EVALUATION OF PHARMACIST'S INTERVENTION ON KNOWLEDGE, ATTITUDE AND PRACTICES OF HYPERTENSIVE PATIENTS ON LIFESTYLE AND DIETARY MODIFICATIONS IN A TERTIARY HEALTH FACILITY IN NORTH-EASTERN NIGERIA

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NOVEMBER, 2017

Declaration

I declare that the work in this dissertation entitled 'Evaluation of Pharmacist's interventionon knowledge, attitude and practices of hypertensive patients on lifestyle and dietary modifications in a tertiary health facility in north-eastern Nigeria' has been carried out by me in the Department of Clinical Pharmacy and Pharmacy Practice. 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 this or any other institution.

Fatima Mustapha Dungus

_____ _____ _____

Signature Date

Certification

This dissertation entitled 'EVALUATION OF PHARMACIST'S INTERVENTION ON KNOWLEDGE, ATTITUDE AND PRACTICES OF HYPERTENSIVE PATIENTS ON LIFESTLE AND DIETARY MODIFICATIONS IN A TERTIARY HEALTH FACILITY IN NORTH-EASTERN NIGERIA' by Fatima Mustapha DUNGUS meets the regulations governing the award of a Master of Science degree in Clinical Pharmacy of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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Dedication

I dedicate this work to my Parents Alhaji Mustapha Dungus and Hajiya Fatima Dungus, May the Almighty Allah have mercy on their souls. Ameen

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The evolution of this work from conception to reality would have remained illusionary but for those who have done so much that mere words of gratitude cannot possibly commensurate their immense contributions. Nevertheless I wish to express my unquantified gratitude to Allah, the Most High, whose mandate has made all things possible and from whom I am endowed with whatever success accrued. To my late parents, may the Almighty bestow on you a high class of Paradise. May their gentle souls rest in peace.

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ABSTRACT

Hypertension is a major public health problem, which is growing in prevalence and poorly controlled worldwide. The prevalence is high in Nigeria and there is generally low level of awareness and practices of lifestyle and diet modification measures. The study was conducted from August 2016 to April 2017 to assess patient's knowledge, attitude and practices of lifestyle and diet at the University of Maiduguri teaching hospital (UMTH). Patients attending the cardiology unit and the general outpatient department (GOPD) of the hospital were identified and patients were enrolled as they consent after informing them of the research protocol. A multiphasic interventional study was used to determine knowledge, attitude and practices of lifestyle and diet in patients with respect to lifestyle and diet. This was achieved by administering questionnaire before and after prospective counselling and education on lifestyle and diet on clinic days and via reminder phone calls. Descriptive and inferential statistics were used to analyze the data. Three hundred and eight (308) patients were enrolled, out of which two hundred and eighty six (286) concluded the study giving a response rate of 92.8%. The majority of the respondents fell within the 40-49 years (86, 30.1%) and 50-59 years (85, 29.7%) age groups. The females (51.7%) constituted a significant majority in the study. Kanuri (35.7%) ethnic group made up a larger percentage in the study. The majority of respondents had no formal education (109, 38.1%) and the unemployed constituted 39.9% of the study. At the start of the study 37.8% and 24.8% had blood pressure levels in stages 1 and 2 respectively. The mean systolic blood pressure was 144.2±20.4 and the median scores of knowledge, attitude and practices were 3, 1 and 1 respectively. There were associations between socio demographic characteristics, time of intervention and blood pressure control. Females, patients within

the >50 years age group and those with formal education had significant blood pressure control. The results of this study indicates that patients need more advice and counselling on lifestyle and dietary modifications. Therefore, clinicians and health educators should give adequate and relevant information on the value of lifestyle and dietary modifications in the control of blood pressure

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List of Abbreviations

AHA	American Heart Association
B.P	Blood pressure
CVD	Cardiovascular Diseases
DALY	Disability Adjusted Life Years
DASH	Dietary Approach to Stop Hypertension
DBP	Diastolic Blood Pressure
GOPD	General Out-Patient Department
HTN	Hypertension
IQR	Interquartile Range
JHS	Joint Hypertension Society
JNC	Joint National Committee on Hypertension Detection, Treatment, Evaluation and Prevention
KAP	Knowledge Attitude and Practice
LMIC	Low and Middle Income Countries
NHS	National Hypertension Society
SD	Standard Deviation
SBP	Systolic Blood Pressure
UMTH	University of Maiduguri Teaching Hospital
WHO	World Health Organization
WHO ISH	World Health Organization-International Society of Hypertension

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Hypertension is the major risk factor for cardiovascular disease, it is growing in prevalence and poorly controlled virtually worldwide.(Kearny *et al*., 2004). It is the commonest non communicable disease in the world with important public health challenge in both economically developing and developed countries (Kearny *et al*., 2004). Poorly controlled hypertension is a significant public health concern all over the world in terms of morbidity, mortality and economic burden especially among older adults (Ogedegbe*et al.,* 2013).Prevention is possible although rarely achieved and treatment can lead to reduced incidence of complications such as stroke, coronary heart disease, heart failure and kidney disease. By the year 2030, 23 million cardiovascular deaths are projected with 85% occurring in low and middle income countries (Mathers*etal*., 2006).Hypertension contributes to approximately 17million deaths worldwide every year despite the fact that it isone of the major, modifiable risk factors of cardiovasculardiseases (Yache*tal.*, 2004). The prevalence of hypertension in Nepal increased from 26.4 percent in 2000 to 40 percent in 2008, and this figure is projected to reach 60 percent by 2025 (Dhitali*etal.*, 2013). The prevalence of hypertension is higher in low- and middle-income countries (Ibrahim *et al*., 2012)where health resources are scarce and stretched by a high burden of infectious diseases such as HIV, malaria and tuberculosis. (Ibrahim *et al.*, 2012). Currently the world wide burden of hypertension is greatest in low and middle income countries (LMIC's) where it affects about 1 out of 5 adults which is projected to increase andthe mortality rates

of cardiovascular diseases are also higherin these countries, these accounts for major economic burdens(Seedat.,2000). According to the World Health Organization (WHO), worldwide raised blood pressure is estimated to cause 7.5million deaths which is about 12% of the total of all deaths. Globally, the overall prevalence of raised blood pressure in adults aged 25 and above was around 40% in 2008, however because of the growing population, the number of people with uncontrolled hypertension rose from 600million in 1980 to nearly 1billion in 2008.The increase in physical activity and reduced salt intake were associated with successful blood pressure control while increased BMI was negatively associated with adequate blood pressure control (Myung et al, 2017)

Prevalence of hypertension is high in Nigeria and the overall awarenessis low in the country (Adeloye*etal.,* 2015), and ranks first among the non-communicablediseases in the country (Akinkugbe, 1997).The prevalence of hypertension is high among the Nigerian population, appropriate interventions need to be developed and implemented to reduce the preventable burden of hypertension especially at primary health care center's which is the first point of call for over 50% of the Nigerian population (Akinlua*etal.*,2015). A community based study of rural and semi urban population in Enugu, Nigeria put the prevalence of hypertension in Nigeria at 32.8% (Ulasi, *etal.,* 2010) and increasing (8-46%), (Ogah*et al.,* 2012). A similar figure (31.8%) was reported for Abia(Ogah*et al.,* 2013).

In Nigeria, Hypertension is basically managed with pharmacotherapy, interventions such as lifestyle and dietary modifications often not emphasized. Lifestyle and dietary modification programs in developing countries are often affected by low literacy levels and income(Okwuonu*etal.*,2014).The 8th Joint National Committee on Prevention, Detection,

Evaluation and Treatment of high blood pressure and the Nigerian Hypertension Society (NHS) guideline for the management of hypertension recommends lifestyle modification for all patients with hypertension. These modifications previously referred to as non-pharmacologic therapy serve as adjunctive therapy for hypertension and include weight reduction, increased physical activity, moderation of dietary sodium and alcohol intake using the Dietary Approach to Stop Hypertension (DASH) eating plan (Okwuonu*etal.*,2014).

The goal of hypertension management is to prevent short and long term complications by achieving and maintaining the blood pressure lower than 140/90mm Hg (Lambert*etal.*, 2006). Patients need to be aware of various modifiable risk factors associated with hypertension which can improve their blood pressure (Akter*etal.*, 2014).The Dietary Approach to Stop Hypertension (DASH) eating plan which effectively lowers blood pressure should be encouraged in these patients (Okwuonu*etal.*, 2014).The DASH plan emphasizes fruits, vegetables and low fat dairy products, protein and reduction in fat and cholesterol etc. (Okwuonu*etal*, 2014).

1.1.1Knowledge, Attitude and Practices of Hypertensive Patients on Lifestyle and Diet

A study conducted among adult hypertensive patients in Nigeria showed that more than half the respondents (54.2%) have a poor level of knowledge of lifestyle and diet modification measures but have a high level of willingness to adapt (Dallas,2007). Recent surveys reveal continued lack in the awareness, treatment and control of hypertension.

(Hennis*etal.,* 2002; Mari *etal.,* 2006; Iyalomhe, 2007; Ong *etal.*, 2007and Petrella*etal.*, 2007).Hence assessing the knowledge, perception, attitudes and lifestyle practices of hypertensive patients is vitally important in achieving hypertension control goals at the population level and also for meeting quality standards in health care delivery (Conner *etal.,* 1996). Knowledge, Attitude and Practices is linked as it provides a quantitative method (predefined questions formatted in standardized questionnaires) that provides access to quantitative and qualitative information. KAP surveys reveal misconceptions or misunderstandings that may represent obstacles to the activities that we would like to implement and potential barriers to behavior change. Note that a KAP survey essentially records an "opinion" and is based on the "declarative" (i.e., statements). In other words, the KAP survey reveals what was said, but there may be considerable gaps between what is said and what is done (Medecins du monde, 2011)

1.1.2Lifestyle and Dietary Modification

Lifestyle modification also known as non-pharmacological therapy is the cornerstone of helping out hypertensive patients to attain lifestyle behaviors that are healthy (Cakir and Pinar, 2006).The increasing prevalence of hypertension is attributed to ageing and behavioral risk factors such as unhealthy diet, harmful use of alcohol, lack of physical activity, excess weight and exposure to persistent stress (WHO, 2008). Patient education by physicians and other members of healthcare team about lifestyle modification plays an important role in the control of hypertension (Ogedegbe*etal.,* 2009).

1.2Problem Statement

Hypertension is a leading cause of morbidity and mortality in Africa, and Nigeria, the most populous country in the continent hugely contributes to this.It is clear that hypertension-associated diseases and events such as stroke, myocardial infarction, angina pectoris, heart failure, and peripheral vascular disease, are risk factors for disability (Merill and Penelope, 2007). Hypertension (HTN) continues to be a serious public health problem in the United States and is a major risk factor for stroke, heart failure, myocardial infarction, and other serious cardiovascular and renal diseases. Hypertension can be asymptomatic, its detection and control continues to be a challenge. The total economic burden of HTN was estimated at $73.4 billion in 2009(Cohen, 2009) in United States. From a public health point of view, the prevention and control of hypertension are cost-effective interventions, particularly in the elderlypatients(Toyouz*et al*, 2006).Risk factors for hypertension include dietary habits, such as high sodium or low potassium intake, high alcohol consumption, low levels of physical activity and overweight (Toyouz*et al*, 2006). An effort to reverse these habits is the pivotal aspect of suggested lifestyle/dietary changes.

1.3Justification

From the available literature search there is generally poor knowledge and practices of lifestyle/diet modification measures among hypertensive patients in Nigeria and there are few studies on lifestyle and diet modifications in hypertensive patients in north eastern Nigeria in particular.The high prevalence and low awareness/practices indicated a need to conduct a study in order to assess patients' knowledge and educate them on the modifiable lifestyle/diet changes in order to improve their blood pressure

1.4 Aim and Objectives of the Study

1.4.1 Aim of the Study

The research is aimed at establishing the effectiveness of intervention on the beneficial roles of lifestyle and dietary modification in patients with hypertension

1.4.2Specific objectives of the study

- To assess knowledge of hypertensive patients regarding lifestyle and dietary modification.
- To evaluate attitude of hypertensive patients regarding lifestyle and dietary modification
- To determine practice of lifestyle and dietary modification in hypertensive patients.
- To associate blood pressure controlin patients with their demographic variables (age, sex, education etc).
- To establish the beneficial role of Pharmacist's intervention on lifestyle and dietary modification in hypertensive patients

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The World Health Organization-International Society of Hypertension (WHO-ISH) define hypertension as a persistent elevation of blood pressure greater than 140/90 mm Hg and advocate the lowering of blood pressure for all patients with cardiovascular (CV) risk factors in addition to hypertension. The WHO-ISH report, however, suggests continuing monitoring without medication for subjects without other risk factors if blood pressures are not greater than 150/95 mm Hg. The JNC VIII recommends drug therapy in these subjects if blood pressures remain greater than 140/90 mm Hg after a 6-12month period of non-pharmacologic interventions (Moser 1999)

Hypertension is a silent, invisible killer that rarely causes symptoms and its complications account for about 10 million deaths worldwide every year. It contributes to the burden of heart disease, stroke and kidney failure. Hypertension disproportionately affects populations in low- and middle-income countries where health systems are weak and inaccessibility to treatment hinders successful control over long term. The numbers of people with hypertension who are undiagnosed, untreated and uncontrolled are also higher in low- and middle-income countries compared to high-income countries (WHO, 2013). Hypertension is the fifth leading risk factor for cardiovascular diseases (CVD) in sub-

Saharan Africa. Due to epidemiological transition, risk factors for CVD, diabetes and other non-communicable diseases are increasing in most communities in Sub-Saharan Africa where communicable diseases and famine are the predominant causes of mortality and disability. Unfortunately, nearly 80% of deaths due to CVD occur in low- and middle-income countries (WHO, 2013).They are the countries that can least afford the social and economic consequences of ill health. In these countries many people do not seek treatment for hypertension because it is prohibitively expensive. Worldwide, hypertension has been found to be the most prevalent health problem among adult patients in primary care, but its treatment has often been sub-optimal (Hassali*et al.,* 2012).

Hypertension is an increasingly important public health issue worldwide. It is the major risk factor for cardiovascular disease, growing in prevalence and poorly controlled virtually worldwide (Kearny *et al*., 2004). The prevalence of cardiovascular disease and hypertension is increasing rapidly in Sub-Saharan Africa (Addo et al., 2007).The current prevalence in many countries particularly in urban societies is said to be already as high as those seen in developed countries. The higher prevalence of hypertension in urban areas compared to rural areas strongly implicates differences in lifestyle/diet as an explanatory factor. Obesity and increased salt and fat intake from consuming more processed foods and engaging in jobs with minimal physical activity are likely explanations for higher hypertension in urban population (Addo*et al*., 2007). Studies have demonstrated a relationship between high BP and lifestyle factors such as overweight, high salt intake, physical in activity and maladaptive coping with stress (Mattila*etal.,* 2003).

Prevalence of hypertension is high in Nigeria and the overall awareness of raised blood pressure is low in the country (Adeloye*etal.,* 2015). It ranks first among the non-

communicable disease in Nigeria (Akinkugbe, 1997). Non pharmacological intervention provides an effective means to lower blood pressure and has been emphasized increasingly as a useful method for both prevention and management (Egan *etal.*, 2003). Presented in Figure 2.1 is the pathophysiology of hypertension.

2.1.1 Pathophysiology of hypertension

Multiple factors that control blood pressure contribute to developing primary HTN. The two primary factors include problems in either hormonal [natriuretic hormone, reninangiotensin-aldosterone system (RAAS)] mechanisms or disturbances in electrolytes (sodium, chloride, potassium). Natriuretic hormone causes an increase in sodium concentrations in cells leading to an increase in blood pressure. The RAAS regulates sodium, potassium, and blood volume, which will ultimately regulate blood pressure in the arteries (blood vessels that carry blood away from the heart). Two hormones involved in the RAAS system include angiotensin II and aldosterone. Angiotensin II causes narrowing of the blood vessels, increases release of chemicals that elevate blood pressure, and increases aldosterone production. The constriction of blood vessels increases blood pressure (less space, same amount of blood), which also places pressure on the heart. Aldosterone causes sodium and water to stay in the blood. As a result, there is a greater volume of blood, which will increase pressure on the heart and elevate blood pressure.1,5 Arterial BP is the pressure in the blood vessel, specifically the arterial wall. It is measured in millimeters of mercury (mmHg). The two arterial blood pressure values are systolic blood pressure (SBP) and diastolic blood pressure (DBP). The SBP is the peak (highest) value that is achieved when the heart contracts. DBP is achieved while the heart is at rest (lowest pressure) and the heart chambers filled with blood (Kayce et al., 2015)

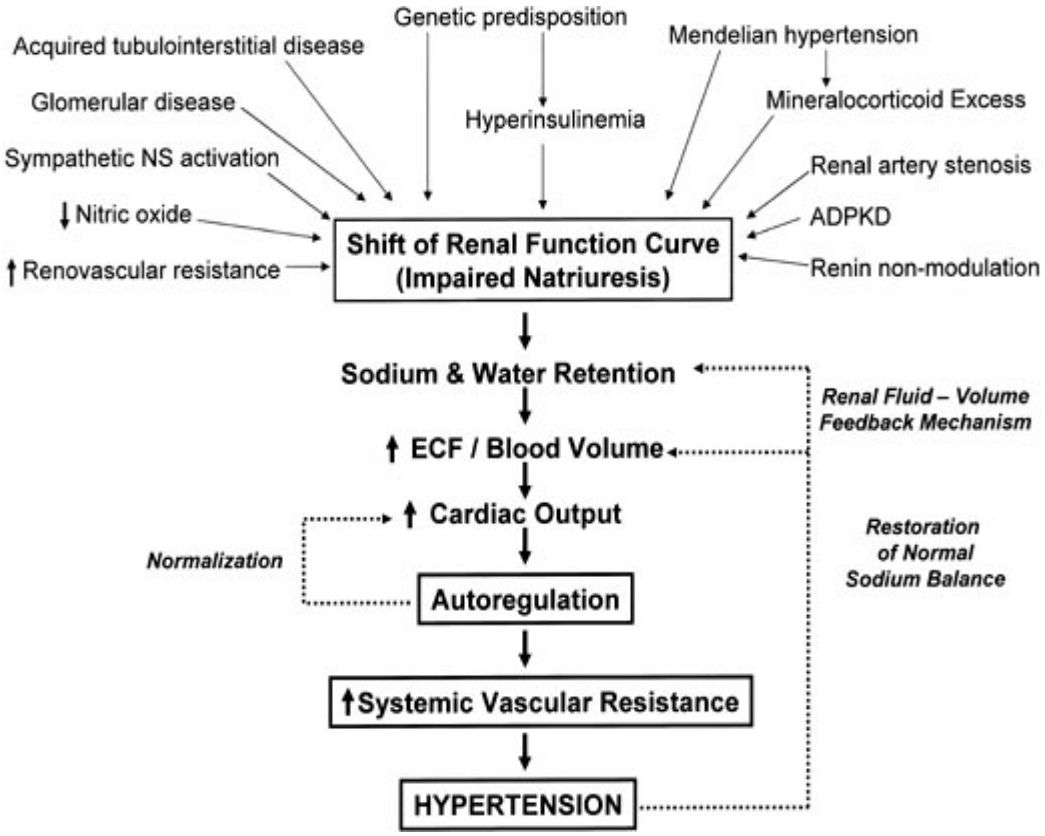


Figure 2.1 Pathophysiology of hypertension (adapted fromChobanian*et al.*, 2003)

2.1.2 Classification of Hypertension

Based on JNC 7, patients with sustained hypertension are further divided into stage 1 hypertension (systolic BP 140-159 or diastolic BP 90-99 mmHg), stage 2 hypertension (systolic BP ≥160 or diastolic BP ≥100 mmHg), and those with compelling indications that include diabetes, cardiovascular disease, and renal disease. The JNC 7 recommended a blood pressure goal of <140/90 mmHg for patients with hypertension and more intense lowering (a BP target of <130/80 mmHg) in hypertensive patients with diabetes or kidney disease. In recent years however, large clinical trials performed in patients with kidney disease and diabetes have failed to demonstrate clear benefit with intense blood pressure control.

Table 2.1:Classification of Blood pressure

Category	**SBP mmHg**		**DBP mmHg**
Normal <120	and	<80	
Prehypertension	120-139	or	80-89
Hypertension stage 1	140-159	or	90-99
Hypertension stage 2	>160	or	>100

(Adapted from JNC 7th **report SBP- systolic blood pressure DBP-diastolic blood pressure)**

2.2 Hypertension in Nigeria

Nigeria is one of many developing countries where the health services have focused on treating infectious diseases, such as malaria and tuberculosis, but in recent years, non-communicable conditions have become an increasing problem.The prevalence of hypertension in South Eastern Nigeria has been found to be 32.8% (Ulasi*etal.*, 2010).This is similar to a study conducted by Ogah*et al.*, 2013 which puts the prevalence rate at 31.8% the reported prevalence in rural areas ranged from 13.5 to 46.4 % in both sexes, 14.7 to 49.5 % in men and 14.3 to 68.8% in women. Data from urban studies revealed a range of 8.1 to 42.0 % in both men and women, 7.9 to 46.3% for men and 3.5 to 37.7% for women (WHO, 2008) In general hypertension prevalence was higher in urban than rural areas. (Ogah*etal.*, 2012).

2.3HypertensionKnowledge, Perception and Lifestyle Modification Practices

A cross sectional study conducted on 252 participants in a semi urban community in Nigeria by Okwuono*et al* (2014) showed that poor knowledge on hypertension, unawareness of lifestyle modifications and failure to practice healthy lifestyle are identified as patient related barriers to blood pressure control . The knowledge is generally poor and the knowledge- practice discordance is quite alarming, as was seen in a study conducted by Oyati*et al.*, in 2011. A similar study was conducted in Enugu state, Nigeria by Ike *et al* (2010) showedpoor level of perception of hypertension and awareness of the lifestyle

modification measures through the mass media, but patients have willingness to adopt the measures. A study conducted in Egypt by Abdelhay and El mezayen (2015) showed that there is poor level of perception about lifestyle behaviours, patients lacked knowledge of some points of risk factors, manifestations and some lifestyle modifications of hypertension.Awotidebe*et al.,* 2014 reported that knowledge of participants about lifestyle activities such as activity and exercise to control hypertension was poor, which he attributed to lack of awareness to these.A similar study conducted in Chennai India in 2010 showed that there was inadequate knowledge, poor practice and negative attitude among with patient regarding hypertension and its management (Pushpamala, 2015).

A study conducted By Tesfaye*et al.,* (2015) reported that patients are not well knowledgeable about hypertension in general and the lifestyle modification required in controlling it.

Table 2.2: Lifestyle Modification to Prevent and Manage Hypertension. (Chobanian*et al.*, 2003)

Modification	**Recommendation**	**Approximately SBP reduction range**
Weight reduction	Maintain normal body weight (BMI 18.5-24.9kg/m^2	5-20mm hg/10kg weight loss
Adopt DASH eating	consume a diet rich in fruits, Vegetables and low fat dairy products with a reduced saturated and total fats	8-14 mm hg
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100mmol/day	2-8 mm hg
Physical activity	Engage in regular aerobic physical activity such as brisk walking at least 30 minutes/day most times of the week	4-9mm hg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks/day in men and a drink/day in women	2-4mmhg

Key: SBP= Systolic blood pressure

2.3.1 Salt Reduction

In most countries average per person salt intake is too high and is between 9 and 12g/day (WHO, 2007).Studies have shown that a modest reduction in salt intake lowers blood pressure in both normotensive and hypertensive of all age group, although there are variations in the magnitude of reduction. A similar study have shown that a reduction in salt intake is one of the most cost effective intervention to reduce heart disease and stroke worldwide at the population level and therefore it is recommended that adults should consume less than 2000 milligrams of sodium or 5g of salt per day (WHO, 2012).Healthy dietary and lifestyle practices decreases blood pressure (Moser *et al*, 2007)

A3-5mm Hg systolic and approximately1mmHg diastolic change in pressures is associated with a 75-100mmol/24 hour difference in sodium intake in adult hypertensive patients; the effect on younger and normotensive subjects is less, approximately 2-3 mmHg for systolic and less than 1 mmHg for diastolic (Alderman, 2000).Thus a large reduction in sodium intake will produce a detectable decline in blood pressure. However, individual responses to sodium reduction varies (Alderman, 2000)

A study was conducted on a typical American diet containing 3400mg sodium/ day, Blood pressure changes based on various amounts of sodium incorporated in a typical diet is shown below

Table 2.3 Blood Pressure Changes based on a Typical American Diet

Diet (sodium/day)	Systolic	Diastolic
Typical (2,300 mg)	2.1 mm Hg	1.1 mm Hg
Typical (1,150 mg)	6.7 mm Hg	3.5 mm Hg
DASH (3,450 mg)	5.9 mm Hg	2.9 mm Hg
DASH (2,300 mg)	7.2 mm Hg	3.5 mm Hg
DASH (1,150 mg)	9.9 mm Hg	4.5 mm hg

(Adapted from Archives of internal medicine, 2003)

2.3.2 Physical Activity

Lifestyle modifications are advocated for the prevention, treatment and control of hypertension (Eskridge, 2010). The blood pressure lowering effects of exercise are most pronounced in people with hypertension who engage in endurance exercise with blood pressure decreasing approximately 5-7 mmHg after an isolated exercise session (acute) or following exercise training (chronic).Overweight patients are at higher risk of developing hypertension, hence weight reduction is highly advised (Eskridge, 2010). Regular physical activity, fitness and exercise are critically important for the health and well-being of people. Prospective studies have demonstrated that moderate-to-vigorous intensity

physical activity at baseline is associated with a lower incidence of hypertension (Barengo*et al.,* 2007).

2.3.3 Alcohol Use

Alcohol use was found to having direct relationship with the development of hypertension, the effects of alcohol consumption on the individual's blood pressure was dose dependent. Those who were heavy consumers exhibit greater variation in their blood pressure with the least consumers having milder effects (Brill, 2011.) as also reported byStrange*et al.,*(2004) which showed that individualswho consume two or more drinks of alcohol a day stand a high risk of developing hypertension.

2.3.4 Smoking

Cigarette smoking causes acute blood pressure elevation, overwhelming evidence supports the conclusion that cigarette smoking causes various adverse cardiovascular events and acts synergistically with hypertension. (Primatesta et al, 2001) Nicotine acts as an adrenergic agonist, mediating local and systemic catecholamine release and possibly the release of vasopressin (Primatesta et al, 2001)

Cigarette Smoking markedly increased the risk of coronary heart diseases (CHD) in hypertensives while its cessation is effective in CHD risk reduction (Baskaki, 2005). In one study, compared to those who never smoked, the relative risk (RR) for CHD across categories of smoking was 1.21 for past smokers, 1.66 for current smokers of 1-14 cigarette/day and 1.66 for current smokers with more than 15 cigarette/day (Al-Delaimy*et al.,* 2002).

2.4 Dietary Approach to Stop Hypertension (DASH)

The DASH eating plan follows heart healthy guidelines to limit saturated fat and cholesterol. It focuses on increasing intake of foods rich in nutrients that are expected to lower blood pressure, mainly minerals (like potassium, calcium, and magnesium), protein and fiber. It includes nutrient-rich foods so that it meets other nutrient requirements as recommended by the Institute of Medicine.The first DASH study involved 459 adults with systolic blood pressures of less than 160 mmHg and diastolic pressures of 80–95 mmHg. 27 percent of the participants had high blood pressure. (Kathrynm, 1999) 50 percent were women and 60 percent were African Americans. It compared three eating plans: a plan that includes foods similar to what many Americans regularly eat; a plan that includes foods similar to what many Americans regularly eat plus more fruits and vegetables; and the DASH eating plan. All three plans included about 3,000 milligrams of sodium daily. None of the plans was vegetarian or used specialty foods.Results were dramatic. Participants who followed both the plan that included more fruits and vegetables and the DASH eating plan had reduced blood pressure. But the DASH eating plan had thegreatest effect, especially for those with high blood pressure. Furthermore, the blood pressure reductions came fast—within 2 weeks of starting the plan.The DASH eating plan used along with other lifestyle changes can help you prevent and control blood pressure. If your blood pressure is not too high, it can be controlled entirely by changing your eating habits, losing weight if you are overweight, getting regular physical activity and cutting down on alcohol. The DASH eating plan also has other benefits, such as lowering LDL (“bad”) cholesterol, which, along with lowering blood pressure, can reduce risk of heart diseases. (Kathrynm, 1999)

CHAPTER THREE

3.0 METHODS

3.1 Study Site

The study was conducted at the University of Maiduguri Teaching Hospital (UMTH), Maiduguri. Borno State,which lies on the geographical coordinates of 11° 50' 42" N, 13° 9' 35" E.UMTH is an ultra-modern hospital owned by the Federal Government of Nigeria. It is one of the tertiary health institutions in the North-East of the country and was designated as a center of excellence in medical and surgical conditions. University of Maiduguri Teaching Hospital has 23 wards and several units with a bed capacity of 650. UMTH is saddled with the responsibilities of training, teaching and research and serves as a referral centre for the six North-Eastern States of Nigeria and the neighboring countries of Chad, Cameroon and Niger Republics.

3.2 Study Design

This study was a multi-phase Interventional study consisting of three phases where Phase 1 was the pre intervention phase, Phase 2 the intervention phase and Phase 3was the post intervention phase.

3.3Data Instrument

A pretested interviewer administered questionnaire was used in the study (Appendix III). The Questionnaire was adapted from a study conducted by Shibiru*et al.,* 2016.The first part of the questionnaire gathered data relating to the demographics of the patient, their age, sex, marital status, educational level and employment status. The second part of the

questionnaire include questions related to knowledge and attitude of lifestyle and diet modifications, questions such as Do you believe exercise can lower your blood pressure and what are the benefits of exercise? The last part of the questionnaire included questions relating to the practices of lifestyle and diet these include do you engage in healthy diet?

The Questionnaire was scored using the Likert scale, each correct answer was scored as 1 and an incorrect answer scored as 0, a total of 15 points is an acceptable summary score.The questionnaire was compiled in English and then translated to the respondents in either Hausa, Shuwa or Kanuriby the interviewer. The baseline characteristics of the patients were obtained from the patient's hospital folder, blood pressure readings recorded in the hospital folder was noted. The questionnaire was tested on 10% of the sample size prior to the study in a similar population and questions were modified after the pilot test, to suit the study. Questions such as 'Do you take alcohol' was deleted from the questionnaire, this is because of the cultural inclinations related to alcohol and that during the pilot study patients find the question offensive. The data from the pilot test were not used in the final study.A call chart was used to register each and every call made to a participant and a diary to note clinic appointment days of the participants

3.3.1Pre intervention phase

During this phase selected subjects were interviewed. Data collection included baseline demographics, subjects' knowledge, attitude and practices of lifestyle and diet modifications.

3.3.2 Intervention Phase

A prospective intervention (counselling and education) on lifestyle and dietary modifications. A structured advice and counselling (Appendix V) based on the JNC VII recommendations on lifestyle and diet was delivered on the clinic days and biweekly via phone calls. These included smoking cessation, reduction in salt, total and saturated fats, red meat, sugar, sugary drinks, refined carbohydrate and alcohol-except modest amounts of red wine and increase in fruits, vegetables, whole grains, fish, poultry, low fat dairy product, olives and olive oil etc.

3.3.3Post Intervention Phase

Post-intervention assessment of knowledge and practices of lifestyle and dietary modifications was carried using the same questionnaire administered pre intervention.

3.4 Study Population

The population for the study included consenting hypertensive patients registered with and attending General outPatient Department (GOPD) and Cardiology Clinic of University of Maiduguri Teaching Hospital. Patients that fit into the inclusion criteria and who consent to take part were recruited into the study.

3.5Inclusion and Exclusion Criteria

3.5.1 Inclusioncriteria

These include outpatient hypertensive patients, old and new cases of hypertension, adults regardless of sex and patients with active mobile phones

3.5.2Exclusion criteria

These include patients with mental illness leading to confusion e.g. delirium, dementia, psychosis, schizophrenia etc.,In-patients, patients with renal failure, cardiac failure, pregnancy-induced hypertensive patients and non-consenting patients

3.6 Sample Size

From the study population attending GOPD/Cardiology Clinic of University of Maiduguri Teaching Hospital, the sample size was determined which was estimated to be less than 10,000according to the records of the Health Management Information System (HMIS) of the hospital.

For population < 10,000

nf=n/1+(n)/(N) (Araoye, 2004)

nf= desired sample size, when study population< 10,000

n=desired sample size, when study population >10,000

N= estimate of the population size

nf=400/1+400/1000

nf=400/1.4

nf=286

286+10% of sample size (29) in the case of attrition= 315 patients

3.7 Ethical Clearance

Prior formal permission was obtained from the Research and Ethics Committee of the UMTH(Appendix I) and aconsent form (Appendix II) was given to volunteer patients after informing and educating them on the study protocol.

3.8 Data Collection

Data was collected from each subject using the designed questionnaire with sections on socio demographic data,degree of knowledge/attitude towards lifestyle or dietary modification and frequency of practice of lifestyle and dietary modification

3.9Data Analysis

The questionnaires were coded and analyzed using statistical package for social sciences version 16.Descriptive statistics was used to summarize socio demographic parameters. The Pre and post intervention blood pressure were compared using chi square test at a significance level of 5%. A paired t-test was used to compare pre and post systolic and diastolic blood pressure Hence, to compare the knowledge, attitude and practices scores before and after intervention a Mann whitney test was carried out,For the knowledge, attitude and practices questions a correct or positive answer was scored as 1 whereas an incorrect or negative answer was scored as 0. For the establishment of association between the demographic data and time of intervention and to measure the blood pressure control, a nonlinear regression analysis was carried out.Findings were presented usingrelevant frequency tables. Statistical calculation was done at 5% significance level.

CHAPTER FOUR

4.0 RESULTS

4.1 Distribution of Hypertensive Patients According to their Socio-demographic Characteristics in University of Maiduguri Teaching Hospital

Three hundred and eight (308) patients were enrolled in the study, out of which two hundred and eightysix (286) concluded the study giving a response rate of 92.8%. The majority of the respondents fell within the age group 40-49 ears (86, 30.1 %) and 50-59years (85, 29.7 %)age groups. Females constituted about fifty two percent of the study population 148 (51.7 %). A large number of the study population have no formal education 109 (38.1 %), with only 72(25.5%) having education up to university level. Most of the respondents were from the dominant ethnic group in the state (Kanuri), which constituted 102 (35.7 %) followed by unspecified other ethnic groups, they constituted 28% of the study. 114 (39.9 %) of the respondents were unemployed, while 28.3 % were self-employed. 25.9% were civil servants. Most of the study population weremarried 214 (74.8%), followed by the widowed 49 (17.1). the single were 20 (7.0%) and the divorced were 3 (1.0%) (Table 4.1)

Table 4.1 Distribution of Socio-demographic Characteristics of the Hypertensive Patients attending UMTH (N=286)

S/no	Participants Characteristics		Frequency (%)
1.	**Sex**		
		Male	138 (48.3)
		Female	148 (51.7)
2.	**Age (yrs.)**		
		< 30	18 (6.3)
		30-39	35 (12.2)
		40-49	86 (30.1)
		50-59	85 (29.7)
		60-69	43 (15)
		70-79	13 (4.5)
		>79	6 (2.1)
3.	**Ethnic Group**		
		Kanuri	102 (35.7)
		Shuwa	43 (15.0)
		Hausa	42 (14.7)
		Babur	19 (6.6)
		Others	80 (28.0)
4.	**Marital Status**		
		Married	214 (74.8)
		Widowed	49 (17.1)
		Single	20 (7.0)
		Divorced	3 (1.0)
5.	**Educational level**		
		Primary	35 (12.2)
		Secondary	24 (8.4)
		Tertiary	46 (16.1)
		University	72 (25.5)
		No formal education	109 (38.1)
6.	**Occupation**		
		Civil servants	74 (25.9)
		Self employed	81 (28.3)
		Unemployed	114 (39.9)
		Student/Volunteer	3 (1.0)
		Retiree	14 (4.9)

4.2 The Blood Pressure Categories of Patients Based on JNC7 Guideline

The blood pressure of participant's pre and post intervention is as below, Chi square test revealed that blood pressure categories improved after intervention. There was statistically significant difference in hypertension stage 2 blood pressure and no statistical significant difference in other categories of blood pressure (Table 4.2)

Table 4.2Distribution of Hypertensive Patients According to their Categories of Blood Pressure by JNC 7 Guideline in UMTH

S/no	Blood Pressure Category	Pre intervention (%)	Post intervention (%)	*P-values*
1	**Normal**	40 (14.0)	52 (18.2)	0.072
2	**Pre Hypertension**	67 (23.4)	94 (32.9)	0.062
3	**Hypertension stage 1**	108 (37.8)	120 (42.0)	0.071
4	**Hypertension stage 2**	71 (24.8)	20 (7.0)*	0.001
Total		**286 (100)**	**286 (100)**	

Chi square test *significance at 5% level

4.3 AssociationsBetween Socio-demographic Characteristics and Blood PressureControl in hypertensive patients in UMTH

Table 4.3 shows the association between the socio-demographic characteristics of the participants with the blood pressure control. A nonlinear regression analysis was carried out and revealed that the Sex variation is a factor in blood pressure control, 8.2% of the female sex have a more controlled blood pressure and 8.7% of the male sex have a controlled blood pressure. In terms of age 16.3% of the age group greater than 50 have a more controlled blood pressure and the percentage of less than 50 with controlled blood pressure are 10.8. Educational levels have an impact in the control of blood pressure as 16.9% of the educated class have significant control of blood pressure. This pattern is similar with the employment status, 14.2% of the working class have a significant (0.009) blood pressure control. Statically there is an overall improvement in blood pressure in the study, this means that majority (p-value at 0.001) of the study population have drastic drop in their blood pressure levels at the end of the study, thus changing the category of blood pressure they belong which ultimately prevents complications and improves productivity.

Table 4.3 Associations between Socio-demographic Characteristics and Blood Pressure Control

Factors	Time	F	% with controlled BP	*p* value	OR	95% CI
Gender						
Male	Pre	138	34.8	Ref		
	post	138	43.5	0.139	1.442	0.887 – 2.344
Female	Pre	148	39.9	Ref		
	post	148	48.1	0.002	2.092	1.316 - 3.226
Age						
< 50	Pre	139	43.2	Ref		
	post	139	54.0	0.072	1.543	0.961 – 2.477
≥50	Pre	147	32.0	Ref		
	post	147	48.3	0.005	1.988	1.237 – 3.193
Educational level						
No formal	Pre	109	42.2	Ref		
	post	109	50.5	0.001	2.012	1.312-3.086
Formal	Pre	177	34.5	Ref		
	post	177	51.4	0.222	1.395	0.818-2.380
Marital status						
Not married	Pre	72	36.1	Ref		
	post	72	48.6	0.004	1.770	1.204-2.600
Married	Pre	214	37.9	Ref		
	post	214	51.9	0.130	1.674	0.059-3.261
Occupation						
Employed	Pre	169	39.1	Ref		
	post	169	53.3	0.009	1.778	1.154-2.739
Unemployed	Pre	117	35.0	Ref		
	post	117	47.9	0.047	1.702	1.006-2.877
Total						
	Pre	286	37.4	Ref		
	post	286	51.0	0.001	1.745	1.250-2.435

Regression analysis

Key: OR= Odd Ratio, F= Frequency, CI= Confidence Intervals

4.4 Knowledge, Attitude and Practice Scores before and after the Intervention of hypertensive patients in UMTH

Results of the intervention on knowledge attitude and practice scores outcomes of the intervention were measured in terms of the change in knowledge attitude and lifestyle practices with regard to hypertension management. Scores of knowledge attitude and practice were compared on the basis of Wilcoxon signed rank test before and after the intervention. Also, the overall scores for the Knowledge, attitude and practice were also compared for the participants before and after the intervention. The median was used in the study as the data was not normally distributed. The median (IQR) knowledge score of the patients changed from 3 (3) before the intervention to 7 (2) after the intervention ($p<0.01$). Similarly, the median (IQR) attitude score changed from 1 (1) to 1(0) after the intervention ($p<0.01$). While, the median (IQR) practice score changed from 1 (1) before the intervention to 7(2).Thus, the total median (IQR) of the Knowledge, attitude and Practice (KAP) score had changed from 5 (5) before the intervention, to 15 (4)after the intervention ($p<0.01$).

Table 4.4 shows the level of knowledge, attitude, practices and the three combined before and after the intervention. Median IQR was used because the data was not normally distributed and that there was statistically significant difference in the pre and post intervention in terms of knowledge, attitude, practices and KAP combined.

Table 4.4: Knowledge, Attitude andPractice Scores before and after the Intervention

Characteristic	Median score (IQR)		*p* value
	Before	After	
Knowledge	3 (3)	7 (2)	0.00
Attitude	1 (1)	1 (0)	0.00
Practice	1 (1)	7 (2)	0.00
KAP Score	5(5)	15 (4)	0.00

Mann whitney test
Key: IQR =Inter Quartile Range, KAP = Knowledge, Attitude and Practice

4.5 Blood Pressure before and after the InterventionBased on Systolic and Diastolic Difference in Hypertensive Patients in UMTH

The mean systolic BP changed from 144.2 ± (20.4)to 137.7 ± (13.0)after the intervention (p<0.01). A similar change was noted on mean (SD) diastolic BP as well, which changed from 91.6 ± (12.2)before the intervention to 89.4 ± (6.2) after the intervention (p<0.01). Comparisons of systolic and diastolic blood pressure before and after the intervention are shown in Table 4.5

Table 4.5: Blood Pressure before and after the intervention (n=286)

Blood Pressure	Before (mmHg) ± SD	After (mmHg) ± SD	*P* value
Systolic BP	144.2 ± 20.4	137.7 ± 13.0	0.001
Diastolic BP	91.6 ± 12.2	89.4 ± 6.2	0.000

Paired t-testKey: SD= Standard deviation BP= Blood pressure

CHAPTER FIVE

5.0 DISCUSSION

This study was conducted at university of Maiduguri teaching hospital to evaluate the effect of lifestyle and dietary modifications in hypertensive patients. The study showed hypertension was more common among females than males. This is reported in a study carried out in Egypt byAbdelhay and El Mezayen in Egypt (2015) and Al-Wehedy*etal.*, (2014).Anowie and Darkwa (2015) have similar findings. The same trend was seen in a study conducted in Nepal by Sharma *etal* (2014) and in Jamaica by Eugene *etal*, 2013.

From the results of this study, it is evident that the largest age group fell within the age range of 40-59 (59.8 %) this was reported in a study conducted byPushpamala (2015)in Indiawhich showed that majority(58 %) of the hypertensive patients belong to age group 45-55years. This was reported in a study conducted by Abdelhay and El mezayen 2015 which showed that the largest age group fell within 55-64 years.The blood pressure of patients were categorized based on the JNC 7 guideline, there were more respondents with stage 1 hypertension, this is in line with a study conducted by Okwuonu*et al.,* (2014) in Abia State, Nigeria. There was however no significant difference in other categories of blood pressure except the hypertension stage 2($p< 0.05$), this is beneficial because uncontrolled high B.P is associated with poor quality of life. Knowledge, attitude, practices and KAP combined were compared pre and post intervention. The median (IQR) increased after the intervention for all four groups and there was statistically significant difference across the groups ($p<0.01$).

The systolic and diastolic blood pressures were also checked to ascertain the effect of the intervention,the mean systolic and diastolic B.P improved after the intervention arewith a reduction of 6.4mmHg systolic blood pressure and 2.3mmHg diastolic blood pressure respectively. This shows the increase in knowledge led to healthy lifestyle practices in subjects and ultimately reduction in blood pressure.Similarly blood pressure control was associated with socio demographics of the patients. there was significant blood pressure control in the educated compared to the uneducated this trend may be related to the fact that literacy level is associated with perception, beliefs and understanding, This is similar to a study conducted in Ibadan,Nigeria by Abdullahi and Amzat, (2011) that shows there is a relationship between level of education and knowledge of risk factors of hypertension. The same findings were reported in a study conducted by Li *et al.*,(2013) who mentioned that educational level has an impact in hypertension control and that 77.3% of the patients in the study were not educated and that those who have no formal education have problem with acceptance. A similar trend was also observed in the employed in comparison with the unemployed class, this may be due to the fact that the employed earn salary/wages and therefore have choice to what they eat. The married classes also have a significant improvement in their blood pressure levels compared with the unmarried, this may be related to the fact that the married have a choice to what they eat andcan regulate their salt intake *etc*. In general, the intervention significantly improved the blood pressure levels of patients, This is similar to the result of an interventional study conducted by Saranya*et al.*, (2016) which reported that knowledge, attitude and practice scores improved after intervention which is also in conformity with a study conducted by Mahajan *etal.*, (2012) in Mumbai, India. This reported that the poor knowledge attitude and practice decreased after the intervention and those practices of lifestyle modification improved after intervention.There is relationship between degree of subjects' knowledge about dietary

modification and hypertensive control, and the association between degree of subjects' knowledge about lifestyle modification and hypertensive control. This is important because patients would most likely adopt positive behavioral changes that would show clinically significant improvement in blood pressure control, coronary heart diseases risk factors and quality of life measures as reported by Toobert *et al.* (2003). Behavioural change, although difficult to obtain, is possible with regular support and counselling, therefore patient education is a key to behavioural change The same study conducted by Toolbert*etal*. (2003) reported a smoking cessation rate of 36% in diabetes-hypertensive patients undergoing lifestyle modification educational programme compared with only 8% in the usual care group. It is critical that persons with high B.P are advised to stop smoking because B.P Levels in smokers are rarely recorded during or immediately after smoking. When acute rises in B.P occur, usual B.P levels of smokers tend to be systematically underestimated (Primatesta et al, 2001)

Exercise is an aspect of lifestyle modification which should never be neglected. Exercise improves circulatory function, an important factor in hypertension management. It helps maintain normal body weight, aids in breathing, digestion and metabolism (Eric and Gourley, 1993). Exercise contributes positively to well-being physically and mentally. It also increases glucose utilization. Hypertensives should participate in some form of regular exercise as it will enhance stable blood glucose and blood pressure.

Overall, this study revealed an association between practice of lifestyle modification and blood pressure control. A comprehensive lifestyle programme has been reported by Toobert*et al*. (2003) to improve blood pressure control, lower the risk of cardiovascular diseases which are potential complications of hypertension and improves quality of life outcomes. Research showed that intensive lifestyle changes may prevent and even reverse coronary heart disease (Ornish*et al.,* 1998), which occur 2.5 times more in hypertensives

than in normotensives (Haffner*et al.*, 1998). The study also showed that there was an association between practice of dietary modification and blood pressure control. This agrees with Trichopoulou*et al*., (2003) who found that adherence to dietary modification caused a 25% reduction in overall mortality due to poor blood pressure control.

The results of this study supports dietary(low fat, low carbohydrate, moderately high protein) and lifestyle modification(exercise and maintenance of ideal body weight) in managing hypertension and patient education and counselling plays a key role

5.1Limitations of the Study

This study has certain limitations which includes;

1. The research results are applicable to one health institution and may not be generalized to other health facilities in Nigeria.
2. Decrease in blood pressure is not uniform to all patients.
3. The study was carried out in a year; this may not give the true picture of patient's lifestyle practices
4. TheStudy did not capture patient's medication and adherence.

CHAPTER SIX

6.0 SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

Non drug measures serve as adjunctive therapy in controlling hypertension and should be encouraged because it has been found to be beneficial in blood pressure control. Healthy lifestyle practices can only be achieved when there is adequate knowledge and good perception.

In summary, this interventional study conducted on 286 patients (138 male and 148 female) at a tertiary health facility in north eastern Nigeria showed that demographic characteristics have a profound effect on blood pressure and that education/counseling have important role in blood pressure control. Knowledge attitude and practices of lifestyle/diet modifications in these patients was generally poor and found to play a role in their uncontrolled blood pressure levels.

The blood pressure levels however improved after intervention (counseling and education) during clinic visits and reminder phone calls. Thus, improving their blood pressure levels and quality of life by resulting in improvement of blood pressure categories which leads to prevention of complications

6.2 Conclusion

Based on the results of this study it can be concluded that hypertension is a public health challenge and its main risk factors are increasing age, female sex, smoking and weight. Moreover, knowledge on lifestyle and diet improved after the intervention. The lifestyle and diet interventions were an effective non pharmacological ways in the management of hypertension and lead to a significant improvement in blood pressure.

It can be concluded that motivation and counselling, stressing the importance of lifestyle modification is required for patients with chronic diseases such as hypertension. Patient counselling by the clinical pharmacists can play a vital role in imparting knowledge to the patients.

6.3 Recommendations

Based on the results of the study, the followings recommendations are suggested:

- Increased awareness of non-pharmacological measures in managing hypertension is essential to empower and motivate patients to adopt healthy lifestyle in order to prevent and manage the disease. This can be achieved through mass media, health education programs in the hospitals and the communities.
- Healthcare providers should update themselves with current information regarding hypertension management and also the physicians institute non pharmacological interventions before commencing new patients on drugs. This would encourage patients to adopt healthy lifestyle.
- It is very important that a health talk is delivered bi-weekly during clinic days, this will enlighten patients.

6.4 Contribution to knowledge

- The study established that phone call intervention plays a vital role in managing hypertension non pharmacologically
- The study enlightened patients on lifestyle and dietary modifications
- The study will encourage clinicians and policy makers to institute non pharmacological measures in managing hypertension in newly diagnosed and old patients

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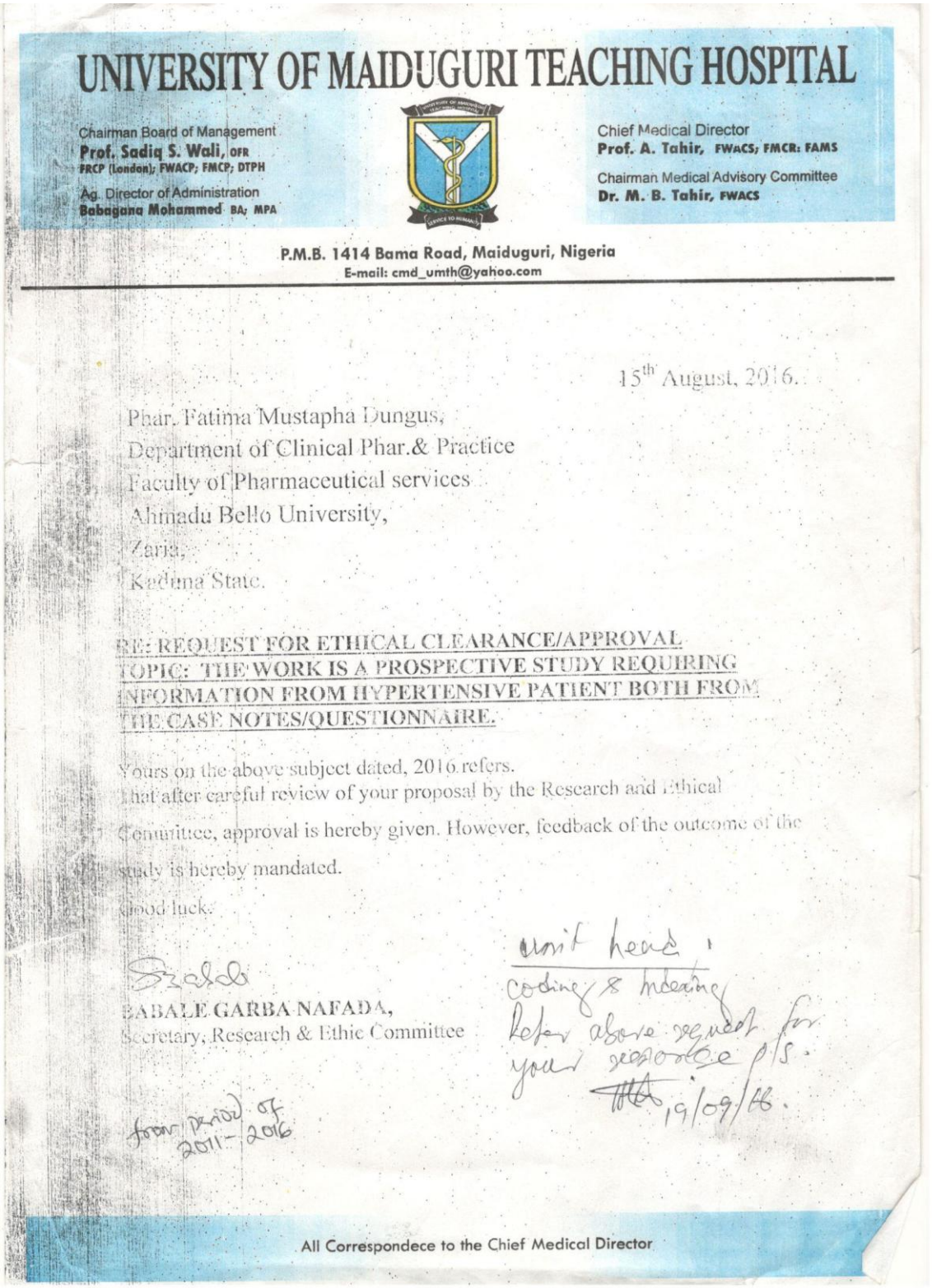
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APPENDIX I

ETHICAL CLEARANCE FORM



UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL

Chairman Board of Management
Prof. Sadiq S. Wali, OFR
FRCP (London); FWACP; FMCP; DTPH
Ag. Director of Administration
Babagana Mohammed BA; MPA

Chief Medical Director
Prof. A. Tahir, FWACS; FMCR: FAMS
Chairman Medical Advisory Committee
Dr. M. B. Tahir, FWACS

P.M.B. 1414 Bama Road, Maiduguri, Nigeria
E-mail: cmd_umth@yahoo.com

15th August, 2016.

Phar. Fatima Mustapha Dungus,
Department of Clinical Phar.& Practice
Faculty of Pharmaceutical services
Ahmadu Bello University,
Zaria,
Kaduna State.

RE: REQUEST FOR ETHICAL CLEARANCE/APPROVAL
TOPIC: THE WORK IS A PROSPECTIVE STUDY REQUIRING INFORMATION FROM HYPERTENSIVE PATIENT BOTH FROM THE CASE NOTES/QUESTIONNAIRE.

Yours on the above subject dated, 2016 refers.
That after careful review of your proposal by the Research and Ethical Committee, approval is hereby given. However, feedback of the outcome of the study is hereby mandated.

Good luck.

BABALE GARBA NAFADA,
Secretary, Research & Ethic Committee

unit head,
coding & indexing
Refer above request for your response p/s.
19/09/16.

from Period of 2011 - 2016

All Correspondece to the Chief Medical Director

APPENDIX II

TITLE OF STUDY: EVALUATION OF PHARMACIST INTERVENTION ON KNOWLEDGE, ATTITUDE AND PRACTICES OF LIFESTYLE AND DIETARY MODIFICATIONS IN HYPERTENSIVE PATIENTS IN A TERTIARY HEALTH FACILITY IN NORTH EASTERN, NIGERIA

INFORMED CONSENT FORM

Dear Sir/Madam

My name is Pharmacist Fatima Mustapha Dungus, I am a Postgraduate student at the Ahmadu Bello University, Zaria. I am conducting a study to find out the knowledge, attitudes and practice of hypertensive patients to lifestyle and dietary modification in controlling hypertension and the impact of intervention.

The findings will show if there are any pitfalls in how patients are educated and then show which areas need to be improved in order to benefit the patients. I therefore invite you to participate in the study.

It is a questionnaire based study and there are no damages to you participating and there are no costs involved for you. I also request permission to look in to your medical files to check for blood pressure control.

If you agree to be part of this study please complete below;

I ……. Agree to be part of this study conducted by Pharmacist Fatima Mustapha Dungus. I acknowledge that the information obtained from my medical records and questionnaire will be solely for

research/educational purposes. I also acknowledge that my identity will not be divulged. I agree that the procedures to be followed have been explained fully to me and the benefits of the study. I am free to withdraw consent and discontinue participation in the study at any time.

Signature……..

Date……..

Witness…….

APPENDIX III

QUESTIONNAIRE

QUESTIONNAIRE ON KNOWLEDGE, ATTITUDE AND PRACTICE OF LIFESTYLE/DIETARY MODIFICATION IN HYPERTENSIVE PATIENTS IN UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL (UMTH)

This Questionnaire is intended for any willing hypertensive patient attending UMTH

Section 1: Demographic data

1. Ethnic origin (check **only one**): □ Kanuri □Shuwa

□ Hausa □ Babur

Other: _____

2. Sex: □ Female □ Male

3. Age.....

4. Marital Status (check **only one**):

□ married □ separated □ widowed □ Single □ divorced

5. Blood pressure.....

6. Occupation (check **only one**):

□ Employed (Full time) □ Employed (Part time) □ Unemployed □ Student/Volunteer

□ Retiree

7. Educational level □ Primary □ Secondary □ Tertiary □ University □ No formal education

Section 2: Knowledge/Attitude of Lifestyle/Diet Modifications

1. Do you believe exercise can lower your blood pressure

   □ Yes □ No

2. What are the benefits of exercise

   i.....

   ii.....

   iii.....

3. If you do not exercise why.....
4. Can a specific diet assist in lowering blood pressure

   □ Yes □ No

5. What are the components of such diet (6 above)

   i.....

   ii.....

   iii.....

6. Does alcohol affect blood pressure

   □ Yes □ No

7. Does adding salt to your food affect your blood pressure

   □ Yes □ No

Section 3: Practices of Lifestyle/Diet Modifications

1. Do you engage in healthy diet

   □ Yes □ No

   Why/Why not?

   .....

2. Do you engage in exercise?

   □ Yes □ No

3. Do you smoke?

□ Yes □ No

APPENDIX IV

S/N	Hospital No.	Mobile No.	Call 1	Call 2	Call 3	Call 4	Call 5	Call 6	Total Calls

Knowledge on Diet	**Check box**
Increase: Fruits Vegetables/green leaves Whole grains Fish Poultry Low fat dairy milk Olives and olive oil	
Decrease: Total and saturated fats Red meat Sugar and sugary drinks Refined Carbohydrate High calorie diet High Fat dairy milk	
Knowledge on Lifestyle	**Check box**
Encourage: 30mins of moderate exercise daily Salt reduction Smoking cessation Alcohol cessation except modest amounts	

APPENDIX VI

STATISTICAL ANALYSIS

NPAR TESTS /K-S(NORMAL)=Knowledge Attitudepre Attitudepost Practicepre Knowledgepost Practicepost KAP1 KAP2

One-Sample Kolmogorov-Smirnov Test

		Knowledge before	Practice before	Attitude After	Knowledge After	Practice After	Attitude Before	KAP1	KAP2
N		286	286	286	286	286	286	286	286
Normal Parameters[a]	Mean	2.8706	.6888	.9790	1.3881	6.4860	1.7063	4.9476	9.1713
	Std. Deviation	2.28666	.46379	.14357	.78566	1.71827	.84879	3.05632	2.12801
Most Extreme Differences	Absolute	.126	.438	.537	.392	.167	.262	.112	.145
	Positive	.126	.251	.442	.392	.096	.262	.112	.076
	Negative	-.105	-.438	-.537	-.262	-.167	-.170	-.093	-.145
Kolmogorov-Smirnov Z		2.133	7.402	9.083	6.632	2.816	4.437	1.896	2.444
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.002	.000

a. Test distribution is Normal.

Wilcoxon Signed Ranks Test

Test Statistics[c]

	Knowledge After - Knowledge before	Attitude After - Attitude Before	Practice After - Practice before	KAP2 - KAP1
Z	-10.779[a]	-10.637[a]	-14.662[b]	-13.287[b]
Asymp. Sig. (2-tailed)	.000	.000	.000	.000

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre systolic	1.4421E2	286	20.37353	1.20471
	post systolic	1.3779E2	286	13.03825	.77097

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre diastolic - post Diastolic	2.25524	11.26310	.66600	.94434	3.56615	3.386	285	.001
Pair 2	pre systolic - post systolic	6.41958	14.17802	.83836	4.76941	8.06975	7.657	285	.000