# FACTORS FOR NON-ADHERENCE TO ANTIHYPERTENSIVE DRUGS AMONG FEDERAL CIVIL SERVANTS ATTENDING FEDERAL STAFF HOSPITALS AND CLINICS, ABUJA, NIGERIA

**BY**

**KAZAURE AMINA ZUBAIR**
**MPH/MED/10832/11-12**

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

**DECEMBER, 2014**

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**BY**

**KAZAURE, AMINA ZUBAIR MBBS (BUK 2001)**
**MPH/MED/10832/11-12**

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## DECLARATION

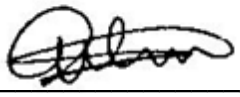
I declare that the work in the dissertation entitled 'Factors for non-adherence to antihypertensive drugs among Federal Civil Servants in Abuja, Nigeria' has been performed by me in the Department of Public Health under the supervision of Drs. AA Abubakar and MS Ibrahim.

The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at any university.

| Kazaure, Amina Zubair | _____ | January 30th 2015 |
|---|---|---|
| Name of student | Signature | Date |

## CERTIFICATION

This dissertation entitled "Factors for Non-Adherence to Antihypertensive Drugs among Federal Civil Servants in Abuja, Nigeria" by Kazaure Amina Zubair meets the regulations governing the award of the degree of Master of Public Health, Field Epidemiology of Ahmadu Bello University and is approved for its contribution to knowledge and literary presentation.



Dr. A.A. Abubakar
MBBS, MPH Field Epidemiology, FWACP
Chairman Supervisory Committee

Date

Dr. M.S. Ibrahim
MBBS, FWACP
Minor Supervisor

Date

Dr M.N. Sambo
MBBS, FWACP, MIAD
Head of Department

Date

Professor H. Zoaka
DVM, MSc, PhD
Dean Post Graduate School

Date

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## OPERATIONAL DEFINITIONS

| | |
|---|---|
| **Hypertension/ high blood pressure** | Hypertension is defined as a systolic blood pressure of 140 mm Hg or more, or a diastolic blood pressure of 90 mm Hg or more. |
| **Medication non-adherence according to the Morisky Green test** | Any one or all of, forgetting to take drugs, neglectful of medicine hours, not taking drugs when feeling well and not taking drugs because of side effects of the drugs. |
| **Medication adherence according to the Morisky Green test** | All of, not forgetting to take drugs, not neglectful of medicine hours, taking drugs regardless of feeling well and taking drugs even when experiencing side effects. |
| **Controlled blood pressure** | Blood pressure less than or equal to 140/90 mmHg. |
| **Uncontrolled blood pressure** | Blood pressure more than 140/90mmgH. |
| **Satisfactory knowledge** | A score of 70% and above on the knowledge score concerning hypertension and its management. |
| **Unsatisfactory knowledge** | A score of 69% and below on the knowledge score concerning hypertension and its management. |
| **Senior Civil Servant** | Civil Servant whose grade level is 7 and above. |
| **Junior Civil Servant** | Civil servant whose grade level is 1 to 6. |

## SUMMARY

Non-adherence to antihypertensive drugs is the most important cause of uncontrolled blood pressure. Uncontrolled blood pressure leads to the development of complications of hypertension. Hospital records at Federal Staff Hospitals (FSH) and Clinics, Abuja showed that hypertensive patients seen have been increasing on a yearly basis from January 2011 to June 2013. This study was conducted in order to identify factors associated with non-adherence to antihypertensive drugs among Federal Civil Servants in order to provide improved management plans suited for them.

Four hundred and twenty four hypertensive patients at two Federal Staff Hospitals and two Federal Staff Clinics in Abuja participated. A descriptive cross sectional study was carried out from August 2013 to June 2014. Participants 18 years and above, who had been on antihypertensive drugs in at least the previous one month and must have been Federal Civil Servants were included in the study. Patients were selected by systematic sampling.

Ethical clearance was obtained from the National Health Research Ethics Committee, Federal Ministry of Health Abuja.

The Morisky Green test for non-adherence was used to assess non-adherence to drugs. Information was collected regarding socio-demographic, drug related and healthcare service delivery factors to patient non-adherence using an interviewer administered questionnaire. Univariate, bivariate and multivariate analysis was conducted using Epi info soft ware.

The level of non-adherence was 69.1%. Factors that were independently associated with non-adherence were; being a Junior Civil Servant (OR 2.9: 95% CI 1.1-7.7), exhaustion of drugs before the next clinic appointment (OR 5.9: 95% CI 2.8-12.5), buying drugs in

private pharmacies and open market (OR 1.9: 95%CI 1.03-3.3) and total time spent counselling less than five minutes (OR 1.8: 95%CI 1.02-3.2).

Ensuring patients come back to the hospital to refill their drugs, improving counselling techniques and making prescribed antihypertensive drugs constantly available in the hospital, could improve the level of non-adherence to antihypertensive drugs among patients attending Federal Staff Hospitals and Clinics.

Key words: Non-adherence, antihypertensive drugs, Federal Civil Servants, Nigeria

# CHAPTER ONE – INTRODUCTION

## 1.1 Background

Hypertension affects approximately one billion people worldwide (4.5% of the current global burden of disease). Three hundred and forty million of these in economically-developed and 340 million in economically-developing countries[1] The World Heart Federation reports that in the developed world, about 330 million people have hypertension, and about 640 million in the developing world. Estimates indicate that up to three quarters of the worlds hypertensive population will be in economically developing countries by the year 2025.[2,3] A previous study done on the prevalence of hypertension in Nigeria showed the prevalence rate of hypertension to be 22%.[4] Hypertension is the leading cause of mortality and the third largest cause of disability, and is poorly controlled worldwide.[1] Hypertension is the leading global risk for mortality, responsible for 12.8% (7.5 million) of total deaths worldwide.[5]

Hypertension is defined as a sustained diastolic pressure greater than 90 mmHg accompanied by an elevated systolic pressure greater than 140 mmHg.[6] There are two types of hypertension, primary or essential hypertension and secondary hypertension. In primary hypertension, there is no known cause for the high blood pressure and it manifests gradually over time. In secondary hypertension however, the high blood pressure is caused by an underlying condition. It starts suddenly and can cause higher blood pressure than primary or essential hypertension. Some diseases that can cause high blood pressure include kidney diseases and adrenal gland tumours. Drugs that cause high blood pressure include birth control pills, cocaine and amphetamines.[7]

There are many drugs that are used to treat hypertension. These include alpha blockers, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, beta blockers,

calcium channel blockers, central alpha agonists, diuretics, rennin inhibitors and vasodilators.[6]

Medication non-adherence is defined as a patient's passive failure to follow a prescribed drug regimen.[8] Medication non-adherence can also be simply defined as the number of doses not taken or taken incorrectly that jeopardizes the patient's therapeutic outcome.

Adherence on the other hand can be defined as the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behaviour to produce a therapeutic result.[9] The World Health Organization (WHO) defines adherence as "the extent to which a person's behaviour taking medication, following a diet, and/or, executing life style changes corresponds with agreed recommendations from a health care provider.[2,10,11] Medication adherence usually refers to whether patients take their medications as prescribed, as well as whether they continue to take a prescribed medication. WHO describes poor adherence as the most important cause of uncontrolled blood pressure and estimates that 50-70% of people do not take their antihypertensive medication as prescribed.[2,11] Non-adherence can take a variety of forms, including not having a prescription filled, taking an incorrect dose, taking a medication at the wrong time, forgetting to take doses, or stopping therapy too soon.[9] Medication non-adherence is a major public health problem that has been called an "invisible epidemic".[9] In patients with hypertension, medication non-adherence is a significant, often unrecognized, risk factor that contributes to poor blood pressure control, thereby contributing to the development of further vascular disorders such as heart failure, coronary heart disease, renal insufficiency, and stroke.[8] Low adherence has been identified as the primary cause of unsatisfactory control of blood pressure. Good adherence has been shown to improve blood pressure control and reduce the complications of hypertension.[6,12] Many patients experience difficulty in following treatment recommendations.[12] Poor adherence to

antihypertensive medications contributes to lack of control in more than two-thirds of hypertensive patients, and it is a critical determinant in the response to antihypertensive therapy.[6] The problem of non-adherence to medical treatment remains a challenge for medical professionals and social scientists. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased health care costs.

In spite of many advances made in adherence research, non-adherence rates have remained nearly unchanged in the last decades.[13] Non-adherence to prescribed drugs schedule has been and continues to be a major problem the world over. Studies on this subject show that adherence is about 50% for medications in chronic diseases and much lower for lifestyle prescriptions.[2] Non-adherence levels vary in different parts of the world as documented in previous literature. In a Pakistani study 23% of the cases were non-adherent.[11] In an Indian study, non-adherence to antihypertensive therapy in the study population was only 28.9%.[2] In an Ethiopian study 35.4% of the study subjects were found to be non-adherent to their treatment.[13] A study in Kano had 45.8% of the respondents as non-adherent to treatment.[14] A Bangladeshi study documented 85% of their study population as non-adherent to antihypertensive drugs.[15]

## 1.2 Problem Statement

Hypertensive cases have been increasing on a yearly basis in Federal Staff Hospital and Clinics, Abuja. Data from Federal Staff Hospital Jabi registration records show that hypertensive patients have increased on a monthly basis. The point prevalence of hypertensive patients in 2011 was 73 patients, 116 patients in 2012 and 172 patients in 2013.[16]

Adherences to long-term therapy for chronic illnesses in developed countries average 50%. In developing countries, the rates are even lower.[12] In a World Health Organization report, adherence to antihypertensive drugs ranged from 52% to 74%. It is usual to consider patients to be sufficiently adherent with their treatment when they take at least 80% of their prescribed anti-hypertensive drugs.[14]

In all WHO regions, men have slightly higher prevalence of raised blood pressure than women. Reports also indicate that more Nigerian men suffer high blood pressure than their female counterparts due to reasons attributable to lifestyles. The risk of high blood pressure increases with age. High blood pressure is particularly common among blacks. Serious complications, such as stroke and heart attacks, also are more common in blacks. High blood pressure tends to run in families. Other risk factors associated with hypertension include obesity, physical inactivity, tobacco use, excessive salt (sodium) consumption, excessive alcohol use, stress, and certain chronic conditions including cholesterol, diabetes, kidney diseases, sleep apnoea and pregnancy.[7]

Poor adherence with treatment is the most important cause of uncontrolled blood pressure.[1] Uncontrolled blood pressure is associated with significant increase in the incidence of complications of hypertension. Non-adherence may worsen disease severity, leading to increased utilization of medical care services and therefore increases in overall health care costs.[17]

It may be assumed that Federal Civil Servants in Abuja are predisposed to developing hypertension due to patient factors such as socio-economic problems and stress. Other factors identified from previous literature include drug related factors and healthcare service delivery factors.

Studies have been conducted among the general population in different parts of the country. Based on the findings from a previous study in Kano, there was a need for educating patients on non-adherence, considering patients financial status when prescribing drugs and subsidising drugs. Prescribing an effective, inexpensive, single dose daily medication with minimal side effects will improve patient compliance considerably.[14]

A meta-analysis to determine the effectiveness of interventions aiming to increase adherence to blood pressure lowering medication was conducted between 1975 and 2000. The majority of trials were performed in the United States and Canada with the remainder located in Europe, Australia and South Africa. Thirty eight studies testing 58 different adherence interventions on 15,519 patients were conducted in nine countries. Simplifying dosing regimens increased adherence in seven out of nine studies, with a relative increase in adherence from eight percent to 19.6%. Motivational strategies were successful in 10 out of 24 studies with generally small increases in adherence up to a maximum of 23%.[18]

Civil Servants are the engine room of service delivery of the Federal Government. They are implementers of Government policies and programs. It is assumed that this makes them very busy, stressed and prone to hypertensive disease. The impact of their poor health leads to poor service delivery.

This makes it necessary to determine the level of non-adherence to antihypertensive drugs and identify those factors that are peculiar to Federal Civil Servants in order provide better management plans that are suited for them. This study therefore indentified factors associated with non-adherence and the level of non-adherence.

## 1.3 Justification

The theme for the 2013 World Health Day marked on the 7th of April was the need to control raised blood pressure (hypertension) as a "silent killer, global public health crisis". The slogan for the campaign was "Healthy Heart Beat. Healthy Blood Presssure. [19] In patients with hypertension, medication non-adherence is a significant, often unrecognized, risk factor that contributes to poor blood pressure control, thereby contributing to the development of further vascular disorders such as heart failure, coronary heart disease, renal insufficiency, and stroke.[8] One in three adults worldwide has high blood pressure. The proportion increases with age, from 1 in 10 people in their 20s and 30s to 5 in 10 people in their 50s.[19]

Hypertension is an overwhelming global challenge, which ranks third as a cause of reduction in disability-adjusted life-years.[1,2] Of the total number of disability-adjusted life years, 3.8% is contributed by hypertension. This means that hypertension is responsible for 3.8% of years of life lost due to premature death plus years of healthy life lost due to illness and disability.[5] Non-adherence is known to be a factor in the lack of control of blood pressure and may lead to unnecessary adjustments of drug regimens and increased health care costs.[20]

Studies have been conducted in the past on factors associated with non-adherence to antihypertensive drugs in different parts of Nigeria.[1,3,6,14] There is limited information concerning patient non-adherence to antihypertensive drugs among Federal Civil Servants in Abuja. Therefore this study would contribute towards planning future interventions suited for Federal Civil Servants in order to achieve controlled blood pressure. Eventually this would improve the overall health and productivity of the Federal Work Force.

## 1.4 Research Questions

1. What is the level of non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospital and Clinics in Abuja?
2. What are the factors associated with non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospital and Clinics in Abuja?

## 1.5 General and Specific Objectives

### 1.5.1 General objective

To assess the level of non-adherence among Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja and identify the factors that are associated with non-adherence to antihypertensive drugs.

### 1.5.2 Specific objectives

1. To determine the socio-demographic factors associated with non-adherence to antihypertensive drugs.
2. To determine the level of knowledge of hypertension and it treatment.
3. To determine the drug related factors associated with non-adherence to antihypertensive drugs.
4. To determine the health service delivery factors associated with non-adherence to antihypertensive drugs.

### 1.5.3 Scope

This study set out to determine the level of non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja. Hypothesised variables categorised into socio-demographic, drugs related and health care service delivery, were used to determine which factors were associated with non-adherence.

## CHAPTER TWO – LITERATURE REVIEW

Approximately one billion people worldwide are affected by hypertension. Three hundred and forty (340) million of these in economically-developed and 340 million in economically-developing countries.[1] Poor adherence with antihypertensive treatment is the most important cause of uncontrolled blood pressure.[1] Uncontrolled blood pressure may worsen disease severity leading to the development of complications of hypertension and increased utilization of health care costs. [17]

### 2.1 Socio-Demographic Factors Affecting Non-Adherence to Antihypertensive Drugs

Numerous studies have investigated the association between hypertensive patients' socio-demographic factors and their adherence to treatment regimens.[21] Socio-demographic factors include age, gender, educational level and marital status.[22]

Previous studies have shown that older patents are more adherent to antihypertensive drugs. A study in Iraq showed that patients older than 70 years were more adherent than younger patients.[23] The Iraqi study also revealed that female patients were more compliant than males. According to the study, this might reflect the general tradition in that society that females are more compliant with medical advice than males. Also males are responsible for looking after families and are usually the ones who work for the family. The latter might lead to forgetting to take medication in busy daily work.[23] In Iraq, Kirkuk, no relationship was found between age and non-adherence.[22]

In a study in South India, age was found to be significantly associated with medication adherence.[24] Furthermore, in a different study carried out in India men had almost threefold increase in risk of non-adherence as compared to women.[2] In a study conducted in Lusaka Zambia, sex of the patient had no bearing on adherence to treatment.[10]

Most married respondents were more adherent than the singles in Maiduguri.[12] There was a significant association between marital status and adherence. Marital status might influence patients' adherence with medication positively. The help and support from a spouse could be the reason why married patients are more adherent to medication than single patients. [25]

In Kano, Nigeria, 74.2% of the respondents who had formal education were adherent with their treatment compared to only 47% respondents without formal education. This difference was found to be statistically significant in that study.[14] On the basis of educational level, there was no association between level of education and adherence in a study conducted in Maiduguri, Nigeria.[12]

### 2.2 Knowledge about Hypertension and its Treatment

In Kirkuk Iraq, the patients had low knowledge regarding hypertension. Sixty six point three percent (66.3%) of patients thought that their hypertension can be cured, 68.5% thought that they can stop medication once blood pressure is controlled, 63% thought that males are more susceptible to hypertension and 36.5% thought that emotional stress was the main cause.[22]

In Saudi Arabia it was found that there is a positive relationship between patient's levels of knowledge of treatment and better adherence. It was found that 43.7% of patients believe that antihypertensive drugs can be stopped once the blood pressure has stabilized. This shows how the lack of knowledge about treatment contributes to patient low adherence behaviour.[21]

In a South Indian study knowledge about the frequency of medication was adequate in 90.6% of the subjects. However, knowledge about the dosage of the medication was inadequate in 78.6% of the cases.[24]

In Bangladesh the patients' understanding of their own illness was an important factor in non-adherence, the poorer the understanding, the more likely to be non-adherent. Many patients stopped their medication due to the belief that hypertension is a curable disease. Only 34.2% of patients believed that hypertension is a non-curable disease.[15]

In Ethiopia it was found that, the right knowledge about hypertension and its treatment created a clear understanding and avoided confusion about the treatment and the disease condition. Knowledge about hypertension and its treatment was found to be positively associated with adherence behaviour. Patients with better awareness were more likely to adhere to their treatment.[13]

### 2.3 Drug Related Factors Affecting Non-Adherence to Antihypertensive Drugs

Drug related factors include: duration of treatment, number of drugs, adverse effects, forgetting to take the drugs, forgetting to take the drugs due to a busy schedule, forgetting to take the drugs due to a feeling of being well, forgetting to take the drugs due to >1 daily dose regimen, taking alternative medicine and exhaustion of drugs before the next clinic apointment.[10-14]

It is well known that adherence is improved if the patient is taking a single drug rather than two or more. A study in Iraq showed that those on single medication were more compliant (54.6%) than those on more than one drug.[22] In Duhok Iraq, the rate of adherence was low in the newly diagnosed patients. This might partially be due to the fact that younger patients are more afraid of taking a lifelong medication than patients in the older age group. It might also be that the course of the disease is usually more severe in the older age group thus predisposing them to be more adherent.[23]

In India taking alternative medicines was not significantly associated with non-adherence.[2] In addition; adverse drug events were not significantly associated with non-

adherence. However the small proportion of respondents experiencing side effects could have been the reason why a significant association was not found.[2] Likewise, a separate study in South India did not show any significant association between adverse drug events and non-adherence.[24] In South India, the asymptomatic course of hypertension was associated with non-adherence.[24]

In Bangladesh, patients did not take their medication mainly due to forgetfulness, feeling well, being too busy and poverty. Forgetfulness was more common among those over age 60 years, which may have been due to senile dementia.[15] Thirty seven percent (37%) of the patients in the study Bangladesh, did not adhere to treatment as a result of the feeling of being well. It was therefore advised that attention should be paid to educating the patients.[15]

In Zambia patients experiencing side effects of dizziness also showed high levels of non-adherence. Side effects commonly hinder adherence since a perception of dizziness is more unpleasant than the subtle symptoms of hypertension.[10] In addition in Lusaka Zambia the study showed that patients taking three types of medications had better adherence. This finding could be due to the fact that those taking more drugs could perceive that their illness is more severe and hence become more adherent to their treatment. Another possible explanation is that physicians caring for chronically non-adherent patients may never get the opportunity to optimally escalate treatment.[10] A higher rate of adherence was seen in those patients who had been hypertensive for more than 10 years and decreased rate with less than 5 years.[10]

In Kano, Nigeria once daily regimen was found to have better adherence than three time's daily ones. Furthermore, medication adherence was greatest for morning dosing, second greatest for evening doses and least for noon. This could be explained by the fact

that patients are usually at home and less busy during the peak adherence periods as opposed to midday medication.[14] Exhaustion of prescribed drugs was among the factors found to be responsible for non adherence in Kano.[14]

## 2.4 Healthcare Service Delivery Factors Affecting Non-Adherence to Antihypertensive Drugs

Healthcare service delivery factors include: receiving healthcare advice, last visit to the health care facility, affordability of the drugs, number of reviews in last six months, spacing of the reviews in months, person conducting the counselling, and total time spent during counselling.

In Duhok Iraq, 84.1% of the patients had their medications prescribed by physician, while 15.9% were prescribed by paramedical staff. According to the study, this was regarded as a good practice as majority of their patients were examined by a physician.[23] Regular follow up of the patients showed a high adherence rate in the Kirkuk Iraq study.[22]

In Saudi Arabia the interpersonal communication process through counselling, in the patient-physician relationship had a potentially positive impact on patients' health outcomes. Physicians usually do not ask their patients about medication-taking behaviour or may use ineffective communication approaches. It is argued that non-collaborative communication on the part of healthcare providers result in poor patient adherence to antihypertensive treatments. In Saudi Arabia, attention has been drawn towards enhancing healthcare team communication skills in order to improve patients' health outcomes. The impact of enhanced health education programs about chronic conditions has provided valuable results that have improved patients' adherence to taking medication.[21]

In India, patients who could only afford some or none of the prescribed drugs were at a higher risk of non-adherence because of the failure to buy the drugs if they did not get them from the hospital. Although the patients got free drugs when they were available, sometimes they were not sufficient to cater for duration over which drugs had been prescribed.[2]

Patients counselled by the nurse were more likely to be non-adherent in Zambia.[10] Again in Lusaka Zambia, being counselled for more than 5 minutes about how to take medication was associated with a decrease in the level of non- adherence.[10] In Lusaka Zambia the number of clinical reviews and spacing of reviews did not statistically affect adherence.[10]

In Maiduguri Nigeria, cost was a crucial issue in patient's adherence especially for patients with chronic diseases as the treatment period could be life-long. A number of studies found that patients who had no insurance cover, were more likely to be non-adherent to treatment.[12] In Kano Nigeria, majority of the patients attended hypertension clinic regularly. The observed good adherence among regular clinic attendees was not surprising since they were also more likely to follow other instructions.[14]

## CHAPTER THREE – METHODOLOGY

### 3.1 Study Area

The Nigerian Federal Civil Service consists of people employed in Nigerian government agencies apart from the military. Majority of the employees are career Civil Servants in the ministries. Promotion is based on qualifications and seniority. The Federal Civil Service employs over 145,500 [25] workers throughout the Federation. The Civil Service is mainly organized around the Federal Ministries, headed by a minister. The ministries are responsible for various parastatals (government-owned corporations).

The Federal Ministry of Health has Federal Staff Clinics and Hospitals dispersed throughout the country. In Abuja there are two Federal Staff Hospitals, Jabi and Gwarinmpa. There are two Federal Staff Clinics in Abuja. The Federal Staff Clinics are in the Office of Head of Service of the Federation and in the building of the Secretary to the Government. All of them serve Federal Civil Servants, their families as well as the general public.

The departments in the Federal Staff Hospitals providing services include the outpatient department, accident and emergency, internal medicine, obstetrics and gynaecology, paediatrics, surgery, radiology, physiotherapy orthopaedics and neurology .The clinics attend to out-patients. Patients who require admission are referred to any of the hospitals for further management.

The average attendance per month recorded by the records department of Federal Staff Hospital Jabi was 7,743 patients, 1,113 patients for Federal Staff Hospital Gwarimpa, 781 patients for Federal Staff Clinic at the building of the Secretary to the Government and 399 patients at the Federal Staff Clinic at the Head of Service of the Federation. The average total attendance of patients for all the hospitals and clinics was 10,036 patients

per month. The average number of old and new and cases of hypertension seen at Federal Staff Hospital Jabi from January to June 2013 were 172 patients per month.

The Federal Staff Hospitals and clinics have a total workforce capacity of 390 workers. Included among these are 45 doctors, 112 nurses, 18 laboratory scientists and 18 pharmacists. Other members of staff include physiotherapists, radiographers, and administrative officers, accounting officers, record officers, sub-staff/cleaners, drivers and security staff.

The Federal Staff Hospital runs a hypertensive clinic twice a week solely for hypertensive patients. The Federal Staff clinics attend to hypertensive patients throughout the week at any given time. Patients are counselled about their condition in the nursing unit during blood pressure checks and from the doctors attending to them during consultation.

The nursing staffs are responsible for taking initial blood pressure measurements and advise patients' concerning the management of the disease like making life style changes and adhering to antihypertensive drugs for life. The medical doctors cross check blood pressure measurements, counsel, prescribe appropriate antihypertensive drugs, request for laboratory investigations and make a follow up appointment.

### 3.2 Study Design

Cross sectional descriptive study design

### 3.3 Study Population

Hypertensive Federal Civil Servants registered at Federal Staff Hospitals and Clinics in Abuja.

### 3.3.1 Inclusion Criteria

1. Patients of age 18 years and above.
2. Those that were on prescribed antihypertensive medications at least in the previous one month.
3. Patients who had co-existing medical conditions were included.
4. Patients must have been Federal Civil Servants.

### 3.3.2 Exclusion Criteria

1. Patients who were too ill to answer the questionnaire.

## 3.4 Sample Size Determination

Sample size was estimated using the proportion of non-adherence to antihypertensive drugs from a previous study in Kano, Nigeria [14] and by applying the formula for cross sectional studies for estimating sample size. Proportion of non-adherence in Kano was found to be 45.8%.

$$n = \frac{z^2 p(1-p)}{d^2}$$ [13]

Where:

n=proportion or sample size

z = Standard normal deviate at 95% confidence interval

p = Proportion with non adherence to antihypertensive drugs from a previous study

q = Complementary probability of non-adherence to antihypertensive drugs

Where q= (1−p)

d = margin of error

n =1.962 ×0.0.458(1-0.458) ÷0.052 =382

A non-response rate of 10% was used, bringing the sample size to: 382+ (382×1/1-10) =382/1-0.1=424

The sample size came to be 424.

### 3.5 Sampling Technique

The sampling technique was systematic sampling.

The sample size for each hospital or clinic was proportionally allocated as follows:

Average number of patients attending each hospital/clinic/month ÷ average number of patients attending all the hospitals and clinics/month× total sample size

Federal Staff Hospital Jabi was: (7743/10036) ×424=327

Federal Staff Hospital Gwarinmpa was: (1113/10036) ×424=47

Federal Staff Hospital Secretary to the Government was: (781/10036) ×424=33

Federal Staff Hospital Head of Service was: (399/10036) ×424=17

The study subjects were chosen from hypertensive patients attending the outpatient clinics of Federal Staff Hospitals and Clinics in Abuja. All the Federal Staff Hospitals and Clinics in the Abuja were chosen for the study. Patients were selected by systematic sampling from a listing on the clinic days. [6,14] The Sampling frame was obtained from the patient register. An interval was obtained using the formula K=n/N. The first patient was chosen randomly by balloting between 1 and K. Subsequent patients were selected based on the interval.

### 3.6 Study Instruments

The selected patients were interviewed using an interviewer administered structured questionnaire. Four research assistants were trained before commencement of the study. Informed consent was obtained from each patient before administering the questionnaire. The questionnaire was adapted from a study in Maiduguri, Nigeria.[12]

Information contained in the questionnaire included socio-demographic profile; patients reported adherence/non adherence to antihypertensive drugs and reasons for non adherence. Patients' non-adherence level was classified using criteria from previous literature. Non-adherence was assessed using the Morisky scale. Morisky-Green test is used for evaluating patient's non-adherence to medications.[23] The test consists of four questions. One point was given to a correct response and zero points given to wrong responses. A patient could get a maximum of four points and a minimum of zero points. According to the protocol of the Morisky-Green test, patients were considered adherent to the treatment when they obtained the maximum score of four points, and patients were considered non-adherent when they obtain three points or less.[23]

Blood pressure measurements during the previous visits were extracted from the register.

### 3.7 Data Collection Methods

Data was collected using a structured pretested questionnaire administered by trained interviewers.Part A consisted of socio-demographic factors and knowledge about hypertension and its management. Part B covered drug related factors. Part C covered health care service delivery factors.

After participants were interviewed, two sitting blood pressure measurements were taken in the left arm with pre-tested mercury sphygmomanometers and stethoscopes approximately two minutes apart by the auscultatory method. The averages of the two readings were used to determine the blood pressure level. The cuff size was 23 × 12.5cm. For all readings Korotkoff phases I and V were used to establish the levels of systolic and diastolic blood pressure, respectively.[13,24] Patients with systolic BP of more than 140 mm of Hg and/or diastolic BP of more than 90 mm of Hg were labeled as having uncontrolled hypertension

Four interviewers were trained before administration of the questionnaire. In addition a pre-test of the questionnaire was done before administration of the final questionnaire.

Data handling and coding was done after the data collection.

### 3.8 Data Management

#### 3.8.1 Measurement of variables

The hypothesised factors were adapted from previous literature. Socio-demographic factors included: age, sex, educational level, and grade level.[22]

Drug related factors included: Duration of treatment, number of drugs, adverse effects, forgetting to take the drugs and reasons for forgetting to take the drugs, taking alternative medicine and exhaustion of drugs before the next clinic appointment. [10-14]

Health system service delivery factors included: ever had health advice, last visit to the health care facility, affordability of the drugs, and number of reviews in the last six months, spacing of reviews in months, health staff conducting counselling, total time spent counselling.

Hypertensive patients were defined as those with raised blood pressure of more than or equal to 140/90 mmHg at the time of data collection. Controlled hypertension was defined as an average blood pressure reading less than 140/90 mmHg at the time of data collection.[13,24]

Benjamin Bloom's taxonomy was followed for measuring the level of knowledge. Since a negligible number of patients could answer more than 80% of questions correctly the groups were readjusted as follows: very good answered more than 80% correctly answered, good 70-80%, fair 60-69% and poor less than 60%. For further analysis, the

good and very good groups were combined together as having satisfactory knowledge, and the poor and fair groups into the category unsatisfactory knowledge.[15]

Knowledge about the frequency and dosage of medication was assessed as good if the patient's response was consistent with the physician's prescription.[21] There were a total of eight questions for knowledge. One point was given to a correct response and zero was given to a wrong response. A patient could get anywhere from a maximum of eight points and a minimum of zero points. The points were converted to percentages and interpreted using blooms taxonomy as described above.

Items to be measured were blood pressure measurements.

Scales used was mmHg using a mercury sphygmomanometer.

The Morisky-Green test was used for evaluating patient's adherence/non-adherence to medications. The Morisky-Green test consists of the following questions:

(1) Have you ever forgotten to take your medicine?

(2) Are you sometimes neglectful in regard to your medicine hours?

(3) Do you skip your medicine hours when you are feeling well?

(4) When you feel badly due to the medicine, do you skip it? According to the protocol of the Morisky-Green test, patients are considered adherent to the treatment when they obtain the maximum score of 4 points, and patients are considered non-adherent when they obtain 3 points or less.[23]

Categorical variables were described using absolute numbers and proportions. Quantitative variables were described using measures of central tendency. Frequencies, proportions and summary statistics were used to describe the study population in relation to relevant variables.

### 3.8.2 Data analysis

In the statistical analysis, descriptive statistics were used for socio- demographic profile of study participants. Bivariate analysis was performed between the various independent variables and non-adherence to antihypertensive treatment. Odds ratios, their 95% confidence intervals and p-values were obtained. Variables whose p-values were significant at $p<0.05$ were then selected for the multivariate analysis in order to determine which variables were independently associated with non-adherence.[2] Logistic regression was used for multivariate analysis.[10] A p value of less than 0.05 was considered to be statistically significant for all analyses.[10] Odds ratio (OR) for non-adherence were reported at 95 percent confidence interval (CI).[10] All statistical analyses were performed using Epi info version 3.4.3 statistical software (CDC Atlanta, Georgia, USA)[10] and Microsoft Excel.

## 3.9 Ethical Considerations

Ethical clearance was obtained from the National Health Research Ethics Committee of Nigeria (NHREC); Federal Ministry of Health Abuja. Written informed consent was obtained from participants before the commencement of the study.

Each study participant was adequately informed about the purpose, method, anticipated benefits and risk of the study by the data collectors. Written consent was obtained from study participants and anonymity was maintained to ensure confidentiality.[13]

## 3.10 Limitations

1. Recall bias; information may not have been given accurately by the respondents.
2. There was the possibility of wilful misstatements by respondents since the information given by them could not be independently verified.

## CHAPTER FOUR - RESULTS

### 4.1 Socio-Demographic Data

**Table 1:** Socio-demographic characteristics of Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja; November 2013-June 2014 (n=424)

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Age (years)** | | |
| 30-39 | 30 | 7.1 |
| 40-49 | 159 | 37.5 |
| 50-59 | 205 | 48.3 |
| 60-69 | 30 | 7.1 |
| **Gender** | | |
| Male | 240 | 56.6 |
| Female | 184 | 43.3 |
| **Marital status** | | |
| Single | 30 | 7.1 |
| Married | 354 | 83.5 |
| Widowed | 19 | 4.5 |
| Divorced | 8 | 1.9 |
| Separated | 13 | 3.1 |
| **Educational level** | | |
| Primary | 10 | 2.4 |
| Secondary | 108 | 25.5 |
| Tertiary | 305 | 71.9 |
| No education | 1 | 0.2 |
| **Grade level** | | |
| 1 to 6 | 75 | 17.7 |
| 7 and above | 349 | 82.3 |

The respondents had a mean age of 50.1 years. The respondents had a mean age of 50.1 years and standard deviation of 6.98 and age range of 31 to 65years. The age group (50-59) years had the highest frequency at 48.3%. There were more males than females, 56.6%. Majority of the patients were married, 83.5%. Up to 71.9% had up to tertiary level of education. Majority 82.3% were Senior Civil Servants.

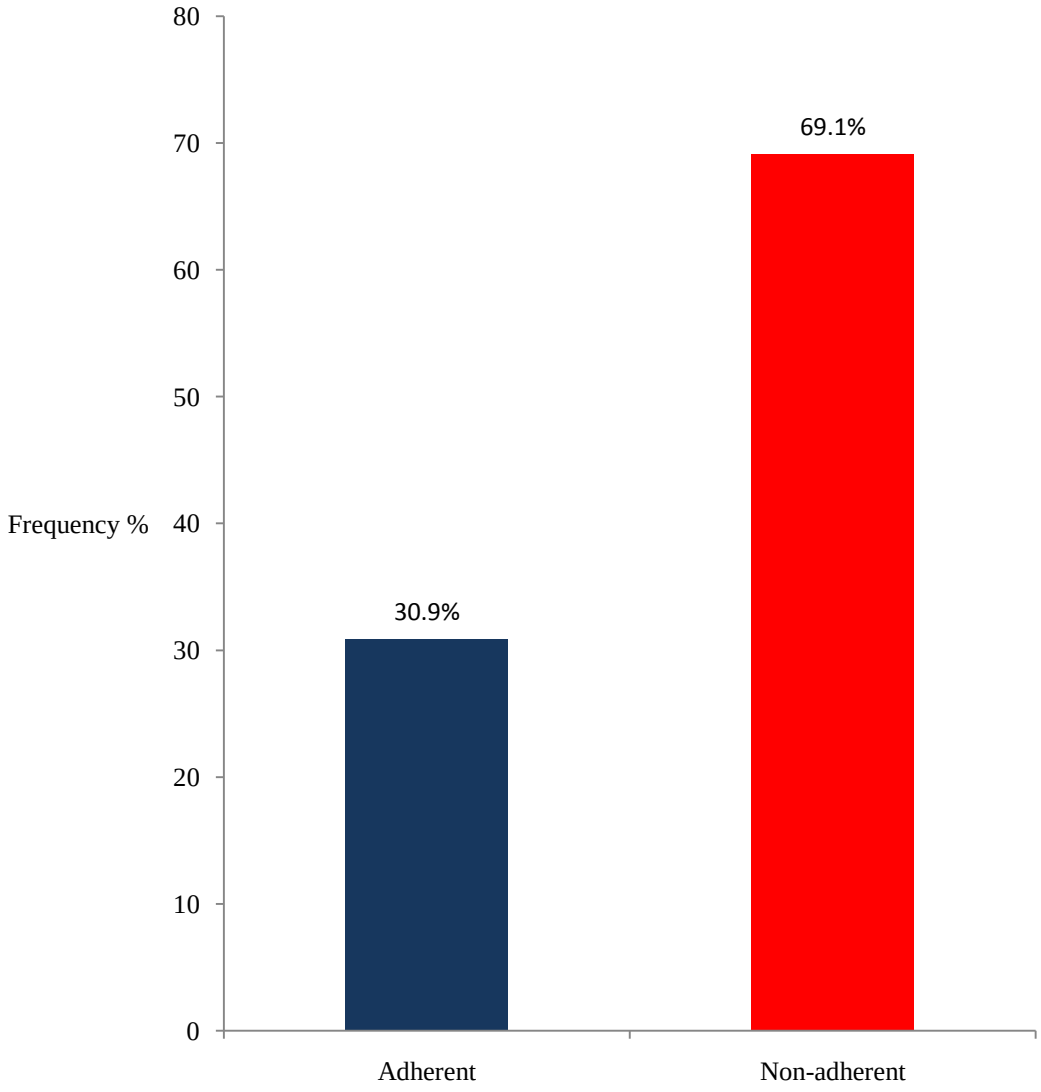



**Figure 1: Distribution of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja by adherence status to antihypertensive drugs; November 2013-June 2014 (n=424)**

Sixty nine point one percent (69.1%), 293/424 of the patients were found non-adherent while 131/424 (30.1%) were adherent to treatment.

**Table 2: Knowledge of hypertension and its treatment of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja; November 2013-June 2014. (n=424)**

| Question | Frequency | Percent (%) |
|---|---|---|
| **1. Hypertension can be cured** | | |
| • Yes | 290 | 68.4 |
| • No | 134 | 31.6 |
| **2. Drugs can be stopped once control is achieved** | | |
| • Yes | 233 | 55.0 |
| • No | 191 | 45.0 |
| **3. The sex more susceptible to hypertension** | | |
| • Males | 194 | 45.8 |
| • Females | 118 | 27.8 |
| • I don't know | 112 | 26.4 |
| **4. The age group more susceptible to hypertension** | | |
| • All age groups | 93 | 21.9 |
| • Elderly | 114 | 26.9 |
| • I don't know | 12 | 2.8 |
| • Middle aged | 205 | 48.3 |
| **5. The causes of hypertension** | | |
| Emotional stress | | |
| • Yes | 86 | 20.3 |
| • No | 338 | 79.7 |
| Hereditary | | |
| • Yes | 51 | 12.0 |
| • No | 373 | 88.0 |
| Obesity | | |
| • Yes | 18 | 4.2 |
| • No | 406 | 95.8 |
| Excessive salt | | |
| • Yes | 33 | 7.8 |
| • No | 391 | 92.2 |
| All of the above | | |
| • Yes | 131 | 30.9 |
| • No | 293 | 69.1 |
| I don't know | | |
| • yes | 106 | 25.0 |
| • No | 318 | 75.0 |
| **The complications of hypertension** | | |
| Heart attack | | |
| • Yes | 15 | 3.5 |
| • No | 409 | 96.5 |
| Stroke | | |
| • Yes | 43 | 10.1 |
| • No | 381 | 89.1 |
| Kidney disease | | |
| • Yes | 8 | 1.9 |
| • No | 416 | 98.1 |

| | | | |
|---|---|---|---|
| | Eye diseases | 9 | 2.1 |
| | • Yes | 415 | 97.9 |
| | • No | | |
| | More than one of the above | | |
| | • Yes | 297 | 70.0 |
| | • No | 127 | 30.0 |
| | I don't know | | |
| | • Yes | 51 | 12.0 |
| | • No | 373 | 88.0 |
| 6. | Knowledge of patient about frequency of drug regimen(from hospital records) | | |
| | • Adequate | 388 | 79.7 |
| | • Inadequate | 86 | 20.3 |
| 7. | Knowledge of patient of dosage of drug(from hospital records) | | |
| | • Adequate | 245 | 57.8 |
| | • Inadequate | 179 | 42.2 |

Sixty four point eight percent (64.8%) of the respondents thought hypertension was a curable disease. Fifty five percent (55%) thought that drugs can be stopped once blood pressure control is achieved. However majority of respondents, 70% were familiar with the complications of hypertension. In addition, 79.9% of the patients were familiar with the frequency of their drug intake, while 57.8% were familiar with the dosages of their drugs.

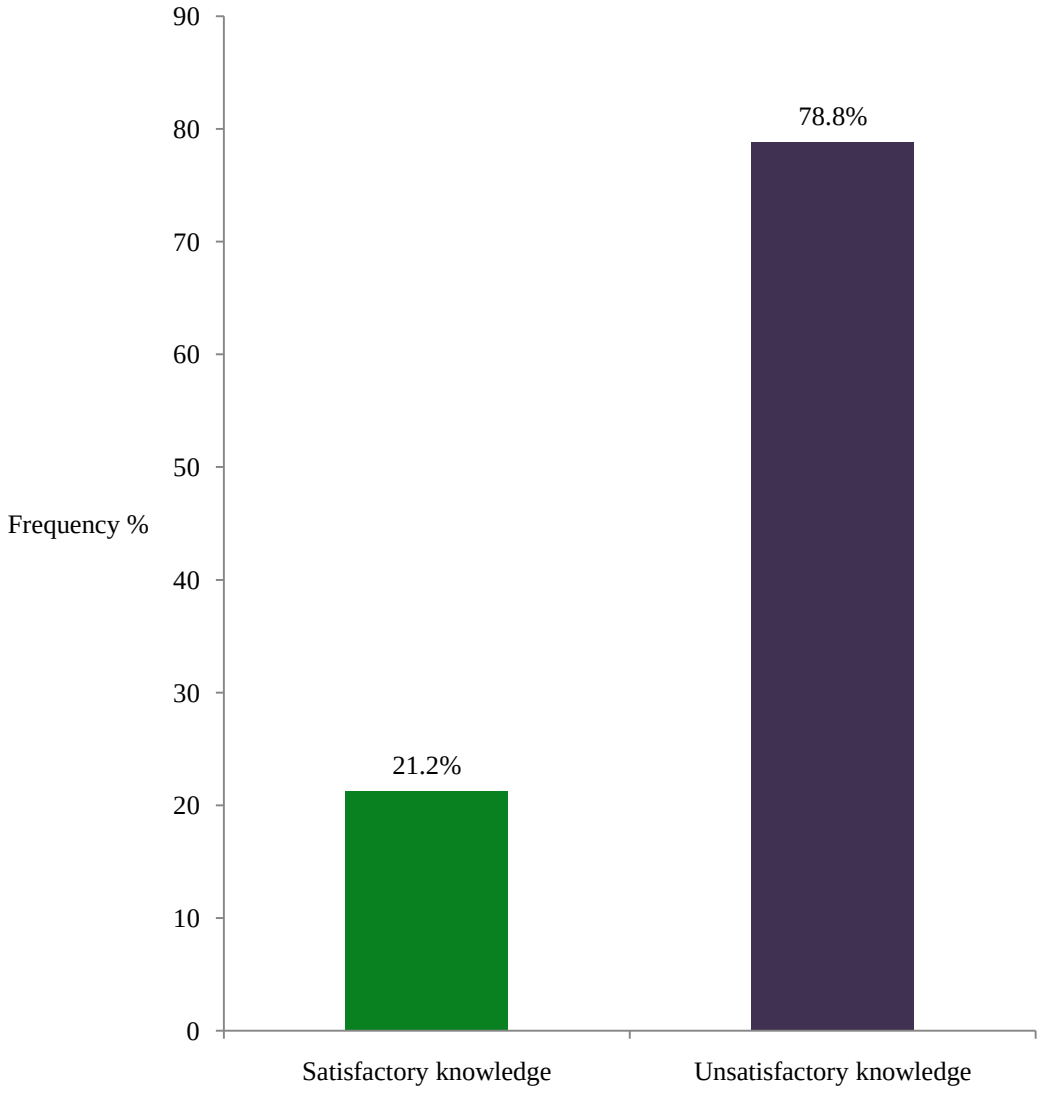



**Figure 2: Knowledge of hypertension and its treatment among hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja; November 2013-June 2014 (n=424)**

Patients with satisfactory knowledge made up 21.2% of the patients while 78.8% fell into the category, unsatisfactory knowledge.

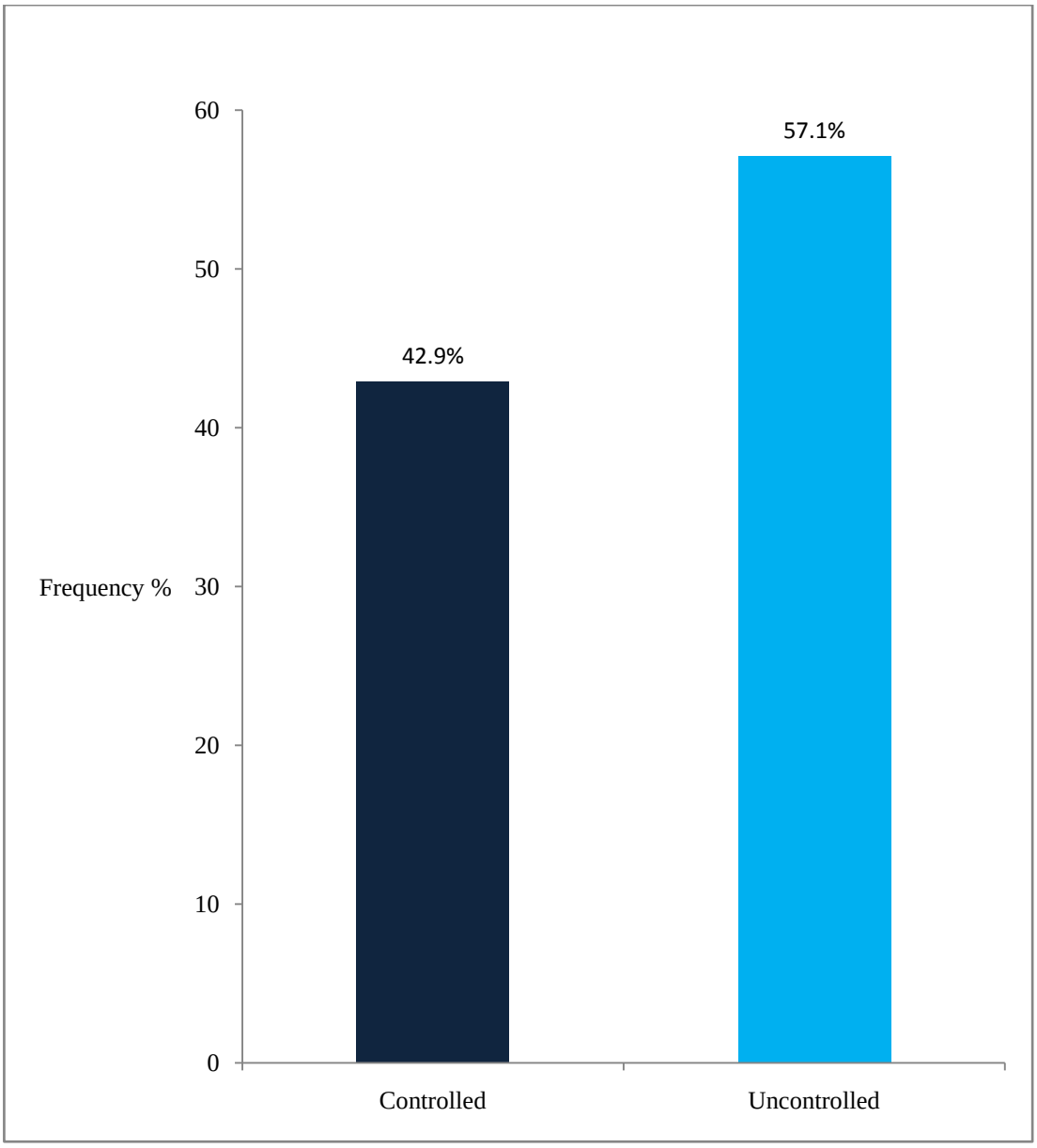



**Figure 3: Current blood pressure status of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja; November 2013-June 2014 (n=424)**

The average systolic was 144.7 mmHg while the average diastolic reading was 89.4 mmHg at the time of the interview. Up to 57.1% of respondents had uncontrolled blood pressure at the time of the interview.

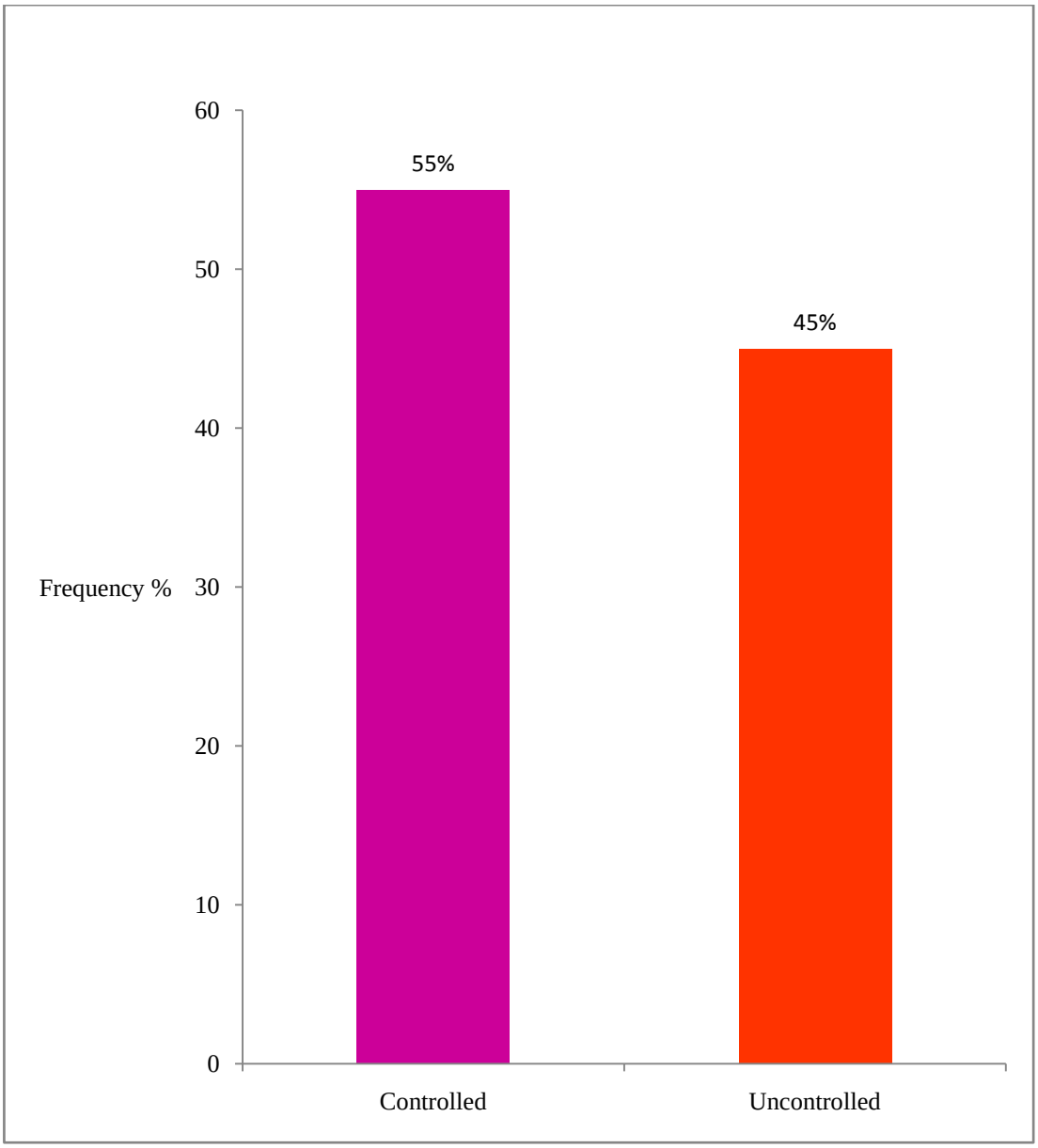



**Figure 4: Blood pressure status during previous visit of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja; November 2013-June 2014 (n=424)**

Forty five percent (45%) of respondents had uncontrolled blood pressure during the last visit to the hospital or clinic.

**Table 3: Drug related factors among hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja; November 2013-June 2014 (n=424)**

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Duration of treatment (years)** | | |
| <5 years | 234 | 55.2 |
| ≥5 years | 190 | 44.8 |
| **Number of drugs** | | |
| 1 | 190 | 44.8 |
| >1 | 234 | 55.2 |
| **Experience adverse affects** | | |
| Yes | 153 | 36.1 |
| No | 271 | 63.9 |
| **Forgetting to take the drugs** | | |
| Yes | 203 | 47.9 |
| No | 221 | 52.1 |
| **Taking alternative medicine** | | |
| Yes | 127 | 30.0 |
| No | 297 | 70.0 |
| **Exhaustion of drugs before next appointment** | | |
| Yes | 180 | 42.5 |
| No | 244 | 57.5 |

Among patients interviewed, 36.1% experienced adverse effects from their drugs. In addition, 47.9% of the patients admit to forgetting to take their antihypertensive drugs. Thirty percent (30%) of the patients were on alternative drugs in addition to antihypertensive medication. Finally 42.5% of those interviewed said that their drugs get exhausted before their next clinic appointment.

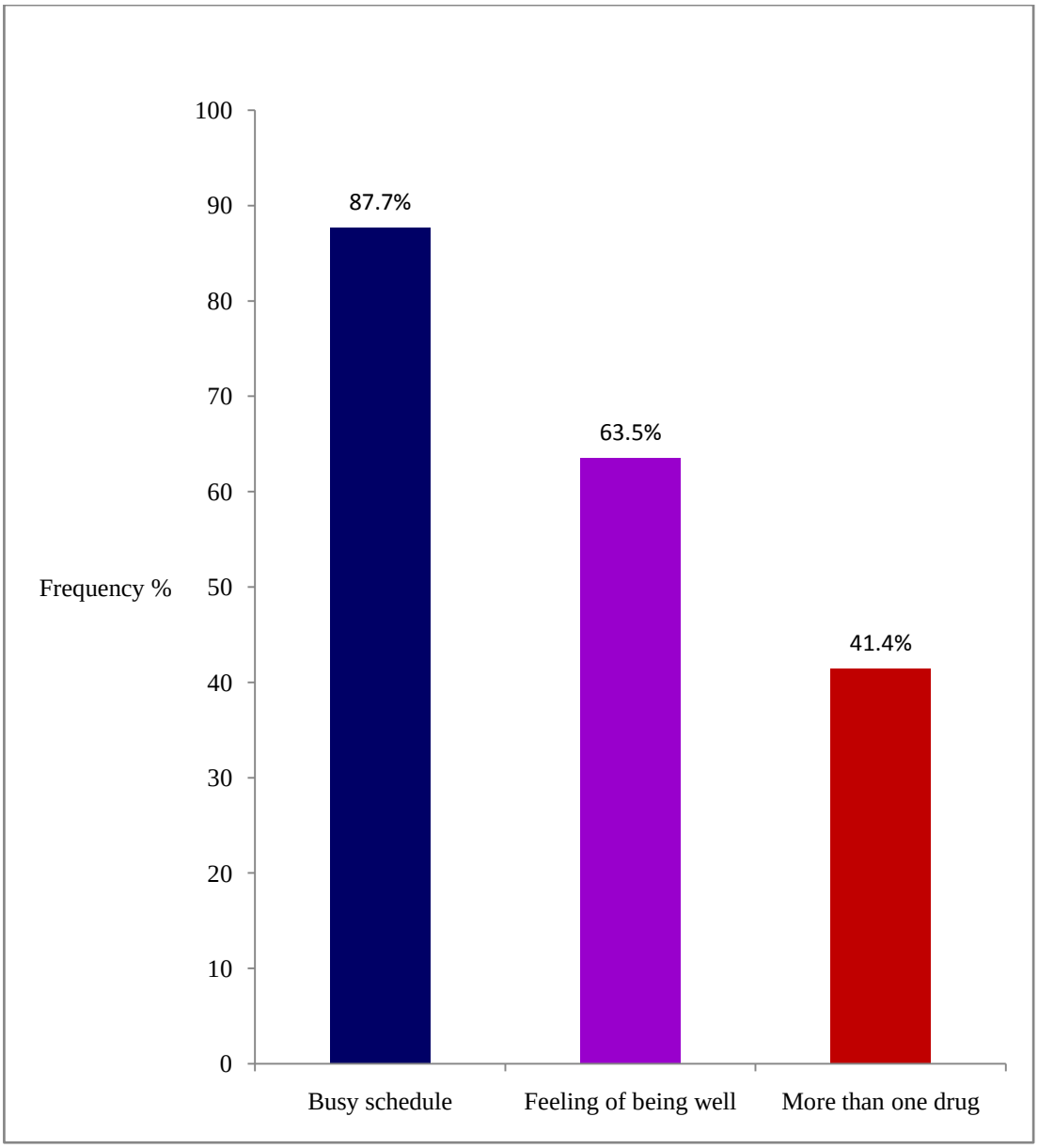



**Figure5: Distribution of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja showing reasons for forgetting to take their drugs; November 2013-December 2014. (n=203)**

Among the reasons for forgetting to take the antihypertensive drugs, forgetting due to a busy schedule had the highest frequency at 87.7%.

**Table 4: Health care service delivery factors among hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja; November 2013-June 2014 (n=424)**

| Variable | Frequency | Percent (%) |
|---|---|---|
| **Last visit to the health care facility** | | |
| <3 months | 248 | 58.5 |
| ≥3 months | 176 | 41.5 |
| **Affordability of the drugs** | | |
| All the drugs | 253 | 59.7 |
| Some/none of the drugs | 171 | 40.3 |
| **Number of clinic reviews in the last 6 months** | | |
| None | 83 | 19.6 |
| 1 and above | 341 | 80.4 |
| **Spacing of clinic reviews in months** | | |
| Every 2 weeks | 51 | 12.0 |
| Every 1 month | 185 | 43.6 |
| Every 2 months or more | 188 | 44.4 |
| **Ever had health care advice** | | |
| Yes | 303 | 71.5 |
| No | 121 | 28.5 |
| **Counselled by** | | |
| Doctor | 122 | 43.3 |
| Nurse | 61 | 20.1 |
| Both doctor and nurse | 120 | 39.6 |
| **Total time spent during counselling** | | |
| Less than 5 minutes | 143 | 47.2 |
| 5 minutes or more | 160 | 52.8 |
| **Choice of antihypertensive drug by** | | |
| Doctor alone | 360 | 84.9 |
| Doctor and patient | 64 | 15.10 |

Patients who bought their drugs in the pharmacy and hospital were almost equal in number 46.9% and 46.5% respectively. Only 19.6 % of those interviewed did not have any reviews in the last 6 months. Furthermore, only 12% of respondents were reviewed every 2 weeks. More than half of the respondents (52.8%) were counselled for more than 5 minutes during their last counselling session.

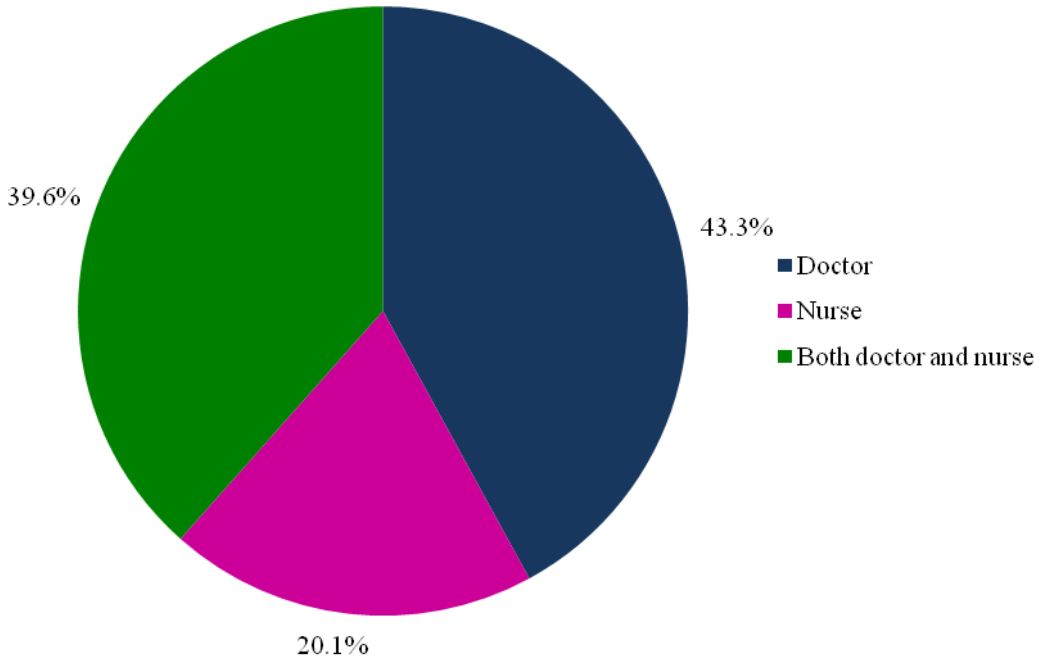



**Figure 6: Distribution of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja by whom they were counseled; November 2012-June 2014. (n=303)**

Patients counselled by the doctor alone were more in number, 43.3% than those counselled by the nurse or doctor and nurse.

**Table 5: Knowledge grade of hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics associated with non-adherence to antihypertensive drugs in Abuja; November 2013-June 2014. (n=424)**

| Variable | Adherence status | | OR(95%CI) | p value |
|---|---|---|---|---|
| | Non-adherence n (%) | Adherence n (%) | | |
| **Knowledgeable about hypertension and its treatment** | | | | |
| Unsatisfactory knowledge | 243(72.8) | 91(27.2) | 2.1(1.3-3.5) | <0.01* |
| Satisfactory knowledge | 50(55.6) | 40(44.4) | 1.0 | |

(*) Statistically significant

Patients with unsatisfactory knowledge were 2.1 times more likely to be non-adherent compared to patients with satisfactory knowledge about hypertension and its treatment 2.1 (95% CI 1.3-3.5).

**Table 6: Socio-demographic factors associated with non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja: November 2013-June 2014. (n=424)**

| Variable | Adherence status | | OR (95% CI) | p value |
|---|---|---|---|---|
| | Non-adherence n (%) | Adherence n (%) | | |
| **Age** | | | | |
| 30-49 | 141(48.1) | 48(36.6) | 1.6(1.1-2.4) | 0.04* |
| 50-69 | 152(51.9) | 83(63.4) | 1.0 | |
| **Sex** | | | | |
| Male | 177(60.4) | 63(48.1) | 1.7(1.1-3.5) | 0.02* |
| Female | 116(39.6) | 68(51.9) | 1.0 | |
| **Marital status** | | | | |
| Single | 52(17.7) | 18(13.7) | 1.3(0.8-2.4) | 0.4 |
| Married | 241(82.3) | 113(86.3) | 1.0 | |
| **Grade level** | | | | |
| Junior civil servant | 63(21.5) | 12(9.2) | 2.1(1.4-5.2) | <0.01* |
| Senior civil servant | 230(78.5) | 119(90.8) | 1.0 | |
| **Level of education** | | | | |
| None/primary | 9(3.1) | 2(1.5) | 2.0(0.4-9.6) | 0.6 |
| Secondary/tertiary | 284(96.9) | 129(98.5) | 1.0 | |

(*) Statistically significant

Among results obtained with significant p values, males were 1.6 times likelier to be non-adherent compared to females (95% CI 1.1-2.5). Furthermore Junior Civil Servants were 2.1 times more likely to be non-adherent compared to Senior Civil Servants. (95% CI 1.4-5.2).

**Table 7: Drug related factors associated with non-adherence to antihypertensive drugs among hypertensive Federal Civil Servants attending Federal Staff Hospitals and Clinics in Abuja; November 2013-June 2014. (n=424)**

| Variable | Adherence level | | OR (95% CI) | p value |
|---|---|---|---|---|
| | Non-adherence n (%) | Adherence n (%) | | |
| **Duration of treatment** | | | | |
| ≥5 years | 120(41.0) | 70(53.4) | 0.6(0.4-0.9) | 0.02* |
| <5years | 173(59.0) | 61(46.6) | 1.0 | |
| **Number of drugs** | | | | |
| >1 | 170(58.0) | 64(48.9) | 1.5(1.0-2.1) | 0.1 |
| 1 | 123(42.0) | 67(51.1) | 1.0 | |
| **Experience of adverse effects of antihypertensive drugs** | | | | |
| Yes | 118(40.3) | 35(26.7) | 1.8(1.2-2.9) | <0.01* |
| No | 175(59.7) | 96(73.3) | 1.0 | |
| **Taking alternative medicine** | | | | |
| Yes | 100(34.1) | 27(20.6) | 2.0(1.2-3.2) | <0.01* |
| No | 193(65.9) | 104(79.4) | 1.0 | |
| **Exhaustion of drugs before next clinic appointment** | | | | |
| Yes | 163(55.6) | 17(13.0) | 8.4(4.8-14.7) | <0.01* |
| No | 130(44.4) | 114(87.0) | 1.0 | |

(*) Statistically significant

Patients who had been on antihypertensive drugs for less than five years were 1.7 times more likely to be non-adherent, compared to patients who had been on drugs for five years or more (95% CI 1.1-2.5). Patients who experienced any adverse effects from their drugs were 1.8 times more likely to be non-adherent (95% CI 1.2-2.9). Patients who took alternative drugs were 2.0 times more likely to be non- adherent compared to those who did not take alternative drugs (95% CI 1.2-3.2). Those whose drugs got exhausted before the next clinic appointment were 8.4 times more likely to be non-adherent (95% CI 4.8-14.7) compared to patients whose drugs did not get exhausted.

**Table 8: Healthcare service delivery factors associated with non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospitals and Clinics Abuja; November 2013-June 2014. (n=424)**

| Variable | Adherence status | | OR (95% CI) | p value |
|---|---|---|---|---|
| | Non-adherence n (%) | Adherence n (%) | | |
| Ever been counselled about hypertension | | | | |
| Yes | 205(70.0) | 98(74.8) | 1.2(0.8-2.0) | 0.37 |
| No | 88(30) | 33(25.2) | 1.0 | |
| Total time spent during counselling | | | | |
| <5 minutes | 112(54.6) | 31(31.6) | 2.6(1.6-4.3) | <0.01* |
| ≥5 minutes | 93(45.4) | 67(68.4) | 1.0 | |
| Last visit to the health care facility | | | | |
| ≥3 months | 138(47.1) | 38(29.0) | 2.2(1.4-3.4) | <0.01* |
| <3 months | 155(52.9) | 93(71.0) | 1.0 | |
| Affordability of the drugs | | | | |
| Some/none of the drugs | 127(43.3) | 44(33.6) | 1.5(0.9-2.3) | 0.07 |
| All of the drugs | 166(56.7) | 87(66.4) | 1.0 | |
| Place of buying drugs | | | | |
| Pharmacy/open market | 177(60.4) | 50(38.2) | 2.5(1.6-3.8) | <001*. |
| Hospital | 116(39.6) | 81(61.8) | 1.0 | |
| Number of clinic appointments in the last 6 months | | | | |
| None | 64(21.8) | 19(14.5) | 1.7(1.0-2.9) | 0.1 |
| 1 and above | 229(78.2) | 112(85.5) | 1.0 | |
| Spacing of reviews in months | | | | |
| Every 2 months or more | 137(46.8) | 51(38.9) | 1.4(0.9-2.1) | 0.2 |
| Every 1 month or less | 156(46.8) | 80(61.1) | 1.0 | |
| Choice of antihypertensive drug by | | | | |
| Doctor alone | 255(87.0) | 105(80.2) | 1.7(1.0-2.9) | 0.09 |
| Doctor & patient | 38(13.0) | 26(87) | 1.0 | |

(*) Statistically significant

Patients who received counselling for less than 5 minutes were 2.6 times more likely to be non-adherent (95%CI 1.6-4.3) compared to patients counselled for five minutes or more. Patients whose last visit to the hospital was 3 months or more were 2.2 times more likely to be non-adherent compared to those whose last visit was less than 3 months (CI 1.4-3.4). Patients who bought their drugs in the pharmacy and open market were 2.5 times more likely to be non-adherent compared to those who bought their drugs in the hospital alone (95%CI 1.6-3.8).

**Table 9: Independent factors for non-adherence to antihypertensive drugs among Federal Civil Servants in Abuja (n= 424)**

| Variables | Odds Ratio | 95% Confidence Interval | p value |
|---|---|---|---|
| Grade level (1-6) | 2.9 | 1.1-7.7 | 0.03 |
| Exhaustion of drugs before next clinic appointment | 5.9 | 2.8-12.5 | 0.01 |
| Buying drugs in the pharmacy and open market | 1.9 | 1.03-3.3 | 0.04 |
| Total time spent counselling less than 5 minutes | 1.8 | 1.02-3.2 | 0.04 |

Further analysis using multiple logistic regressions was carried out to evaluate the relationship between multiple factors and non-adherence to antihypertensive drugs. When controlling for other variables in the model, Junior Civil Servants had a significantly higher chance of non-adherence (95%CI 1.1-7.7). Those whose drugs got exhausted before the next clinic appointment had a 5.9 times likelihood of non-adherence (95%CI 2.8-12.5). Patients who bought drugs at the pharmacy and open market had a higher chance of non-adherence by 1.9 times (95%CI 1.03-3.3). In addition, patients whose total time spent counselling was less than five minutes had a 1.8 times higher chance of non-adherence (95%CI 102-3.2).

## CHAPTER FIVE - DISCUSSION

Low adherence has been identified as the primary cause of unsatisfactory control of blood pressure. Good adherence has been shown to improve blood pressure control and reduce the complications of hypertension.[6]

It is therefore important to ensure that patients adhere to their prescribed drugs as given to them by their doctors. Ensuring antihypertensive drugs are taken, will decrease the complications of hypertension as well as decrease over all health care costs.[13]

In this study 69.1% of the respondents were non-adherent to antihypertensive drugs. This is lower compared to findings in a previous study done in Bangladesh which showed that the level of non-adherence among study subjects was up to 85%.[15] The result in this study is however higher than what has been reported in other studies, Kano 45.8%,[14] Ethiopia 35.4%[13] and Zambia 17%.[10] This study was conducted among Federal Civil Servants living in an urban setting. It may be that the participants in this study led bussier life styles because of their occupation and where they lived. The studies that had lower levels of non-adherence mentioned above were conducted among the general population.

Patients who were in the younger age bracket of (30-49) were more likely to be non-adherent compared to the older age group of (50-69). This is in keeping with previous studies such as those done in Iraq,[22] South India [24] and Iraq Duhok.[23] It may be that older patients have a more severe course of the disease with complications which may have set in and makes them adhere to drugs more. Also younger patients may be afraid of taking a lifelong medication which may pose them to be non-adherent. However other studies did not find any significant association between age and non-adherence to antihypertensive drugs.[2]

In this study a significant association was found between sex and non-adherence to antihypertensive drugs. Men were more likely to be non-adherent compared to females. Reasons may be because men tend to lead busier life styles than women. They are considered bread winners and carry the responsibility of providing for their families. They are always outdoors in search of income which may make them forget to take their drugs.[13] Men have other life concerns rather than spending time to follow up on health care issues.[22] Also women generally take care of their health compared to men.[15] This result is similar to the research done in Ethiopia[13] and Iraq.[22] On the other hand, in a different study done in Zambia, sex had no bearing on adherence to treatment.[10]

Junior Civil Servants were found to be more likely to be non-adherent compared to Senior Civil Servants in this study. A possible reason may be that Junior Civil Servants have lower incomes compared to Senior Civil Servants which may make the drugs less affordable to them. In addition Junior Civil Servants are younger compared to Senior Civil Servants. Previous studies have shown that older patients tend to be more adherent to treatment.[23,24]

Patients with unsatisfactory knowledge about hypertension and its management were more likely to be non-adherent to drugs compared to patients with good knowledge. Having right knowledge about hypertension and its treatment was positively associated with adherence behaviour in Ethiopia. It created a clear understanding about the disease and avoided confusion.[13] Similar findings to this study were also obtained in Bangladesh. Patients who had been educated about the disease process, the goal of blood pressure control and the fact that drugs can be changed due to side effects were found to be more adherent to their medication.[15] In Kano, poor adherence was found mainly due to ignorance on need for regular treatment.[14]

Patients, who had been on treatment for less than five years, were more likely to be non-adherent compared to patients who had been on medication for five years or more. Our finding in this study is similar to that done in Iraq, Kirkuk. In that study, adherence rate increases as the duration of hypertension increases.[22] A different finding was however obtained in the Indian study where the result was not significant.[2] It may be possible that patients who have had hypertension for a longer period are older patients and tend to be more adherent. It may also be possible that younger patients are afraid of taking lifelong medications compared to older patients. Also the disease may be more severe in older patients making them more adherent to their medications.[23]

Patients experiencing side effects from their antihypertensive drugs were more likely to be non-adherent to treatment. A similar result was obtained in Zambia.[10] Several studies on the other hand did not yield significant results such as two separate studies done in India.[2,24] The reason may be those patients who experience side effects from their drugs would rather do without the drugs and remain with the subtle symptoms of hypertension. Also some of the side effects of the drugs may interfere with their lifestyle to the extent that patients would rather not adhere to the drugs as prescribed.

Patients who took alternative medicine were more likely to be non-adherent compared to patients who did not in this study. In India however taking alternative medicines was not significantly associated with non-adherence.[2] It may be because patients who take alternative drugs assume that the alternative drugs act as a substitute for their antihypertensive drugs. It may also be assumed that patients do not take the required dosages of their antihypertensive drugs thinking that alternative medication will make up the difference in the required dose. The implications of this being that patients would be non-adherent to their medications since taking an incorrect dose is considered as form of non-adherence[9].

Patients whose drugs got exhausted before their next clinic appointment were more likely to be non-adherent compared those whose drugs did not get exhausted. In Kano similar results were obtained.[14] It is possible that patients' not willing to refill their drugs in good time means that they are not taking their prescribed drugs as they should.

Patients counselled for less than five minutes were more likely to be non-adherent compared to patients who were counselled for five minutes or more. This result is similar to the Zambian study, where being counselled for more than five minutes about how to take medication was associated with decrease in the level on non-adherence.[10] 'Patient-centred' communication between patients and health care providers contributes to increase patients' understanding about their illnesses and adherence to treatment.[21] Increasing the time for counselling sessions can be addressed by hiring nurses who specialise in counselling for hypertensive disease. Each hypertensive patient to have a minimum of 5 minutes for each counselling session.

Patients whose last visit to the hospital for follow up was 3 months or more were more likely to be non-adherent compared to patients whose last visit was less than 3 months ago. In India the risk of non-adherence was increased among patients who had taken a longer time since their last visit to a health care facility.[2] This is in agreement with the Iraqi study[22] and the Kano study.[14] The observed good adherence among regular clinic attendees was because they were also more likely to follow other instructions.[14] However in Zambia the spacing of clinical reviews did not affect adherence.[10]

Patients who bought their drugs in private pharmacies and open markets were more likely to be non-adherent compared to those who bought their drugs in the hospital. It may be possible these patients may delay buying their drugs outside the hospital environment if they become distracted by other actives upon leaving the hospital. Not buying their drugs

at the right time may leave room for non-adherence to drugs. Patient may not take the required doses for extended periods of time at different time intervals pending the time they buy their drugs outside the hospital.

In this study the grade level, exhaustion of drugs before the next clinic appointment, buying drugs in private pharmacies/open market and counselling received for less than five minutes were independent factors associated with non-adherence to antihypertensive drugs among Federal Civil Servants in Abuja.

Medication non-adherence to antihypertensive drugs constitutes a major problem in the management of hypertension. Addressing the factors associated with non-adherence in this study may improve adherence to drugs. This would in turn improve the general well being of Civil Servants thereby improve productivity at the work place. In addition there would be reduced spending in health care costs that results from unnecessary adjustments of medication.

## CHAPTER SIX – CONCLUSION AND RECOMMENDATIONS

In conclusion the level of non-adherence to antihypertensive drugs was found to be high among Federal Civil Servants. Socio-demographic factors that were associated with non-adherence included age, sex and grade level. Unsatisfactory knowledge of hypertension and its treatment was association with non-adherence. Among drug related factors, duration of treatment, side effect of drugs, taking alternative drugs, and exhaustion of drugs before next clinic appointment were found to be significantly associated with non-adherence. The total time spent counselling, last visit to the health care facility, and place of buying the drugs were the health care delivery factors that were associated with non-adherence.

Being a Junior Civil Servant, having your drugs exhausted before the next clinic appointment, total time spent counselling less than 5 minutes and buying drugs outside the hospital were independent factors associated with non-adherence to antihypertensive drugs in this study.

Recommendations of this study to Federal Staff Hospitals and Clinics are as follows:

1. For the health care staff to take note of hypertensive Junior Civil Servants as potential patients that my not adhere to drugs. Support groups can be created to ensure that Junior Civil Servants are informed about the importance of adherence to treatment and this may in turn motivate them to take better care of their health.
2. Special health messages either visual, audio or live speeches can be given to stress the importance of refilling drugs in good time before seeing the doctor.
3. Communication techniques to be improved during counselling sessions between patients and hospital staff about the importance of adhering to antihypertensive drugs. This may be achieved by training health care staff in counselling techniques specific for hypertensive disease. New communication techniques apart from one

on one counselling can be adopted like fliers, showing mini documentaries about importance of adherence to antihypertensive drugs and the consequences of not taking the drugs. All hypertensive patients should be counselled for five minutes or more before or after seeing the doctor.

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*Appendix 1*

## Study Instruments

### Questionnaire for risk factors for non adherence to antihypertensive drugs

**Questionnaire no:.....**

**Part A**

**Demographic/patient related factors**

Answer/circle the appropriate option

1. Age _____Years

2. Gender

(a) Male (b) Female

3. Marital status

(a) Married (b) Single (c) Divorced (d) Widowed (e) Separated

4. Grade level

(a). 1-10 (b). 12-17

5. Level of education

(a). Primary (b).Secondary (c).Tertiary (d). No formal education

6. Do you practise any of the life styles changes (salt restriction, low fat intake, weight reduction?)

(a). Yes (b). No

7. Can hypertension be cured?

(a). Yes (b). No

8. Can drugs be stopped once control is achieved?

(a). Yes (b). No

9. Which sex is more susceptible to hypertension?

(a). Male (b). Female (c). I don't know

10. Which age group is more susceptible to hypertension?

(a). Elderly (b) .Middle aged (c) .All age groups

11. What are the causes of hypertension?

(a). Emotional stress (b).Hereditary (c).Obesity (d). Excessive salt

(e). All of the above (f). I don't know

12. What are the complications of hypertension?

(a). Don't know (b).Heart attack (c) More than one (d). Stroke

(e).Kidney disease (f). Eye disease

13. Knowledge of patient about frequency of your drug regimen? (From patient records)

(a). Adequate (b).Inadequate

14. Knowledge about the dosage of the drug? (From patient records)

(a). Adequate (b). Inadequate

**Part B**

**Blood pressure and drug related factors**

14. How long have you had hypertension? ----------years

(a). < 5 years (b).≥5 years

15. Which drugs are you currently using (please list them)

1. ----------
2. ----------
3. ----------
4. ----------

16. How many drugs are you currently taking?

(a).1 (b). >1

17. Do you experience any symptoms?

(a). Yes (b). No

18. Which symptoms are you experiencing? Kindly list them here

1.....

2.....

3.....

4.....

19. Do you experience any adverse effects /side effects of antihypertensive drugs?

(a). Yes (b). No

20. Please list the adverse effects and side effects

1.....

2.....

3.....

4.....

21. Do you have any complications of hypertension?

(a). Present (b). Absent

22. Please list the complications

1.....

2.....

3.....

4.....

23. Do you have any other disease condition apart from hypertension (co morbidities)?

(a). Present (b). Absent

24. Please list the disease condition (co morbidities)

1.....

2.....

3.....

25. Do you forget to take your drugs?

(a). Yes (b). No

26. What are the possible reasons why you forget to take your drugs? Please list them here.

1.....

2.....

3.....

4.....

27. Does a busy schedule make you forget to take your drugs?

(a). Yes (b). No

28. Does feeling well make you forget to take your drug?

(a). Yes (b) .No

29. Does having more than 1 daily drug regimen make you forget to take your drug?

(a). Yes (b) .No

30. Do you take alternative drugs for the hypertension?

(a). Yes (b). No

31. If you take alternative drugs what are the names of the drugs?

1.....

2.....

3.....

4.....

32. Do your drugs get exhausted before your next clinic appointment?

(a). Yes (b). No

**Part C**

**Health care related factors**

33. Have you ever had health advice from the health care facility?

(a). Yes (b). No

34. When was your last visit to the health facility?

.....months .....years

35. Last visit to the health care facility was

(a). ≥3 months (b). <3months

36. Do you understand your drug regimen?

(a). Well (b). Not very well (c). No

37. Can you afford your drugs?

(a). All of the drugs. (b).Some /none of the drugs

38. Where do you buy your drugs?

(a). Hospital/clinic (b). Private pharmacy (c). Open market

39. How many reviews have you had in the last 6 months?

(a) none (b) 1 and above

40. How are the reviews spaced (in months)?

(a). Every 1 month (b). Every 2 months or more

41. What is the distance from your home to the hospital?

(a).Less than 5km (b).5-10 km

42. Who are you counselled by in the hospital /clinic?

(a).Doctor (b). Nurse (c). Both doctor and nurse

43. What is the total time spent during counselling?

(a). Less than 5 minute's (b). More than 5 minutes

44. Who made the choice of the antihypertensive drug?

(a). Doctor alone (b). Doctor and patient

**Blood pressure measurements**

45. Blood pressure reading

(a). Average systolic.....mmHg (b). Average Diastolic.....mmHg

46. Blood pressure control

(a). Controlled (b). Uncontrolled

47. Blood pressure reading during previous visit (from hospital records).....mmHg

**Knowledge score (socio-demographic/patient related factors Qu. 7-14)**

1. Satisfactory knowledge = 70% and above correctly answered
2. Unsatisfactory knowledge = 69% and below correctly answered

**48. Knowledge score (%).....**

**(a).Satisfactory knowledge**

**(b).Unsatisfactory knowledge**

1. Good knowledge is 70% and above correctly answered
2. Needing improvement is 69% and below correctly answered

**The Morisky Green grading scale for adherence/non adherence**

(1) Have you ever forgotten to take your medicine?

(a). Yes (b). No

(2) Are you sometimes neglectful in regard to your medicine hours?

(a). Yes (b) .No

(3) Do you skip your medicine hours when you are feeling well?

(a). Yes (b). No

(4) When you feel badly due to the medicine, do you skip it?

(a). Yes (b) .No

Morisky Green Test score .....

Scoring of knowledge about hypertension and its treatment among Federal Civil Servants attending Federal Staff Hospitals and Clinics, Abuja; November 2013-June 2014 (n= 424)

| Question | Correct response | Score for correct response | Score for wrong response |
|---|---|---|---|
| 1. Can hypertension be cured?<br>• Yes<br>• No | No | 1 | 0 |
| 2. Can drugs be stopped once control is achieved?<br>• Yes<br>• No | No | 1 | 0 |
| 3. Which sex is more susceptible to hypertension?<br>• Females<br>• Males<br>• I don't | Males | 1 | 0 |
| 4. Which age group is more susceptible to hypertension?<br>• Elderly<br>• Middle aged<br>• All of the above<br>• I don't know | Middle aged | 1 | 0 |
| 5. What are the causes of hypertension?<br>• Emotional stress<br>• Hereditary<br>• Obesity<br>• Excessive salt<br>• All of the above<br>• I don't know | Hereditary | 1 | 0 |
| 6. What are the complications of hypertension?<br>• Heart attack<br>• Stroke<br>• Kidney disease<br>• Eye disease<br>• More than one<br>• I don't know | More than one | 1 | 0 |
| 7. Knowledge of patient about the drug regimen | Adequate | 1 | 0 |
| 8. Knowledge of patient about dosage of drug | Adequate | 1 | 0 |

## *Appendix 2*

# Ethical Approval

**National Health Research Ethics Committee of Nigeria (NHREC)**

Promoting Highest Ethical and Scientific Standards for Health Research in Nigeria

Federal Ministry of Health

**NHREC Protocol Number NHREC/01/01/2007-17/09/2013**
**NHREC Approval Number NHREC/01/01/2007-12/10/2013**
**Date: October 17, 2013**

**Re: Risk factors for non-adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospitals and Clinics, FCT, Abuja**

Health Research Ethics Committee (HREC) assigned number: NHREC/01/01/2007
Name of Principal Investigator: Dr. Amina Kazaure

Address of Principal Investigator: MPH in Field Epidemiology
Ahmadu Bello University Zaria
ameedaah@yahoo.co.uk

Date of receipt of valid application: 17-09-2013
Date when final determination of research was made: 12-10-2013

**Notice of Expedited Committee Review and Approval**

This is to inform you that the research described in the submitted protocol, the consent forms, advertisements and other participant information materials have been reviewed and *given expedited committee approval by the National Health Research Ethics Committee.*

This approval dates from 12/10/2013 to 11/10/2014. If there is delay in starting the research, please inform the HREC so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study.* In multiyear research, endeavour to submit your annual report to the HREC early, in order to obtain renewal of your approval and avoid disruption of your research.

*The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.*

Signed

**Clement Adebamowo** BMChB Hons (Jos), FWACS, FACS, DSc (Harvard)
Honorary Consultant Surgeon, Director, West African Center for Bioethics and
Chairman, National Health Research Ethics Committee of Nigeria (NHREC

Department of Health Planning, Research & Statistics
Federal Ministry of Health
11th Floor, Federal Secretariat Complex Phase III
Ahmadu Bello Way, Abuja

Tel: +234-09-523-8367
E-mail: chairman@nhrec.net, secretary@nhrec.net, desk.officer@nhrec.net,
URL: http://www.nhrec.net,

*Appendix 3*

## Informed Consent Form

Informed Consent Form for hypertensive Federal Civil Servants attending Federal Staff Hospital and Clinics in the FCT. We are inviting them to participate in this research, risk factors associated with non adherence to antihypertensive drugs among Federal Civil Servants attending Federal Staff Hospital and Clinics in the FCT.

**Name of principal investigator**: Dr. Amina Zubair Kazaure

This informed consent form has two parts:

- Information sheet (to share information about the research with you)
- Certificate of consent ( for signatures if you agree to take part)

You will be given a copy of the full informed consent form

**PART I**: Information sheet

### Introduction

I am Dr. Amina Z. Kazaure, of the Nigerian Field and Laboratory Training Program Abuja. We are doing research on non adherence to antihypertensive drugs. I am going to give you information and invite you to be part of this research. Before you decide you can talk to anyone you feel comfortable with about the research. There may be some words that you do not understand please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me, the research assistant or the staff.

**Purpose**

Non-adherence to antihypertensive drugs is common in Nigeria. Previous studies have shown that only about 50% of hypertensive patients adhere to their drugs. The reason we are doing this research is to find out the level of non adherence among Federal Civil Servants attending Federal Staff Hospital and clinics and those factors that are likely to contribute to non adherence in order to address them. Better drug adherence leads to controlled blood pressure levels and thus reduces the likely hood of developing the complications that are associated with hypertension such as stroke, heart failure, kidney failure and heart attacks.

**Description of the process**

The research will be conducted during one clinic appointment. It will take approximately 45 minutes. This research will involve taking blood pressure measurements twice in one sitting about 5 minutes apart and administering a questionnaire by the research assistant to the participant.

**Participant selection**

We are inviting all hypertensive Federal Civil Servants aged 18 years and above attending Federal Staff Hospitals and Clinics in the FCT.

**Voluntary Participation**

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this hospital/clinic will continue and nothing will change. You may change your mind later and stop participating even if you agreed earlier.

**Confidentiality**

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will not be identified by your name but by a number and you cannot be traced to that number.

**Right to Refuse or Withdraw**

You do not have to take part in this research if you do not wish to do so. You may also stop participating in the research at any time you choose. It is your choice and all of your rights will still be respected.

**Who to Contact**

If you wish to ask questions later, you may contact: Dr. Amina Kazaure Telephone number: 08033870046

**PART II**

I have been invited to participate in research of non adherence to antihypertensive drugs. I understand that it will involve taking two blood pressure measurements. I am aware that there may be no benefit to me personally. I have been provided with the name of a researcher who can be easily contacted using the number I was given for that person.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research and understand that I have the right to withdraw from the research at any time without in any way affecting my medical care.

Print Name of Participant_____

Signature of Participant _____

Date _____

Day/month/year

If illiterate

A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team).

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness_____ and thumb print of participant

Signature of witness _____

Date _____

Day/month/year

I have accurately read or witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print Name of Researcher_____

Signature of Researcher _____

Date _____

Day/month/year

A copy of this Informed Consent Form has been provided to participant _____ (initialled by the participant.)

*Appendix 4*

## Work Plan

| Serial no | Activity | Schedule | | | | | | | | Person responsible |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Start date | End date | Aug | Sept | Oct | Nov | Dec | Jan | |
| 1 | Development of data collection tools | August 1st 2013 | January 31st 2014 | ↔ | | | | | | Researcher |
| 2 | Ethical clearance and approval | | | | ↔ | | | | | Researcher |
| 3 | Recruitment of research assistants | | | | ↔ | | | | | Researcher |
| 4 | Training of research assistants | | | | ↔ | | | | | Researcher |
| 5 | Pre-test | | | | | ↔ | | | | Research team |
| 6 | Questionnaire administration | | | | | ↔ | → | | | Research team |
| 7 | Data entry and analysis | | | | | | ↔ | → | → | Research team |
| 8 | Report writing | | | | | | | | ↔ | Researcher |