hypertension, closely followed by stroke, is the most prevalent CVD while CHD is the least prevalent. However in South Western Nigeria heart failure had the highest occurrence 384(35%) followed by Hypertension.²⁶ At the beginning of the 20th century, CVD accounted for less than 10 percent of all deaths worldwide. However, by the beginning of the 21st century, CVD accounts for nearly half of all deaths in the developed world and 25 percent in the developing world.²⁷ By 2020 it is predicted that 25 million lives annually will be affected by CVD and that coronary heart disease (CHD) will surpass infectious disease as the world's number one cause of death and disability.²⁸ Most of the researches done so far in Nigeria on hypertension and CVDs are hospital based.

According to medical reports,²⁹ Hypertension has shown to form the bulk of admissions in Nigerian hospitals, with the mean age of Nigerians that come down with hypertension said to be less than 50 years of age. More worrisome is the fact that about 30 million Nigerians (or 20 percent) of the adult population suffer from hypertension with only about 30 percent of this number (9 to 12 million Nigerians) aware they suffer from it, according to latest report released during the World Hypertension Day 2010.³⁰

Moreover, CVDs remains the leading cause of death in the world, far outstripping deaths due to malaria, HIV/AIDS, and tuberculosis.²⁷ Approximately 80% of the 35 million deaths annually attributable to chronic diseases and a similar proportion of the approximately 16.7 million deaths due to CVDs occur in low- and middle-income countries (LIMIC); defined as gross national income per capita of less than US dollars \$1,026 per annum in 2011.³¹⁻³² CVD occurs at a younger age group as against the usual presentation in middle age and elderly.

This might reflect to some extent a demographic artefact due to the lower age distribution in LIMIC.¹² The personal and macro-economic implications for the workforce and national productivity are profound. A recent study of five countries emphasizes that a much higher proportion of deaths occur in the working age population, large proportion of which are public servants.³³ Despite limitations concerning the quality of records on cardiovascular disease, the potential consequences of the burden of CVDs falling upon the ‘breadwinners’ of the community are sobering. These LIMIC are faced with a dual burden of communicable and non-communicable diseases, which require tertiary care, and a consequent diversion of limited resources. In conjunction with the loss of productive years of life, the consequences lead to economic constraints with an impact on both the private and the public sectors.

Also, the demographic tide is inexorably shifting, and it is estimated that by 2010, 70% of the world’s elderly will live in LIMIC and the trend towards urbanization will accelerate.³⁴ Other studies project that the increase in mortality due to coronary heart disease and stroke will be approximately three-fold higher in developing countries, including Nigeria in comparison to the developed nations. The trends are illustrated by changes in epidemiologic transitions which is marked by fall in rates due to communicable diseases and an increase in the proportion due to non-communicable diseases.¹² Although in developing countries like ours this classical demographic transition does not occur, a rather dual burden of communicable and non-communicable diseases with consequent over-stretching of the limited resources is seen.²⁶

Civil Servant are heterogeneous group of urban dwellers, characterised by sedentary life style with access to motorised transport and junk foods in as reported by Bunker, showed that civil servants with higher economic status appear to be more westernised in their life style and hence have risk similar to black Americans.

1.3 Justification for the Study

In Sub-Saharan Africa, despite marked regional differences, much of the continent is at an early phase of the epidemiologic transition with 70% of deaths due to communicable diseases, namely, infections and parasites. In essence, one can consider all of Africa as an epidemiological transition spanning the spectrum from Phase 1 to Phase 4 in different countries and among different ethnic groups. Recent data from South Africa are interesting and perhaps provide a window into a 'future epidemic', The Heart of Soweto Study in predominantly urban, black South Africans, drew attention to the rising incidence of risk factors in black Africans. In a population with a mean age of 46 years, 78% had greater than one major risk factor, primarily obesity, hypertension, and smoking, although serum cholesterol was elevated in only 14%. In 2006, however, of 1593 new cases of CVDs in this study. Given the ominous trends about obesity and the increase in other risk factors, it is likely that the coming years will see major increases in the incidence and prevalence of hypertension, coronary heart disease in South Africa and probably in sub-Saharan Africa as a whole.²⁷

Quality epidemiological data is lacking in Nigeria on Hypertension and limited population based studies on prevalence of multiple risk factors in urban communities. The prevalence of Hypertension is on the increase due to lifestyle/diet changes, rapid urbanization and adoption of western life style.³⁵ The disease surveillance data is very scanty on hypertension/CVDs and there has been limited published community based risk assessment of hypertension in Northern Nigeria. The highest rates of cardiovascular death are in Eastern Europe and Central Asia and in the Middle East and North Africa.³⁶ Civil servants constitute the bulk of productive population. Findings will be used to plan for intervention. A study among civil servants in Nigeria by Bunker

and colleagues found the risk factors of hypertension /cardiovascular disease similar to that of U.S black males.²⁶

The factors are age, body mass index, alcohol consumption, generalized obesity and truncal obesity, diabetes, hypercholesterolemia, smoking and low fruit intake.³⁷ There are major challenges for primary and secondary prevention including lack of data, limited national resources, and the lack of prediction models in certain populations. These are concerns that in comparison with communicable diseases, cardiovascular and chronic diseases have a relatively low priority in the global health agenda and that this requires additional emphasis.

1.4 Research Questions

1. What is the prevalence of Hypertension among civil servants in Kano?
2. What are the determinants of Hypertension among civil servants?
3. What is the level of awareness and knowledge of hypertension and CVD among civil servants?

1.4.1 Scope of the study

The scope of this work covered the prevalence, determinants and Knowledge of hypertension. Modifiable factors that included high blood pressure, diabetes, obesity/abnormal lipids, tobacco use, physical inactivity and unhealthy diets and Non-modifiable: age, gender and ethnicity.

1.5 General and Specific Objectives

1.5.1 General objective

To determine the prevalence and determinants of hypertension among civil servants in Kano State.

1.5.2 Specific objectives

1. To assess the level of awareness and knowledge of hypertension among civil servants.
2. To determine the prevalence of hypertension among civil servants.
3. To identify the modifiable risk factors of hypertension among civil servants.
4. To identify the non-modifiable risk factors of hypertension among civil servants in Kano.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Cardiovascular diseases (CVD) are diseases that involve the heart or blood vessels³⁸. It includes coronary artery diseases (CAD) such as angina and myocardial infarction, stroke, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, heart arrhythmia, congenital heart disease, valvular heart disease, aortic aneurysms, peripheral artery disease, and venous thrombosis³⁸⁻³⁹. This may be caused by Hypertension or high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, and excessive alcohol consumption, among others. Hypertension or High blood pressure results in 13% of CVD deaths, while tobacco results in 9%, diabetes 6%, lack of exercise 6% and obesity 5%.³⁸

It is estimated that 90% of CVD is preventable.⁴⁰ Prevention of Cardiovascular disease is by decreasing risk factors through: healthy eating, exercise, avoidance of tobacco smoke and limiting alcohol intake.³⁸ Treating high blood pressure and diabetes is also beneficial.³⁸ Treating people who have strep throat with antibiotics can decrease the risk of rheumatic heart disease.⁴¹ The effect of the use of aspirin in people who are otherwise healthy is of unclear benefit.⁴²⁻⁴³ Treatment of those who have CVD improves outcomes.³⁸

2.2 Epidemiology of Hypertension

In few decades now, African populations are passing through epidemiological transitions.⁴⁴ This as a result of changes in environmental and behavioural determinants such as increasing tobacco use, increasing fat and calorie consumption, and decreasing physical activity and longer periods of exposure to these determinants because of longer life expectancy. Traditionally, Africa has been the last major region in the world where the burden of infectious disease still outweighs the

burden of non-communicable diseases and injuries.⁴⁵ While the rates of decline in fertility and mortality vary considerably across the region, at least one clear pattern is emerging that holds across most of Africa: a steady rise in non-communicable diseases (including cardio-metabolic and respiratory conditions as well as cancers) in the presence of significant, longstanding infectious disease prevalence. As in other parts of the world, the prevalence of hypertension in the sub-Saharan Africa region has increased as a manifestation of the epidemiological transition.⁴⁶ Hypertension has become a significant problem in many African countries experiencing the epidemiological transition from communicable to non-communicable diseases.⁴⁷⁻⁴⁸ Rural to-urban migration coupled with acculturation and modernization high blood pressure as observed in African epidemiologic studies.⁴⁹⁻⁵⁰

Cardiovascular diseases are the leading cause of death. In 2008, 30% of all global death is attributed to cardiovascular diseases. Death caused by cardiovascular diseases are also higher in low- and middle-income countries as over 80% of all global death caused by cardiovascular diseases occurred in those countries. It is also estimated that by 2030, over 23 million people will die from cardiovascular diseases each year.³⁸ CVDs resulted in 17.3 million deaths (31.5%) in 2013 up from 12.3 million (25.8%) in 1990.³⁹ Deaths, at a given age, from CVD are more common and have been increasing in much of the developing world, while rates have declined in most of the developed world since the 1970s.⁵¹⁻⁵² Coronary artery disease and stroke account for 80% of CVD deaths in males and 75% of CVD deaths in females.³⁸ Most cardiovascular disease affects older adults. In the United States 11% of people between 20 and 40 have CVD, while 37% between 40 and 60, 71% of people between 60 and 80, and 85% of people over 80 have CVD.⁵³ The average age of death from coronary artery disease in the developed world is around

80 while it is around 68 in the developing world.⁵¹ Disease onset is typically seven to ten years earlier in men as compared to women.

It is estimated that 60% of the world's cardiovascular disease burden will occur in the South-East Asian subcontinent despite only accounting for 20% of the world's population. This may be secondary to a combination of genetic predisposition and environmental factors.⁵¹

2.2.1 Risk factors for hypertension

There are several risk factors for hypertension: age, gender, tobacco use, physical inactivity, excessive alcohol consumption, unhealthy diet, obesity, family history of cardiovascular disease, raised blood pressure (hypertension), raised blood sugar (diabetes mellitus), raised blood cholesterol (hyperlipidemia), psychosocial factors, poverty and low educational status, and air pollution.⁵³⁻⁵⁸ While the individual contribution of each risk factor varies between different communities or ethnic groups the overall contribution of these risk factors is very consistent.⁵⁹ Some of these risk factors, such as age, gender or family history, genetic, are immutable; however, many important cardiovascular risk factors are modifiable by lifestyle change, social change, drug treatment and prevention of hypertension, hyperlipidemia, and diabetes.

2.3 Hypertension

Hypertension is a medical condition in which the blood pressure in the arteries is elevated.⁶⁰⁻⁶² It has been described as the “silent killer” because initially the disease has no symptoms, and hence an individual can have hypertension without realizing it.⁶³⁻⁶⁵ The normal blood pressure is level 120/80 mmHg or less. High blood pressure can be either primary or secondary hypertension.

The primary hypertension account for over 90% of all cases of hypertension, with no exact cause, although there are several risk factors.⁶⁶ While 10% of cases are usually secondary

hypertension, that results from other diseases present in the body such as coronary heart disease (CVD), kidney disease, cardiovascular disease, etc.⁶⁷⁻⁶⁸

Hypertension is the most common Non Communicable Disease (NCD) globally and a public health challenge in many developing countries including Nigeria.⁶⁹⁻⁷¹ Hypertension affects all races, and the prevalence varies across regions and countries. Hypertension has been described as a disease of the African race,⁷²⁻⁷³ and despite this high prevalence among the African population, many Nigerians do not know their blood pressure, neither do they have access to education and services required to treat and prevent the disease.

2.3.1 Knowledge of hypertension

Knowledge is very important in controlling hypertension, as educating patients on hypertension and modification of lifestyle through health promoting behaviors.⁷⁴ Knowledge is one method for changing a person's attitude and therefore his or her behaviour or lifestyle.⁷⁵ The level of knowledge people achieve can determine their attitude and practice towards hypertension.⁷⁶ Patients who are informed about their condition appear to recover early than those without knowledge.⁷⁷ In United Kingdom, hypertensive participants in the survey of the general population London,⁷⁸ show poor understanding of high Blood Pressure or hypertension and had little knowledge of their own Blood Pressure.

In Nigeria, the knowledge of hypertension was observed among men to be 7.7% and 8.7% among women but significantly higher among diagnosed hypertensive.⁷⁹ Knowledge about the etiology and management of hypertension among workers are inadequate.

In Nigeria, 73% university workers thought hypertension were caused by undue thinking, stress, or worries⁸⁰ and 89% of hospital workers in Abeokuta, correctly identified hypertension as a risk

factor for cardiovascular disease and stroke.⁸¹ A study population revealed that hypertensive patients had poor knowledge, attitude and practices, only 16.58% had good knowledge, 30.89% good attitude and 26.76% had good practices towards hypertension prior to intervention, but improved significantly after health intervention to 75%, 78.23% and 66.18% respectively.⁸²

A similar study revealed that, patients are generally knowledgeable about hypertension but that knowledge is usually not comprehensive especially in terms of specific factors that relate to their condition and good control of blood pressure. They found patients with high school education significantly more likely to understand normal blood pressure values.⁸³

2.3.2 Prevalence of hypertension

Hypertension is increasingly becoming an important medical and public health concern worldwide. The proportion of the global burden of disease attributable to hypertension has significantly increased from about 4.5% to 7% in 2010.⁸⁴ This makes hypertension the single most important cause of morbidity and mortality globally and highlights the urgent need of action to address the problem.⁸⁵ In the year 2000, the prevalence of the disease was 27% in adult males in United State, while in Nigeria 34.8% meaning over 56 million Nigerians are hypertensive.⁸⁶⁻⁸⁸ Africa has the highest prevalence of hypertension and estimated over 46% of adult Africans have the disease.⁸⁹⁻⁹⁰ It has been described as a disease of the African race, as statistics has shown that Africans were more genetically predisposed to developing the disease.^{91,92,93} Hypertension affecting approximately 1 billion people globally, accounts for 7.5 million deaths annually. This is about 12.8% of all total deaths.⁹⁴⁻⁹⁶ It also accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS.⁹⁷⁻⁹⁸

In Africa, communicable diseases and maternal, perinatal and nutritional accounted for the greatest burden of morbidity and mortality.⁹⁹ This burden is fast shifting towards chronic non-

communicable diseases, and by extension Cardiovascular Disease. This phenomenon is what is being termed as a "double burden of disease".¹⁰⁰ In the twentieth century, high blood pressure was almost non-existent in African societies; estimates now show that in Africa more than 40% of adults have hypertension.¹⁰¹

In sub-Saharan Africa, the prevalence of hypertension is increasing rapidly over the past two to three decades¹⁰² generally because of the continuous effect of risk factors such as an obesity, unhealthy diet, dyslipidaemia and physical inactivity. Some studies have shown that the current prevalence of hypertension in many developing countries, particularly in urban societies, is already as high as those seen in developed countries.¹⁰³⁻¹⁰⁴ In year 2000, approximately 80 million adults had hypertension and projections based on current epidemiological data suggest that this figure will rise to 150 million by 2025.¹⁰⁵ Further, there is evidence that indicates that related complications of hypertension, and in particular stroke and heart failure are also becoming increasingly more common in this region.¹⁰⁶⁻¹⁰⁷ These trends have been strongly linked with changes in individual and societal lifestyle such as an increase in tobacco use, excessive alcohol consumption, reduced physical activity and adoption of "Western" diets that are high in salt, refined sugar and unhealthy fats and oils.

In Nigeria, the prevalence of hypertension may form a substantial proportion of the total burden in Africa because of the large population of the country currently estimated to be over 170 million¹⁰⁸⁻¹¹⁰ with an increasing adult population and changing lifestyle of Nigerians, the burden of hypertension may continue to increase as time unfolds.¹¹¹

In the last two decades, Nigeria has seen a rise in the number of prevalence studies concerning hypertension and other non-communicable diseases.¹¹²⁻¹¹⁸ hypertension and other NCD account for at least 20% of all deaths in the country.¹¹⁹⁻¹²⁰ It is a major risk factor for Cardiovascular

disease coronary heart disease, ischemic heart disease as well as haemorrhagic stroke.¹²¹⁻¹²² Its complications also constitute 25% of all emergency medical admission and 60% of all hospital admissions. It is the most frequently diagnosed disease in the elderly.¹²³⁻¹²⁴

A recent study by Adeloje conducted several appropriate meta-analysis of data point from different studies to predict the prevalence of hypertension in the future.¹²⁵

2.3.3 Irreversible or non– modifiable factors of hypertension

The non-modifiable risk factors are attributes or characteristics in the individual that cannot be changed or adjusted, hence they are out of our control and little or nothing can be done to control them; such factors include age, sex, race, family history, genetic composition, etc.

Genetics

Cardiovascular disease in a person's parents increases their risk by 3 fold.¹²⁸ Heredity and ethnicity has been identified as a risk factor for hypertension.³⁵ Although, these risk factors cannot be modified, but their presence help identify those at greatest risk.¹²⁷ A study has identified multiple genetic factors that may enhance and promote premature atherosclerosis in the whole vascular system including intracranial large arteries.¹²⁸ These include glutathione S transferase, omega-1 gene polymorphism, angiotensin converting enzyme polymorphism, plasma to vascular endothelial growth factor ratio, and plasma homocysteine level.³⁵

Age

Age is by far the most important risk factor in developing cardiovascular or heart diseases, with approximately a tripling of risk with each decade of life.¹²⁹ Coronary fatty streaks can begin to form in adolescence.¹³⁰ It is estimated that 82 percent of people who die of coronary heart

disease are 65 and older.¹³¹ At the same time, the risk of stroke doubles every decade after age of 55 years.¹³²

Multiple explanations have been proposed to explain why age increases the risk of cardiovascular/heart diseases. One of them is related to serum cholesterol level¹³³. In most populations, the serum total cholesterol level increases as age increases. In men, this increase levels off around age 45 to 50 years. In women, the increase continues sharply until age 60-65 years.¹³⁴ Aging is also associated with changes in the mechanical and structural properties of the vascular wall, which leads to the loss of arterial elasticity and reduced arterial compliance and may subsequently lead to coronary artery disease.¹³⁵

Sex

Men are at greater risk of hypertension and heart disease than pre-menopausal women.^{136,137} Once past menopause, it has been argued that a woman's risk is similar to a man's¹³⁷ although more recent data from the WHO and UN disputes this.¹³⁸ If a female has diabetes, she is more likely to develop heart disease than a male with diabetes.¹³⁹ Coronary heart diseases are 2 to 5 times more common among middle-aged men than women.¹⁴⁰ In a study done by the World Health Organization, sex contributes to approximately 40% of the variation in sex ratios of hypertension /coronary heart disease mortality.¹⁴¹

Another study reports similar results finding that gender differences explains nearly half the risk associated with cardiovascular diseases.¹⁴⁰ One of the proposed explanations for gender differences in cardiovascular diseases is hormonal difference.¹⁴⁰ Among women, estrogen is the predominant sex hormone. Estrogen may have protective effects through glucose metabolism and hemostatic system, and may have direct effect in improving endothelial cell function.¹⁴⁰ The

production of estrogen decreases after menopause, and this may change the female lipid metabolism toward a more atherogenic form by decreasing the HDL cholesterol level while increasing LDL and total cholesterol levels.¹⁴⁰

Among men and women, there are notable differences in body weight, height, body fat distribution, heart rate, stroke volume, and arterial compliance.¹³⁴ In the very elderly, age-related large artery pulsatility and stiffness is more pronounced among women than men.¹³⁴ This may be caused by the women's smaller body size and arterial dimensions which are independent of menopause.¹³⁴

2.3.4 Reversible or modifiable factors of hypertension

Modifiable risk factors of hypertension are attributes, characteristics, exposures or life style patterns that can be adjusted or changed to prevent the development of the disease. These modifiable risk factors include; obesity, excessive salt intake, inadequate physical activity or lack of exercise, high fat diet, tobacco use, alcohol consumption, and insufficient fruit and vegetables consumption.

Tobacco use

Cigarettes are the major form of smoked tobacco.¹⁴² Risks to health from tobacco use result not only from direct consumption of tobacco, but also from exposure to second-hand smoke.¹⁴² Approximately 10% of cardiovascular disease is attributed to smoking;¹⁴² however, people who quit smoking by age 30 have almost as low a risk of death as never smokers.¹⁴³

Tobacco smoking is well-known to increase the risk of developing hypertension and cardiovascular diseases like stroke, thrombosis and heart attack. Smoking causes an immediate increase in blood pressure resulting in higher ambulatory blood pressure levels for smokers than

for non-smokers. In the world health survey 2003, the prevalence of tobacco smoking varied widely. The survey shows that in all countries, men smoked more than women, with the largest disparities observed in Central and Western Africa. Smoking cessation is known to reduce the overall risk of cardiovascular diseases.¹⁴⁴ In order to reduce smoking at the population level, multi-sectoral interventions like banning of tobacco advertisements, increasing taxes on tobacco products, and banning smoking in public spaces.¹⁴⁵ The prevalence of tobacco smoking varied widely among countries, men smoked more than women, with the largest disparities observed in Central and Western Africa. Among men, the prevalence of smoking was highest in Southern Africa followed by Eastern Africa. The prevalence of smoking was highest in Southern Africa followed by Eastern Africa. Remarkably, smoking was more prevalent in rural than in urban areas in most countries. While Kenya, Mauritania, Senegal and South Africa, smoking levels is higher among the urban population than their rural areas. The WHO surveys observed that, Daily smokers represent a greater proportion of actual smokers and were disproportionately male.¹⁴³

Physical inactivity

Insufficient physical activity (defined as less than 5 times for 30 minutes of moderate activity per week, or less than 3 times for 20 minutes of vigorous activity per week) is currently the fourth leading risk factor for mortality worldwide.¹⁴¹ In 2008, 31.3% of adults aged 15 or older (28.2% men and 34.4% women) were insufficiently physically active.¹⁴¹ The risk of ischemic heart disease and diabetes mellitus is reduced by almost a third in adults who participate in 150 minutes of moderate physical activity each week (or equivalent).¹⁴² In addition, physical activity assists weight loss and improves blood glucose control, blood pressure, lipid profile and insulin sensitivity. These effects may, at least in part, explain its cardiovascular benefits.¹⁴¹

Adequate physical activity has been shown to have many health promoting effects and has a direct and independent role in reducing hypertension.¹⁴⁵⁻¹⁴⁶ In Africa, traditionally a high level of physical activity explains the low levels of chronic diseases found. However, the high rate of urbanization that has been occurring crossways the continent has been decreasing the amounts of physical activity.¹⁴⁷ Studies from WHO STEP survey on the adequate physical activity, defined as more than 150 minutes per week walking /moderate activity /vigorous activity, reported by males was markedly higher than that of females. In the World Health Survey,¹⁴³⁻¹⁴⁷ women also reported lower levels of physical activity than men, probably because of their traditionally defined roles, such as care giving, that require less physical strain. Adequate physical activity is more prevalent in rural than urban regions of Africa, which partly explains the high prevalence of obesity in urban areas.

Diet

High dietary intakes of saturated fat, trans-fats and salt and low intake of fruits, vegetables and fish are linked to cardiovascular risk, although whether all these associations are a cause is disputed. The World Health Organization attributes approximately 1.7 million deaths worldwide to low fruit and vegetable consumption.¹⁴¹ The amount of dietary salt consumed is also an important determinant of blood pressure levels and overall cardiovascular risk.¹⁴¹

Frequent consumption of high-energy foods, such as processed foods that are high in fats and sugars, promotes obesity and may increase cardiovascular risk.¹⁴¹ High trans-fat intake has adverse effects on blood lipids and circulating inflammatory markers,¹⁴⁸ and elimination of trans-fat from diets has been widely advocated.¹⁴⁹ There is evidence that higher consumption of sugar is associated with higher blood pressure and unfavourable blood lipids,¹⁵⁰ and sugar intake also increases the risk of diabetes mellitus.¹⁵¹ High consumption of processed meats is associated

with an increased risk of cardiovascular disease, possibly in part due to increased dietary salt intake.¹⁵²

The relationship between alcohol consumption and cardiovascular disease is complex, and may depend on the amount of alcohol consumed. There is a direct relationship between high levels of alcohol consumption and risk of cardiovascular disease.¹⁴¹ Drinking at low levels without episodes of heavy drinking may be associated with a reduced risk of cardiovascular disease.¹⁵³ Overall alcohol consumption at the population level is associated with multiple health risks that exceed any potential benefits.^{141,154}

High salt intake

In Africa similarly in Nigeria, A high intake of sodium is common, mostly used to preserve food or is added to already-prepared food to make it tastier.¹⁵⁵ Decreased intake of salt not only reduces blood pressure and related CVD risk, but has other beneficial cardiovascular effects that are independent of and additive to its effect on blood pressure.^{126,156} It has a direct effect on reducing stroke, aortic stiffness, left ventricular hypertrophy, chronic kidney disease and proteinuria.¹⁵⁷ Intervention studies conducted to shows reduction in salt intake and an increase in potassium improve the blood pressure in African populations. A study done in Tanzania indicated that low sodium diet lead to a low urinary excretion level of 52 mmols per day, and reduced blood pressure in normotensive people significantly within four to five days.¹⁵⁸ A study in Kenya reported that supplementation with potassium in newly diagnosed patients with hypertension reduced the blood pressure to a level similar to that found in patients treated with a diuretic.¹⁵⁹

Alcohol consumption

Alcohol consumption is relatively frequent in Africa,¹⁶⁰ and has a direct effect between high levels and specific patterns of alcohol consumption (such as binge drinking) and rising risk of hypertension.

In Nigeria, the influence of heavy drinking, on increasing blood pressure levels has been described.¹⁶¹ Interventions in a multi-sectoral manner should be introduced to limit alcohol use, like in reducing tobacco use, increasing taxes on alcohol, and banning alcohol advertising especially to young people.¹⁶²

Insufficient fruit and vegetable consumption

Fruit and vegetable is one element of a healthy diet and varies considerably among countries, reflecting economic, cultural and agricultural production environments.¹⁶³ Most of the benefits of fruits and vegetables come from reduction in CVD and risk factors, particularly hypertension. In Africa people often eat insufficient fruits and vegetables, resulting in low potassium intake. This in turn is associated with higher blood pressure in some patients; a potassium intake of 90 mmol/day is recommended.¹⁶⁴

Obesity

Obesity is a condition in which excess body fat has accumulated to such an extent that health may be adversely affected. The degree of body weight is expressed as Body Mass Index; this is the ratio of weight in kilograms (kg) to the square of height in meters. The BMI is used to categorize a person's body weight as underweight (BMI less than 18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), or obese (BMI greater than 30). Obesity greatly increases the risk for hypertension and has also been shown to be associated with coronary artery disease and some cancers, and to reduce life expectancy.¹⁶⁵ STEPS survey findings show that there is a

high prevalence of overweight and obesity in many African countries particularly among urban women. The mean BMI was significantly higher for women compared to men across all countries as was the standardized prevalence of overweight (BMI > 25Kg/m²) and obesity (BMI > 30Kg/m²). Apparently, the lower male prevalence relates to the much higher rate of heavy manual labor commonly reported in men while the higher prevalence rates among women may be due to physiological changes related to pregnancy and childbirth, and cultures.

2.4 Socio-economic Disadvantage

Cardiovascular disease affects low- and middle-income countries even more than high-income countries.¹⁶⁶ There is relatively little information regarding social patterns of cardiovascular disease within low- and middle-income countries,¹⁶⁶ but within high-income countries low income and low educational status are consistently associated with greater risk of cardiovascular disease.¹⁶⁷ Policies that have resulted in increased socio-economic inequalities have been associated with greater subsequent socio-economic differences in cardiovascular disease¹⁶⁶ implying a cause and effect relationship. Psychosocial factors, environmental exposures, health behaviours, and health-care access and quality contribute to socio-economic differentials in cardiovascular disease.¹⁶⁸ The Commission on Social Determinants of Health recommended that more equal distributions of power, wealth, education, housing, environmental factors, nutrition, and health care were needed to address inequalities in cardiovascular disease and non-communicable diseases.¹⁶⁹

2.4.1 Air pollution

Particulate matter has been studied for its short- and long-term exposure effects on cardiovascular disease. Currently, PM_{2.5} is the major focus, in which gradients are used to determine CVD risk. For every 10 µg/m³ of PM_{2.5} long-term exposure, there was an estimated

8–18% CVD mortality risk.¹⁷⁰ Women had a higher relative risk (RR) (1.42) for PM2.5 induced coronary artery disease than men (0.90) did.¹⁷¹ Overall, long-term PM exposure increased rate of atherosclerosis and inflammation. In regards to short-term exposure (2 hours), every 25 µg/m³ of PM2.5 resulted in a 48% increase of CVD mortality risk.¹⁷²

In addition, after only 5 days of exposure, a rise in systolic (2.8 mmHg) and diastolic (2.7 mmHg) blood pressure occurred for every 10.5 µg/m³ of PM2.5.¹⁷³ Other research has implicated PM2.5 in irregular heart rhythm, reduced heart rate variability (decreased vagal tone), and most notably heart failure.¹⁷⁴⁻¹⁷⁵ PM2.5 is also linked to carotid artery thickening and increased risk of acute myocardial infarction.¹⁷⁶⁻¹⁷⁷

2.5 Cardiovascular Risk Assessment

Existing cardiovascular disease or a previous cardiovascular event, such as a heart attack or stroke, is the strongest predictor of a future cardiovascular event.¹⁷⁴ Age, sex, smoking, blood pressure, blood lipids and diabetes are important predictors of future cardiovascular disease in people who are not known to have cardiovascular disease.¹⁷⁵ These measures, and sometimes others, may be combined into composite risk scores to estimate an individual's future risk of cardiovascular disease.¹⁷⁴ Numerous risk scores exist although their respective merits are debated.¹⁷⁶ Other diagnostic tests and biomarkers remain under evaluation but currently these lack clear-cut evidence to support their routine use. They include family history, coronary artery calcification score, high sensitivity C-reactive protein (hs-CRP), ankle brachial index, lipoprotein subclasses and particle concentration, lipoprotein(a), apolipoproteins A-I and B, fibrinogen, white blood cell count, homocysteine, N-terminal pro B-type natriuretic peptide (NT-proBNP), and markers of kidney function.¹⁷⁷⁻¹⁷⁸

2.5.1 Work

Little is known about the relationship between work and cardiovascular disease, but links have been established between certain toxins, extreme heat and cold, exposure to tobacco smoke, and mental health concerns such as stress and depression.¹⁷⁹

2.5.2 Pathophysiology

Population-based studies show that atherosclerosis, the major precursor of cardiovascular disease, begins in childhood.¹⁸⁰ The Path-biological Determinants of Atherosclerosis in Youth Study demonstrated that intimal lesions appear in all the aortas and more than half of the right coronary arteries of youths aged 7–9 years.¹⁸¹

This is extremely important considering that 1 in 3 people die from complications attributable to atherosclerosis. In order to stem the tide, education and awareness that cardiovascular disease poses the greatest threat, and measures to prevent or reverse this disease must be taken.

Obesity and diabetes mellitus are often linked to cardiovascular disease,¹⁸² as are a history of chronic kidney disease and hypercholesterolemia.¹⁸³ In fact, cardiovascular disease is the most life-threatening of the diabetic complications and diabetics are two- to four-fold more likely to die of cardiovascular-related causes than non-diabetics.¹⁸⁴⁻¹⁸⁶

2.5.3 Screening

Screening using the blood pressure measurement, ECGs (either at rest or with exercise) are not recommended in those without symptoms who are at low risk.¹⁸⁷ This includes those who are young without risk factors.¹⁸⁸ In those at higher risk the evidence for screening with ECGs is inconclusive.¹⁸⁹

Additionally echocardiography, myocardial perfusion imaging, and cardiac stress testing is not recommended in those at low risk who do not have symptoms.¹⁹⁰

Some biomarkers may add to conventional cardiovascular risk factors in predicting the risk of future cardiovascular disease; however, the clinical value of some biomarkers is questionable.^{191,192}

The NIH recommends lipid testing in children beginning at the age of 2 if there is a family history of heart disease or lipid problems.¹⁹³ It is hoped that early testing will improve lifestyle factors in those at risk such as diet and exercise.¹⁹⁴

2.5.4 Prevention

Up to 90% of cardiovascular diseases such as hypertension may be preventable if established risk factors are avoided.¹⁹⁵⁻¹⁹⁶ Currently practiced measures to prevent hypertension include:

- i. A low-fat, high-fiber diet including whole grains and fruit and vegetables.¹⁹⁷⁻¹⁹⁸ Five portions a day reduces risk by about 25%.¹⁹⁹
- ii. Tobacco cessation and avoidance of second-hand smoke.¹⁹⁷
- iii. Limit alcohol consumption to the recommended daily limits;¹⁹⁷ consumption of 1–2 standard alcoholic drinks per day may reduce risk by 30%.²⁰⁰⁻²⁰¹ However, excessive alcohol intake increases the risk of hypertension /cardiovascular disease.²⁰²
- iv. Lower blood pressures, if elevated.
- v. Decrease non-HDL cholesterol.²⁰³⁻²⁰⁴
- vi. Decrease body fat if overweight or obese.²⁰⁵
- vii. Increase daily activity to 30 minutes of vigorous exercise per day at least five times per week (multiply by three if horizontal);¹⁹⁶

- viii. Reduce sugar consumptions.
- ix. Decrease psychosocial stress.²⁰⁶ This measure may be complicated by imprecise definitions of what constitute psychosocial interventions.²⁰⁷ Mental stress-induced myocardial ischemia is associated with an increased risk of hypertension, heart problems in those with previous heart disease.²⁰⁸ Severe emotional and physical stress leads to a form of heart dysfunction known as Takotsubo syndrome in some people.²⁰⁹ Stress, however, plays a relatively minor role in hypertension.²¹⁰ Specific relaxation therapies are of unclear benefit.²¹¹⁻²¹²
- x. Diet. A diet high in fruits and vegetables decreases the risk of hypertension/ cardiovascular disease and death.¹⁹⁶ Evidence suggests that the Mediterranean diet may improve cardiovascular outcomes.²¹⁵ There is also evidence that a Mediterranean diet may be more effective than a low-fat diet in bringing about long-term changes to cardiovascular risk factors (e.g., lower cholesterol level and blood pressure).²¹⁷ The DASH diet (high in nuts, fish, fruits and vegetables, and low in sweets, red meat and fat) has been shown to reduce blood pressure,²¹⁸ lower total and low density lipoprotein cholesterol²¹⁹ and improve metabolic syndrome;²²⁰ but the long-term benefits outside the context of a clinical trial have been questioned.²²¹ A high fiber diet appears to lower the risk.²²²
- xi. Medication; Aspirin has been found to be of only modest benefit in those at low risk of heart disease as the risk of serious bleeding is almost equal to the benefit with respect to cardiovascular problems.²²³ In those at very low risk it is not recommended.²²⁴ Statins are effective in preventing further cardiovascular disease in people with a history of cardiovascular disease.²²⁵ As the event rate is higher in men than in women, the decrease

in events is more easily seen in men than women.²²⁵ In those without cardiovascular disease but risk factors statins appear to also be beneficial with a decrease in the risk of death and further heart disease.²²⁶ A United States guideline recommends statins in those who have a 12% or greater risk of cardiovascular disease over the next ten years.¹⁹⁷⁻¹⁹⁹

- xii. Supplements: While a healthy diet is beneficial, in general the effect of antioxidant supplementation (vitamin E, vitamin C, etc) or vitamins has not been shown to protection against cardiovascular disease and in some cases may possibly result in harm.²⁰⁰⁻²⁰² Mineral supplements have also not been found to be useful.²⁰³ Niacin, a type of vitamin B3, may be an exception with a modest decrease in the risk of cardiovascular events in those at high risk.²⁰⁴⁻²⁰⁵ Magnesium supplementation lowers high blood pressure in a dose dependent manner.²⁰⁶ Magnesium therapy is recommended for patients with ventricular arrhythmia associated with torsades de pointes who present with long QT syndrome as well as for the treatment of patients with digoxin intoxication-induced arrhythmias.²⁰⁷ Evidence to support omega-3 fatty acid supplementation is lacking.²⁰⁸

2.5.5 Management

Hypertension is treatable with initial treatment primarily focused on diet and lifestyle interventions¹. Initiation of treatment: consider absolute risk of CVD. Treatment targets: control BP to normal: SBP <130 and DBP <85 mmHg .Non-pharmacologic: Lifestyle modification, Pharmacologic: drug selection. Major classes: A = ACEI, ARIIB B = β -adrenoceptor blockers C = calcium channel blockers D = diuretics Others: alpha receptor blockers, direct vasodilators, etc

CHAPTER THREE

METHODOLOGY

3.1 Study Area

Kano State is one of the seven states in the North West geo-political zone of Nigeria. The state is located on latitude 12⁰ 37' North, 9⁰ 29' East, 9⁰ 33' South and 7⁰ 43' West. It was created along with eleven other states and formally came into being on April 1, 1968. It has a daily mean temperature of 30 to 33°C during March-May. Lowest temperature is 10°C during the months of September to February. The rainfall pattern is uni-model; with an average rainfall of 600 mm. Kano State has a total land area of 20,760 square kilometres.

The State is arguably the most homogeneous in the Nigerian Federation. The state has 44 local government areas. It shares borders with Kaduna State to the west, Katsina State to the North-west, Jigawa State to the east, while Bauchi State is on the eastern boundary. It is the most populous State in the federation with a projected population of 10,685,000 people (2010 projection from 2006 Census) and has population of about 50,000 civil servants from hundred Ministries, Departments and Agencies (MDAs). There is almost equal distribution of male (51%) and female (49%). Majority of the people of Kano State are Hausa and Fulani with a large number of other ethnic nationalities. This is what has made Kano a cosmopolitan State with alot of antecedent traffic congestion, rapid urbanisation, exposure to tobacco smoking leading to increase stress related diseases such as hypertension and other cardiovascular diseases.

3.2 Study Design

A descriptive cross-sectional study was conducted among civil servants in Kano State.

3.3 Study Period

The study was conducted from December, 2013 to October, 2014. See Work plan (Appendix V).

3.4 Study Population

The study population are confirmed civil servants working with Kano state Government, at state level during the study period.

3.4.1 Inclusion criteria

Confirmed civil servants aged 18-60 years who consented to partake in the study.

3.4.2 Exclusion criteria

Those Civil servants that are sick, unconfirmed (less than 6months with employment and casual staff).

3.5 Sample Size Determination

The sample size was determined using the formula

$$\{n = Z^2 \times P \times (1-P) / d^2\}^{(47)}$$

Where n - minimum sample size required;

$Z_{1-\alpha/2}$ is the standard normal deviation corresponding to 5% level of significance (0.05).

The value of $Z_{1-\alpha/2}$ obtained from the normal distribution table was 1.96;

P= prevalence of hypertension in Nigeria, 20%⁽⁵¹⁻⁵³⁾

d = absolute precision (0.05) i.e. we would like the result to be within 5% of the true value

Substituting the values

$$\begin{aligned} n &= (1.96)^2 \times (0.02) \times (0.98) / (0.05)^2 \\ &= 3.842 \times 0.0196 / 0.0025 = 244 \end{aligned}$$

Adding 10% to cater for non response (NR):

$$n = n / (1 - \text{NR}) \quad \text{where } n - \text{sample size, NR} - \text{non response}$$

$$\begin{aligned} n &= 244 / (1 - 10\%) \\ &= 266 \end{aligned}$$

Design Effect of 2 was added to increase the sample size to 536.

3.6 Sampling Technique

A multistage sampling technique was used as follows:

Stage 1: The 25 Ministries/Parastatals selected by simple random sampling from the sampling frame (List of all the Ministries/Parastatals).

- The Sample size was allocated (536) among selected ministries, by using proportional allocation.

The MDAs and their sample Allocation is as follows:

| MDAs | Sample allocation (n=526) | Percent (%) |
|--|---------------------------|-------------|
| Office of the head of Civil Service | 11 | 2 |
| Education | 40 | 8 |
| Finance | 25 | 5 |
| Budget & Planning | 20 | 4 |
| Audit | 25 | 5 |
| Information | 25 | 5 |
| Health | 35 | 7 |
| Agriculture | 35 | 7 |
| Cabinet Office | 15 | 3 |
| Environment | 30 | 6 |
| Commerce and Industry | 25 | 5 |
| Justice | 20 | 4 |
| State House of Assembly | 15 | 3 |
| Women Affairs & Social Development | 20 | 4 |
| Kano State Independent Electoral commission | 15 | 3 |
| Land & Physical Planning | 15 | 3 |
| Hisbah Board | 15 | 3 |
| Works & Housing | 20 | 4 |
| Local Government and Chieftaincy Affairs | 20 | 4 |
| Revenue Board | 15 | 3 |
| Hospital Management Board | 20 | 4 |
| Water Resources | 20 | 4 |
| Pilgrims Welfare Board | 15 | 3 |
| Karota | 15 | 3 |
| Pension Board | 15 | 3 |

Stage 2: The respondents were selected from the list (payroll) of all staff in the chosen ministries using the systematic sampling, after obtaining the sampling interval (sampling frame/sample size sampling technique was employed in this case). $K=18.6$

3.7 Study Instrument

A WHO modified STEPS [www.who.int/chp/steps/instrument/en] semi-structured interviewer administered questionnaire was adapted and used for data collection in the study. It has 4 sections (1-4)

Step 1: Demographic; Sex, Age, Education, Marital Status, and Occupation.

Step 1: Behavioral measurements: Tobacco use, Alcohol use, Diet, Physical activity, Travel history, Recreational activities, and sedentary behavior.

Step 2: Physical measurements: Height and Weight, Waist circumference, Blood pressure, Hip circumference and Heart rate.

Step 3: Biochemical measurements: Blood glucose, Blood lipids, Triglycerides and HDL cholesterol.

Step 4: Awareness and Knowledge of hypertension/ cardiovascular diseases.

The questionnaire was translated to the local language (Hausa) and then back to English.

3.7.1 Community Entry

Advocacy visit was paid to the office of the Head of civil service with a formal request to conduct the study among the ministries, departments and agencies (MDA) under him and he welcomed the proposal. He instructed the Director Administration and General Services who issued a circular that notified all the selected ministries through their heads.

3.8 Data Collection Methods

Four interviewers who were Senior Community Health Extension Workers (SCHEWs) were recruited and trained. They were trained on two occasions to make sure that they understood each and every question and can measure the anthropometrics of the respondents. The researcher pre-tested the questionnaire in the office of the head of civil service Audu Bako Secretariat which is the central location of majority of the MDAs. Forty questionnaires were pre-tested and were answered easily.

Information on demographic, behavioural, physical, biochemical measurements as well as awareness and Knowledge was collected using the questionnaire described above (translated to local dialect).

3.8.1 Blood pressure measurement

Blood pressure (BP) was measured with the participants seated for at least five minutes in a calm and quiet place with the arm supported at the level of the heart using a standard Sphygmomanometer (ACCOSON^R) of appropriate size of cuff, both arms were measured at first encounter, and arm that gave higher reading was used subsequently. The cuff was rapidly inflated to determine the pulse obliteration pressure, then quickly deflated, then re-inflated to the same point and slowly deflated to measure the BP. The first appearance of repeated sounds and the disappearance of the sounds correspond to the systolic and diastolic points respectively. The readings were recorded to the nearest 2mmHg and two readings separated by interval of at least 2 minutes and the average taken and if the first two readings differ by more than 10mmHg additional readings was obtained.²⁰⁹

3.8.2 Measurement of Height

Standing height was measured without shoes to the nearest 0.1 cm at all sites using stature metre.²¹⁰

3.8.3 Measurement of weight

Weights were standardised using a standard 2.5kg metal plate and measured to the nearest 0.1 kg using a calibrated portable weighing scale Seca 750 (Vogel & Halke, Hamburg, Germany), with participants wearing light clothes. Body Mass Index (BMI) was calculated as weight (kg)/height (m)².²¹⁰ BMI is a measure of body fat based on height and weight commonly used to classify by WHO as underweight(> 18.5), Normal (18.5-24.9) overweight (25-30) and obesity(> 30) in adults.

3.8.4 Measurement of hip and waist circumferences

The waist circumference was measured with inelastic tailor's tape as the horizontal level at the midpoint between the iliac crest and the lower costal margin with minimal clothes on. Hip circumference was recorded as the horizontal level of maximum circumference around the buttocks to the nearest 0.5cm, Waist-Hip ratio was calculated as Waist circumference (cm)/ Hip circumference (cm).²¹¹ Normal (0.8 women,<0.9 men), Overweight (women 0.8-0.84; men 0.9-0.99),Obese (women >0.85; men >1)²

3.9 Sample Collection

Blood samples were drawn from a forearm vein with the participant seated and relaxed using full aseptic technique. The samples were put into fluoride oxalate (glycolytic inhibitor) containers and kept on ice packed cool box and was transported within 1 hour of collection to the chemical pathology laboratory of Aminu Kano Teaching Hospital (AKTH) (about 2 km from survey sites) for plasma glucose estimation.

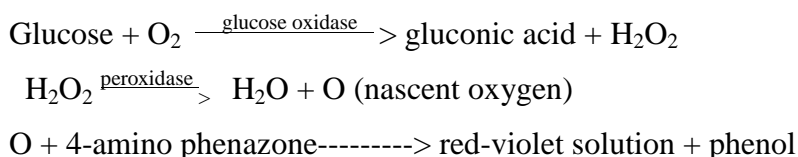
3.9.1 Laboratory procedures

Blood collection and processing

Under strict aseptic conditions, after cleaning the blood collection site thoroughly by the researcher with 70% alcohol, with the help of an assistant five milliliters of venous blood was drawn by venepuncture using a 21G hypodermic needle into a clot gel activator tube. Samples were separated by centrifugation at 1000 revolutions per minute for 10 minutes. The sera obtained was be transferred into appropriately labeled plain containers and frozen at -20°C in a non-defrosting freezer until the time of analysis. The samples were analyzed in batches twice weekly. Concentrations of serum Total cholesterol (TC), Low density lipoprotein cholesterol (LDL-C), High density lipoprotein cholesterol (HDL-C) and triglycerides were measured using enzymatic assays. Total cholesterol was measured by the enzymatic endpoint assay method described by Allan et al.²¹² High density lipoprotein-cholesterol was measured also by the enzymatic endpoint method described by Allan et al, after the precipitation of cholesterol in LDL, VLDL and chylomicron fractions by the action of phosphotungstic acid in the presence of magnesium ions. Triglyceride was estimated by the enzymatic colorimetric method of McGowan et al. Low density lipoprotein cholesterol levels was calculated from the levels of total cholesterol, HDL-C and triglycerides, using the Friedwald et al's formula.²¹³

3.9.2 Plasma glucose estimation

Plasma glucose (Serum glucose) were estimated by glucose oxidase method as modified by Sanders et al respectively was estimated, through the glucose-oxidase method of Trinder, using 4-amino phenazone as Oxygen acceptor.²¹⁴ The principle of the test is as follows:



Glucose oxidase promotes the oxidation of glucose to gluconic acid with the production of an equivalent amount of hydrogen peroxide. In the presence of peroxidase, O₂ from H₂O₂ is transferred to an acceptor in this case 4-amino phenazone with the production of a colour complex, the intensity of which is proportional to the concentration of glucose concentration in the plasma sample.

3.10 Statistical Analyses

Univariate analysis was conducted, frequencies and proportions computed. Prevalence was determined by descriptive analysis. Bivariate analysis using Chi square test at 95% confidence interval and multivariate logistic regression analysis was conducted to examine the association between dependent variable and some risk factors of hypertension (cardiovascular disease). A p-value of ≤ 0.05 was considered significant. Tables, proportions and percentages as well as charts were used to summarize data obtained from the study. Epi-Info version 3.5.4 and Microsoft Excel were used for data analysis. Knowledge total score was 8 points which was graded as 0-2 as poor, 3-4 fair and 5-8 as Good, adapted from similar work.⁵

3.11 Ethical Consideration

3.11.1 Ethical clearance

Ethical approval was obtained from The Ethical Review Committee of the Kano State Ministry of Health. Also permission from the office of the head of civil servants was obtained that ensured full cooperation of study participants.

3.11.2 Informed consent

During the exercise written informed consent was sought, no names were collected only Ids. Respondents have right to withdrew anytime without prejudice. Confidentiality and privacy was

maintained as interview was conducted in a conducive and private offices .Those with elevated results were counselled and treated with free Anti-hypertensives while some were referred to Muhammed Abdullahi Wase Specialist Hospital (MAWSH) to receive proper medical attention. Data was kept and stored securely in a password locked personal computer.

3.12 Limitations

Dietary level of salt intake and monosodium glutamate was not assessed. Diagnosis of diabetes and high cholesterol was made on only single fasting blood test. Also Lack of funds limited the number of test to be conducted especially Troponin.

CHAPTER FOUR

RESULTS

A total of 536 participants were recruited for the study from twenty five (25) selected ministries of Kano state, but only 520 finally participated in the study giving a response rate of 97.0% and the results were presented below.

Table 1a: Socio-demographic profile of the respondents among civil servants of Kano, State, Nigeria, 2014

| Variable | Frequency (n=520) | Percent (%) |
|---------------------------|-------------------|-------------|
| Gender | | |
| Male | 438 | 84.2 |
| Females | 82 | 15.8 |
| Age Group (years) | | |
| <25 | 19 | 3.7 |
| 25-29 | 35 | 6.7 |
| 30-34 | 61 | 11.7 |
| 35-39 | 63 | 12.1 |
| 40-44 | 92 | 17.7 |
| 45-49 | 97 | 18.7 |
| Monthly Income (₦) | | |
| <18000 | 2 | 0.4 |
| ≥18000 | 518 | 99.6 |

Majority of the participants were males (84.2%) while females accounted for only 15.8%, mean age was 43.0±9.9 years. Almost all the respondents (99.2%) had monthly income greater than the minimum wage of ₦ 18000 while only 0.4% of them received less than that.

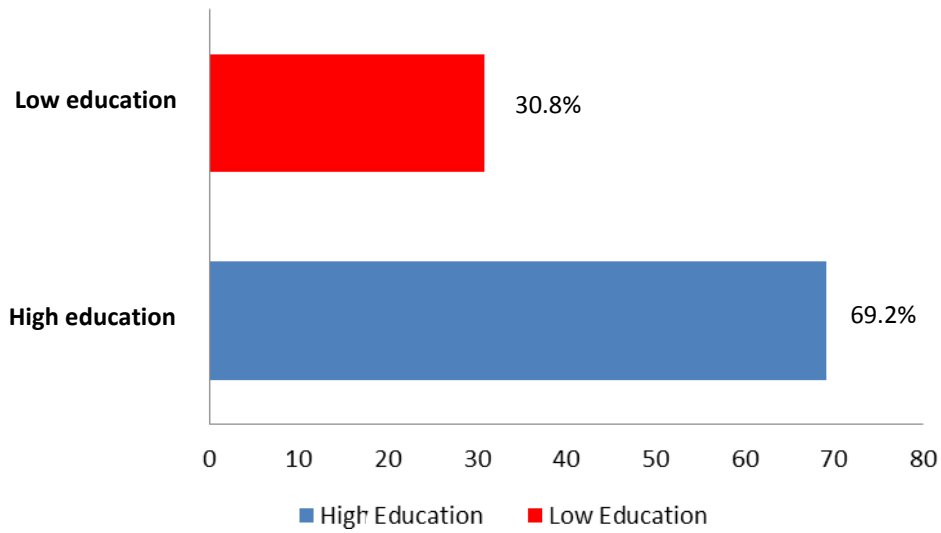


Figure 1: The percentage of respondents by their Tertiary Education

Figure 1 Shows civil servants with higher level of education accounted for 69.2%, while those with low level are 30.8%.

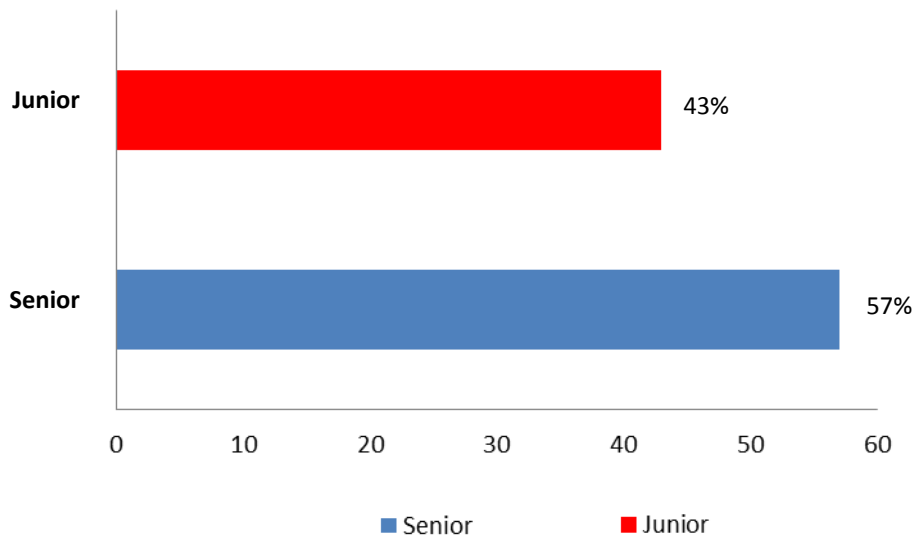


Figure 2: The percentage of the respondents by Cadre (Grade level)

The figure showed the distribution of the respondents' grade levels/ cadre, in which 296 (57%) of them were senior staffs while 224 (43%) were junior staffs respectively.

Table 1b: Socio-demographic characteristics of participants

| Variable | Frequency | Percent (%) |
|-------------------------|-----------|-------------|
| Marital Status | | |
| Never Married | 60 | 11.5 |
| Currently Married | 437 | 84 |
| Divorced | 5 | 1 |
| Widowed | 7 | 1.3 |
| Missing | 11 | 2.1 |
| Ethnic Group | | |
| Hausa | 464 | 89.2 |
| Fulani | 54 | 10.4 |
| Others | 2 | 0.4 |
| Female WH ratio | | |
| High | 80 | 98.8 |
| Normal | 1 | 1.2 |
| Male WH ratio | | |
| High | 412 | 99.3 |
| Normal | 3 | 0.7 |
| Vegetable intake | | |
| Adequate | 63 | 12.1 |
| Inadequate | 457 | 87.9 |
| Fruit intake | | |
| Adequate | 88 | 16.9 |
| In adequate | 432 | 83.1 |

Majority of respondents 89.2% were Hausa, Fulani (10.4%) and other tribes (0.4%), similarly currently married accounted for 84%, divorced 1% and widowed 1.3% respectively. Knowledge score indicated only 0.8% had good knowledge of risk factors associated with hypertension, 49.5% had fair knowledge while 49.8% had poor knowledge score. Higher percentage of respondents reported not taking adequate fruits (83.1%) and Vegetables (87.9%).

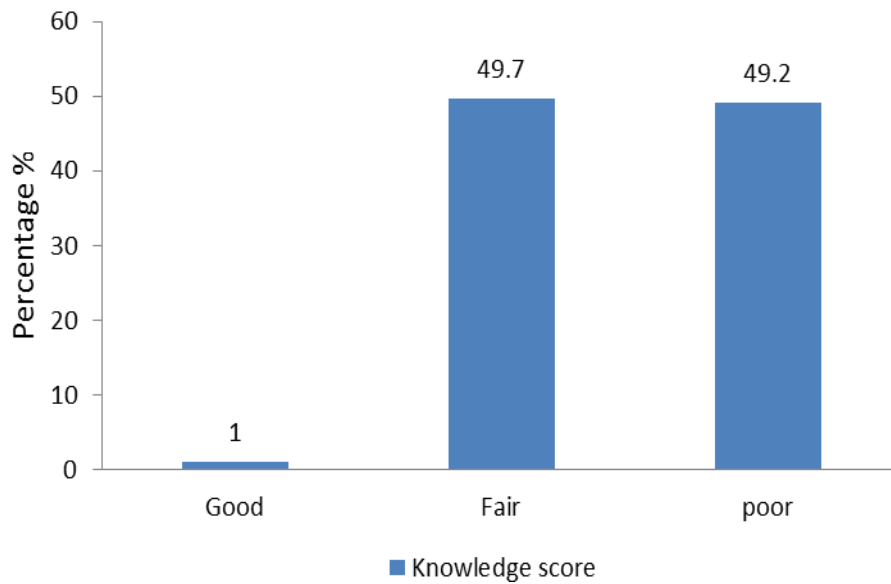


Figure 3: Respondents knowledge on major risk factors of Hypertension/ Cardiovascular Disease

The figure showed the respondents knowledge scores on the risk factors for developing hypertension/cardiovascular disease which indicated poor (49.2%) and fair (49.7%) scores, only very few (1%) had knowledge of the major risk factors of hypertension.

Table 2: The prevalence of Hypertension, Diabetes/Impaired Fasting Glycaemia and Abnormal body weights among respondents n=520

| Variables | Present (%) | Absent (%) |
|-------------------------------------|---|-----------------------|
| Systolic Hypertension | 138 (26.5) | 382 (73.5) |
| Diastolic Hypertension | 183 (35.2) | 337(64.8) |
| Diabetes / Impaired Fasting Glucose | 30(5.8) / 74(14.2) | 416(80) |
| BMI | Obesity 48 (9.2) Overweight 142 (27.3) Underweight 40 (7.7) | Overweight 290 (55.8) |

Keys: n, number of participants; HTN, Hypertensive; GL Cadre according to grade level; Income Level in Naira; FG, Fasting Glucose; II, Second Classification of Diabetes Mellitus; WH, Waist Hip ratio

The prevalence of some risk factors associated with hypertension among the respondents, 26.5% had systolic hypertension, 35.2% diastolic hypertension, while 5.8% had diabetes, and 9.2% were obese, 27.3% overweight and 7.7% are underweight respectively.

Table 3: Distribution of respondents' risk factors between hypertensive and non hypertensive

| Variable | Non-Hypertensive (%) n=382 | Systolic Hypertension (%) n=138 | P-Value |
|---|-------------------------------|------------------------------------|---------|
| Blood Sugar | | | |
| Normal | 323(84.6) | 93(67.4) | |
| Abnormal Sugar (Diabetes & Impaired FG) | 18(4.7) / 41(10.7) | 12(8.7) / 33(23.9) | 0.0001 |
| BMI (Kg/m²) | | | |
| Normal | 229(59.9) | 61(44.2) | 0.000 |
| Obese | 26(6.8) | 22(15.9) | |
| Over weight | 90(23.6) | 52(37.7) | |
| Underweight | 37(9.7) | 3(2.2) | |
| Knowledge levels | | | |
| Good | 4(1.0) | 0(0.00) | |
| Fair | 190(49.7) | 67(48.6) | 0.45 |
| Poor | 188(49.2) | 71(51.4) | |

Keys: n, number of participant; BMI, Body Mass Index; significance level of 5%

The result showed significant association between Diabetes Mellitus, Body Mass Index and Systolic Hypertension. However, participants' Knowledge of risk factors of hypertension was not found to be associated with Systolic Hypertension.

Table 4: Distribution of respondents' factors and diastolic hypertension

| Variable | Diastolic Hypertensive (n) | Non-Hypertension (n) | P-Value |
|--------------------------|----------------------------|----------------------|---------|
| Blood sugar Level | | | |
| Normal | 287(85.2) | 129(70.5) | |
| Diabetes & Impaired FG | 13(3.9) / 37(11.0) | 17(9.3) / 37(20.2) | 0.0003 |
| BMI categories | | | |
| Normal | 201(59.6) | 89(48.6) | |
| Obese | 22(6.5) | 26(14.2) | 0.0000 |
| Over weight | 78(23.1) | 64(35.0) | |
| Underweight | 36(10.7) | 4(2.2) | |
| Knowledge groups | | | |
| Fair | 161(47.8) | 96(52.5) | |
| Good | 4(1.2) | 0(0.0) | 0.2242 |
| Poor | 172(51.0) | 87(47.5) | |

Keys: n, number of participant; .BMI, Body Mass Index; P-value; significance level of 5%

Similarly, Diastolic Hypertension was found to be significantly associated with Diabetes Mellitus and Body Mass Index but not with participants' knowledge of risk factors of hypertension.

Table 5: Bivariate analysis of respondents related variables with Systolic hypertension

| Variables | Systolic HTN | Non-HTN | OR (95% CI) | P-Value |
|--|--------------|------------|---------------------------|---------|
| Age Group | | | | |
| <40 | 18(10.1) | 160(89.9) | | 0.000 |
| ≥40 | 120(35.1) | 222(64.9) | 4.80 (2.81- 8.21) | |
| Sex | | | | |
| Female | 20(24.4) | 62(75.6) | | 0.631 |
| Male | 118(26.9) | 320(73.1) | 1.14 (0.67- 2.01) | |
| Tertiary education | | | | |
| High education | 95(26.4) | 265(73.6) | | 0.908 |
| Low education | 43(26.9) | 117(73.1) | 1.03 (0.67- 1.56) | |
| Monthly income | | | | |
| <18000 | 1(50.0) | 1(50.0) | | 0.452 |
| ≥18000 | 137(26.4) | 381(73.6) | 0.36 (0.02 -5.79) | |
| Smoking | | | | |
| No | 114(25.0) | 342 (75.0) | 1.80 (1.04- 3.12) | 0.034 |
| Yes | 24(37.5) | 40 (62.5) | | |
| DM 2 | | | | |
| Diabetes | 12(40) | 18 (60) | | 0.085 |
| Non-Diabetes | 126(25.7) | 364 (74.3) | 0.52 (0.24- 1.11) | |
| Exercise days per week | | | | |
| Adequate | 10(40) | 15 (60) | 0.52 (0.23- 1.19) | 0.118 |
| Inadequate | 128(25.9) | 367 (74.1) | | |
| Vigorous intensity Activity at work | | | | |
| No | 126(25.9) | 360 (74.1) | 1.56 (0.75- 3.24) | 0.232 |
| Yes | 12(35.3) | 22 (64.7) | | |
| Moderate intensity Activity at work | | | | |
| No | 93(24.9) | 281(75.1) | 1.35 (0.88- 2.05) | 0.167 |
| Yes | 45(30.8) | 101(69.4) | | |
| Adequate fruit intake | | | | |
| Adequate | 26(29.5) | 62 (70.5) | 0.83 (0.50- 1.38) | 0.48 |
| Inadequate | 112(25.9) | 320 (74.1) | | |
| Adequate vegetable Intake | | | | |
| Adequate | 16(25.4) | 47(74.6) | 1.07(0.58- 1.95) | 0.828 |
| Inadequate | 122(26.7) | 335(73.3) | | |
| Serum uric acid | | | | |
| High | 22 (56.4) | 17(43.6) | 4.072 (2.691-7.93) | 0.00001 |
| Low | 116 (24.1) | 22(56.4) | | |

Keys: CI, confidence interval; DM, Diabetes Mellitus; significance level of 5%.

There was a significant increased risk of Systolic hypertension for those with advanced age (≥ 40), Smoking and High level of uric acid. While for male gender, low educational status, lack of vigorous intensity of activity at work, lack of moderate intensity of activity at work and inadequate vegetable intake were not statistically significant risk factors. However, monthly income, being non-diabetic, regular exercise per week, and adequate fruit intake were found to be protective factors.

Table 6: Bivariate analysis of respondents related variables with Diastolic HTN

| Variables | Diastolic HTN | Non-HTN | OR (95% CI) | P-Value |
|--|---------------|-----------|-------------------|---------|
| Age Group | | | | |
| <40 | 29(16.3) | 149(83.7) | 0.24 (0.51- 0.37) | 0.000* |
| ≥40 | 154(45) | 188(55.0) | | |
| Sex | | | | |
| Female | 28(34.1) | 54(65.9) | 2.55 (1.21- 5.38) | 0.829 |
| Male | 155(35.4) | 283(64.6) | | |
| Level of Education | | | | |
| High Education /Formal | 122(33.9) | 238(66.1) | 0.83(0.57-1.56) | 0.351 |
| Low Education/Informal | 61(38.1) | 99(61.9) | | |
| Monthly Income | | | | |
| <18000 | 1(50.0) | 1(50.0) | 1.85(0.12- 2.69) | 0.6604 |
| ≥18000 | 182(35.1) | 336(64.9) | | |
| Smoking | | | | |
| No | 153(33.6) | 303(66.4) | 0.57(0.34-0.97) | 0.037* |
| Yes | 182(35.1) | 34(53.1) | | |
| Diabetes | | | | |
| Diabetes | 17(56.7) | 13(43.3) | 2.55(1.21- 5.38) | 0.0112 |
| Non-Diabetes | 166(33.9) | 324(66.1) | | |
| Vigorous intensity Activity at work | | | | |
| No | 165(34) | 321(66.0) | 0.46 (0.23-0.91) | 0.025* |
| Yes | 18(52.9) | 16(47.1) | | |
| Moderate intensity Activity at work | | | | |
| No | 125(33.4) | 249(66.6) | 0.76(0.51-1.13) | 0.176 |
| Yes | 58(39.7) | 88(60.3) | | |
| Adequate | 36(40.9) | 52(59.1) | 1.34 (0.84- 2.15) | 0.218 |
| Inadequate | 147(34.0) | 285(66.0) | | |
| WH ratio | | | | |
| High | 169(34.3) | 323(65.7) | 1.57 (0.16-15.2) | 0.695 |
| Normal | 1(25.0) | 3(75.0) | | |
| Adequate vegetable intake | | | | |
| Adequate | 21(33) | 42(66.7) | | 0.742 |
| inadequate | 162(35.4) | 295(64.8) | | |
| Serum uric acid | | | | |
| High | 24(61.5) | 15(38.5) | | 0.0003* |
| Normal | 159(33.1) | 322(66.9) | 3.24(1.65-6.35) | |

Keys: DM, Diabetes Mellitus; WH, Waist Hip; CI, confidence interval; significance level of 5%.

Table 6; Showed the Odds Ratio, CI and P-value of the association between participants' characteristics and Diastolic Hypertension: The participants' sex (male) and Diabetes Mellitus were found to have significantly increased risk of Diastolic hypertension. Although, low monthly income, adequate fruit intake and high Waist Hip ratio association with Diastolic Hypertension, were not significant. Meanwhile, young age, high educational status, non-smoking status, vigorous intensity of activity at work, and moderate intensity of activity at work, were non-significantly found to reduce the risk of Diastolic Hypertension.

Table 7: Predictors of hypertension a major cardiovascular disease

| Variables | AOR | (95% CI) |
|---------------------------|------|----------------|
| Age, >40 years | 4.10 | (2.44 - 7.11) |
| BMI >31 | 2.47 | (1.57 - 3.66) |
| Lack of vigorous activity | 2.31 | (1.24 - 5.04) |
| High Serum Uric acid | 3.21 | (1.55- 6.59) |

Multivariate analysis revealed being older than 40 years (AOR: 4.10; 95% CI: 2.44 - 7.11), having BMI >31(AOR: 2.47; 95% CI: 1.57-3.66), lack of vigorous activity (AOR: 2.31; 95% CI: 1.24 - 5.04), and a high serum uric acid (AOR: 3.21; 95% CI: 1.55-6.59) as independent risk factors of hypertension.

FOCUS GROUP DISCUSSION (FGD) RESULTS

Focus group discussion conducted complemented the study and further gave insight to the level of Knowledge of hypertension /CVD among civil servants from the results of thematic contents analysis.

Question 1: What do you know about cardiovascular disease?

"Disease which occur as a result of eating habit or eating and sleeping habit due to the poor digestion"

"Disease which usually occur as a result of lack of rest, over thinking"

"Disease of over thinking"

"Some of the people inherit the disease from their parent"

"Over thinking and over – activities"

"Hereditary factor, because I saw one child who was delivered with such disease of cardiovascular"

"Adult can obtain it due to the over-thinking"

"Diseases that affect the lungs or rather chest"

"Diseases that affect directly the heart"

"Disease which is mostly found is the blood"

"Disease that is going through the heart"

"Disease that is transmitted or non transmitted disease that affect heart, blood vessel"

"Disease affecting the organs or body in general having deal with issue of hypertension or cholesterol or diabetes"

"Disease normally affects the function of the heart or beating slowly or higher beating"

"...those that are responsible for abnormal heart beat, hypertension etc. these heart diseases can be caused by the types of foods we are eating as human – being.."

"Caused by the types of food we are eating or an imported beverages or social interaction as you will see some body with diseases and can communicate it to another."

"Abnormal heart beat is caused by anxiety or stress, yet is a discuss of anxiety"

"Like blood vessels, the lack of ways that will allow free flow of blood, like exercises, or food that will potential the heart activities and good blood circulation,

"Terrible events is the cause of abnormal heart beat"

"Anxiety, is cause; yet, but some certain sickness may cause these sickness"

"You may get somebody with hypertension, but as a result of anxiety, his heart may be affected"

"You may get somebody with hypertension, but as a result of anxiety, his heart may be affected"

"A sick person may go on wrong medication and it can cause this"

QUESTION 2: What is the cause of cardiovascular disease in this environment?

"Over – age"

"Much eating of delicious food without exercise"

"Come temporarily during pregnancy and disappear after delivery"

"Is a hereditary disease"

"Happened to the people whose has lack of sugar or insulin in their body"

"Inability of the human body to catabolize insulin"

"Lack of sugar or sugar is above normal the limit"

QUESTION 3: What do you know about obesity or hyperlipidemia or hyper cholesterol?

"Disease which occur due to the eating of oily food or delicious food without exercise"

"Oily food where the body start to deposit a lot of sugar leading the body to definitely become obese."

"Increase in body size or person growth above normal"

"Too much eating"

"Hereditary"

"Lack of exercise"

"The blood"

"Abnormal increase of the fibric and fat into calories, abnormal increase"

"Increase of the fat, or over size"

"Reversed over size of the body"

"Excessive feeding of individual or fat usually increase height and weight"

"Modern eating habit can caused obesity"

QUESTION 4: What do you know about hypertension?

"Children and adult who put themselves into too much trouble or is a disease of too much thinking"

"Is the rise of blood pressure above normal"

"About | blood pressure by the inflow of the blood through the heart and the brain"

"Something disturb his brain, his heart, his heart is not at rest, always continue thinking, so the blood pressure will go high against the level that is normal"

"Level of blood pressure is beyond the normal person but it can be lower and more dangerous"

"Situation that is uncontrollable"

"It's a diseases that caused by worried about something which stay in mind without solution"

"It's the same as diabetes mellitus, as the disease of heritage"

"Hypertension is a disease of heritage"

"Previously its affect not affecting under-age"

"It mostly, affect people around age of forty to forty years or older"

"Hypertension its disease that is associated old-age"

"Hypertension is an anxiety"

"About | blood pressure by the inflow of the blood through the heart and the brain"

"Something disturb his brain, his heart, his heart is not at rest, always continue thinking, so the blood pressure will go high against the level that is normal"

"Abnormalities of the blood system in the body"

QUESTION 5: What are the relationships between diet, smoking, alcohol consumption and the risk of causing all these diseases?

"People who are using alcohol usually end up with heart attack, because the alcohol enter into the blood circulation"

"Smoking entered the lungs causing the diseases to both side"

"Smoking and alcohol consumption can lead to serious heart problem lungs and causing coginatal effect"

"Reduce too much thinking in our mind"

"An alcohol consumer & smoker may easily be affected with diabetes, hypertension and even if there is regular exercise"

"Canned food are usually causing some diseases"

"You at risk of these diseases"

"Cigarette smoking is the cause of many diseases, especially, diabetes mellitus"

"Smoking cigarette and eating colanut they are highly hazardous, even if they not potentiate diabetes mellitus and hypertension, they may cause other diseases"

"It's the uncontrolled diet that cause all these sickness."

"Smoking may lead to excessive coughing"

"Smoking may lead to excessive coughing"

"Smoking, alcohol consumption are usually has the responsibilities of causing abnormal behaviours"

"It also affects the heart seriously"

QUESTION 6: What are the major factors of causing or aid cardiovascular diseases in our environment?

"Frustration"

"Industrial pollution"

"Over heating or using hot water when bathing after delivery"

"Chest pain due to the eating of hot food"

"Eating of spicy food"

"Hypertension can also affect heart and course cardiovascular disease"

"People who had hypertension and diabetic, usually their heart are swollen and goes down by itself, condition may lead to cardiovascular disease"

"Improper taking of drugs"

"Lack of rest can lead"

"Infection"

QUESTION 7: What do you think about life-style, smoking, and potential risk of DM, HPT and obesity?

"Those who are eating food and sleep, without waiting to start digesting, will cause these"

"Take food with out adequate arrangement. These can cause so many things."

"I am taking many types of food directly, before, but I was advised by doctor, and re-arrange my food and now I am getting very much development"

"Landlord gives immediate noticed and will cause anxiety and will be with one of these diseases."

"If you are from influential family then later you became poor, the life have changed to another" condition, and may become with various things"

"...belong to poor family and letter became richer, you must change your types of food and lifestyle to the situation that you may be affected with these disease"

"An alcohol consumer & smoker may easily be affected with diabetic hypertension and even if there is regular exercise"

"Smoking and alcohol consumption a great effect on life style"

"Lifestyle is a major cause of causing diabetic, hypertension"

"Alcohol consumption food and smoking may also increase the risk of causing damage of lungs, heart etc"

QUESTION 8: What recommendations can you make on CVDs to the researcher and the state government through the office of the head of civil service Kano?

"Government, should take responsibility of free routine medical check-up to the civil servant"

"Government should support the program and assist with drugs"

"Public enlightenment is good through media like radio, television"

"Government support continuous periodic free medical check-up and assist with drugs"

"...make the head of civil servant office as a centre"

"Doctors to volunteer themselves for this program"

"Government should support and assist its sick staff in time when money is needed"

"Government should punished any staff that may cause delay in the process of assisting a sick person"

"Patience (for doctors) as your work is a services of endurance, he will see foolishness"

"Head civil service office to resuscitate the services of the head of civil service staff clinic"

"Government to zones staff clinics for the health services"

"Introduce health insurance scheme to all"

"Raising awareness to the civil servant and how to eat balance diet, exercise and avoiding of oily food"

"Monthly or yearly civil servant medical check up should be provided"

"Security involvement which may definitely help in reducing the higher risk of youth in a matter of smoking and alcohol consumption"

"New topic in the primary secondary and tertiary level new topic on health related matter should be created so to avoid negligence of health from the beginning"

"Exercise field should be provided to the government for both male & female in every ministry"

"Government to create workshop/seminars to the civil servant and youth on how to prevent themselves from getting all these diseases"

"Government should provide adequate health education monthly or every 3-3 months to every ministry and companies"

"Government to atleast build a staff clinic to every ministry for regular check-up"

CHAPTER FIVE

DISCUSSIONS

African countries are experiencing an unprecedented epidemic of CVDs. Hypertension is the key driver of these cardiovascular complications. Whereas hypertension almost did not exist in native African populations in the first half of the twentieth century, high blood pressure now affects between 20-40% of these populations.⁵² Lowering blood pressure and controlling hypertension is key to preventing CVD. Many countries in Africa are undergoing a rapid demographic and epidemiologic transition.²⁶ While much attention in the region has been focused on communicable diseases such as malaria, tuberculosis, and HIV/AIDS, changes in demographic and determinants of health, particularly changes in lifestyle associated with urbanization, have resulted in an epidemiological and nutrition transition towards a greater prevalence of non-communicable diseases. The dual burden of persistent infectious diseases and emerging chronic diseases such as hypertension, poses a serious threat to population health in the region.¹¹¹ Prevalence and incidence of both hypertension and prehypertension are high. Efforts to prevent or attenuate high blood pressure could lead to a substantial reduction of complications. Lifestyle modifications play a crucial role in preventing elevation of and better control of high blood pressure. Weight loss, control of sodium intake and diet, and promoting physical activity are essential steps towards this direction. However, when medications are needed to reduce blood pressure levels, the selection of the appropriate drugs is important not only for effective control but also to minimize side effects.¹⁰³

Previous studies corroborated that burden of hypertension/CVD is largely the result of an increase in the prevalence of the determinants and major risk factors whose onset and presence are usually insidious and asymptomatic.¹⁴⁰

In this study, out of the 520 respondents, 438 (84%) were males while females accounted for 15.8%. Men are at greater risk of hypertension and its complications than pre-menopausal women.¹³⁵⁻¹³⁶ A study reported that, gender differences explains half the risk associated with cardiovascular disease and a proposed an explanation for gender differences is hormonal.¹⁴⁰ Estrogen is the predominant sex hormone among women, and may have protective effects through glucose metabolism and hemostatic system, and may have direct effect in improving endothelial cell function. Once past menopause, it has been argued that a woman's risk is similar to a man's¹³⁶ although more recent data from the WHO and UN disputes this.¹³⁷ If a female has Hypertension, she is more likely to develop heart disease than a male with hypertension.¹³⁸

The age distribution of respondents ranged from 18 to 65 with a mean of 43.0 ± 9.9 years. One of the multiple explanations proposed to explain why age increases the risk of hypertension, {cardiovascular / heart diseases are related to serum cholesterol level}.¹³³ In most populations, the serum total cholesterol level increases as age increases. In men, this increase levels off around age 45 to 50 years while in women, the increase continues sharply until age 60-65 years¹³³.

Aging is also associated with changes in the mechanical and structural properties of the vascular wall, which leads to the loss of arterial elasticity and reduced arterial compliance and may subsequently lead to coronary artery disease.¹³⁴

The prevalence of Systolic and Diastolic hypertension were 138 (26.5%) and 183 (35.2%), while diabetes mellitus, obesity, and overweight, were 30(5.8%), 48(9.2%) 142(27.3%) respectively. In a similar study from North-western Nigeria, revealed that hypertension is the most prevalent CVD while heart failure followed by hypertension in the South-west.²²⁶ Another

study showed that civil servants have similar risk to black Americans in developing hypertension²²⁶. Hypertension is the most common CVD globally and a public health challenge in many developing countries including Nigeria,⁶⁹⁻⁷¹ as reported also in this work.

The overall prevalence of Systolic (26.5%) and Diastolic hypertension (35.2%) and obesity (9.2%) in this study was similar to 29.7% reported⁵³ but higher 47.2% by.⁵¹ The Prevalence of Type 2 Diabetes Mellitus in this study was 5.8% which is higher than 2.2%-2.8% reported by Nigeria Health Review 2010¹²⁵ and also higher than 5.0% estimates for Nigeria by the International Diabetes Federation (IDF).⁵³ It is possible that the high prevalence of hypertension which is one of the important risk factors for Type 2 DM and the older nature of the study population, coupled with low physical activity owing to sedentary nature of the civil servants and westernised life style and diet.²⁶

The few number of women among the respondents could be as a result of religious and cultural practices of the community, in which women were not encouraged to participate in white colour job, in similar study among Turkish population, women accounted for 46.7% of the respondents¹⁵⁶ likewise similar result was found in a study conducted at Nigerian university by Adeseye.¹⁵⁷

The Knowledge score of participants in the study was; poor 259(49.8%). Hypertension has been described as a disease of the African race⁷²⁻⁷³ and despite this high prevalence, many Nigerians do not know their blood pressure, neither do they have access to educational information and services required to treat and prevent the disease.⁷² In a study in Nigeria, the knowledge of hypertension was observed among men to be 7.7% and 8.7% among women but significantly higher among those who are hypertensive.⁷⁹ Knowledge about the etiology and management of

hypertension among workers are inadequate. Also it was found that, 73% university workers thought hypertension was caused by undue thinking, stress, or worries⁸⁰ and 89% of hospital workers in Abeokuta, correctly identified hypertension as a risk factor for cardiovascular disease and stroke.⁸¹

A previous study revealed that hypertensive patients had poor knowledge, which is similar to the finding in this study but 16.6% had good knowledge of hypertension prior to intervention.⁸²

A similar study revealed that, patients are generally knowledgeable about hypertension but that knowledge is usually not comprehensive especially in terms of specific factors that relate to their knowledge of risk factors associated with cardiovascular disease in this study among respondents was generally poor as only 0.8% had a good knowledge. This is similar to the study among LAUTECH university staffs¹⁵⁷ and the findings from Kuwait in which participants' knowledge of stroke symptoms was low; about half of respondents (47.8%) were not aware of any stroke symptoms, and only 10.4% could identify all symptoms of hypertension / cardiovascular disease.¹⁵⁸ In contrast, Angusta found that Filipino-Americans had adequate knowledge of hypertension and some complications with an average knowledge score of 82.8%.¹⁵⁹ The study revealed that individuals who have diabetes, hypertension and cardiovascular disease as well as family history of CVDs have high knowledge base about cardiovascular disease.¹⁵⁶

This gap in knowledge of symptoms associated with hypertension, cardiovascular diseases could be as a result of lack of awareness of risk factors which is not the case in United State of America as reported by.¹⁵⁶ Understanding the behavioural determinants of hypertension/ cardiovascular disease and specific risk factors is helpful in designing effective health prevention strategies. Early screening targeting the younger generation is also important to help detect the risk factors in their earliest stages.

The study also found significant association between body mass index with both systolic and diastolic hypertension, which was consistent with the findings of Ying on the study of young Chinese women.¹⁶⁰ Nadia in (1989 and 2004) compared data of cardiovascular disease and has found significant association between BMI and hypertension but the magnitude of the association has decreased overtime.¹⁶¹

Association between BMI and hypertension could be as a result of excess adiposity which is associated with a variety of health risks, including an increased incidence of cardiovascular events.¹⁶²

Another study reported that among men and women aged 30 through to 74 years, greater body weight are at increased risk of death from cardiovascular disease; however, the relative risk associated with excess weight was higher among younger ones.¹⁶³

In this manner Clinicians should emphasize the importance of weight management for the primary prevention of CVDs such as hypertension in men and women.

In this study, there was strong association between diabetes and hypertension among the participants this could be as a result of abnormal cholesterol and high triglycerides in diabetic patients; likewise obesity has been found to be associated with insulin resistance.¹⁴

A recent study shows that cardiovascular disease is the major cause of mortality in persons with diabetes and or hypertension and contributes to high prevalence of cardiovascular disease in up to 75%.¹⁶⁴

In a large prospective cohort study involving 12550 adults shows that the development of Type II diabetes was almost 2.5 times likely in persons with hypertension than in their normal counterparts.¹⁵⁷

The findings in this study is in agreement with that of Alma in Pakistani population which concluded that hypertension and diabetes were interlinked.¹⁶⁵

The study also found that there is an increased risk of systolic hypertension with advanced age and smoking among the respondents which is corroborated by the findings of previous researchers.¹⁶⁵⁻¹⁶⁶ It has been shown that smoking would raise blood pressure and heart rate through its acute vasoconstriction effect.¹⁶⁷ Different research groups have reported the effect of smoking on blood pressure: some showed that there is no association between smoking and blood pressure,¹⁶⁶ while others reported that blood pressure of smokers was lower than that of non-smokers and others believed that smoking would raise blood pressure.¹⁶⁷

Another study shows that chronically, cigarette smoking induces arterial stiffness which may persist for a decade after smoking cessation.¹⁶⁸

In this study; sex (male) and diabetes mellitus were found to have significantly increased risk of diastolic hypertension. Likewise, monthly income, adequate fruit intake and high waist hip ratio were associated with diastolic hypertension, but the risk is not significant. Meanwhile, young age, high educational status, non-smoking status, vigorous intensity of activity at work, and moderate intensity of activity at work, were not significantly found to reduce the risk of diastolic hypertension.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study has shown prevalence of hypertension among civil servants in Kano state, Nigeria to be high (Systolic and Diastolic hypertension), also diabetes mellitus, Obesity, and overweight are high. The level of knowledge of hypertension among the respondents was very low. A BMI greater than 30 (obesity), lack of vigorous physical activity were the major modifiable risk factors of hypertension, while age greater than 40 years was found to be the non-modifiable risk factor of hypertension among the civil servants of Kano State.

6.2 Recommendations

1. Office of the Head of civil service in conjunction with State ministry of health and ministry of information should intensify efforts on behaviour change, publicity campaign [health education] on hypertension and its risk factors among civil servants.
2. Civil servants through Nigerian labour congress and other unions should sensitize and create publicity awareness on the importance of regular exercise during their monthly meetings, orientation of new civil servants and workers day celebrations, and also to establish recreational/ indoor games to encourage exercises.
3. Office of the head of civil service in collaboration with hospital management board should encourage all staffs on the importance of regular medical check-ups and early referrals. This can be initiated as a yearly event.
4. Civil servants should be enlightened on the dangers of High Serum Uric acid especially red meat diet and its derivatives.

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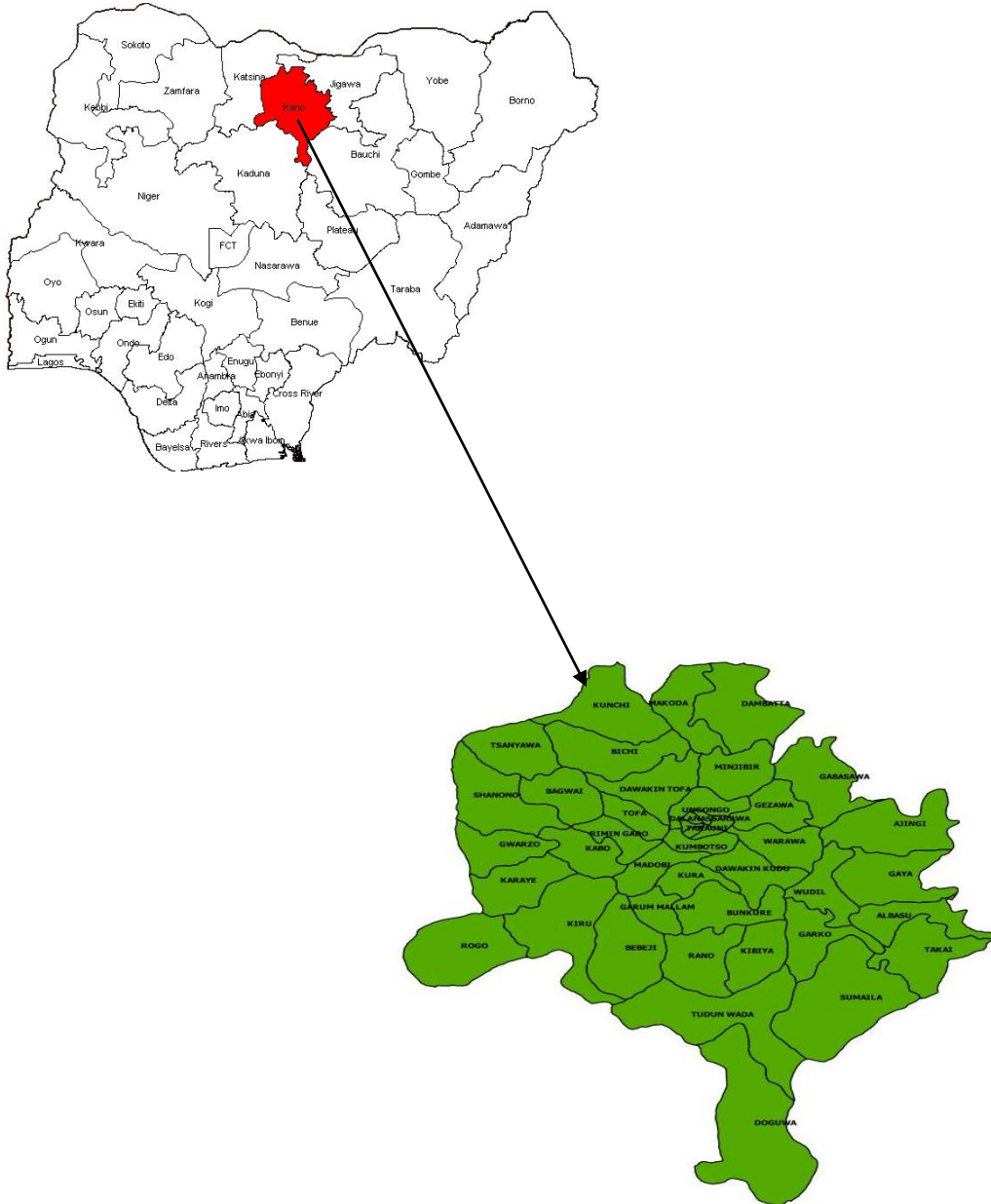
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APPENDICES



Appendix I: Map of Nigeria highlighting Kano State

APPENDIX II

INFORMED CONSENT AND AGREEMENT TO PARTICIPATE

You are being asked to participate in this focus group discussion on 'prevalence and determinants of hypertension among civil servant in Kano State' because of your experience as a civil servant.

Read this informed consent and agreement to participate form carefully and ask as many questions as you like before you decide whether you want to participate in this focus group session. You are free to ask questions at any time before or after your participation in this session.

Project Title: Prevalence and determinants of hypertension among civil servants in Kano State

Investigator: Dr Imam Wada Bello Cohort 4 Resident NFELTP.

Purpose of the Focus Group: To assess the knowledge and awareness of civil servants on hypertension / cardiovascular diseases. In addition, the focus group will attempt to garner possible solutions and challenges from the experiences of participants for recommendation to the Government through the Office of the Head of Civil Service Kano.

Procedures: You will be asked to share your experiences and honest opinions about your knowledge and awareness of hypertension / CVD and its risk factors during one-hour sessions. In addition, you may be contacted at a later date to clarify your comments or to share any additional thoughts as a report is being prepared.

Confidentiality and Anonymity:

Confidentiality and anonymity means that we will not share or use your name, health center, address, or any other identifying information in reports or other materials related to this study. All of the information we collect is confidential and all data will be pooled and published in aggregate form only.

Participant Consent and Agreement:

I have read the information presented above about the focus group being facilitated by representatives of the Faculty of Medicine Ahmadu Bello University Zaria/Nigeria Field Epidemiology and Laboratory Training Programme Abuja. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions and any additional details I wanted. I am aware that I have the option of allowing my interview to be tape recorded to ensure an accurate recording of my responses.

I am also aware that excerpts from the interview may be included in a report, with the understanding that the quotations will be anonymous.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this focus group session and to keep in confidence information that could identify specific participants and/or the information they provided.

I agree to have my interview tape recorded. YES NO

I agree to the use of anonymous quotations in any reports that comes from this focus group session. YES NO

Participant's name: _____

Participant's signature:

Date:

APPENDIX III

QUALITATIVE COMPONENT OF KAP STUDY (FOCUS GROUP DISCUSSIONS [FGD] GUIDE)

Dear Respondent(s),

My Name is..... I am conducting research on hypertension/
cardiovascular disease risk factors. We would be doing FGD with you as part of an evaluation of
your knowledge, in a study title: “*Prevalence and Determinants of hypertension among Civil
Servants in Kano State*” {***Obtain Consent from all before proceeding***}

Any information obtained shall be treated with strict confidentiality.

- 1) What do you know about Cardiovascular Diseases?
- 2) What do you know about Diabetes mellitus, Hypertension, Obesity, Hyperlipidaemia?
- 3) What are the causes of major cardiovascular diseases in this environment?
- 4) What are Preventable measures do you know for Diabetes mellitus, Hypertension and
Obesity?
- 5) Do you think Diet, Smoking, Alcohol consumption has risk of causing some diseases?
- 6) Do you think Life style, smoking have potential risk of DM, HPT and Obesity?

**QUALITATIVE COMPONENT OF KAP STUDY
(FOCUS GROUP DISCUSSIONS [FGD] GUIDE)**

HAUSA VERSION

Assalamu alaikum,

Sunana..... Ina wakiltar mai bincike daga Nigerian Field Epidemiology and Laboratory Training Programme/Jamiar Ahmadu Bello ta Zariya . Zamu tattauna daku game da binciken da mukeyi a kan alamurran da suka shafi fahintarku, dangane da cututtuka dabam-dabam a cikin shiri maitake: *“Yawaitar da Kuma Hanyoyin Kamuwa da Manyan Cututtukan da suka Shafi hawan Jini, Zuciya, da Hanyoyin Jini Tsakanin Maaikatan Gwamnati na Jihar Kano(Harkar lafiya da cututtuka da suka shafi Hawan Jini da kuma Ciwon Suga,Kiba” {Muna neman izini daga gurin ku kafin mucu gaba}*

Duk wani bayani da zamu dauka, za ayi amfani dashi ta wanna shirin kawai.

- 1) Me kuka fahinta game da cututtukan Zuciya da magudanan jini?
- 2) Shin ko kun son ciwon suga, hawan jini da kuma ciwon Kiba?
- 3) Shin Ko kun san Hanyoyin daake Kamuwa da wadannan cututtuka?
- 4) Waddanne abubuwa kukeyi dangane da kariya daga kamuwa da cutar ciwon suga,hawan jini,Kiba?
- 5) Waddanne abubuwa kukeyi dangane da kariya daga kamuwa da ciwon suga, hawan jini da kuma amosanin jini?
- 6) Kuna ganin akwai alaka tsakanin yanayin rayuwa da hadarin kamuwa da ciwon suga da hawan jini?

APPENDIX IV

QUESTIONNAIRE

PREVALENCE AND DETERMINANTS OF HYPERTENSION AMONG CIVIL SERVANTS, IN KANO STATE, NIGERIA

SURVEY INFORMATION

Q1. Interview Language

English Hausa Others

Q2. Questionnaire Number

Q3. Consent has been read and obtained

Yes No

Q4. Ministry/Department/Agency _____

Q5. LGA _____

Q6. Age in years _____

Q7. Sex

Female

Male

Q8. Ethnic group

- 1. Hausa
- 2. Fulani
- 3. Others

Q9. Highest level of Education completed

- 1. Quranic
- 2. Primary School
- 3. Secondary School
- 4. OND
- 5. NCE
- 6. HND
- 7. Degree
- 8. Post Graduate

Q10. Marital Status

- 1. Never Married
- 2. Currently Married
- 3. Divorced
- 4. Widowed
- 5. Refused 88

Q11. Occupation

- 1. Government Employed
- 2. Others

Q12. How many people older than 18 years including you have live, in your household?

Q13. Average monthly income _____

Q14. Cadre based on grade level

- 1. Senior
- 2. Junior

STEP 1 OF CVD

Q15. Have you ever heard about CVD?

- Yes
- No

K1.

Q16. What do you understand by CVD? K5 _____

K5a. Disease caused by stress _____

K5b. Disease of body swelling and inability to use the side of the body or leg? _____

K5c. Group of disorders of the heart and blood vessels. _____

K5d. Don't know CVD _____

Q17. What are the risk factors of CVD you know? _____

K2a. Hypertension
 K2c Heart failure K2b Diabetes
 K2d Obesity / hyperlipideamia
 K2e Smoking K2f Don't know risk F

Q18. What are the commom symptoms of CVD do you know? K4

K4a. Syncopal attack K4 d Cough

K4b Easy fatigality K4e Polydipsia

K4c PND K4f Polyuria

K4g Body swelling K4h Chest pain (Central)

K4i TIA KAj Don't know symptom

Q20. Do you know the major causes of CVD in this environment?
 Yes
 No.

Q21. What do you understand by hypertension?

K6a. Stress related disorder
 K6b. Elevated and persistent rise of BP
 K6c. Salt and poor diet disease

Q22. What do you understand by Diabetes mellitus?

K7a. Excessive sugar intake disease
 K7c Hereditary disease

K7b. Metabolic disorder characterized by chronic rise in blood sugar.

Q23. Mention 3 ways that you can present yourself from CVD

K8a. Healthy Diet K8c Stop smoking and alcohol
 K8b. Regular Exercise K8d Don't know

Q24. Knowledge score _____

Step 1 Behavioural measurements _____

Q25. Do you currently smoke any Tobacco products if No go to Q30

Yes
 No

Q27. Do you remember how long ago it was in years? _____

Q28. How old were you when you first started smoking Daily? _____

Q29. On average how many of the following do you smoke each day?

T5a. Manufactured Cigarettes

T5b. Hand rolled Cigarettes

T5c. Cigars, Cigarillos

T5d. Pipes full of tobacco

30. In the past, Did you ever smoke daily
Yes No

31. How old were you when you stopped smoking daily _____

32. Do you currently use any smokeless tobacco such as snuff, chering tobacco, betel? If no skip to Q34. _____

33. On average how many times a day to you use.

| | | | | | |
|-------|----------------------|------|--------------------------|-----------------|--------------------------|
| TIIa | Snuff by mouth | TIIc | <input type="checkbox"/> | Chewing tobacco | <input type="checkbox"/> |
| Tiib. | Snuff by nose | Tiid | <input type="checkbox"/> | Betel, grid | <input type="checkbox"/> |
| Tiie. | Other (Specify)..... | | | | |

34. In the past did you ever use smokeless tobacco daily?
Yes No.

35. During the past 7 days on how many days did someone in your home smoke when you were present? _____

36. During the past 7 days did someone smoke in a closed areas in your work place when you are present. _____

ALCOHOL CONSUMPTION

37. Have you ever consumed on Alcoholic chink such as beer, wine, spirits, fermented cider? If no skip to Q47.

Yes No.

38. Have you consumed an alcoholic drink within the past 12 month if no skip to Q 47 L

Yes No.

39. During the past 12 months, how frequently have you had at least one alcoholic drink
1. Daily
 2. 5 – 6 days per week
 3. 1 – 4 days in
 4. 4 – 3 days per month
 5. less than once a month
40. Did you consume an alcoholic drink within the past 30 days?
 Yes No
- If no skip to Q47
41. During the past 30 days on how many occasions did you have at least one alcoholic drink?

42. How many standard alcoholic drinks did you have during one occasion?

43. What was the largest no of standard alcoholic drinks you had on a single occasion?

44. How many did you have for men: 5 or more, for women 4 or more standard drinks in a style drinking occasion? _____
45. During the past 30 days, when you consumed an alcoholic drink, how often was it with meals?
- A81 Usually with meals
- A82 Sometimes with meals
- A83 Rarely with meals
- A84 Never with meals
46. During each day of the past 7 days, how many standard alcoholic drinks did you have each day?

DIET

47. 47 In a typical week, on how many days do you eat fruit? _____
48. How many servings of fruit do you eat on one of those days _____
49. In a week, on how many days do you eat vegetables? _____
50. Number of servings of vegetables do you eat on one of those days? ____
51. What type of oils or fats is most often used for meal preparation in your household?
1. Vegetable oil
 2. Groundnut oil
 3. Palm oil
 4. Butter
 5. Other

52. Number of meals per week do you eat that were not prepared at home? _____

PHYSICAL ACTIVITY

53. Vigorous Intensity activity at work?
Yes No

54. How many days do you do vigorous intensity activities as part of your work in a week?

55. How much time do you spend day vigorous intensity activities at work in a typical day?

56. Moderate intensity at work? _____

57. How many days do you do moderate intensity activities as past of your work in per week?

58. Time you spend day moderate intensity activities at work on a typical day?

59. Do you walk or use bicycle for atleast 10 minutes continuously to get to and from places?
Yes No

60. On how many days do you walk or bicycle for 10 minutes continuously to get to and from places?

61. Time spend walking or cycling for travel on a typical day? _____

RECREATIONAL ACTIVITIES

62. Vigorous intensity sports, fitness activities
Yes No

63. Number of Days in a week you do vigorous intensity sports, fitness?

64. Time spent doing vigorous intensity sports, fitness in a day?

65. Do you do moderate intensity sports, fitness?
Yes No.

66. No. of Days in a week you do moderate intensity sports, fitness?

67. How much time do you spend doing moderate intensity parts fitness sedentary behavior?

68. How much time do you spend, sittly or reclining on a typical day?

HISTORY OF RAISED BLOOD PRESSURE

- 69. Have you ever had your BP measured by a doctor or health worker?
If no skip to Q78
- 70. Have you ever been told by a doctor or health worker that you have a raised BP or hypertension?
If no skip to 78
- 71. Have you been told in the past 12 months?
Yes No.
- 72. Drugs that you have taken in the past two weeks
Yes No.
- 73. Advice to reduce salt intake?
Yes No.
- 74. Advise to or treatment to lose weight
Yes No.
- 75. Advice or treatment to stop smoking
Yes No.
- 76. Advice to start or do more exercise
Yes No.
- 77. Have you ever seen traditional heater for hypertension
Yes No.
- 78. Are you currently taking any herbal or traditional remedy for hypertension?

HISTORY OF DIABETES

- 79. Hy of blood sugar measured by a doctor or other health worker if no go to Q90.
Yes No.
- 80. Have you ever been told by doctor or other health worker that you have DM?
Yes No.
- 81. Have you been told in the past 12 months if no go to Q90
Yes No.
- 82. Are you on insulin?
Yes No.
- 83. Drugs (medication) that you have taken in the past 2 weeks
Yes No.

84. Special prescribed diet
Yes No.
85. Advice or treatment to lose weight
Yes No.
86. Advice or treatment to stop smoking?
Yes No.
87. Advice or treatment to do more exercise
88. Have you ever seen a traditional healer for DM or raised blood sugar?
Yes No.
89. Are you taking my herbal or traditional remedy for your diabetes
Yes No.

STEP 2 PHYSICAL MEASUREMENTS

90. Height in Metres
91. Weight in Kilograms
92. For women are you pregnant? If yes go to Q95
93. Waist circumference in centimeters
94. Cuff size used
M5a Small
M5b Medium
M5c Large
95. Systolic Bp reading 1 in mmHg
96. Systolic Bp reading 2 in mmHg
97. Systolic Bp reading 1 in mmHg
98. Systolic Bp reading 1 in mmHg
99. Hx of medication for hypertension or Raised Bp in the past 2 weeks?
Yes No.
100. HIP Circumstance in centimetres
101. Heart Rate in beats per minute
- Step 3 Biochemical Measurements

102. During the past 12 hours have you had anything to eat or drink, other than water?
Yes No.
103. Time of the day specimen taken
104. Fasting blood glucose in mmol/L
105. Is there Hx of medication or insulin taken to day?
Yes No.
106. Total Cholesterol in mmol/L
107. Is there Hx of treatment for raised cholesterol within the past 2 weeks?
Yes No.
108. Triglycerides in mmol/L
109. HDL Cholesterol in mmol/L
110. LDL Cholesterol in mmol/L

APPENDIX V

WORK PLAN

| S/N | ACTIVITY | SCHEDULE | | | | | | | | PERSON RESPONSIBLE |
|-----|--|------------|----------|------|------|------|-----|-----|-----|--------------------|
| | | START DATE | END DATE | OC T | NO V | DE C | JAN | FEB | MAR | |
| | | I/10/13 | 31/3/14 | | | | | | | |
| 1 | Development of data collection tool | | | ↔ | | | | | | Researcher |
| 2 | Ethical clearance & approval form | | | ↔ | | | | | | Researcher |
| 3 | Recruitment of research assistants | | | | ↔ | | | | | Researcher |
| 4 | Training of research assistants | | | | | ↔ | | | | Researcher |
| 5 | Pre test | | | | | | ↔ | | | Research team |
| 6 | Questionnaire administration & sample collection | | | | | | | ↔ | | Research team |
| 7 | Sample analysis | | | | | | | | ↔ | Research team |
| 8 | Data entry and analysis | | | | | | ↔ | | | Researcher |
| 9 | Report writing | | | | | | | ↔ | | Researcher |

APPENDIX VI

MANPOWER DEVELOPMENT DIRECTORATE

LIST OF KANO STATE MDA's

| S/N | MDAs |
|------------|--|
| 1 | Government House |
| 2 | Deputy Governors Office (DGO) |
| 3 | Cabinet Office (SSG's Office) Office of Head of Civil Service |
| 5 | Civil Service Commission (CSC) |
| 6 | Kano State House of Assembly (KNHA) |
| 7 | Min. of Information (MOI) |
| 8 | Min. of Finance (MOF) |
| 9 | Min. of Justice (MOJ) |
| 10 | Min. of Planning & Budget (MOPB) |
| 11 | Min. of Environment (M.O. Env.) |
| 12 | Min. for Local Government & Comm. Devt. |
| 13 | Min. of Land & Physical Planning (MOL) |
| 14 | Min. of Works, Housing & Transport (MOWHT) |
| 15 | Min. of Education, Science & Technology |
| 16 | Min. of Health (MOH) |
| 17 | Min. of Water Resources & Rural Devt. |
| 18 | Min. of Commerce (MOC) |
| 19 | Min. of Women Affairs & Soc. Devt. (MOWA) |
| 20 | Min. of Agriculture |
| 21 | Due Process Bureau (DPB) |
| 22 | Office of the Auditor General (OAG) |
| 23 | Local Government Audit (LGA) |
| 24 | Snr. Sec. Sch. Mgt. Board (K.S.S.S.M.B) |
| 25 | State Primary Education Board (SUBEB) |
| 26 | Science and Technical Sch. Board (STSB) |
| 27 | Kano State Pension Fund Trustee (KSPFT) |
| 28 | State Relief & Rehabilitation Agency (SARERA) |
| 29 | History & Culture Bureau (KSHCB) |

- 30 KANSIEC
- 31 Public Complaint & Anti Corruption C. (PCAC)
- 32 Defunct Societal Re-orientation Directorate
- 33 Library Board (KSLB)
- 34 Abubakar Rimi Television
- 35 Film Censorship Board (KSFCB)
- 36 Primary Health Care Mgt. Board (PHCMB)
- 37 Housing Corporation (KSHC)
- 38 KASCO
- 39 KNAP
- 40 Kano Geographical Information System (KANGIS)
- 41 Shariah Commission (KSSC)
- 42 Scholarship Board (KSSB)
- 43 Drugs Management Agency (DMA)
- 44 Radio Kano (RK)
- 45 Water Board (KSWB)
- 46 High Court of Justice (HCJ)
- 47 Shariah Court of Appeal (KSSCA)
- 48 Judicial Service Commission (JSC)
- 49 Kano University of Science & Tech. Wudil (KUST)
- 50 Audu Bako College of Agric D/Batta (ABCOA)
- 51 Kano State Multi-Door Court (KMDC)
- 52 Sa'adatu Rimi College of Education (SRCOE) KBT
- 53 Public Account Committee (PAC)
- 54 Kano State Printing Press (KSPP)
- 55 Guidance & Counseling Board (KSGCB)
- 56 Emirate Council
- 57 Council of Chiefs
- 58 Kano State Road Maint. Agency (KARMA)
- 59 Hisba Board (KSHB)
- 60 Kano State Transport Authority (Kano Line)
- 61 RUWASA
- 62 North West University (NWU)
- 63 Aminu Kano Sch. Of Isl. Legal Studies (AKCILS)

- 64 Kano State Polytechnic (KSP)
- 65 Agency for Mass Education (AME)
- 66 Sustainable Kano Project (KSSKP)
- 67 WRECA
- 68 Zakkah & Hubsu Commission
- 69 Zoological & Wild Life Mgt Agency (KAZOWMA)
- 70 Hospital Management Board (HMB)
- 71 Kano State Internal Revenue Service
- 72 Abubakar Rimi Market (ARM)
- 73 State Agency for Control of Aids (SACA)
- 74 KNUPDA
- 75 KNARDA
- 76 KAROTA
- 77 REMASAB
- 78 Kano State Sports Commission
- 79 Directorate of Youth Development & Economic Empowerment
- 80 College of Arts Science & Rem. Studies (CAS)
- 81 Tourism Board (KSTB)
- 82 Pilgrims Welfare Board (KSPWB)
- 83 Rural Electricity Board (REB)
- 84 Law Reform Commission
- 85 Kano State Bureau of Statistics
- 86 Kano State Investment and Properties (KSIP)
- 87 Qur'anic & Islamiyya Schools Management Board
- 88 Private & Voluntary Institutions Board
- 89 College of Nursing and Midwives, Madobi
- 90 School of Hygiene
- 91 Rabiu Musa Kwankwaso College of Arts, Science and Remedial Studies, T/Wada
- 92 Computer Centre
- 93 Corporate Security Institute
- 94 SERVICOM Directorate
- 95 Kano State Consumer Protection Council
- 96 Rural Access & Mobility Directorate

APPENDIX VII

ETHICAL CLEARANCE



KANO STATE HOSPITALS MANAGEMENT BOARD

BOARD HEADQUARTERS
P.M.B 3540, POST OFFICE ROAD, KANO

HMB/GEN/488/VOL. I

2/2/1435AH (15/11/2013)

Dr Imam Wada Bello

Nigerian Field Epidemiology And Laboratory Training Programme (NFELTP)
NO 50 Haile Salaisse Street Asokoro Abuja.
Nigeria.

ETHICAL CLEARANCE

Sequel to a research title "PREVALANCE AND DETERMINANTS OF MAJOR FACTORS OF CARDIOVASCULAR DISEASES AMONG CIVIL SERVANTS IN KANO STATE .". In the light of the above, I am mandated to convey provisional clearance to proceed on your study based on the following conditions.

- i. That the consent of all participants must be obtained by filling an informed consent form.
- ii. That you should liase with the Management of the facility for appropriate guidance.
- iii. That any publication related to the study should be brought to the knowledge of the Ethical Committee for approval.
- iv. That a copy of your finding should be submitted for documentation, record and final approval, please.

Best Regards,

A handwritten signature in blue ink, appearing to read 'Zahra Suleiman', written over a horizontal line.

ZAHRA SULEIMAN

Asst. Sec. I (Est.)

FOR: EXECUTIVE SECRETARY