EFFECTS OF TWO HEALTH EDUCATION INTERVENTIONS ON ADHERENCE TO ANTIHYPERTENSIVE MEDICATION AND ON BLOOD PRESSURE IN SELECTED TERTIARY HEALTH FACILITIES IN SOUTHWESTERN NIGERIA

BY

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DEDICATION

This work is dedicated to the quest for true knowledge and empowerment for all lovers of systematic study.

ABSTRACT

Hypertension is often the precursor to cardiovascular disease complications with end-organ damage in poorly managed condition. Adherence to medication and appointment-keeping are critical in the control of hypertension and reduction of associated complications. However, poor adherence to treatment is common among hypertensive patients in clinical settings. Evidence-based health education interventions that can optimise patients' adherence to medication and appointment-keeping are few in Nigeria. The study was therefore designed to explore the effects of two health education interventions on adherence to antihypertensive medication, appointment-keeping and Systolic Blood Pressure (SBP) implicated in end-organ pathology in selected tertiary health facilities in Southwestern Nigeria.

The study was quasi-experimental involving patients receiving care in hypertensive clinics in three tertiary health institutions. The institutions were randomly allocated to Intervention 1 (Olabisi Onabanjo University Teaching Hospital, Sagamu), Intervention 2 (Lagos University Teaching Hospital, Lagos) and Control (University College Hospital, Ibadan) groups. Patient Education and Counselling (Intervention 1) and Patient Education and Counselling with Family-Support (Intervention 2) were implemented for four weeks. Baseline and follow-up evaluations employed a validated structured questionnaire to measure primary outcomes of Self-Reported Medication-Adherence (SRMA) on a 15-point scale, Appointment-Keeping (AK) on a 9-point scale and Pill Count (PC) from 60 participants purposively selected from each group. Secondary outcomes of SBP values were measured at baseline and followed up for nine weeks to determine changes in SBP. Data were analysed using descriptive statistics and ANOVA at p=0.05.

Respondents were males (71.7%; 58.3%; 61.7%) and females (28.3%; 41.7%; 38.3%); and their ages were 52.1±6.5, 51.3±7.2 and 50.8±6.2 years for Intervention 1, Intervention 2 and Control groups respectively. The participants had non-formal (16.7%; 20.0%; 25%), primary (33.3%; 25.0%; 20.0%), secondary (26.7%; 16.7%; 20.0%) and post-secondary (15.0%; 23.3%; 18.3%) education for Intervention 1, Intervention 2 and Control groups respectively. At baseline, there were no significant differences in outcome measures among the three groups in respect of primary outcomes of SRMA (9.2±1.1; 9.1±1.0; 9.3±1.0), PC (57.9±5.1;

54.3±8.6; 58.9±4.6), AK (5.2±1.7; 5.1±1.0; 5.1±0.9) and secondary outcomes of SBP (159.0±8.7; 157.8±9.5; 155.4±8.4 mmHg) values respectively. At 13th week follow-up, Intervention 2 demonstrated significantly higher scores in respect of SRMA (14.4±0.7), PC (94.0±0.5), AK (8.9±0.3) with SBP reduction from 157.8±9.5 to 134.2±3.4 mmHg compared with Intervention 1 with SRMA (12.5±1.0), PC (89.5±0.6), AK (8.50±0.5) and a corresponding SBP reduction from 159.0±8.7 to 150.0±5.2 mmHg. The values of SRMA, PC and AK in control were 9.6±1.0, 59.6±0.6 and 5.8±1.0 respectively with SBP reduction from 155.4±8.4 to 154.0±6.9 mmHg. Furthermore, the magnitude of changes (Δ) between outcome measures at 13th week follow-up and their respective baseline values for the three groups were ΔSRMA=3.3, ΔAK=3.3, ΔSBP=9.0 mmHg, ΔSRMA=5.3, ΔAK=3.8, ΔSBP=23.63 mmHg and ΔSRMA=1.2, ΔAK=5.4, ΔSBP=1.4 mmHg for Intervention 1, Intervention 2 and Control groups respectively. Intervention 2 results were significantly higher.

The Patient Education and Counselling with Family-Support intervention was more effective in influencing adherence to appointment-keeping and medication–consumption leading to reduction in blood pressure. Therefore, it is recommended that family-support be incorporated in patient education strategies for effective control of hypertension.

Keywords: Hypertension, Medication-adherence, Appointment-keeping, Family-support, Patient education and counselling

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CERTIFICATION

I certify that this work was carried out by Nnodimele Onuigbo Atulomah in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria.

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OPERATIONAL DEFINITION OF TERMS

A number of terms have been applied in this study in a very special and limited way in order to focus and guide attention to the main outcomes intended. These terms have been operationally defined for the following;

Predisposing factors: The term refers to personal-level characteristics of a person or population according to Green, and Kreuter (1991 and 2005) that drives behaviour as antecedents to behaviour and includes knowledge, four perception sub-domains, attitudinal disposition, and are capable of influencing behaviour in a specific direction.

Reinforcing factors: This term has been used in the context of any reward or punishment experienced or anticipated as a consequence of behaviour, serving to strengthen the motivation or drive the impetus for the behaviour after it has occurred. In this study, the term has been used to describe social support that can be provided such as reminders, expression of encouragements through appraisals and affirmation and empathy (Green, and Kreuter; 1991, 2005).

Enabling factors: This term has been applied in this study in the context of any characteristics of the physical and social environment that facilitates carrying out specific actions and any skill or resource required to attain a specific behaviour. In this study, the term has been used to describe social support that can be provided such as tangible service or help to facilitate medication-adherence and appointment-keeping (Green, and Kreuter; 1991, 2005).

Medication-Adherence behaviour: The term has been applied in this study as persistence in medication-taking following the active collaborative decision-making process and relationship between patient and healthcare providers in ensuring achievement of a desired clinical goal. (DiMatteo, 2004; Osterberg and Blaschke, 2005).

Compliance: The term appears in this study as obedience to instruction and the expectation that patients will passively follow orders as given by healthcare providers. However, the two terms adherence and compliance have been interchangeably used because of the nature of patient-care-giver relationship existing in the community where the study was carried out. (DiMatteo, 2004)

ABBREVIATIONS

ACEI	Angiotensin Converting Enzyme Inhibitor
AIDS	Acquired Immunodeficiency Syndrome
AK	Appointment-Keeping
BP	Blood Pressure
DBP	Diastolic Blood Pressure
DOT	Directly Observed Therapy
HBP	High Blood Pressure
HIV	Human Immunodeficiency Virus
HTN	Hypertension
KII	Key Informant Interview
LUTH	Lagos University Teaching Hospital
OOUTH	Olabisi Onabanjo University Teaching hospital
PC	Pill count
PEC	Patient Education and Counseling
PECSS	PEC with Social Support
PRECEDE	Predisposing Reinforcing Enabling Constructs in Educational/Environmental Diagnosis and Evaluation
SBP	Systolic Blood Pressure
SRMA	Self-Reported Medication Adherence
TLC	Telephone-Linked Computer
UCH	University College Hospital
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

High blood pressure is recognized as an important preventable cause of premature death from heart diseases and stroke globally. This is increasingly becoming an important global public health problem (Kearney, Whelton, Reynolds, Muntner, Whelton, and He, 2005), particularly among blacks who have been extensively studied in the United States (Sanderson, Mirza, Fry, Jeroan, Allison, and Bittner, 2007; Quipping, Burt, Paulose-Ram, Yoon, and Gillum, 2008) and elsewhere (Sliwa, Wilkinson, Hansen, Ntyintyane, Tibazarwa, Becker and Stewart, 2008).

Hypertension is a condition that is characterized by a persistent elevation of arterial blood pressure over a prolonged period of time. Consequent to this, an individual diagnosed to be hypertensive has important behavioural antecedents and clinical implicationsassociated with this health condition.Clinically, an individual with uncontrolled hypertension has physiological impairments which may manifest as characteristic disabilitiessuch as renal (Mennuni, Rubattu, Pierelli, Tocci, Fofi and Volpe, 2014) or visual impairments which may seriously cause inabilities to perform actions that enhance quality of life, depending on the severity of the condition.In sub-groups of the population known to be susceptible to persistent elevation of arterial blood pressure, particularly among blacks, even small elevations in blood pressure have been found to increase the risk of end-stage renal disease and poor prognosis (Coresh and Jaar, 1997; Martins, Tareen, and Norris, 2002). Thus, hypertension has been well established to be a significant global health problem including Nigerian population (Moranti, 2001).

Uncontrolled blood pressure have been demonstrated to contribute to the more than 500,000 strokes and about one million myocardial infarction cases reported each year in the United States alone (Johnson, Williamsand Marshal, 1999). It is estimated that about one billion

people globally and approximately 65 million persons in the United States of America are affected with hypertension (Fields, Burt, Cutler, Hughes, Roccella, and Sorlie, 2004; Ong, Cheung, Man, Lau, and Lam, 2007). Global deaths attributable to cardiovascular diseases estimates reported by the World Health Organization (WHO) for 2005 was 17,528,132 with 6.4% of this mortality recorded for sub-Saharan Africa (Mathers andLoncar, 2006). The burden of global hypertension prevalence is substantial and is growing to an epidemic proportion according to Kearney, et al. (2005). Similarly, Schmieder, Grassi and Kjeldsen (2013) reported a global estimate of hypertension burden in 2013 of 972 million people and projected an estimated 1.56 billion individuals to be affected by 2025 going by current trends.

It has been projected that by 2015, the total deaths estimates resulting from hypertensive heart disease would be 81, 383 for Africa (Mathers andLoncar, 2006). One explanation provided by literature for this increase in morbidity and mortality due to cardiovascular disease (CVD), suggests that the protective effects against high blood pressure offered by diet rich in vegetables, moderate living characterized by less stress in settings of sub-Saharan Africa are fast fading and the possible explanation for these blood pressure trends in these settings may also be due to changes in lifestyles such as reduced physical activities, smoking and high lipid diet amongst these populations (Kaufman, Owoaje, James, Rotimi, and Cooper, 1996; Kaufman, Owoaje, Rotimi and Cooper, 1999; Olatunbosun, Kaufman, Cooper, and Bella, 2000; Cappuccio, Micah, Emmett, Kerry, Antwi, Martin-Peprah, Phillips, Plange-Rhule and Eastwood, 2004; Nejjari, Arharbi, Chentir, Boujnah, Kemmou, et al, 2012).

Considering the rapid increase in urbanization in many cities and culture transition to westernization among the population, which are advancing at a tremendous rate in these regions, no doubt, are important factors contributing to the present situation through lifestyles that carries high risk for hypertension resulting from stress and dietary practices. Clinical and epidemiological evidence strongly suggests hypertension to be associated with increased urbanization, industrialization, acculturation and assimilation of western lifestyle by populations in communities and cultures that hitherto were predominantly agrarian (Mehio, Nasreddine, Mokdad, Adra, Tabet and Hwalla, 2010; Nejjari, et al. 2012). It is becoming obvious that a disease like hypertension which is preventable is progressively becoming an

important public health problem (Kearney, Whelton, Reynolds, Muntner, Whelton, and He, 2005) requiring serious attention.

Chronic illnesses represent significant health challenges in developing countries of the world next to infectious diseases (Murray and Lopez, 1997; Cappuccio, et al., 2004; Agyemang, Bruiineels and Owusu-Dabo, 2005). This observation may well serve to confirm the notion of a health transition model which has been described as the gradual but consistent shift along the health transition continuum from predominantly infectious diseases to that of chronic illnesses among the population of many developing countries of the world, including Nigeria; and the behavioural and environmental factors responsible for this phenomena. Kaufman, et al. (1996) observed and reported increasing risk factors for hypertension and changes in blood pressure profile of rural and urban populations in Southwestern Nigeria which they linked to certain lifestyles.

The total estimated deaths from cardiovascular disease reported for Nigeria in 2004 was 201,500 deaths and 10,700 of these were recorded for hypertensive heart disease.Similarly, a recent study conducted in Kenya, East Africa to assess prevalence and awareness of hypertension in that population, confirmed high prevalence of the disease among slum dwellers (Van de Vijver, Oti, Agyemang, Gomez and Kyobutungi, 2013).Hypertension is often the precursor to a number of cardiovascular morbidity including congestiveheart failure, chronic occlusive peripheral vascular disease, renal failure and stroke (Giles and Materson,2005).

Many studies have confirmed that individuals of black ethnic expression tend to develop and sustain hypertension (Kaufman et al., 1996; Murray and Lopez, 1997; Kaufman, et al., 1999; Perkovic, Huxley, Wu, Prabhakaran and MacMahons, 2007) and that an epidemic of cardiovascular diseases (CVD) is emerging in Sub-Saharan Africa (Reddy and Yusuf, 1998; Addo, Smeeth, and Leon, 2007).In a community-based study, Agyemang et al. (2005) demonstrated that within rural, semi-urban and urban communities of Ghana, blood pressure was observed to increase with advancing age. Cappuccio et al., (2004) in their study also observed similar rapid increase in blood pressure and prevalence of hypertension among adults in Africa whom they studied. The mortality rates recorded for cardiovascular-related

diseases, especially hypertension among these ethnic groups remain unacceptably high despite availability of potent and effective medications and treatment modality to adequately manage the conditions. Over the past century, life expectancy has increased dramatically as a result of advances in public health research and practices, especially in countries where these are given high priority. Documented evidence suggests clearly that the incidence of hypertension continues to rise in Nigeria and other parts of the world among blacks, with consequent high morbidity and mortality.

Series of observations by researchers have shown that the incidence of hypertension continues to rise among Nigerians with its consequent high morbidity and mortality. Tracing the trend from earlier years, Johnson (1971) reported a prevalence of hypertension in urban Lagos of 7.9% for men and 9.9% for women, while Oviasu and Okupa (1980) later observed a prevalence of 14% for men and 11% for women, in Benin City Nigeria, thus confirming a worsening trend. Akinkugbe (1990) noted the health transition occurring among populations in developing countries in which chronic illnesses especially cardiovascular diseases such as hypertension and other chronic illnesses are becoming steadily established in the urban and rural communities. By the publication of the 1997 national survey of adults in Nigeria reported a prevalence rate for hypertension of 15.5% for men and 8.7% for women, a confirmation of a growing epidemic (National Expert Committee on NCD, 1997).

Kadiri, Walker, Salako and Akinkugbe (1999) reported hypertension age-adjusted prevalence for a population of workers in Ibadan, an urban city in southwestern Nigeria, of 9.8% for men and 8.0% for women. In the same report, they also confirmed that regular consumption of alcohol, obesity especially in women and the use of tobacco to be responsible for the growing burden of hypertensive heart disease. In this study, they noted among a number of other factors associated with developing high blood pressure that high fat and salt diet seem to be important correlates. Furthermore, Akinboboye, Idris, Akinboboye and Akinkugbe (2003) reported a prevalence rate for hypertension in a general adult population for Nigeria to be between 10.0% and 12.0%. Considering the 2008 WHO report of global disease burden, estimated hypertension prevalence for Nigeria at 38.6% for men and 41.2% for females, an increase by almost three-folds of the 2003 prevalence rate.

There is no doubt that the burden of hypertension is increasing with its accompanying morbidity and mortality in Nigeria. A number of factors have conclusively been associated with the aetiology of hypertension. Among these factors includes the consumption of high fat and salt diets, use of tobacco products, consumption of alcohol and a sedentary lifestyle that predisposes to obesitycharacteristic of Nigerians (Akinkugbe, 1990; Kadiri, et al. 1999; Kaufman et al., 1999). Robust evidence from well-designed studies have shown that pharmacological treatment of patients with elevated blood pressure will effectively reduce morbidity, disability and mortality from cardiovascular disease because these drugs are sufficiently efficacious to control the condition when properly diagnosed and treatment applied appropriately, especially in combination (M'Buyamba-Kabangu, Anisiuba, Ndiaye, Lemogoum, Jacobs, Ijoma, Thijs, 2013; Armario and Waeber, 2013).

However, response to treatment has been varied with complaints of troublesome adverse effects such as fatigue, impotence,cough, constipation or adverse metabolic syndrome (for example,hypokalemia, hyperglycaemia, hypercholesterolemia, hyperuricemia), which often interfere with maintaining therapeutic objectives.Furthermore, the costs of hypertension treatment are substantial,especially inadepressed economy typical of developing nation. The nature of the disease makes it difficult to apply clear cut treatment because it requires adequate monitoring and titrating of dosages with responses.

Many patients with hypertension have inadequate control of their blood pressure and treatment appears to have a one-size fit-all modality. Poor responses to treatment in these circumstances are worrisome and predispose patients to worsening health conditions with target organ damage, an important clinical endpoint in poorly managed hypertension (M'Buyamba-Kabangu, et al., 2013). Improving the treatment of hypertension requires an understanding of the ways in which physicians manage this condition and a means of assessing the efficacy of this care. Poor adherence to medication regimens accounts for substantial worsening of disease with its attendant consequences of poor prognosis and death. In fact, combination drug treatment or use of fixed-dosecombination appears to be more favoured than single dose for reasons that, they are better tolerated by patients, more effective in pharmacologically addressing the multifactorial aetiology of the disease and blood pressure reduction (Kronish, Woodward, Sergie, Ogedegbe, Falzon and Mann, 2011; Chalmers,

Arima, Harrap, Touyz and Park, 2013). However, treatment of this nature is found to be accompanied by challenges of remembering to take the multiple medications prescribed.

1.2 Statement of the Problem

Studies have suggested that medication adherence failure in cardiovascular illnesses continue to remain a major problem in the effective control of hypertension despite availability of effective drugs, therapy modality and knowledge of hypertension aetiologies. It has been stated that typically, adherence rate for prescribed medications in chronic illnesses is estimated to range from 30% to about 50% (WHO, 2003; Jones, 2003; Haynes, McDonald, Garg and Montague, 2004; Cohen, 2009). The optimum medication adherence required for the control of blood pressure has been estimated to be at about 80% and higher (Pladeval, Brotons, Gabriel, Arnau, Suarez, de la Figuera, Marquez et al. 2010; Kronish, et al., 2011). Medication adherence is a critical determinant of blood pressure control in clinical practice (Perreault, Lamarre, Blais, Dragomir, Berbiche, Lalonde, Laurier, St-Maurice and Collin, 2005), and this importantly demonstrates the significant role of behaviour in health and disease. Medication adherence is a behavioural issue required clinical practice improved treatment outcome.

In the literature, adherence has been defined as patient's maintenance of an assigned therapeutic regimen (Sabate, 2003; DiMatteo, 2004; Osterberg and Blashke, 2005; Cohen, 2009). Since the word compliance may imply coercion of one individual by another, some authors have preferred to use the term adherence (Osterberg and Blaschke, 2005), which gives the impression of concordance between patient and care-giver on therapeutic objectives and clinical goals. Regardless of how effective a drug is for the treatment of hypertension, without daily use of prescribed medication, the outcome of treatment will be poor. Although factors influencingadherence such as nature of the treatment modality (Wanovich, Kerrish, Gerbino and Shoheiber, 2004), adverse effects and slow onset of response known in essential hypertension, contribute to poor treatment adherence and consequently, clinicians become dissatisfied when patients are not making expected progress in their treatment despite the advantages of potent medications that can be used in different combinations for treating hypertension.

Typically, it has been observed that blood pressure control among populations with high blood pressure is about 50% (Egan, Zhao and Axon, 2010).No doubt, poor medication adherence has been blamed for such low treatment outcome in the number of hypertensive patients achieving blood pressure levels at or below the treatment goal of 140/90 mm Hg, especially in the United States where much study have been carried out (Ramsay, 1999). Pooradherence to antihypertensive medications contributes to lack of control in more than two-thirds of these patients, and it is a critical determinant in the response to antihypertensive therapy (Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure JNC VII2003). Among hypertensive patients, control of blood pressure is significantly better with improved medication adherence (Haynes, McDonald, Carg, and Montague, 2004; Viswanathan, Golin, Jones, Ashok, Blalock, Wines, Coker-Schwimmer, Rosen, Priyanka Sista, and Lohr,(2012).

A review of relevant literature addressing medication adherence, particularly hypertension therapy in Nigeria, yielded ten studies (Olubodun, Falase, and Cole, 1990; Erhun, Agbani, and Bolaji, 2005; Erah,and Chuks-Eboka, 2008; Gureje, Kola, Afolabi, and Olley, 2008; Ayodele and Oladipo, 2012; Adedapo, Sikuade, Adeleke, and Okechukwu, 2012; Adeyemo, Tayo, Luke, Ogedegbe, Durazo-Arvizu, and Cooper, 2013; Suleiman, Amogu, and Ganiyu, 2013; Ogedegbe, Tobin, Fernandez, Cassells, Diaz-Gloster, Khalida, Pickering, and Schwartz, 2014; Okuboyejoand Eyesan, 2014) out of seventy two articles, of which twenty seven were studies related to HIV and AIDS medication adherence issues, while the remaining were studies related to other chronic illnesses. This limited number of publications in peer-reviewed journals suggests a paucity of quality data on studies related to medication adherence with respect to hypertension treatment in Nigeria (Ikechukwu, Obinna, and Ogochukwu, 2010). The paucity of data regarding intervention studies related to non-adherence among patients with hypertension is an important cause for concern. It has beenrevealed that a significant proportion of outpatients estimated to be between 20% and 50% fail to take their medications completely thus resulting to poor clinical outcome (Kripalani, Yao and Haynes, 2007; Barrios, Banegas, Ruilope, and Rodicio, 2007). The reasons offered by literature for this failure to take prescribed medications are many and varied, some intentional and some unintentional.

Gold and McClung (2006) in a study observed that quality patient education intervention which consisted of providing information about the disease state and treatment without personal attention had little impact on adherence. The situation may be far worse among hypertensive populations attending clinics for care of their conditions in Nigeria where the healthcare system is highly over-burdened with patients and not as highly organized and articulated as it is in the United States or Europe.

Hypertension is often poorly controlled despite its seriousness and availability of very effective treatments. The major problem with treatment in chronic diseases such as hypertension is that in order to control the blood pressure, certain interventions are required which includes medications and life-style changes that may not be easy to make initially. Failure to adequately control blood pressure in hypertension has been attributed to poor adherence to treatment requirement. A number of other factors have been identified to contribute to poor control of blood pressure in hypertension (DiMatteo, 2004) and may include failure of patients to keep appointments with physicians (Moranti, 2001), failure of physicians to detect and adequately treat hypertension to goal levels, and failure of patients to persist with prescribed therapy (Osterberg and Blaschke, 2005), eventually predisposing the patients to high morbidity for target organ damage and mortality. Patients are not consistent in taking their medications or adhering to dietary requirements known to enhance the treatment such as low salt and low fat diet, smoking cessation, limiting the amount of alcohol they consume and performing activities that would encourage weight loss and improve vitality.

With the availability of treatment modalities and effective medications for the disease, success is not always recorded. This is because patients do not always adhere to recommended treatment. Several efforts have been made through research to determine factors involved in patient adherence difficulties and to develop targeted strategies to improve patients' adherence to treatment (Jaffe, Lee, Young, Sidney, and Go, 2013). Results have been varied suggesting that the problem still lies with the best ways to consistently influence adherence to hypertensive treatment.

The purpose of this study was to evaluate the outcomes of two innovative theory-based health education interventions;Patient Education and Counselling (PEC) and a combination of PEC and Social Support (PECSS) on medication-adherence andappointment-keeping behaviours and consequently the clinical outcome of systolic blood pressure reduction among hypertensive patients in selected tertiary health facilities in South-westNigeria. The health education interventions involvedhealth educator/nurse-administered patient-centred patient education and counselling with family support that would not only arouse awareness of risks of failing to take medications regularly but provide social support for the patient,thus facilitating medication adherence among hypertensive patients in the medical outpatient department of the selected tertiary health facilities.

1.3 Justification for the study

It is important to note that adequate control of blood pressure (BP) in patients with essential arterial hypertension enables them to maintain acceptable quality of lifeand facilitate increase in their life expectancy (Lenfant, Chobanian, Jones, and Roccella, 2003; Rajpura, and Nayak, 2014). Management of essential arterial hypertension includes pharmacological treatment with drugs, dietary modifications, adequate rest and exercise. Importantly, adequate control of the disease depends primarily on the level of adherence to different treatments prescribed for the patient necessary to facilitate maintenance of blood pressure that will halt progression to end-organ damage or sudden adverse events in the blood vessels that may result to morbidity or mortality.

Nevertheless, one of the problems inherent in the treatment of hypertension is that early in the pathogenesis of the disease, blood pressurerise is usually slow and does not produce obvious clinical manifestations, and therefore patients may assume that there is no need for medical attention or that the disease is not likely to progress to a more serious level. Thus, failure in therapy for high blood pressure is common(Lee, Wang, Liu, Cheung, Morisky, and Wong, 2013) and is mainly related to lack of treatment adherence; particularly of concern is that patients do not take their medications regularly as observed in a number of studies (DiMatteo,

2004).

A number of studies have been conducted in Nigeria to provide understanding of the dynamics and factors associated with medication adherence but only very few are interventions designed to enhance adherence. Most importantly, there is a dearth of evidence-based interventions on best strategies to increase patients' adherence in Nigeria related to factors associated with hypertension and treatment failure related to adherence. However, evidence from systematic reviews of study trials among Nigerian population related to medication adherence in hypertension treatment is few. Importantly, evidence-based health education interventions which can optimise patients' adherence to medication among black patients, who are especially at highest risk, are few (Ogedegbe, et al.2014), particularly in Nigeria. Only two intervention studies (Erhun, et al., 2005 ;Adedapo, et al., 2012), out of ten studies (Olubodun et al. 1990; Erhun, et al. 2005; Erah, et al. 2008; Gureje, et al. 2008; Ayodele and Oladipo, 2012; Adedapo, et al., 2012; Adeyemo, et al., 2013; Suleiman, et al., 2013; Oged**e**gbe, et al., 2014; Okuboyejoand Eyesan, 2014),involving medication adherence in hypertension therapy in Nigeria showed up in a Pubmed search. These intervention studies produced some improvements but were characterised by some methodological limitations in their designs,especially, in not having control groups to test the validity of results obtained. Furthermore, the study designs were not guided by conceptual and theoretical framework, therefore were not grounded in theory.

Given the many factors that may be involved in poor medication adherence, a multifactorial approach is required to accommodate the many factors associated with adherence to prescribed medications. Successful methods may be complex but are often guided by behaviour theories.In order to improve medication adherence and appointment-keeping of patients receiving hypertension treatment, and consequently, adequately controlling blood pressure profile, there is need to develop innovative theory-based health education strategies for enhancing hypertension-related knowledge, arousing conscious awareness of the implications of poorly controlled blood pressure, stimulate a desired willingness to persist with prescribed medications and build certain skills required to promote and reinforce medication adherence.

Similarly, medication-taking in patients generally is improved when there is some form of social support or reinforcement (Haynes, McDonald, Garg, Montague, 2004; Cornwell and Waite, 2012). Evidently, any strategy that will improve cognitive capacity of individuals and reinforce their decision-making will immensely contribute to whatis required for treatment adherence. Health education provides the consciousness-raising, concern-arousing, action-stimulating impetus that is required for patients to becomeinvolved and committed to their own treatment. At the individual level, health education most importantly, includes instructional activities and social interactions that would positively change health behaviour, especially medication adherence in hypertension treatment. This is why an innovative approach to improving adherenceis needed. Health promotion strategies emphasizing intensive patient education and counselling with social support have potentials for improving medication adherence among hypertensive patients.

Medication adherence failure and poor appointment-keeping by patients with hypertension continues to remain a major problem responsible for the ineffective control of hypertension and currently, evidence-based interventions on best strategies to increase patients' adherence to hypertension medications in Nigeria is scanty.Hence, there is acompelling need at this time for an effectivetheory-based health education programme to be developed in healthcare facilities so that better results can be recorded, thus reducing morbidity and mortality.

With the backdrop of evidence from studies reporting worsening prevalence and the lack of theory-based intervention studies, this intervention is considered important in a number of ways. It will provide the needed evidence-based strategy for influencing medication adherence among Nigerians, a substantial proportion of who receive care in referral health care facilities.Therefore, this study aim to develop and applytheory-based innovative health education intervention incorporating intensive patient education and counseling activities,guided by health behaviour theory, to influence medication-adherence and appointment-keeping through improved awareness of treatment benefits, rationale for available treatment modalities, motivate desire to persist in medication-taking, and provide social support from family members in self-care among hypertensive patients.

The focused Patient Education and Counselling with Social Support protocol has a number of defining characteristics which makes it innovative and includes the following; it provides simple and clear explanations of the mechanisms involved in developing hypertension as a diseaseentity and emphasizes that poorly managed hypertension conditions would result in poor prognosis. It furthershows how the various systems of the body undergo changes that may result in elevated blood pressure and that there are no final cure when the disease is established except careful management of the blood pressure,and demonstrates that treatment modalities are available to effectively manage and maintain control of blood pressure in orderto prevent any adverse cardiovascular event such as stroke, heart attacks, retinopathy or kidney failure. Furthermore, the protocol stresses that adherence to prescribed medications and appointment-keeping for monitoring the progress of the condition constitute the most effective way ofkeeping blood pressure controlled and avoid complications that may impact on quality of life.

The outcome of this study would provide rational basis for modifying existing health education activities at outpatient clinics and providing evidence for policy reform for hypertension treatment guidelines. The study will also enhance the health education profession by documenting the outcomes so that other professionals can use it to enhance patient adherence.This study will also provide empirical support for the theoretical framework applied in designing the intervention.

1.4 Research Questions

In the course of structuring the study, the following set of research questions were raised requiring answers and they are, to what extent will the two health education interventions involving Patient Education and Counselling with Family Support affect;

1. Predisposing factors involved in medication adherence and appointment-keeping in hypertension treatment among the participants in this study?
2. Reinforcing factors involved in medication adherence and appointment-keeping in hypertension treatment among the participants in this study?

3. Enabling factors involved in medication adherence to hypertension and appointment-keeping in hypertension treatment among the participants in this study?
4. Level ofmedication-adherence in hypertension treatment among the participants in this study?
5. Appointment-keeping of the participants in this study?
6. Systolic and Diastolic Blood pressure of the participants in this study? And,
7. Which of the two interventions (PEC or PECSS) will be more effective in influencing medication-adherence, appointment-keeping in hypertension treatment and consequently blood pressure outcome among the participants in the study?

1.5 Objectives of the Study

Broad objective

The broad objective for this study was to determine the extent to which two health education interventions involving Patient Education and Counselling with Social Support can influence predisposing, Reinforcing, Enabling factors,in order to produce acceptable levels of appointment-keeping, medication-adherence,and blood pressurecontrol outcomes among hypertensive patients in selected tertiary health facilities in Southwestern, Nigeria.

Specific Objectives

The specific objectives that guided the design and implementation of the study were the following, to;

1. Design and implement two sets of Theory-based interventions (Experiment 1: Patient Education andCounselling [PEC] and Experiment 2:Patient Education and Counselling with Social Support [PECSS]) to address the predisposing, reinforcing and enabling factors associated with medication-adherence in hypertension treatment and appointment-keeping among study participants,
2. Determine baseline assessment of predisposing, reinforcing, and enabling factors associated with medication adherence and Adherence behaviours outcomes with corresponding systolic and diastolic blood pressure measures.

3. Assess the immediate impact of the interventions on the predisposing, reinforcing and enabling factors involved in medication adherence and appointment-keeping among the participants in the study.
4. Evaluate the outcomes at 13thweek follow-up for the two interventions with respect toappointment-keeping, medication-taking behaviour, and blood pressure outcomes among the participants in this study.
5. Determine which of the two interventions had the greater influence on appointment-keeping, medication-adherence measuresand blood pressure outcomes.
6. Conduct ten key-informant in-depth interviews consisting four patients, two Social support family members, two clinic nurses and two Senior Nurse Administrators of the cadre of chief matrons from the two intervention health facilities at 12 months after follow up evaluation, to elicit perspectives and opinions regarding the interventions and patients' adherence to medication and appointment keeping.

1.6 Research Hypotheses

As a result of the two interventions and fouroutcome variables involved,the study hypothesizes that;

1. There will be a significant difference between self-reported medication-adherence scores of participants in intervention one conditionand the scores reported for participants in intervention two condition at 13th week follow-up.
2. There will be a significant difference between mean pill-count recorded for participants in intervention one conditionand the mean pill-count recorded for participants in intervention two condition at 13th week follow-up.
3. There will be a significant difference between scores of appointment-keeping recorded for participants in intervention one conditionand the mean scores recorded for participants in intervention two condition at 13th week follow-up.
4. There will be a significant difference between mean systolicand diastolic blood pressure recorded for participants in intervention one conditionand the mean systolic and diastolic blood pressure recorded for participants in intervention two condition at 13th week follow-up.

5. Intervention two will produce better outcomes in respect of medication adherence and systolic and diastolic blood pressure reduction than intervention one for participants in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chronic diseases constitute a major health challenge for healthcare systems globally and represent a major contributor to ill-health and mortality in any population (Murray and Lopez, 1997; Cappuccio et al, 2004; Agyemang, Bruiineels and Owusu-Dabo, 2005; Go, bauman, Coleman-King, Fonarow, Lawrence, Williams and Sanchez, 2014).The rate at which chronic disease is increasing is disturbing; particularly with cardiovascular morbidity.The global prevalence of hypertension is steadily increasing and given the population projections which predicts a doubling of the elderly population over the next 30 years (Kearney, Whelton, Reynolds, Muntner, Whelton and He, 2005; Mathers and Loncar, 2006) and the corresponding rise in chronic disease burdenthat this trend will produce on society, should be sufficient reasons to arouse public health concern and generate the impetus for appropriate action.

Chronic diseases may be described as long-term communicable and non-communicable disease conditions lasting more than six months or even a life-time, usually incurable in nature andinvolve some functional impairment or disabilities that account for poor quality of life outcome. Chronic diseases include conditions such as cardiovascular disease, diabetes, high blood pressure, cancer, mental disorders, asthma, chronic bronchitis and certain types of infectious diseases such as HIV/AIDS, tuberculosis among others. This review will briefly consider the epidemiology of hypertension, symptomatology associated with persistent elevation of arterial blood pressure, aetiology of hypertension, treatment modalities and rationale for treatment, behavioural issues in hypertension treatment including adherence and emerging theoretical issues conceptualized in health promotion and education that may explain medication adherence issues. Importantly, a review of important intervention studies related to medication adherence will be undertaken to identify intervention designs, outcomes

on adherence and blood pressure and any methodological issues arising.

2.2Epidemiology of Hypertension

High blood pressure is an important preventable cause of premature death from heart diseases and stroke among diverse populations of the world (Kokubo, Kamide, Okamura, Watanabe, Higashiyama, Kawanishi, Okayama and Kawano, 2008; Hozawa, 2011). Hypertension and other cardiovascular diseases (CVD) are increasingly becoming important global public health problemsof immense consequences and wide impact(Kearney, Whelton, Reynolds, Muntner, Whelton, nd He, 2005), particularly among blacks who have been extensively studied in the United States (Opie and Seedat, 2005; Sanderson, Mirza, Fry, Allison, and Bittner, 2007; Quipping et al, 2008; Egan, Zhao and Axon, 2010; Ogedegbe, Tobin, Fernandez, Cassells, Diaz-Gloster, Khalida, Pickering and Schwartz, 2014) and elsewhere in the world (Sliwa et al., 2008)thus, warranting serious consideration. Thesestudies have provided strong evidence in support of an epidemiological transition which is now broadening the complexity and spectrum of cardiovascular disease in the African continent (Silwa et al., 2008).

Hypertension is the most common cardiovascular disease believed to affect as many as 65 million adults in the United States with systolic and or diastolic blood pressure above 140/90 mm Hg (Egan, etal., 2010), which represents the cut-off point defining the disease among this population.It is estimated that between 23% and 38% affected individuals are nottaking their medications correctly. Hypertension is a condition that is characterized by a persistent elevation of arterial blood pressure over a prolonged period of time and frequently causes pathological changes in the vasculature and hypertrophy of the left ventricles that usually lead to morbidity and mortality. Persistent elevation of arterial blood pressure may manifest as impairment at certain target organs in the retina, cranial blood vessels and kidneys (Johnson, and Wright, 2005). Untreated hypertension may progress to the more severe form known as malignant hypertension and may be the precursor of rapidly deteriorating quality of life of population of hypertensive patients. It has been well established that, even small elevations in blood pressure have been found to increase the risk of poor prognosis with complications which may involve end-stage renal disease (Segura, Campo, Gil, Roldan, Vigil, and Rodicio, 2004) especially among Blacks and exacerbated by co-morbidity with diabetes mellitus.

Long-term prospective epidemiological studies indicate that, for both systolic and diastolic blood pressure, the higher the blood pressure the greater the cardiovascular disease with poor end of life outcome (Reid, Rubin and Whiting, 2001). Thus, hypertension has been, and continues to be considered a significant health problem among Blacks including Nigerian population (Moranti, 2001).

Epidemiologically therefore, enormous health hazards such as stroke and blood pressure-related end-organ damage are associated with persistent elevation of blood pressure, whether undiagnosed, untreated or unresponsive to treatment. Furthermore, patients that are poorly managed or are unresponsive to medication are at significant risk of morbidity and mortality. Uncontrolled blood pressure have been demonstrated to contribute to the more than 500,000 strokes and 1 million myocardial infarction cases reported each year in the United States alone (Kemp and Conte, 2012).

2.2.1 Magnitude of the Problem

The mortality rates recorded for cardiovascular-related diseases, especially hypertension, remain unacceptably high in all populations of the world despite availability of potent and efficacious medications and treatment modality. Over the past century, life expectancy has increased dramatically as a result of advances in public health research and practices, especially in countries where these are given high priority. Nejjari, Arharbi, Chentir, Boujnah, Kemmou, Megdiche et al., (2012) confirmed in their study that hypertension in North Africa is high with a total estimated crude prevalence of 45.4% (confidence interval of 44.8-46.0). Similarly, van de Vijver, Oti, Agyemang, Gomez and Kyobutungi (2013) in their study conducted in Kenya, Eastern Africa, observed high prevalence of hypertension with low rates of awareness of the disease with poor treatment and control.Unfortunately, the incidence of hypertension continues to rise in Nigeria and other parts of the world in diverse ethnic populations particularly among blacks, with consequent high morbidity and mortality. Approximately 65 million persons in the United States of America and about 1 billion people globally are affected with hypertension (Fields, et al., 2007). World Health Organization (WHO),in a report of Global deaths attributable to cardiovascular diseases, estimated17, 528, 132 deaths for 2005 with 6.4% of this mortality recorded for sub-Saharan (Mathers et al.,

2006). Global mortality from high blood pressure is now established as a problem (Gupta, Arshed, and Poulter, 2014).The total estimated deaths from cardiovascular disease reported for Nigeria in 2004 was 201,500 deaths and 10,700 of these was recorded for hypertensive heart diseasewhile data published for 2008 was 435,900 deaths with a population prevalence of high blood pressure of 42.8%; with female recording higher prevalence (44.0%) than males (41.5%) (WHO, 2012). These data show that women are at higher risk for CVD than men (American Heart Association AHA, 2012; WHO, 2012). Thus, it is clear that there is a growing health problem that requires an intervention. Data published by Murray and Lopez(2004)for WHO related to burden of disease and mortality are currently being referred toas valid(Mathers and Loncar, 2006).

Further, disease burden expressed as disability adjusted life years (DALYs) lost to cardiovascular diseases and hypertensive heart disease recorded for Nigeria for the same year was 2,116,000 and 105,000 respectively and puts Nigeria in the first position in sub-Saharan Africa (Mathers et al., 2006). It is projected that by 2015, the total deaths estimate resulting from hypertensive heart disease would be 81, 383 for Africa (Mathers et al., 2006). It has been suggested that this increase in mortality observed due to cardiovascular disease may be as a result of a cultural transition taking place in which the protective effects against high blood pressure offered by diet rich in vegetables, moderate living characterized by less stress in these sub-Saharan Africansettings arefast deminishing. Furthermore,other possible explanation for these blood pressure trends in these sub-regional settings may also be due to changes in lifestyles such as reduced physical activities, smoking and high lipid diet amongst these populations (Olatunbosun, Kaufman, Cooper, and Bella, 2000; Cappuccio, et al., 2004).

It is also thought that the gradual assimilation of western lifestyleamong these rural communities in sub-Saharan Africa may be partly responsible for lifestyle changes likely to be precursor to the observed changes in blood pressure profile (Kearney, Whelton, Reynolds, Muntner, Whelton, and He, 2005) requiring serious attentionand the incidence of hypertension continues to rise in Nigerians with its consequent high morbidity and mortality.

2.2.2 Risk Factors for Hypertension

Hypertension is a clinical disease which represents a significant modifiable risk factor for other cardiovascular diseases globally that may predispose to other more severe forms of cardiovascular diseases such as stroke, cerebrovascular disease, ischemic heart disease and congestive heart failure with target organ damage. A number of non-modifiable and modifiable risk factors have been established for cardiovascular hypertensive disease.

Non-Modifiable Factors in Hypertension

Non-modifiable factors associated with hypertension have been identified as how age, sex, genetic constitution and ethnicity may contribute to developing hypertension. These are characteristics of the individual that constitute the biology of the individual which cannot be immediately influenced by any intervention. It is known that blood pressure rises with age in both males and females, especially in ethnic Africans (Sanderson, Mirza, Fry, Allison, and Bittner, 2007); and is thought to be as a combined influence of accumulated environmental impact on the biological system and aging process. Similarly, there appear to be a sex difference in the blood pressure profile of any given population where early in life there appear to be no differences between males and females but at adolescence and towards middle age, the difference becomes marked(Park, 2005).

There appear to be evidence that genetic factors are also involved in developing hypertension among populations. It has been shown that the likelihood of an individual to develop hypertension whose parents have been diagnosed with the disease is significantly higher than those whose parents are normotensive (Park, 2005). It has become well established that persons of African origin tend to have higher blood pressure than other ethnic groups.Kaufman et al (1996) reported increasing risk factors for hypertension and changes in blood pressure profile of rural and urban populations in Southwestern Nigeria. Many studies have confirmed that individuals of black ethnic expression tend to develop and sustain hypertension (Kaufman et al., 1996; Murray and Lopez, 2004; Kaufman, et al., 1999). In a community-based survey, Agyemang et al (2005) demonstrated that within rural, semi-urban and urban communities of Ghana, blood pressure was observed to increase with increasing age. Cappuccio et al (2004) in their study also observed rapid increases in blood pressure and

prevalence of hypertension in adults in Africa. Furthermore, studies conducted in Eastern Africa and North Africa demonstrated high prevalence (Van de Vijver et al, 2013; Nejjari, et al, 2012).

These risk factors are usually not amenable to many interventions to prevent the occurrence of the disease.However, with strategic health promotion and education for primary prevention of modifiable risk factors or early detection and treatment at the secondary level of intervention is most likely to reduce morbidity and mortality from hypertension(Ohty, Tsuchihashi, Ohya, Fujii, et al., 2001). Therefore, it is essential to regularly conduct community screening of sub-group of the population at most risk; for example, individuals with family history of hypertension and follow them up with tailored primary prevention intervention. As individuals begin to approach the age of 45 to 50 years, they should be encouraged to have regular blood pressure measurements.

Modifiable Risk Factors in Hypertension

Health Transition has been described as the gradual shift in morbidity and mortality from predominantly infectious diseases to chronic illnesses observed in global disease profilein the course of the past centuries and the social forces that has contributed as both causes and consequences of this transition (Ware, Christakis and Kleinman, 1992). Also part of the health transition is the changes in the distribution of causes of death and in the prevalence of different types of illness. Even though acute infectious diseases now present less of a burden of mortality in developing countries presently than previously recorded, there is a concurrent rise in the proportion of chronic illness reported, such as hypertension, heart diseases, cancer, diabetes, and stress-related illnesses. These health conditions are the hallmark of industrialization, urbanization and the attendant growth in psycho-behavioural pathology.

Multiple factors are known to contribute as determinants of health and may influence the health of every person in the community in one way or the other. These factors include heredity, environment, health services, education, behaviour of sorts and social conditions that are modifiable. Therefore health and any strategy to maintain it must be considered from the ecological perspective. Heredity describes the biological processes by which particular

characteristic traits are transmitted from parents to their offspring. This is why the offspring always closely resemble their parents in many ways. These traits are connected with the component of the body unit that carries all the information required to successfully reproduce the species, the genes and chromosomes. The physical, psychological and social characteristics of an individual so much depends on the genetic make-up of that individual (de Castro,1999). This implies that the health of an individual is similarly linked to the genetic characteristics of the individual.

Heredity has been known to play significant role in disease processes. The many causes of diseases such as hypertension, asthma, diabetes, cancer, glucose 6 phosphate dehydrogenase deficiency (G6PDD) are in one way or the other attributable to intrinsic factors, such as heredity, and extrinsic factors, such as the environment and lifestyle (Dmitrenko, 1999). Therefore any health promotion activity that do not consider the likelihood of a health problem arising from genetic make-up of the individual at risk and plan accordingly by appropriate intervention may not likely find appropriate solutions to such health problems.

The environment is an important factor that may determine the likelihood of establishing disease in a person. Many problems generated within the physical environment have been shown to have direct impact on the health of people in the community. For instance, air pollution which is caused by the presence of poisonous chemicals discharged from industrial exhaust chimneys, carbon monoxide fumes discharged from petroleum-fueled vehicles, fires and other sources can adversely affect health. Today, pollution of the environment contributes to the cause of a number of health problems such as asthma and other breathing difficulties.

The presence of certain substances such as mercury, cadmium and lead can pollute drinking water and adversely affect normal physiological function particularly, the cardiovascular system, kidneys and central nervous system to produce diseases (Tellez-Plaza, Jones, Dominguez-Lucas, Guallar, and Navas-Acien, 2013; Tellez-Plaza, Guallar, Howard, Umans, Francesconi, Goessler, Silbergeld, Devreux and Navas-Acien, 2013). Human activities have direct influence on the environment, especially, as the structure and architecture of the environment is continually changed by such activities as deforestation and urban

development. The likely effects of heavy metals found as pollutants in the environment have been studied in various parts of the world and their health effects proposed, particularly for cardiovascular diseases (Lauwerys, Amery, Bernard, Bruaux, Buchet, Claeys, De Plaen, Ducoffre et al., 1990; Tellez-Plazaet al., 2013). The issue of waste disposal in developing counties has contributed significantly to the environmental problems of developing countries of the world. In order to provide adequate solution to problems associated with waste disposal in variousrural and urban communities, it ha been suggested tht government should established strategic plans to handle waste disposal and become committed to sustaining it through policy that would support equity and place priority on environmental health.

Epidemiological investigations have linked major risk factors of high blood cholesterol, smoking and dietary factors to sustained high blood pressure. The risk factor concept has similarly identified that particular biologic, lifestyle, and social conditions are associated with increased risk of the disease. Stress, smoking, certain diets rich in cholesterol, lipids, salt and sedentary lifestyle are generally known to provoke sustained elevation of blood pressure in susceptible individuals(Horan and Lenfant, 1990; Kokubo, 2014). Over-consumption of dietary salt is knownto contribute to increase in arterial blood pressure (O'shaughnessy and Karet, 2006;Legowski and Legetic, 2011) and individuals of black race appear to conserve the electrolyte very effectively.With the increasing introduction of salt-rich snacks from processed foods, prevalence of hypertension is likely to rise in the coming years. Obesity resulting from combined high fat and carbohydrate diets with little or no physical activities for a prolonged period usually predisposesindividuals to obesity and hypertension. Furthermore, identification of populations predisposed to these risk factors has become a prerequisite for effective prevention programmes in the United States.No doubt, some populations in Nigeria, especially in urban settings, are gradually acquiring lifestyles and social conditions similar to that prevailing in some United States communities, characterized by overt tension, inactivity and physical disposition and poor choice of diet resulting in individuals that are obese.Health promotion and education intervention when strategically initiated are most likely to be effective in controlling the disease in the population.

2.2.3 Pathophysiology of Hypertension

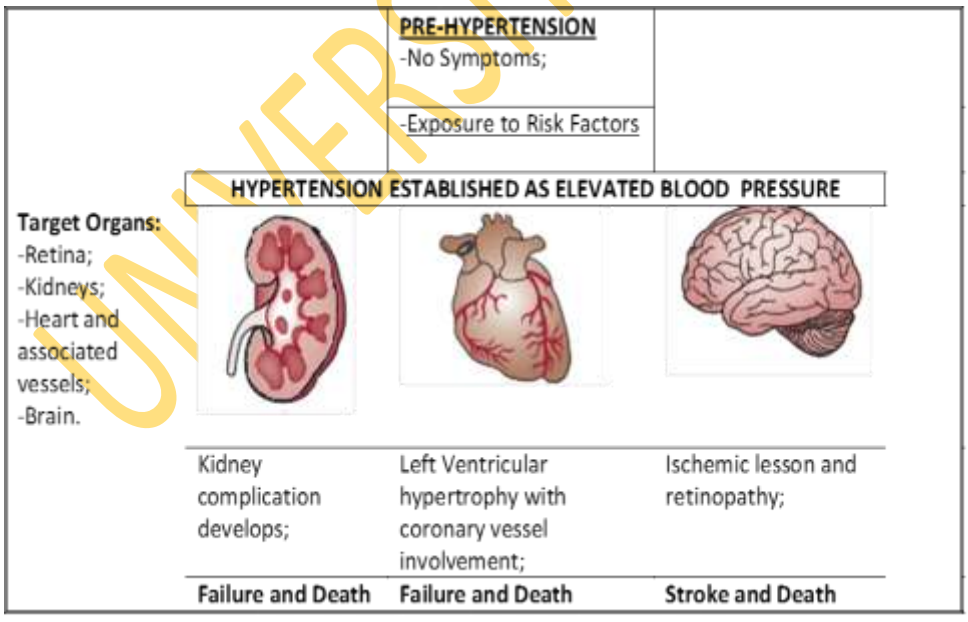
The body is able to control blood pressure by a number of complex physiologic mechanisms involving the central nervous system, kidneys and some system of chemical interactions associated wih the endocrine system. Blood pressure maintenance is essential for circulation and function of all organs in the body. Essentially, the kidneys, brain and other vital organs of the body are effectively perfused with blood because of the hydrostatic blood pressure within the systemic circulation and this is determined by the combined total peripheral resistance produced by the arterioles and the cardiac output. The peripheral resistance is under not so well understood complex mechanisms; however, it is at least clear that innervations from the vasomotor centre in the central nervous system influences the calibre of the arterioles. On the other hand, cardiac output is a function of the stroke volume and rate of contraction of the heart. The viscosity of the blood flowing in the arteries further contributes in no small measure to arterial blood pressure.

A combination of complex factors has been shown to contribute to the viscosity of the blood, such as the amount of plasma proteins in circulation, volume of water in relation to other materials suspended in the blood.The amount of water in circulation may partially be a function of the ability of the kidney to clear the electrolytes reaching the glomeruli through the nephrons. When electrolytes, particularly sodium are effectively reabsorbed, more water is held in circulation and thus contributing to vascular load and oedema. This can be seen in faulty kidney function as blood pressure is usually affected.

One other way by which the blood pressure is controlled is by the renin-angiotensin system. In response to the kidneys with particular reference to sodium depletion or acute fall in renal blood pressure due to excessive bleeding, the kidneys may release rennin into the blood that triggers a cascade of events leading to vasoconstriction by angiotensin II. Angiotensin I, the precursor, is a mild vasoconstrictor which is a direct product of the protolytic conversion of angiotensinogen by rennin (Frerrario, Barnes, Block, et al., 1990). This constriction is an attempt to restore falling blood pressure. However, when the arterial blood pressure is fully restored, the release of rennin is cut off.Unfortunately, when the system looses control, there is no way of stopping the release of rennin thus, a viscous circle is establishedwhich

culminate to sustained elevated blood pressure that may eventually result in renal damage if not treated (Mennuni, Rubattu, Pierelli, Tocci, Fofi, and Volpe, 2014).

Hypertension is a condition characterized by a persistent rise in arterial blood pressure over a long period following the loss of ability of the cardiovascular system to control the blood pressure through physiological feedback mechanism(Messerli, Williams, and Ritz, 2007). When arterial pressure becomes elevated for such a prolonged period, there may be progressive changes in the blood vessels that usually may predict impending danger of a stroke or heart attack. Hypertension may be regarded as primary or secondary. Usually no underlying cause can be identified in most of the cases in primary hypertension. Sometime the term essential hypertension is used to describe this type of hypertension. On the other hand, secondary hypertension may arise as a result of a pathological lesion within the system such as tumour of the adrenal gland, renal disease, hyperaldosteronism or in toxaemia of pregnancy. Therefore, it could be said that the pathophysiology of hypertension is multi-factorial and hence, the treatment may require rational approach to match treatment with the many factors in the aetiology of the disease.



Source: Adapted from Messerli, Williams, and Ritz, 2007

Figure 2.1 Target Organs at high risk of Damage as a result of high blood pressure

Invariably, hypertension may co-exist with other chronic illnesses especially diabetes mellitus and when this happens,the disease may rapidly progress to the more severe form known as malignant hypertension with end-organ damage (Ohty et al., 2001).

2.2.4 Symptomatology

Although initially, hypertension may not present with any noticeable symptoms, but as the disease progresses and becomes established, the individual affected may experience persistent headaches and probably palpitations.Because initially, the disease is with little or no symptoms and for this reason, many individuals may have elevated blood pressure without realizing it and consequently are not treated early enough. Other symptoms associated with hypertension includescongestive heart failure, retinopathy, renal failure which may be sequel to more severe hypertension, and possible stroke as the condition worsensculminating to death (Messerli, et al, 2007).

2.3Rationale for Hypertension Treatment and Treatment Modalities

Investigations into the pathogenesis of hypertension have provided important information about the disease. It is known that the etiology of essential hypertension is not completely well understood, however what is known suggests that a sustained elevation of arterial blood pressure over a prolonged period is indicative of some pharmacologic or non-pharmacologic intervention. It has also been demonstrated that in hypertension, there isa pathological defect in the normal regulation of blood pressure resulting in disturbed adaptive balance in whichoneor more of the vasoconstrictors in blood pressure (BP) regulation persists and prevails over other adaptive systems.

The clinical rationale for therapy in hypertension has been to reduce both systolic and diastolic blood pressure adequately by primarily reducing the peripheral resistance and a number of other components of the BP regulating systems without undue adverse effects which may manifest as severe hypotension or palpitations.However, where there is a pathologic lesion such as tumor of the adrenal gland (*pheochrornocytoma*) and toxemia of pregnancy in secondary hypertension, surgical removal of the affected organ or termination of the pregnancy would reduce the blood

pressure. Therefore, in the rational treatment of hypertension with medication, in order to reduce the incidence of adverse effects on the patient, it has been recommended to use combination of drugs known to synergistically exert their pharmacologic actions at various organs known to play role in the mechanism of hypertension. For instance, as it is known that hypertension has a multi-factor etiology involving the vasomotor center accounting for the aspects of stress and tension, arterioles accounting for peripheral resistance, the cardiac output also accounting for sustained arterial blood pressure and the kidneys responsible for both salt-water regulation and the rennin-angiotensin system; therefore, the use of multiple drugs rather than single drug therapy would be more effective in the control of BP with lower incidence of adverse effects (Reid, et al, 2001).

The use of antihypertensive medications still constitutes the modality recommended to achieve desired goals (Burnier, 2006). Antihypertensive agents are known to produce their BP-lowering effects through a number of mechanisms (Rosendorff, Black, Cannon, Gersh, Gore, Izzo, Kaplan,O'Connor, O'Gara, Oparil et al., 2007). Drugs that exert their effect through the Central Nervous System act to reduce the sympathetic nervous outflow from the vasomotor in the mid-brain to the arterioles and provide the rationale for treating stress-induced hypertension. In addition to this, anxiolytic agents concomitantly used usually enhance therapeutic effects. The adrenergic neuron blocking agents have been employed to reduce the responsive of the arteriolar musculature to sympathetic stimulation by either depleting or preventing re-uptake of neurotransmitter substance at the sympathetic nerve terminals. As a result of severe adverse effects, these class of drugs are no longer in use but replaced by the vasodilators.

Vasodilators may act directly on the blood vessels by dilating the arterioles by some complex mechanism involving calcium ions and smooth-muscle contractile mechanism or producing direct inhibition of alpha-receptors in some blood vessels.Beta adrenergic reception blockers inhibit sympathetic action on the heart thereby reducing cardiac output and at times exert actions on the brain stem and kidneys to reduce the release of rennin.The Renin-Angiotensin inhibitors competitively inhibit Angiotensin converting Enzyme which produces the powerful vasoconstrictor angiotensin II, hence preventing the effects of this substance on the arterioles

(Mennuni, et al., 2014). By identifying the possible etiologic factors involved, it is possible to select drugs in rational combination and at low dosages to produce desired clinical goals. Adjunct drugs such as diuretics which stimulate the excretion of sodium and water and antiplatelet agents such as Aspirin can effectively enhance results in hypertension pharmacotherapy with little or no adverse effects. Most importantly, it has been shown that slight reduction in salt intake or excretion from the kidneys facilitated by diuretic agent has produced remarkable reduction in blood pressure (Mennuni et al., 2014). Unlike previously when single drug therapy with very high dosages were employed for the treatment of hypertension and resulted in little lowering of arterial blood pressure with severe side effect, current therapeutic approach now employ multiple drugs. Benefits of treatment are without doubt and can halt progression to the stage of end-organ damage characteristic of poor prognosis(Kronish, Woodward, Sergie, Ogedegbe, Falzon and Mann, 2011) and combination drug therapy are widely favoured (Chalmers, Arima, Harrap, Touyz and Park, 2013).

2.4 Medication Adherence in Hypertension Treatment

Medication adherence failure in chronic illnesses, especially cardiovascular diseases continues to remain a major problem in the effective control of hypertension (Viswanathan, et al., 2012) despite availability of effective drugs, therapy modality and knowledge of hypertension aetiologies. In a study conducted to determine medication adherence in chronic illnesses measured by self-report concluded that forgetfulness, not remembering to refill when the drugs finished among otherswere reasons for non-adherence considered to be under the patient's control (Boskovic, Leppee, Culig and Eric, 2013). It has been stated that typically, adherence rate for prescribed medications in chronic illnesses is about 50% (WHO, 2003; Jones, 2003; Haynes, McDonald, Garg and Montague, 2004). Unfortunately, Even though various attempts have been made to provide clear understanding of the reasons for poor therapeutic outcome in hypertensive therapy, not enough has been mentioned about behavioural and educational interventions to consciously improve medication adherence (Bosworth, Gentry, Powers,Olsen, Rose, McCant, Goldstein,& Oddone, 2007).Adherence has been described as the extent to which a person's behaviour, in terms of taking drugs, following diets, or executing lifestyle changes, coincides with medical or health advice (DiMatteo, 2004).

Hypertension is often the precursor to congestive heart failure, chronic occlusive peripheral vascular disease, renal failure and stroke (Giles and Materson, 2005). Target organ damage is an important clinical endpoint in poorly managed hypertension and this is implicated in systolic blood pressure persistently higher than 140 mmHg. Medication adherence is an important determinant of blood pressure control (Perreault, Lamarre, Blais, Dragomir, Berbiche, Lalonde, Laurier, St-Maurice and Collin, 2005).Regardless of how effective a drug is for the treatment of hypertension, without daily use of prescribed medication, the outcome of treatment will be poor. Although factors influencing adherence such as nature of the treatment modality (Wanovich, Kerrish, Gerbino and Shoheiber, 2004),adverse effects and the usual slow onset of response encountered in essential hypertension are some reasons offered by patients for not taking their medications as expected and clinicians are worried when patients are not making expected progress in their treatment despite the advantages of potent medications that can be used in different combinations for treating hypertension.

It has been demonstrated that poor medication adherence is principally responsible for poor treatment outcome in the population of hypertensive patients achieving BP levels at or below the treatment goal of 140/90mm Hg, especially in the United States (Ramsay, 1999). Poor compliance to antihypertensive medications contributes to lack of control in more than two-thirds of these patients, and it is a critical determinant in the response to antihypertensive therapy (Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,2003). Among hypertensive patients, control of blood pressure is significantly better with improved medication compliance (Viswanathan, et al., 2012).

There is no doubt that drugs are available for the treatment of hypertension, and available clinical evidence also suggest that these drugs are potent sufficiently to control the condition when it is properly diagnosed and treatment applied appropriately. However, response to treatment has been varied with complaints of troublesome adverse effects such as impotence,cough, fatigue, hypokalemia, dehydration, especially when diuretics are included in the regimens, and often interfere with maintaining therapeutic objectives (Osterberg and Blaschke, 2005).Further, the costs of hypertension treatment are substantial,especially

inadepressed economy typical of developing nation. The nature of the disease makes it difficult for clear cut treatment because it requires adequate monitoring and titrating dosages with responses.

Many patients with hypertension have inadequate control of their blood pressure because treatment appears to have a one-size fit-all modality. Improving the treatment of hypertension requires an understanding of the ways in which physicians manage this condition and a means of assessing the efficacy of this care. Poor adherence to medication regimens accounts for substantial worsening of disease with its attendant consequences of poor prognosis and death. Adherence has been defined as patient maintenance of an assigned therapeutic regimen. Since the word compliance can imply coercion of one individual by another, some prefer to use the term adherence (Osterberg and Blaschke, 2005), which gives the impression of concordance between patient and care-giver on therapeutic objectives and clinical goals. Most observers will describe compliant patients as those who believe they have the illness diagnosed and that it is harmful. They believe the prescribed treatment will help and the benefits of the treatment outweigh the disadvantages. Yet many patients see a physician, have their health problems diagnosed, but do not adhere to the therapeutic regimen. The reasons are many and varied, some intentional and some unintentional.

A review of the literature reveals that a significant proportion of outpatients estimated to be between 20% and 50% fail to take their medications completely thus resulting to poor outcome (Bosworth et al., 2007; Kripalani, Yao and Haynes, 2007; Viswanathan, et al. 2012). In a study by Gold and McClung (2006), it was observed that minimal intervention which consisted of providing information about the disease state and treatment without personal attention had little impact on adherence. The situation may be far worse among hypertensive population in Nigeria where the healthcare system is not as highly organized and articulated as it is in the United States or Europe.

Hypertension is often poorly controlled despite its seriousness and the availability of very effective treatments. The major problems with treatment in chronic diseases such as hypertension is that in order to control the blood pressure certain interventions are required

which includes medications, life-style changes that may not be easy to make initially. Failure to adequately control blood pressure in hypertension has been attributed to poor adherence to treatment requirement. Many factors have been identified to contribute to poor control (DiMatteo, 2004) and may include failure of patients to keep appointments with physicians (Moranti, 2001), failure of physicians to detect and adequately treat hypertension to goal levels, and failure of patients to persist with prescribed therapy (Osterberg and Blaschke, 2005), eventually predispose them to high morbidity for target organ damage and mortality.

Patient are not consistent in taking their medications or adhering to dietary requirements known to enhance the treatment such as low salt and low fat diet, smoking cessation, limiting the amount of alcohol they consume and performing activities that would encourage weight loss and improve vitality. Importantly, there is growing concern about the high global mortality rates recorded in recent times for individuals with poor medication-adherence behaviour in hypertension therapy (Kearney et al, 2005). With the availability of treatment modalities and effective medications for the disease, success is not always recorded. This is because patients do not always adhere to recommended treatment. Several efforts have been made through research to determine factors involved in patient adherence difficulties and to develop targeted strategies to improve patients' adherence to treatment. Results have been varied suggesting that the problem still lies with the best ways to consistently influence adherence to hypertensive treatment.

It is important to note that adequate control of blood pressure (BP) in patients with essential arterial hypertension increases their life expectancy and quality of life measures. Management of essential arterial hypertension includes pharmacological treatment, diet and exercise. The main aim of treatment is to reduce blood pressure to a level that is without any risk to the individual.Adequate control of the disease depends primarily on the use of appropriate medications and adherence to different actions prescribed for the patient required to maintain blood pressure that will not produce end-organ damage or sudden event in the blood vessels that may result to morbidity or mortality. Nevertheless, one of the problems inherent in the treatment of hypertension is that early in the pathogenesis of the disease, increased blood pressure does not usually produce relevant clinical manifestations, and therefore the patient

may assume that there is no need for medical attention or that the disease is not likely to progress to a more serious level. Therefore, failure in therapy for high blood pressure is common and is mainly related to lack of treatment adherence.

It has also been suggested that informed decision-making is a desirable outcome in providing solutions when there is uncertainty in the course of action to take and when decision-making is shared between patients and significant others such as a family member or a caregiver, there is improved patient satisfaction and health outcomes. A number of studies have consistently shown that hypertensive patientsdo not adhere to prescribed treatment and this population has been estimated to be about 50% to 65% (DiMatteo, 2004; Viswanathan et al., 2012).Osterberg and Blaschke (2005) in their review reported that adherence rates of 80%and above, confirmed by Kronish et al., (2011), for chronic illnesses such as CVD, diabetes mellitus and cancer treatments are acceptable as adequate and in the case of HIV treatment, require a minimum of 95% (Ickovics,Cameron, Zackin, Basset, Chesney, Johnson, and Kuritzkes, 2002) adherence in order to adequately suppress viral load. Importantly, adherence to prescribed treatment in chronic illnesses has implications for patients' illness outcome;this is because if the patient do not persist in medication-taking, they are not likely to benefit from the effectiveness of the regimens. Other consequences may be that clinicians may be misled to conclude that the prescribe treatment is inadequate or inappropriate. When assessing adherence, there is need to determine methods that will provide some level of validity.

2.4.1 Measurement of Medication Adherence

Measurement of adherence to medical regimens may pose some operational difficulty because of the complexities and convenience involved in observing the behaviour based on the definition. Adherence to medication has been defined as the extent to which patients' behaviours coincide with health care providers' recommendations for health and medical advice (Lee, et al. 2013). Furthermore, according to Sabate (2003), it can be defined as the extent to which a patient's behaviour, with respect to taking medication, corresponds with agreed recommendations from a healthcare provider. In both clinical care and research settings, measuring and classifying the patterns of patients' adherence may be difficult to attain with absolute precision.

In practical terms, various methods have been developed to measure medication adherence and have been grouped into two major categories: indirect (self-report, pill-count, automated pharmacy database records, and electronic/manual medication monitor) and direct (biochemical analysis of urine or blood samples, Directly Observed Therapy [DOT]); and these have served the purpose of assessing the extent to which medication-taking behaviour correlates with health outcomes in illnesses (Morisky,Greenand Levine, 1986;Schroeder,Fahey, Haya, Montgomerya andPetersa, 2006;Burnier, 2006; Krousel-wood, Thomas, Muntner, and Morisky, 2004). Each of these methods has defined merits and shortcomings.However, a number of factors need to be considered when deciding what method to apply in measuring adherence. The researcher should consider cost, convenience and balance these with accuracy.

Most commonly used method for assessing medication adherence in both research and clinical setting is the self-report. Patient self-report of their medication adherence behaviour can be collected conveniently by the use of a well-designed and validated questionnaire (Morisky, Green, and Levine, 1986; Kim, Hill, Bone and Levine, 2000). The self-report method has the advantage of being inexpensive, with simple measurement strategy applicable to a variety of regimens, generally brief and has face validity. This method provides opportunity for the researcher to understand cognitive-behavioural characteristics and medication beliefs pertinent as antecedents to non-adherence that may be valuable in addressing such difficulties otherwise would not be immediately apparent with the more direct bio-assay method.The drawback of medication adherence self-report lies in its subjective attributes which relies on memory recall or attempting to impress the researcher by exaggerating reports of medication use, which sometimes referred to as“The white coat effects”.

While self-report of medication adherence may not be the “Gold standard”, it is commonly usedwhen there is need to rapidly determine medication adherence in primary care or outpatient clinics.On the other hand,in research when there is need to validate self-reported adherence measures, additional methods such as pill-count or weighing inhaler canisters or liquid medication becomes necessary. The use of pill-countfor measuring medication

adherence has been used early in studies involving medication adherence (Oladepo, Adeniyi,Brieger, Ayeni, and Kale, 1989; Hilbrands, Hoitsma andKoene, 1995). It requires some level of rigour of carefully counting left over pills after a given period and allows the investigator to indirectly infer the extent of medication adherence. Medication adherence measures employing pill-counts have been shown to be considerably highly correlated with bio-assay indices of adherence in iron deficiency therapy (Cromer, Steinberg, Gardner, Thornton, and Shannon, 1989) and highly active antiretroviral therapy (Moss, Hahn, Perry, Charlebois, Guzman, Clark, andBangsberg,2004).

In a meta-analysis conducted to review the impact of drug class on medication adherence in the treatment of hypertension revealed that medication adherence may vary widely depending on whether the situation was in a clinical trial or observational study (Kronish et al., 2011). Generally, for effective control of blood pressure, medication adherence minimum threshold has been calculated at 80% of drugs prescribed for a given period and below this threshold an individual is considered noncompliant (Kronish et al., 2011). Other methods of pill-count have applied the use of electronic medication monitors also referred to as medication event monitoring system (MEMS-AARDEX, LTD, Switzerland), the Doser (Meditrack Products, Hudson, MA) and the MDILog (Westmed Technologies, Englewood, CO). The MEMS can be used to validate other methods of adherence measures as seen in the study conducted by Moss et al (2004). These are electronic devices installed with microprocessors attached to the caps of pill bottles that record information about cap opening that can be downloaded into a computer and analysed (Moss, et al., 2004). Electronic monitoring is not exclusive to pills alone, metered inhalers can also be monitored using these electronic devices; for instance the Doser can be attached to metered dose inhalers with a pre-programmable liquid crystal display that displays amount of doses remaining in the canister and dosing activities each day. These may offer more precise measure of medication-taking but has a few drawbacks such as cost prohibition, especially in low-income communities.

Clinical assays from blood and urine samples offer other methods of verifying adherence by biochemical analysis in a more direct method. This method involves the use of bio-markers directly related to metabolic by-products of the parent medications in the treatment regimen.

While it is regarded as the best method of estimating adherence, it requires invasive procedure that needs to be repeated over time to obtain a trend and profile of the maker. Perhaps, this method would be useful in clinical setting where blood levels of drugs required to maintain therapeutic effects needs to be determined, such as in the treatment of convulsive disorders or cardiac glycosidesfor congestive heart failure (Maenpaa, Manninen, and Heinonen, 1992). Apart from the use of biochemical assay as described in this review, another direct method of practical implications in adherence measure is the Directly Observed Therapy (DOT) which has been extensively applied in the treatment of tuberculosis (TB), and currently consists of treatment modalities for TB. The threat of resistant strains emerging and rendering the treatment ineffective as a result of non-adherence has warranted the adoption of a close monitoring of medication-taking requiring observing patients taking the drugs to confirm that medication is adequately maintained throughout the treatment.

2.5Psycho-Cognitive and Behaviouralissues in Hypertension Treatment

Human experiences have always been closely associated with constant outbreaks of disease epidemics, a familiar situation in most communities, in which some individuals or a whole population suffer severe consequences even death. Humans may unwittingly and inadvertently increase the likelihood of morbidity and exposure to risk factors as a result of lack of knowledge or conscious awareness of the far-reaching consequences of their actions or by their decision-making process.Psycho-cognitive and behavioural factors have become important consideration in preventive health. Recognizing that behaviour has direct link to health outcomes and cognitive processes of knowledge, perception and health beliefs are important antecedents to behaviour, are some of the reasons why health education is considered an important paradigm for preventive health.

Health is not only a medical issue confined to natural and biological factors which can be addressed exclusively by biomedical interventions such as prescribing drug treatment or performing a surgical operation. Rather, health is a product, not only of biological constitution (what individuals are made of), but of how the individual live and act in the community (social-behavioural).Health Promotion therefore, through its theory-based programming, is an important paradigm for applying effective disease prevention strategies

and control measures in every community (Glanz, Rimer and Lewis, 2002; Gorin and Arnold, 1998).

Health education includes not only instructional activities and other strategies to change individual health behaviour;it also provides the consciousness-raising, concern-arousing, action-stimulating impetus for public involvement and commitment to social reforms essential to its success in any community.Health education has long moved away from the traditional giving of information to a more strategic position because it is now well recognized that health education approaches based merely on giving information are ineffective to fully influence desirable change in health behaviour, but require motivational and environmental support to produce better results as evidenced by health promotion approaches.

In behavior change process, health education principles influence the individual micro-level cognitive processes and health beliefs (Ogedegbe, 2008) as well as the environmental macro-level conditionswhen appropriate reinforcements and enablers, as observed by Green and Kreuter (1991) in their model, are applied.This approachis more likely toproduce the desired behaviour change.

2.5.1. Health Literacy as a Predictor of Treatment Adherence

Health outcomesand opportunities of individuals in a community to improve their welfare are basically determined, in part, by the level of health literacy, cognitive awareness, and available health information at their disposal and health beliefs motivating health-enhancing behaviours or health-depleting behaviours (Nutbeam, 2008). These are influenced by certain cultural dispositions rooted in traditional belief system that can generate superstition and create inappropriate locus of control (Omeje and Nebo, 2011), or educational opportunities, behavioural skills developed and socio-economic variables that underpin social life in the community. It is now well established that health behaviour has links to health outcomes and these links in turn are dependent on factors associated with health literacy, cognitive awareness, healthcare services, available health-related information and decision-making process at the individual level (DeWalt, Berkman, Sheridan, Lohr, and Pignone, 2004; Atulomah and Atulomah, 2012).

Education may be described as the process of cultivating and transforming the mind into a more matured faculty for reasoning, and plays very important role in influencing the health of an individual through providing better understanding of how phenomena are linked, and an appreciation of how these affect the individual (Schuz, Wurm, Ziegelmann, Warner, Tesch-Rmer, and Schwarzer, 2011). Education facilitates the elimination of superstition and encourages objectivity. Educational exposure and functional literacy, combined, are social factors responsible for the process of acculturation in any population. Acculturation is a social transition that can facilitate bridging the gap between native culture and scientific culture. In recent times, emphasis on health literacy as an important overarching personal-level cognitive factor (Baker, Wolf, Feinglass and Thompson, 2008; Gazmararian, Kripalani, Miller, Echt, Ren, and Rask, 2006) has appeared in literature, which may have important bearing on medication adherence. This is an important patient-level factor amenable to educational intervention strategy. Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to understand and use information in ways that promote and maintain good health (Institute of Medicine, 2004; Sorensen, Van den Broucke, Fullam, Doyle, Pelikan, Slonska et al., 2012).

Acculturation is a product of enlightenment and education. Personal-level psychological constructs and structural sphere determined by educational attainment contribute significantly to the outcome of translating health-information to preventive health actions. Similarly, structural sphere which constitute cognitive capacity, shape a wide range of experiences for an individual and is determined by the educational experience of the individual. Cox, Browmer and Ring (2011) citing Nutbeam (2000) described health literacy as the cognitive disposition and social skills of an individual which provides opportunity to gain access to information,ability to understand and use information in ways that promote and maintain good health. Evidently, any strategy that will improve cognitive capacity of individualssuch as health literacy,will also influence decision-making and contribute immensely to treatment adherence.

Health education provides the consciousness-raising, concern-arousing, action-stimulating impetus that is required for patients to become involved and committed to their own

treatment. At the individual level, health education most importantly, includes instructional activities through communication skills and social interactions that would positively change health behaviour, especially medication adherence in hypertension treatment. Communication is all about meaning we give to any experience and the understanding derived from such thoughts transmitted by the information generated and shared. Health literacy and knowledge gap constitute important factors to be considered in the entire phenomena involving Psycho-cognitive processes and the resultant health choices that enable an individual to engage in health behaviour (Finnegan and Viswanathan, 2008).

The fact that individuals in rural communities with low literacy may have difficulty in conceptualizing scientific ideas involved with health actions,underscore the rationale for desiring to improve their health literacy(Nutbeam, 2008).With improved health literacy, the individual can effectively engage in health protection with better health outcomes.The goal of health education is to provide opportunity to arouse conscious-awareness of the implications of the far-reaching consequences of diseases individuals are exposed to, and to contextualize perception of risks involved in decision-making by individuals, when health information are well articulated (Atulomah and Atulomah, 2012).Treatment failure in hypertension has been predominantly attributed to medication non-adherence with consequent increase in morbidity and mortality of at-risk populations.

2.5.2 Conceptualizing health literacy and health belief in Hypertension Treatment

Adherence to treatment can be conceptualized within the context of health belief and explained by health behaviour theories. Theories about health behaviour provide the necessary framework for understanding patient adherence to recommendations regarding health and also provide the guiding principles for developing effective interventions to influence target behaviour of interest. In a study conducted by Schuz, et al. (2011)about changes in functional health and how this is related to medication beliefs and adherence, found out that changes in beliefs about illness appear to affect individual adherence. They suggested targeting such beliefs for intervention design in order to provide appropriate interpretation of changes in health subjects are passing through for improved medication adherence in specific illness.

Similarly, in another study to establish the role of beliefs in medication adherence, Van Steenis, Driesenaar, Bensing, Van Hulten, Souverein, Van Dijk, et al. (2014) investigated the relationship between beliefs related to necessities of medication in asthma and concerns about the medication, showed that it would be more important to focus on necessities than on concerns in an attempt to improve adherence.This position was confirmed in the study of Rajpura and Nayak (2014) who suggested based on their findings, that a more benign perception of illness translates to lower medication adherence whereas, positive beliefs about medication and threatening beliefs about illness are crucial in shaping adherence behaviour in elderly hypertensive individuals.

Emerging from these studies, they recommended that intervention programmes aimed at strengthening medication adherence in the elderly hypertension patients should incorporate designs that address perception and beliefs about illness and the value offered bymedication in the treatment of hypertension. Furthermore, patients' beliefs about hypertension and its treatment, low health literacy, poor medication adherence among other factors have also been confirmed as important patient-related barriers to the control of blood pressure (Ogedegbe, 2008).

A number of health behaviour theories have accommodatedmany factors that influence decision-making into their constructs to explain how these behavioural antecedents are linked to decision-making and behavioural outcomes. Examples of such theories include the health belief model (Rosenstock, 1974), theory of reasoned action/planned behaviour (Fishbein and Ajzen, 1975), social cognitive theory (Bandura, 1977; Bandura, 2004)and the Predisposing, Reinforcing, Enabling Constructs in Educational/Environmental Diagnosis and Evaluation (PRECEDE) meta-model of Green and Kreuter, (2005) which provide an ecological perspective that contextualize all behaviour theories within its construct in a programme planning framework for intervention. The strongest evidence for the validity of these theories lies in hundreds of studies that have applied these theories to produce results consistent with their tenets.

Health Belief Model (HBM) has been widely applied in studies to explain preventive health behaviour by examining the extent to which an individual perceives a problem as having serious consequences and a high probability of occurrence. The behaviour exhibited is determined by whether the individual (a) believes that he/she is susceptible to a particular health problem, (b) regards this problem as serious, (c) is convinced that treatment or prevention activities are effective and (d) at the same time inexpensive, and (e) receives a cue to take health promoting action. In other words, health behaviour decisions are made through computational analysis of susceptibility to disease, disease severity, cost/benefit of treatment as defined by HBM construct.

It should be borne in mind that acceptance of personal susceptibility to a condition varies from person to person, so also is the individual's perception of the seriousness vary. This perception must be viewed in the context of the knowledge of the condition that the individual has and how significantly his educational attainment, culturally set values and beliefs impinge on this knowledge. These modifying factors also awaken or subdue threat of the likelihood of serious consequences as a result of inactivity. Furthermore, the modifying factors enable the individual to evaluate the outcome expected in the perspective of any constraint; where the benefit clearly outweighs the constraint, the individual is motivated to take the action recommended. Finally, the individual must also be able to recognize certain important cues as reminders that prompt him or her to take necessary action to reduce the threat that is present. However, if the individual did not believe himself or herself particularly susceptible, a very strong cue to action would be required to motivate behaviour. Conversely, a high level of perceived personal susceptibility and seriousness would require only minor stimuli to trigger the recommended behaviour.

HBM research has been used to explore a variety of health behaviours in diverse populations. Researchers have applied the model to studies that attempt to explain and predict a variety of health behaviour response (Janz and Becker, 1984). With the advent of HIV and AIDS, the model has been used to gain a better understanding of sexual risk behaviours (Rosenstock, Strecher, & Becker, 1994; Montgomery, Joseph, and Becker, 1989) and condom-use behaviour (Hingson, Strunin, Berlin, and Herren, 1990; Ford and Norris, 1995). Its application in AIDS risk reduction research among intravenous Drug Users (IDUs) has shown

that HBM variables are conceptually linked to how people who exhibit high-risk behaviours perceived HIV/AIDS disease (Hingson,Strunin, Berlin, and Herren, 1990; McCusker, Stoddard, Zapka, et al., 1992).

Furthermore, several studies have suggested the predictive validity of the model in predicting compliance to condom use (Ford & Norris, 1995) and HIV needle risk-practices among IDU.Therefore, any intervention guided by HBM construct, have to address health literacy and beliefs through cognitive process. HBM may be applied in conceptualizing health literacy and health belief in hypertension treatment within its constructs. Perceived threat in HBM is influenced by a variety of modifying factors and is determined by knowledge of the nature of the disease and prevention protocol, beliefs and attitudinal dispositions of the individual toward the disease and prevention. Further, the levels of the individual's perception of susceptibility and its seriousness and their inter-relationship with the modifying factors is influenced by recognition of appropriate cues such as symptoms or reminders.

Social cognitive theory (SCT) elaborated by Bandura, (2004) explains the triad relationship between the environment, the individual who is engaging in a particular behaviour, and the behaviour displayed. The outcome of such behaviour change is mediated through cognitive processes which involve thinking, reasoning, perceiving and believing, and that cognition about behaviour is altered most easily through actual performance or observed performance of the behaviour of interest. In other words, people change and maintain their behaviour depending on their expectations about the outcomes that will result from engaging in the behaviour change and expectations about the individual's ability to engage in or execute the behaviour. The SCT defines modifying factors of self-efficacy which expresses beliefs regarding one's ability to successfully carry out a course of action or perform a behaviour which is linked with actually having the skills necessary for performance of the desired behaviour; and outcome expectancy which reflects the beliefs that performance of such behaviour will have desired effects or consequences. This is an important factor shaping behaviour.

Bandura argues that perceived self-efficacy influences all aspects of behaviour including acquisition of new behaviour and inhibition of existing behaviour. This was further confirmed by Strecher, Devellis, Becker, and Rosenstock (1986) in an attempt to evaluate the role of self-efficacy in achieving health behaviour change, observed that when certain skills have been acquired through personal experiences, observational learning and verbal persuasions (cognitive processes), and are successfully performed, this further enhances self-efficacy. They concluded by ascribing a consistently positive relationship between self-efficacy and health behaviour change and maintenance (Strecher, et al., 1986). It is important to recognize the role of psycho-behavioural cognitive processes in health behaviour change.

2.5.3 The role of human behaviour in the ecology of health and disease and global disease burden.

Behaviour maybe viewed as actions, inactions and reactions performed by an individual evoked or provoked by underlying psychological circumstances. All behaviours are health-related. Indeed, the fact that cultural behaviours have been identified to play very critical role in disease transmission (WHO, 1988) and can hinder control programmes is an important subject for special consideration in health promotion. The disease ecology focuses on the interaction between two organisms: the disease-causing pathogens and the host within the context of the environment. It is important therefore to note that diseases are most often viewed as serious threat to human health and humans are, invariably responsible for exposure and burden of the disease within the community. It has been suggested that health and disease are measures reflecting the effectiveness with which human groups, combining cultural and biological resources are able to adapt to their environment. Why it is important to consider the role human behaviour play in the ecology of health and disease? The fact that diseases cause death makes interventions and empirical studies of the dynamics of disease etiology and behavioural antecedents so important.

Humans may unwittingly and inadvertently act in a way that increases the likelihood of disease by exposing themselves or others to risk factors of both the exogenous and endogenous variety. In many cases, this enhanced exposure potential occurs through disruption (human activity) of existing ecological relationships among the host, the agent(s) of disease, and the environment. In this way, human behaviour may be said to be a risk factor

for disease in that human activity may be a necessary component in the chain of events leading to a disease outcome. No doubt, human behavioural factors play significant role in every category of disease causation, although their role is sometimes subtle or indirect.

Health behaviours can be conceptualized as health-enhancing or health-depleting. There can be no ultimate control of any disease or health problem whose etiology is well defined without addressing the associated behavioural patterns involved. This is the basic issue involved in the failure to reduce morbidity and mortality rates by exclusively applying the biomedical or clinical approach. In other to understand behaviour, there is need to examine carefully the answers that may be offered to the question "why do people behave the way they do?" Again, we come to a question that has complex answers. However, beneath the complexity of answers is the issue of choice. Behaviour constitutes an important consideration in health because the way we act affects our health; for example, consumption of diet high in calorie with sedentary lifestyle or salt exposes individuals to the risk of obesity and hypertension.Kasland Cobb (1966a and 1966b) proposed health-related behaviour typology and suggested preventive health-behaviour, illness behaviour, sick-role behaviour, at-risk behaviour as elements of health behaviour typology including other health-seeking behaviours such as family planning and attending antenatal clinic which is characterized by compliance.

According to Kasl and Cobb (1966a and 1966b), preventive health behaviour represents any activity undertaken by individuals who believe they are healthy and for the purpose of preventing any illness at the asymptomatic stage in order to attain an even greater level of health. These include good nutrition, immunization, regular exercise, abstinence orientation toward pre-marital sex, use of condoms, and use of seat belt among others (Glanz, Rimer and Lewis, 2002). Most health promotion activities are strategically designed at this level of primary prevention when the disease process is asymptomatic and has not been established. The framework for any intervention programmes at this level may be organized around health promotion and specific protection which corresponds to actions taken prior to the onset of disease symptoms. Primary prevention is a desirable goal and cheaper at addressing community and individuals health needs. Health promotion consists of non-medical

intervention such as lifestyle adjustment such as good nutrition, clean environment, provision of social amenities and equity.

Illness behaviour is any activity undertaken by an individual who perceives him-self to be ill and set out to define the state of this illnesss and to discover a suitable remedy. This may be regarded as health-seeking and may include visit to the hospital for check-up and diagnosis.Sick-role behaviour describes activity undertaken by individuals who thinkthey are ill for the purpose of getting well,and proceed to receive treatment from appropriate therapists. This defines secondary level of prevention and offers appropriate intervention for at-risk individualswho need to be protected from greater risk of developing a specific health problem as a result of not complying with recommended treatment. Hypertension treatment is an important secondary prevention intervention to control the condition. Compliance is an important behaviour that can prevent the individual who is hypertensive or diabetic from stroke or deteriorating health conditions.

Compliance difficulty is the major problem in most chronic illness. However, behaviour is usually learned and therefore modification of behaviour towards one that enhances health requires strategic planning as is defined by health education. In health education the emphasis is to encourage disease prevention with appropriate mode of interventions.

2.6 Studiesinvolving Medication Adherence in Hypertensive Disease.

Hypertension is often the precursor to cardiovascular disease complications with end-organ damage in poorly managed condition. Adherence to prescribed medications and appointment-keeping are critical in the control of hypertension and reduction of associated complications. However, poor treatment adherence is common among hypertensive patients in clinical settings. In fact, this problem is not peculiar to CVD but cuts across all chronic diseases based on evidence provided by systematic reviews and meta-analysis of studies (DiMatteo, Giordani, Lepper and Croghan, 2002; DiMatteo, 2004; Osterberg and Blaschke, 2005; Chong, Aslani and Chen, 2011;Kronish, et al. 2011). Similarly, hypertension and persistent use of prescribed medications constitute a major problem reported in diverse communities world-wide, including China (Xu, Ju, Wang, Wang Liu, Zhao, Wang, Wang and Wang 2013),

Malaysia (Ahmad, Ramli, Islahudin and Paraidathathu, 2013) and Greece (Tsiantou, Pantzou, Pavi, Koulierakis and Kyriopoulos, 2010) where studies on the use of antihypertensive agents and anti-diabetic medications have been found to be unsatisfactory.

This section will review two major categories of studies conducted with regards to medication adherence involving treatment of hypertension. Categories to be reviewed will focus on cross-sectional studies that determine factors associated with non-adherence and interventionprogrammes that seek to improve medication adherence. The reviewwill explore types of studies identifying methodological implications, effectiveness and outcomes reported from various studies.

Research on adherence to treatment has grown in recent times, especially studies that provide insight into factors associated with medication adherence in hypertension treatment. Large volumes of data have emerged from cross-sectional studies and systematic reviews assessing the extent to which various personal-level and environmental-level factors are associated with medication adherence in a number of chronic illnesses. These studies all seem to consistently identify complexity of medication regimenwith respect to number and type of medications and frequency of daily dosages(Claxton, Cramer, and Pierce, 2001;Kronish et al., 2011), low health literacy and inadequate knowledge (Familoni, Ogun andAina, 2004; Katibi, Olarinoye, and Kuranga, 2010), medication side effects including persistent coughing especially with ACEI (Laufs, Rettig-Ewen and Bohm, 2011) and forgetfulness as critical factors associated with challenges impeding successful medication adherence among patients with chronic illnesses.

Adherence seem to be high, as suggested by DiMatteo (2004), in a literature that reviewed published empirical studies from 1948 to 1998 on medication adherence, when patients clearly understand the purpose for which the medication have been prescribed, have no cognitive impairment and have resources to sustain medications such as social support and financial support. Importantly, these factors are also those that are amenable to interventions.Most studies have expressed concern regarding the challenging methodological issues involved inmeasuring medication adherence and have come up with various

instruments in the form of self-report questionnaires which have been used and found to have fairly high reliability and validityindices (Krousal-Wood, Thomas, Muntner, and Morisky,2004;Krousel-wood, Muntner, Jannu, Desalvo and Re, 2005). Most cross-sectional observational studies have adopted self-reported method and needed to validate their measurements by a second method such as pill-count or the electronic event monitoring system(Morisky et al., 1986; Oladepo, et al., 1989; Kim, et al., 2000).

The primary focus of all intervention studies is on how medication adherence in chronic illnesses can be improved and sustained. This is because medication adherence is the single most important and serious challenge in the successful control of chronic diseases whether it is hypertensive cardiovascular, diabetes mellitus, psychiatric disorders or HIV/AIDS among others. Studies have demonstrated that improving medication adherence in these conditions would greatly reduce poor clinical outcomes. There is evidence from systematic reviews of study trials covering a wide range of diseasesthat the numbers of interventions addressing medication challenges in hypertension treatment are few compared with other diseases. This is particularly important for a number of reasons; prevalence of hypertension is still high for a disease that is preventable and clinical outcomes are poor for a disease that has effective treatment modalities.

Poor clinical outcome in hypertension treatment translates to complications resulting to other CVD with mortalities that compound overall outcome. Furthermore, evidence-based health education interventions that can optimize patients' adherence to medication among blacks who are especially at highest risk are few (Ogedegbe, et al., 2014), particularly in Nigeria considering the small number of publication in peer-reviewed publications on the topic. A Pubmed search for studies addressing medication adherence, particularly hypertension therapy in Nigeria, yielded ten studies (Olubodun et al. 1990; Erhun, et al. 2005; Erah, et al. 2008;Gureje, et al. 2008; Ayodele and Oladipo, 2012; Adedapo, et al. 2012; Adeyemo, et al. 2013; Suleiman, et al. 2013; Oged**e**gbe, et al., 2014; OkuboyejoandEyesan, 2014) out of seventy two articles, of which twenty seven were studies related to HIV and AIDS medication adherence issues while the remaining were studies related to other chronic illnesses.This limited number of publications in peer-reviewed journals suggests a paucity of

quality data on intervention studies to improve medication adherence with respect to hypertension treatment in Nigeria (Ikechukwu, Obinna, and Ogochukwu, 2010).

The paucity of data regarding intervention studies related to non-adherence among patients with hypertensionis an important cause for concern. Patients' failure to consistently use prescribed treatment, particularly, medications for both communicable and non-communicable diseases have been well studied and shown to be related to worsening of the diagnosed disease conditions with poor outcomes. Generally, numerous observational studies have been conducted to provide better understanding of the various factors that may be involved with the dynamics of adherence to treatment in chronic illnesses. DiMatteo et al (2002) using meta-analysis of studies related to medication adherence in various disease conditions showed that only findings from few published literatures were considered superior for critical appraisal. Sixty three studies out of eight hundred and fiftysuch studies conducted within the 30 year period (1968 to 1998) were assessed to determine the relationship between medication adherence and treatment outcomes. The outcome of the analysis of studies showed that adherence was linked to better disease outcomes and suggested adherence to be a valuable goal of intervention at the individual micro-level.

Generally, studies are classified based on methodological considerations and consist of observational cross-sectional studies, educational-cognitive and behavioural interventions. While observational cross-sectional studies seek to identify and explain causal relationships between factors involved and treatment adherence, educational/behavioural interventionsemphasizeknowledge-based design to convey information that can facilitate change in behaviour accompanying certain reinforcements such as reminders. A number of behavioural interventions such as telephone reminders to improve medication-taking behaviour, in related conditions such as hyperlipidaemia, have been applied but have had minimal improvement in adherence (Haynes, McKibbon and Kanani, 1996). Olubodun, et al., (1990) conducted a study among Nigerian hypertensive patients to evaluate medication adherence and factors militating against good compliance and discovered that lack of information about their condition was reported as the key factor and not economic constraint.

Interventions adopting educational approach are designed to address knowledge deficit related to specific disease process and improve the individual's understanding of how it puts the individual at risk of poor outcome. This is an important aspect of the educational process to eliminate ignorance, because patients usually have poor understanding of the disease, poor understanding of the benefits of the medication in the treatment, poor perceptions of the risks involved with deteriorating health conditions. The most important aspect in the treatment of chronic disease like hypertension is that the patient is required to take a number of drugs throughout the period of their life time. Again, the patient has poor understanding of the proper use of the prescribed medication, especially when the medication regimen is complicated. These are important barriers the educational intervention should strategically address. Educational interventions that are not strategically designed guided by sound behaviour theories may not be adequate to address all the psycho-cognitive characteristics of the individual, given the many factors contributing to poor adherence to medication (Hugtenburg, Timmers, Elders, Vervloet, and van Dijk,2013).

2.6.1 Educational Interventions

Adedapo et al (2012) conducted a prospective four months drug utilization and blood pressure control study with hypertensive patients (n=116) attending primary care. The intervention led by two physicians and six clinic nurses had two sessions of intensive health education and counselling sessions on clinic days, first in a group setting by the nurses and followed by an individual one-on-one counselling by the physicians. The participants were followed up at six months and one year respectively and data about medication for diagnosed condition, medication and salt consumption were assessed along with blood pressure measurements using standard mercury sphygmomanometer in a sitting position. Medication adherence was measured based on drug refills and appointment-keeping. Mean blood pressure over the follow-up period was computed and recorded for each patient using a less than 140/90 mmHg as indicative of controlled blood pressure. This intervention led to a positive result in adherence (72.2%) and clinical outcome of blood pressure control in 70.7% of the participants. The authors claimed that factors thought to have contributed significantly to blood pressure control included the intensive health education and counselling at group and individual levels and emphasized the value of health education and counselling and some

form of support. However, there was no control in the study.

Ogedegbe et al, (2014) in a recent study conducted among African-Americans to control hypertension,used cluster-randomized clinical trial in which thirty community health centers were randomly assigned to intervention group and control group. Patients in the intervention group received four modules of structured patient education focusing on causes, complications and treatment of hypertension, and adverse effects expected with medications. Furthermore, the intervention group received home blood pressure monitoring and monthly life-style counselling. On the other hand, patients and physicians assigned to control group received printed patient education materials and hypertension treatment guidelines, respectively. The study set as its primary outcome blood pressure control below 140/90 mmHg and secondary outcome as mean changes in both systolic and diastolic blood pressures at twelve months.

In this study, 36% of the participants were hypertensive and diabetic and 56% were obese. Findings reported from the study showed that blood pressure control was similar in both intervention and control groups but observed better control of blood pressure among participants (56%) without co-morbidity of obesity and diabetes mellitus compared with control (44.7%). The study concluded that a practice-based multicomponent intervention was no better than control in improving blood pressure among hypertensive blacks and recommended further research on developing more efficient and tailored behavioural modification strategies for hypertension control that will target patients in low-resource setting.

Erhun, et al. (2005) conducted a one year prospective randomized cohort study of outpatients attending health facility where free health services and medications were provided. The objective of the study was to determine whether additional involvement of a pharmacist-led support care would improve blood pressure outcome in middle-aged and elderly Nigerian hypertensive patients (n=51) managed on a combination of antihypertensive drugs including a diuretic and methyldopa. The Pharmacist-led intervention consisted of patient education and counseling with regards to prescribed medications, personalized goals of lifestyle

modification stressing weight loss with increased physical activities, providing information about the nature of hypertension and its complications, modifying dosages to minimize adverse effects and monitoring treatment outcomes. Results of the study showed a significant reduction in both systolic and diastolic blood pressure from 167.9±30.3 mmHg and 103±32.09 mmHg, respectively at baseline to 126±6.20 mmHg and 80.60±4.66 mmHg at the end of the sixth month. Correspondingly, medication adherence was significantly improved. The study concluded that pharmacist-managed hypertension clinics can improve blood pressure control and reduce treatment failure.

Schroeder, Fahey, Hollinghurst, and Peters (2005) conducted a nurse-led adherence support group to assist hypertensive male and female patients(n=245) in the intervention group (n = 128) talk about concerns with the diagnosis of hypertension and problems they might have with their medications. Two sessions were organized for the intervention with the first session lasting 20 minutes long, followed by a 10 minute reinforcement session that was held 2 months later. The control group (n = 117) received standard care for hypertension. Adherence was measured with MEMS pill bottle caps to calculate 'timing adherence', 'correct taking' adherence, and 'taking adherence'. Blood pressure measurements were carried out as a measure of clinical outcome. There were no statistically significant results for blood pressure or any measure of adherence, despite the large sample size.

2.6.2 Behavioural Interventions

Behavioural interventions to improve adherence to hypertension medication in Nigeria appear to be rear with more studies in the treatment of HIV and AIDS using mobile system technology (Okuboyejo and Eyesan, 2014). Friedman, Kazis, Jette, Smith, Stollerman, Torgerson and Carey (1996), tested a telephone-linked computer system (TLC) for monitoring and counselling hypertensive patients. Middle aged subjects (n=267) were randomly allocated to intervention group (TLC; n=133) and control (n=134) who received usual clinic care. Medication adherence was measured by pill-count at the participants' homes and a questionnaire was used to evaluate attitudes of participants towards the application of computer technology to health. The unadjusted results did not demonstrate significant improvement in adherence or clinical outcome in patients receiving TLC as

compared to those patients receiving usual care. However, when the data were adjusted for age, sex, and baseline adherence, the patients using TLC demonstrated a 17.7% improvement in medication adherence from baseline while those receiving usual care reported 11.7% improvement (p=0.03).

Furthermore, at baseline blood pressure resulted in a significant improvement in diastolic blood pressure in the TLC group but no difference between the groups for systolic blood pressure. Sub-group analysis showed, in people who were non-adherent at baseline (n = 26), that those using TLC had significantly greater improvement in medication adherence and diastolic blood pressure than those receiving usual care. In people who were adherent at baseline (n = 241), TLC showed no significant difference in adherence between the two groups over the course of the trial.

Evidence from these studies suggest that results are varied, though studies reviewed are few but they all demonstrate the value of educational and behavioural interventions to improve medication adherence and blood pressure outcomes in hypertension treatment. Furthermore, systematic reviews of studies recommend strategically designed theory-based studies that can be implemented to effectively influence adherence and clinical outcome measures. Some of the studies in this review had methodological problems such as not having control group to compare with and the design of the educational intervention not guided by specific behaviour theories. Presently, efforts to develop theory-based innovative educational and behavioural interventions in Nigeria to improve patient adherence to medication and control blood pressure continues to represent a worthwhile strategy in secondary prevention intervention.

2.7 Conceptual Framework

Health education has been defined as any combination of planned learning activities that enable individuals, groups and communities to voluntarily behave in ways that promote health prevent diseases and facilitate recovery from illness (Green & Kreuter, 1991). The dynamics of change in an individual, group or community can be as complex and unpredictable as the human character and culture if not based on scientific principles. A number of health education theories and models have been developed to enable the achievement of better understanding of health behaviour change. According to Van Ryn, and

Heaney(1992), theoriescan be regarded as systematically organized knowledge applicable in a relatively wide variety of circumstances that can be developed to analyse, predict or otherwise explain the nature of behaviour of a specified set of phenomena. On the other hand, models have been viewed in many ways, basically considered as a visual construct of proposed causal linkages among a set of concepts believed to be related to a particular public health problem (Earp and Ennett, 1991).

Mcleroy, Bibeau, Steckler, and Glanz, (1987) emphasizing the importance of models within the context of an ecological perspective, stated that behaviour results from the interaction between the individual and the environmental determinants, such as biological, psychological, socio-cultural and structural spheres of education, which facilitates it. This position therefore means that in planning research and intervention programmes in health promotion and education, it is vitally important to consider not only the individual and his micro-level factors, but influential environmental and social forces that are involved in generating or facilitating the individual's behaviour. Most models accommodate a combination of certain aspects of theories within its construct which enables clearer understanding and diagnosis of health behaviours.

In this study the PRECEDE meta-model would be adopted to provide a clear explanation of how the important variables are linked so that they would be tailored to the needs and the hypotheses proposed and concepts incorporated in developing the instrument so that it would capture the phenomena being studied.

2.7.1 PRECEDE Framework

The acronym PRECEDE stands for "Predisposing, Reinforcing and Enabling, Construct in Educational/Environmental Diagnosis and Evaluation" was developed by Green, Kreuter, Deeds and Patridge, (1980) and later revised to include the rapidly growing knowledge in genetic factor in order to make it ecological in perspective,is a programme planning model (Green and Kreuter, 2005). The framework is considered to be a meta-model because it not only accommodates key concepts from other models such as Health Belief Model (Rosenstock, 1974) and other social-behavioural theories, which attempt to explain causal relationships between antecedent factors in a complex web of causal relationships and their

outcomes, it also shows how interventions may affect determinant factors and their outcomes. Since this study is an intervention to improve medication-taking behaviour and appointment-keeping in hypertension therapy, applying this model will be very useful in determining key antecedents factors that require manipulation through appropriate health education intervention strategies.

The study will consider the educational diagnostic components of the framework to conceptualize the behavioural problems involved with medication-taking and appointment-keeping into predisposing, enabling and reinforcing factors. These three classes of factors address the domains of cognition related to patients' understanding of the specifics of the therapy, cost-benefit factors and skills required to perform lifestyle adjustments necessary. Further, predisposing factors would also enable opportunity to address affective conditions such as perception of seriousness of the health condition and threat to life if treatment is not consistently adhered to. Enabling factors provide the second set of conditions which makes it possible for individuals to act on the knowledge they have about their condition and the possible outcome of non-adherence. These have been identified as resources such as finance to be able to purchase medications prescribed, distance and skills. The influence of the behaviour and attitudes of significant others especially family members, comprise the reinforcing factors. In this wise, the assistance social support and care-giver-patient interaction can provide would be significant to urge individuals to take specific actions or behaviours required to improve medication adherence.

Predisposing,Reinforcing, Enabling, Construct in Educational/EnvironmentalDiagnosisandEvaluation-PRECEDE

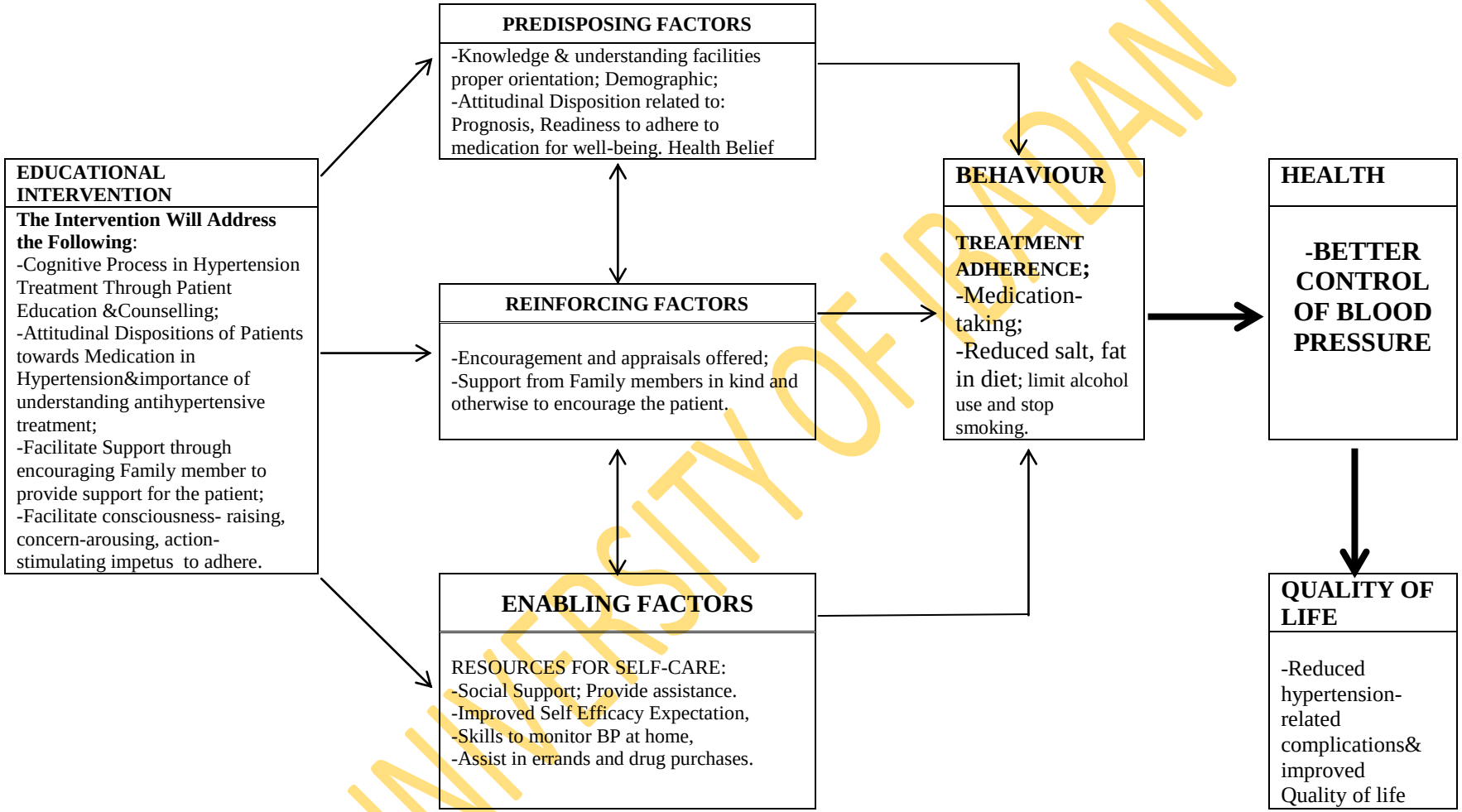


*Figure 2.2 Application of **PRECEDE** to educational intervention to improve nursing skills required to enhance palliative care that will enhance quality of life of cancer patients. Source: Adapted from Green, Kreuter, Deeds &Patridge, (1980)*

2.7.2 The Components of the PRECEDE Model and the Interventions

The health promotion interventions designed consists of counselling with structured patient education and social support provided by a family member. The interventions are expected to produce the consciousness-raising, concern-arousing, action-stimulating impetus for patient involvement and commitment that is essential to improving medication adherence and appointment-keeping. The intervention draws its theoretical grounding from the component of the PRECEDE model that has just been described and consist of the predisposing factor which conceptually provides the intervention with consciousness-raising influence through knowledge about hypertension, its treatment requirements modalities, rationale for treatment, expected outcomes, and benefits of regular medication consumption and appointment–keeping.

Furthermore, within predisposing factor of the PRECEDE model, the intervention is conceptually modelled to produce concern-arousing influence through reinforcing self-efficacy in taking medications and clarifying perceptions of seriousness of poorly managed hypertension. The approach is intended to optimize patients' predispositions and cognitive orientation that would enhance certain skills that should facilitate adherence to antihypertensive therapy. A good level of knowledge about hypertension and its treatment goals can improve patients' compliance to treatment so achieve better therapeutic result; however, this may not be enough.

Social support is very essential in chronic illnesses in which some level of assistance is provided the patient in order to cope with the conditions associated with medication issues, dietary recommendations required to enhance outcomes, smoking cessation, limiting alcohol intake and exercise. For example, Ho,Bryson, and Rumsfeld, (2009), in their review emphasized that multimodal interventions have recorded better success than interventions involving single strategies attributing this success to the multi-factorial nature of non-adherence. Hence, the aspects of the model that accommodate the reinforcing and enabling factors conceptually provide the intervention with the component that emphasizes social support.

The role of social network and social support in facilitating medication adherence in chronic illnesses is beginning to be well recognized and widely accepted. Much of what has emerged from the pioneering work of Barnes (1954) who first presented the concept of social network and described patterns of social relationships is the work of John Cassel (1976) who posited that social support appears to provide important psychosocial resource that reduces individual's vulnerability to the adverse effects of stress on health (Israel, 1982; Heaney, 1991). Social network refers to the web of social relationships that surround people within and outside the family and is characterized by structure, processes and function (House,Umberon, and Landis, 1988). Social network maybe described as having structural characteristics when it involve social relationships established within the context of formal organizational or institutional roles; when it identifies specific geographical locations in proximity with the focal person in the relationship; and when there is recognition of who belongs to the network and facilitate interaction with others in the network; when resources and support are given and received in the relationship.

Social support exists within social network and constitutes an important function of social network (Heaney and Israel, 2008) and involves the provision of emotional support in terms of empathy, love, trust and caring. Other functional content of social relationships include support that directly assist an individual in need by providing tangible assistance or services. Social support may also involve providing advice, suggestion and information the individual needs to address a specific issue or health problem. Social support is always intended to be helpful. There is sufficient evidence that beneficial effects on health may be derived from supportive social network of the family. Similarly, natural helpers may provide effective social support for families having individuals with health challenges (Berkman, Glass, Brissette and Seeman, 2000). Effectiveness of support provided may depend on who is giving it (Agneessens, Waege, and Lievens, 2006). If the social support has the characteristics of natural helper and the assistance is provided over a long time, tend to be more effective (Mcleroy, Gottlieb and Heaney, 2001).

In this intervention study, it is conceptualized that social support as provided by a family member having the qualities described above providing assistance to the patient that is most

likely to enhance self-efficacy expectation in medication-taking behaviour, subdue perceived threat and intensify cues to take medication through reminders. In addition, information that would be beneficial to the patient would be available through informational support. In other words, social support may be considered as a modifying factor in the domain of reinforcing and enabling factors. In the intervention, a family member would be trained to provide the support.

The above conceptual issues underscore the rationale for designing the study to focus on two main strategies which includes counselling that will motivate, enhance understanding about the disease, improve perception of seriousness of the disease, and social support to enhance medication adherence and appointment-keeping.

CHAPTER THREE

METHODOLOGY

This chapter describes the methodological approach adopted for conducting the study. It presents a description of the study design, sampling techniques adopted, the design of the instrument and intervention strategies implemented with a description of the evaluation techniques.

3.1 Study Design

This study utilized a quasi-experimental design with random allocation of three tertiary institutions into Intervention One (I_1) group {OlabisiOnabanjo University Teaching Hospital (OOUTH)}, Intervention (I_2) group {Lagos University Teaching Hospital (LUTH)} and control group (Ct) {University College Hospital (UCH)}.The interventionsweretailored to cognitive-behavioural Patient Education and Counselling (PEC) andPatient Education and Counselling with social support (PECSS) offered by a family member while the control condition was only the regular clinic activities. Further, qualitative methods were used to obtain pertinent information that was used to contextualize the design and implementation of the intervention. At twelve months following outcome evaluation, ten key informant interviews (KII) were conducted with four patients, two Social support family members, two clinic nurses and two Senior Nurse Administrators of the cadre of chief matrons selected from the two intervention health facilities, to elicit perspectives and opinions regarding the interventions and patients' adherence to medication and appointment keeping.

3.2 Description of Study Area

The study was conducted in the hypertension-outpatient departments of three tertiary health facilities in Lagos University Teaching Hospital, Lagos (LUTH), Olabisi Onabanjo Teaching Hospital(OOUTH) and the control group was at the University College Hospital (UCH) Ibadan. All of the Teaching Hospitals are located in the metropolitan cities of the tropical rain forest ofsouthwestern Nigeria, while the second institution is sited in a rapidly growing

urban setting at Sagamu. All the health facilities were established for providing referral health care services, training of medical and health personnel and research across the nation.

3.3 Population of Interest

The population in the study was patients diagnosed with essential hypertension attending hypertension clinics in the three teaching hospitals selected at Sagamu, Lagos, and Ibadan respectively. Patients wereidentified from a register of attendees based on inclusion criteria of having arterial hypertension diagnosed with blood pressure ≥ 140/90 mmHg (Nuesch, Schroeder, Dieterle, Martina, Battegay, 2001), approached and sought their willingness and consent to participate in the study. Those who accepted were enrolled into the study following full explanations of the intervention. Individuals with secondary hypertension complicated by co-morbidity with other chronic illnesses such as diabetes, stroke and impaired cognitive ability were excluded.

3.4 Sample size and Sampling protocol

The sample size derived for the study was computed using the sample size formula adopted from a similar study conducted by Oladepo et al (1989) and considered 95% level of significance and a 90% power (Jekel Elmore, and Katz, 1996).

$$N = [K] x \frac{(Z\alpha + Z\beta)^2 \times 2 \times p\,(1 - p)}{(d)^2}$$

Where N = Sample size **and K = 1/(1-F)**accounted for buffering attrition that may occur,

Zα= alpha corresponding to p = 0.05, representing confidence desired of (1.96) type I error for two-tailed test,

$\mathbf{Z_\beta}$ = 10% beta error corresponding to 90% power desired for one-tailed test or 1.28 accounting for type II error.

P_1 is the expected adherence proportion rate of the control group, which is 50%, and q_1 is

(100-P_1), on the other hand, P_2 is the anticipated medication-adherencerate of the intervention group, minimum of 80% with a difference of 30% between control and intervention.The sample size formula for comparison of 2 independent group proportions was used to derive 50 participants for study groups and 10% was added to account for attrition to give a final sample size a minimum of 60 patients assigned to each group in order to detect an expected difference in medication-adherence and appointment-keeping of at least 30% for outcome evaluation from baseline. Therefore based on the computation, a total of 180 participants were enrolled for the study. Three health facilities for the study were balloted out of six within the region.Participants attending the hypertension clinics from balloted health facilities whose names were in the clinic register were identified and approached. Those who indicated willingness to participate and gave their consent were enrolled into the study following full explanations of the intervention. Individuals with secondary hypertension complicated by co-morbidity with other chronic illnesses such as diabetes, stroke and impaired cognitive ability were excluded.

3.5 Variables and Hypotheses

The variables measured in this study included certain socio-demographic characteristics relevant to this study such as age of the participants, their occupation, educational attainment, and their hypertension status in terms of blood pressure and pulse rates. Other measures included Predisposing Factors such as knowledge about hypertension as a disease, treatment requirements, outcome expected and perception sub-variables which includes perceived seriousness of the disease, perceived susceptibility to complications of hypertension arising from poor medication regularity, perceived self-efficacy to take prescribed treatment in hypertension and perceived benefits of taking medications for the treatment of hypertension. Other variables included Reinforcing and Enabling factors through which social support was operationalized. The outcome variables included appointment-keeping, Self-reported Medication Adherence, Pill-Count and Blood pressure measurements.

3.5.1 Test of Significance and Null Hypotheses

In order to determine whether the intervention has impacted on the participants, the following six null hypotheses were tested against the alternative hypotheses;

1. There is no significant difference between self-reported medication-adherence mean scores of participants in intervention one conditionsand the mean scores for participants in intervention two conditions at 13th weeks follow-up.
2. There is no significant difference between mean pill-count recorded for participants in intervention one conditionsand the mean count recorded for participants in intervention two conditions at 13th weeks follow-up.
3. There is no significant difference between mean scores of appointment-keeping recorded for participants in intervention one conditionsand the mean scores recorded for participants in intervention two conditions at 13th weeks follow-up.
4. There is no significant difference between mean systolic blood pressurerecorded for participants in intervention one conditionand the mean systolic pressure recorded for participants in intervention two conditions at 13th weeks follow-up.
5. There is no significant difference between mean diastolic blood pressurerecorded for participants in intervention one conditionand the mean diastolic pressure recorded for participants in intervention two conditions at 13th weeks follow-up.
6. There is no significant difference in behavioural and clinical outcomes of medication adherence and blood pressure between the two interventions in the study at 13th week follow up.

3.6 Instrument for Data Collection

Four instruments were developed for this study which rated pre-, post-intervention measures and outcome evaluation of the intervention. The first was a 73-Item questionnaire (Cronbach alpha was 0.83). The second, a medication-consumption inventory was used to record actual pills consumed by participants within a designated time period. The third instrument for data collection was a Focus Group guide that was used to determine participant's challenges about medication-adherence and the best way to interphase the intervention with the clinic setting without disrupting the normal set-up of consultations during clinic visits. Findings from these Focus Group Discussions were used to contextualize the intervention within the clinic setup.The fourth instrument, an interview guide, was developed for selected key informants (KI) to explore their perspectives of the interventions with respect to their condition, medication adherence and outcome of blood pressure control at 12 months after theoutcome evaluation. (See Appendix 1, 2, 3 and 4)

3.6.1Measures

Measures for the study were conceptually derived from the PRECEDE model (Green and Kreuter, 2005) and Hill-Born compliance scale for medication-adherence and appointment-keeping behaviours (Kim, Hill, Born and Levine, 2000). The conceptual framework provided selection of measures including the outcome (Self-Reported Medication Adherence, Pill-Count, and Blood Pressure measurement), independent variables (Predisposing, Reinforcing and Enabling factors) and demographic variables. These variables were incorporated into the patient counselling and social support interventions and conceptualized in the instruments for measurements of impact and outcome as set in the objectives for the study.

Outcome Variables

*Adherence:*Self-Reported Medication Adherence (SRMA), Pill-Count (PC), Appointment-Keeping (AK) and Blood Pressure (BP) measurement constituted the outcome variables in this study. SRMA were operationalized in the section of the questionnaire (see appendix 1) that asked questions about "frequency of forgetting to take prescribed medications", "frequency of deciding not to take medications for the treatment of hypertension", "too busy to take medication" and "frequency of getting refill prescription when medications runs out" measured on a 15-point four response Likert-type scales (0 = *All of the time*, 1 = *Most of the time*, 2 = *some of the time*, 3 = *none of the time*). Similarly, three questionnaire items were used to measure AK, the second outcome variable for adherence, on a 9-point four response Likert-type scale (0 = *all of the time*, 1 = *most of the time*, 2 = *some of the time*, 3 = *none of the time*): "frequency of forgetting to go for an appointment", "too busy to meet scheduled appointment with healthcare giver", with reversed coding on "frequency of meeting scheduled appointment". Blood pressure was measured using a mercury sphygmomanometer calibrated in mm of mercury (Hg). Pill-Count was performed according to the method adopted in a study conducted by Oladepo et al (1989); by counting pills that were not consumed and subtracting this from total pills prescribed to derive pills consumed during a designated period of 14 days.

Independent Variables

Predisposing Factors: Consisted of knowledge variables, perception sub-variables and attitudinal variable which were operationalized in the questionnaire in sections B through to E. Section B of the questionnaire contained items that tested participants' knowledge of symptoms related to hypertension, knowledge of the natural history and progression of hypertension, whether the disease can be cured or not, identifications of organs that are affected when condition becomes complicated, and the dietary items that should be avoided in hypertension measured on a multiple choice one correct-response 23-point scale. Perceived Seriousness of hypertension was assessed by seven statements using a 21-point Likert-type response scale (0 = *strongly agree,* 1= *agree*, 2 = *disagree*, 3 = *strongly disagree*). The seven items of perception of seriousness were aggregated to create a sub-scale of measurement on a 21-point scale. Perceived susceptibility sub-scale used three items on a 4-response options Likert-type scale with responses (0 = *strongly agree,* 1= *agree*, 2 = *disagree*, 3 = *strongly disagree*) coded so that low value on the perception domain represented little or no perceived susceptibility. Perceived susceptibility items were aggregated to create a sub-scale of measurement on a 9-point scale.

Similarly, perception of benefit of taking recommended medication sub-scale, and perception of self-efficacy sub-scale were measured using 4-response options Likert-type scale. The six items of perception of benefit and the five items of perception of self-efficacy were aggregated to create an 18-point sub-scale and 15-point sub-scale respectively. On the scale of measure, low value represent little or no expressed confidence to carry out described actions related to treatment in hypertension. Scores were distributed by quartiles.Scores above the third quartile were considered excellent and scores below the second quartile were considered poor, while scores between the second and third quartiles were considered above average for this study.

Attitudinal disposition sub-scale was measured on a 4-response options Likert-type scale with response categories: 0 = *Strongly Disagree*, 1 = *Disagree*, 2 = *Agree* and 3 = *Strongly Agree*. The eleven attitudinal disposition items where aggregated to create a scale of measurement on a 33-point scale, where low value indicated that the respondent was not will to adhere to

medication and had little or no apprehension for the consequence of the outcome of poorly managed hypertension.

Reinforcing Factors: The role played by a family member in meeting social support need of the respondents in terms of emotional and appraisal support and reminders to take medication was measured using the 4-response options likert-type response categories (0 = *Strongly Disagree*, 1 = *Disagree*, 2 = *Agree* and 3 = *Strongly Agree)*, where low value represents little or no support. Aggregating the five items in the sub-scale created a 15-point scale of measurement on which the respondents were able to report the extent to which they received support from family at least a member.

Enabling Factors: The role played by a family member in meeting social support need of the respondents in terms of providing some tangible service to support the patient in coping with hypertension was measured using the 4-response optionsLikert-type response categories (0 = *Strongly Disagree*, 1 = *Disagree*, 2 = *Agree* and 3 = *Strongly Agree)*, where low value represents little or no support. Aggregating the five items in the sub-scale created a 15-point scale of measurement on which the respondents were able to report the extent to which they received such support from family at least a member.

3.7 Reliability and Validity of Instrument

The validity and reliability of the questionnaire for the study was ensured in a number of ways. The validity of the contents of the questionnaire was strengthened through incorporating items and variables identified from review of literature pertinent to medication-taking and appointment-keeping related to hypertension. Further, the development of the questionnaire items was structured based on the objectives identified for the study and guided by the conceptual framework of the PRECEDE model (Green and Kreuter, 2005) and social support(Heaney and Israel, 2008). Furthermore, review of the instrument by my supervisor and senior colleagues was extensively undertaken to provide face validity. The reliability of the questionnaire was assured through test- retest with equivalent groups (N = 10) away from intervention area. Content and item analysis was conducted with Cronbach alpha of 0.83 computed.

3.8 Ethical Issues

Before embarking on the study, a letter of introduction was secured from the department of Health Promotion and Education, University of Ibadan and an application for ethical approval to carry out the study was made to the Health Research Ethics Committee of the Olabisi Onabanjo University Teaching Hospital and the research protocol was approved. (See Appendix 5, 6and 7) All study participants gave informed consent prior to data collection and intervention. Each participant that indicated willingness to participate was counselled regarding confidentiality and the nature of the intervention and consent was secured. (See Appendix 8)

3.9 Data Collection Procedures

Data collection was carried out using the instruments designed for the study. This was done at three points during the study; the pre-intervention or base-line, immediate post-intervention at the close of the four weeks intervention to measure changes that may have occurred for predisposing factors and at 13thweek follow-up. Furthermore, ten key-informant in-depth interviews consisting four patients, two Family support, two clinic nurses and two Senior Nurse Administrators of the cadre of chief matrons from the two intervention health facilities were conducted 12 months after follow up evaluation, to elicit opinions on the interventions and patients' adherence to medication and appointment keeping. Six research assistants were trained to collect data during the study period.

3.9.1 Baseline Data Collection

The baseline data in this study served to define the beginning and a reference point for the intervention and to provide rationale for comparing all groups atpost intervention for all variables influenced by the interventions and possibly basisfor detecting any changes attributable to the intervention. Baseline data were collected from all participants from the three health facilities involved in the study using the questionnaire designed.

3.9.2 Immediate Post-Intervention Data Collection

Immediate post-intervention measures were collected from all participants involved in the study at the three study locations using the questionnaire designed for the study at the end of

the Four–Week intervention. Data collected at this point served as reference to measure the impact of the intervention.

3.9.3 Outcome Evaluation

At the 13th week follow-up, a third data collection was carried out to measure the primary outcome of the intervention particularly with respect to behavioural outcomes such as self-reported medication adherence, pill count, appointment-keeping and secondary outcome of systolic blood pressure reduction. In addition to the use of questionnaire similar to that used for post-intervention measurement, Pill-count of leftover pills was undertaken for each participant in the intervention and control groups at baseline and follow-up and documented in the medication-consumption inventory record (MCIR). The number of pills participants received from pharmacy, based on prescription, were noted along with types of drugs and any left-over medications were requested to be returned at the next fortnightly visits during the pre-intervention phase and follow-up period. The documentations of returned pills enabled computation of consumed pills and adherence rate by subtracting leftover pills from total pills prescribed to give number of pills consumed, multiplied by 100 to give adherence rate.

3.9.4 In-Depth Key Informant Interviews

Ten key-informant interviews consisting four patients, two Social support family members, two clinic nurses and two Senior Nurse Administrators of the cadre of chief matrons from the two intervention health facilities were conducted 12 months after follow up evaluation, to elicit opinions regarding the interventions and patients' adherence experiences to medication and appointment keeping. The validated semi-structured key informant interview guide was used to explore reasons for attending the clinic at the health facility, Key Informants' perspectives of the health education intervention conducted, implications of incorporating such programmes within clinic activities, and suggestions for improvement for better outcome in the future. Interviews conducted lasted about 45 to 60 minutes and notes were taken.

3.10 The Intervention Protocol

The intervention involved four phases in which the first phase, the pre-intervention phase, consisted designing the interventions, obtaining ethical approval to conduct the intervention, and training research assistants for data collection. The information derived from preliminary data collected was used to complement phase two of the study which involved the design and implementation of the interventions (cognitive-behavioural patient counselling, and social support) to influence adherence to medication-taking and appointment-keeping for hypertension treatment. The third phase was the period of follow-up running up to the 13thweek of the intervention. The fourth phase was an in-depth interview with key-informants conducted to explore key stakeholders' perspectives of the intervention and the outcomes.

Table 3.1Intervention Mapping.

Intervention Groups	**Measurements**				
	Base-line Data 4 Weeks	**Intervention 4 weeks of 4 sessions**	**ImpactEvaluation end of 4th week**	**Outcome Evaluation at 13 weeks follow-up**	**Key-Informat In-Depth Interviews 12 Months**
Experimental group 1-(I_1):(Hypertension Clinic attendees at OOUTH Sagamu)	√	√	√	√	√
Experimental group 2-(I_2):(Hypertension Clinic attendees at LUTH Lagos)	√	√	√	√	√
Control group- (CtG): (Clinic attendees at UCH Hypertension outpatient clinic)	√	0	√	√	0

3.10.1 Pre-Intervention Phase

Training

The following are activities that were carried out during the first phase of the study. The pre-intervention phase involved the selection and training of research assistants in order to provide them sufficient skills in data collection functions. A training manual was designed with the purpose of preparing fourresearch assistants and two clinic nurses with sufficient skills and understanding of the rationale for the intervention and to enable them effectively

perform designated roles and responsibilities that should contribute to the success of the intervention including monitoring procedures. (See Appendix 9)

Six research assistants were trained, three of them with bachelor of Public health degrees, one with master of Public Health degree and two nurse-practitioners (Clinic Nurses). Training took place in a classroom setting with materials to be used in the intervention. The training programme lasted two days and each daily session was for three hours and consisted of review of activities that would take place during the three phases of the intervention with practical demonstrations of each aspect on the second day. Importantly, discussions of ethical issues were considered in the training, including how to obtain informed consent from the participants. Skills of data gathering using questionnaire and pill-count inventory sheet were also reviewed and demonstrated. The counselling protocol designed for the intervention was reviewed and salient core issues emphasized for consistency. Overall rationale for patient counselling incorporated in the intervention was established. (See appendix 5 for training manual)

Two Focus Groups of males (N=5) and females (N=5) were conducted and facilitated by one trained Research Assistant using a focus group guide (see the appendix 4b) and another research assistant served as the note taker. The guide included open-ended questions with follow-up probes designed to explore what patients' experiences with hypertension treatment were like, challenges faced with medication-adherence and how this can be addressed in the counseling sessions that was planned for the study. Importantly, the FG explored how best the intervention may interphase with the clinic appointment with minimum disruptions of the natural activities in the clinic, thus contextualizing the intervention in the clinic procedures.

Consenting participants from the study groups were given pre-intervention counselling about the intervention protocol, especially regarding what to do with leftover pills. Clinic days for intervention and control groups were identified and arrangements were made to have special regular clinic sessions organized for these participants to enable two-weekly pill-counting for four weeks performed before the intervention. Prescribed Medications were collected from the pharmacy and checked for each patient by research assistants who documented the

number of pills required for the following fortnight. Participants were required to bring along with them leftover pills from previous prescriptions to the designated two-weekly appointment for pill-counting purposes during the four weeks pre-intervention period. This was done for two consecutive times and on each session unconsumed pills for each participant were documented in the Medication-taking Inventory for pill–count. At the end of the pre-intervention period, baseline data was collected from all the participants using the validated questionnaire before proceeding to administer the interventions.

3.10.2The Intervention Phase

Design and implementation of the Intervention

The design ofthe intervention was theory-based and was conceptualized through thePRECEDE (Green, Kreuter, Deeds and Patridge, 1980) meta-model and social support model (Heaney and Israel, 2008) for identifying and influencing salient factors involved inappointment-keeping, medication-adherence and reduction in blood pressure of hypertensive patients attending clinics in the selected health facilities. The rationale for conceptualizing this intervention in the PRECEDE conceptual framework was that, once these salient factors involved in medication-adherence have been identified, they can be improved by modifying the patients' predisposing, reinforcing and enabling (PRE) factors that help to shape appointment-keeping, medication-adherence and consequently reduction in blood pressure which is the desired outcome of clinical treatment in hypertension. The intervention was therefore designed to address predisposing factors involved in medication-adherence such as knowledge, perception and attitudes, reinforcing and enabling factors such as assistance, in terms of reminders which was offered by social support from a family member and in so doing, appointment-keeping, medication-adherence and blood pressure measures would be improved.

Two interventions were designed consisting patient education and counselling (PEC) as intervention one and patient education and counselling with social support (PECSS) offered by a family member as intervention two. (See details in Appendix 10 and 11) The control received the usual clinic health education activities. The institutions were assigned as control, intervention one and intervention two out by simple balloting out of six institutions (LUTH,

LASUTH in Lagos State; OOUTH in Ogun State, UCH in Oyo State and LAUTECH and OAUTHC in Osun State). Participants in all the study groups were approached and those that consented to participate and met the inclusion criteria of uncomplicated hypertension without comorbidity with other chronic illnesses such as diabetes mellitus or cancer were selected for the study.

Theintervention sessions were organized and conducted at each intervention days as group session that lasted 45 minutes at the beginning of the clinic day and a one-to one counselling after meeting with clinic physicians that lasted about eight to ten minutes. The contents of the group counselling were structured around specific behavioural and educational objectives that involved improvement in knowledge and awareness of hypertension, benefits of regular medication consumption and risk in not taking medication as prescribed, perception of complications in hypertension as a result of poor medication consumption and seriousness of such worsening condition. The second counselling with the individual participant was designed to reinforce information given during the group session and was intended to awaken knowledge of benefits of treatment of hypertension, arouse perceived seriousness of hypertension that may result from poor medication-adherence, modify attitudinal dispositions towards medication-taking and perceived susceptibility to complications of hypertension arising from poor medication-consumption, emphasized benefits of taking recommended medications in hypertension. The individuals were provided the opportunity of asking questions for clarifications and in closing were led to agree on a course of action regarding issues concerning medication-adherence and appointment-keeping. These weekly meetings in the clinics were arranged by consensus for four consecutive sessions. The counselling sessions were administered by the trained clinic nurse. At the end of the four sessions, immediate impact evaluation was conducted using the same questionnaire as in the baseline data collection.

The second intervention similar to intervention ONE in all aspects of the patient education and counselling protocol used but differed in the aspect of social support incorporating elements of counselling with health education similar to that given to the patient but was directed to a member of the family (the significant other) who served to enhance Self-

efficacy, provide reminders and assistance in encouraging patient to take their medications at home during self-management. In order to illustrate the importance of the social support to the well-being of the patient and how often the family member was to provide the necessary support, the role of the social support was anecdotally likened to what thirst and hunger does as reminders for drinking water or eating food to nourish the body and sustain life.

During the pre-intervention phase, participants in this group were asked to identify and bring along a family member such as a spouse, child or sibling who is well-disposed to the patient to serve as support to be incorporated in the intervention. Social support was conceptualized through the following four broad types of supportive behaviours recognized to reinforce patient to overcome difficulties in medication-taking. The social support provided emotional support through expressing empathy, care, love, building trust; instrumental support by provision of tangible aid and services such as reminders to take medications and measure blood pressure or arrange for someone competent to perform this at home; informational support by providing advice, suggestions and information, and; appraisal support which required that such family member provide constructive feedback and affirmation on how well they are doing with their medications.

During the intervention involving social support, the family member who volunteered to serve as social support was trained to recognize and appreciate the consequences of poorly managed hypertension which may be due to not taking medication and not attending to scheduled clinic appointments. Furthermore, the family member was also instructed about limiting fat and salt consumption by the patient. The family member received group counselling as the patient has received in the first session and in addition, receive capacity building in providing emotional, informational support for the patient during the one-to-one session lasting about 10 to 15 minutes with the patient as a passive listener. Again, the family member was given opportunity to ask questions and get clarifications about the importance of their role as social support for the participant. Again, the counselling sessions for both participants and their social support were intended to meet the overall goal of providing in-depth knowledge, understanding that would produce consciousness-arousing, motivational drive necessary to facilitate patient adherence to recommended treatment modality.

Similarly, at the close of every individual counselling session, social support and participant were led to agree on a course of action regarding issues concerning medication-adherence and appointment-keeping. These weekly meetings in the clinics were arranged by consensus for four consecutive sessions. The counselling sessions were administered by the combination of researcher, trained research assistants and clinic nurses recruited. At the end of the four sessions, immediate impact evaluation was conducted using the same questionnaire as in the baseline data collection. Two modules were designed as intervention contents and administered.

Module One of the Intervention

Module for Patient Education and Counseling (PEC) to Enhance Medication Adherence and Appointment-Keeping

Focused health education and communication delivered through well designed counselling protocol is considered a strategic approach to awaken certain conscious awareness and arouse appropriate feelings that are essential to stimulating personal involvement and commitment to drive behaviour change, especially in medication adherence and appointment-keeping. Most of the times, care in hypertension treatment is provided through self-management by the patient. They need instructions and encouragement to acquire the skills required to successfully implement effective hypertension self-care activities.

Communication enhances and establishes learning, comprehension and good understanding when strategically incorporated in patient education that is structured to enhance knowledge about consequences of untreated or poorly treated hypertension.Patient education and counseling awakens an understanding of the benefits of persistence in medication-taking and appointment-keeping within the context of hypertension self-care activities. Personal interpretations of the nature of hypertension and the risks involved in not taking medication can also be correctly modified and reinforced with clarification of the benefits derived from medication adherence during counseling sessions. When the patient is engaged in communication and able to clarify issues that appear shrouded in superstition, outcome becomes better.

Therefore, this module has been designed tohighlight and discuss probable reasons for developing hypertension and consequences of poorly treated conditions and to identify rationale for treatment modalities in hypertension. Furthermore, it enables the patient to identify difficulties and barriers regarding compliance, provide understanding of the implications of non-adherence to treatment and appointment-keeping. It also facilitates the reinforcement of attitudinal orientations required to encourage medication adherence and appointment-keeping.

The Patient Education and Counseling Module Consists of Four Sessions of 45 minutes each offered as general/group and individual counseling.

Session One Introduction: An Overview of the rationale for patient's diagnosis, medication-taking history and its implications for health and well-being.

Session Two Hypertension: Treatment modalities and expected outcomes.

Session Three: The importance of medication adherence and appointment-keeping in hypertension treatment.

Session Four: Self-management in hypertension and Communicating important signs about the health of the patient to their health care workers**;** This module was prepared using the information obtained from the FGD and baseline measures with regard to the specific needs of the patients defined by predisposing, enabling and reinforcing factors associated with medication adherence and appointment-keeping in the treatment of hypertension. The needs assessment during phase one of the intervention was conducted, in part, in order to strengthen the module and contextualize the contents. (*See detailed Session Implementation: Appendix 10*)

Module Two of the Intervention

Module for Social Support (SS) to Enhance Medication Adherence and Appointment-Keeping

Contemporary health care is beginning to consider ways by which social support may play significant role in contributing to health promotion. The importance of extending care to include the family members or other social network around the patient is becoming well accepted. Family involvement is very important when providing social support for

chronically ill patients, because the burden of the disease on the patient can be better alleviated when shared. In this relationship, good social support is associated with improved psychological disposition of the patient and provides advantage in facilitating some changes in the behavior of patients that can be sustained to reinforce self-care.

Therefore, this module will define key functions of the social support in providing assistance to the patient in order to enhance medication adherence and appointment-keeping that will produce improved clinical outcome. This counseling session will be offered to reinforce what has been presented during the forty five minutes general patient education and counseling session.

The social support Counseling/Training Module Consists of Four Sessions of 15 minutes each, given to a familymember to offer social support;

Introduction: An overview of Hypertension, medication and chronic illnesses. .

Social Support One: Principles and Functions of Social Support in Hypertension Treatment and involvement of family members.

Social Support Two: Areas of hypertension Treatment in which the Social support or family members may participate effectively and activities that they can perform which will support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

Social Support Three: Rationale for involvement of the immediate family members to support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

The study involved delivering two interventions to patients; Patient Education and Counselling (PEC) and a combination of Patient Education and Counselling with Social Support (PECSS) to enhanced Medication Adherence and Appointment-Keeping among participants. The focused PEC with SS protocol has the following defining characteristics;

1. It explains the mechanism involved in developing hypertension and that poorly managed condition would result in poor prognosis,
2. It shows how the various systems of the body undergo changes that may result in elevated blood pressure and that there is no final cure for the disease,

3. It further demonstrates that treatment modalities are available to effectively manage and maintain control of blood pressure and prevent any adverse cardiovascular events such as stroke, heart attacks, retinopathy or kidney failure,
4. It stresses that adherence to prescribed medications and appointment-keeping for monitoring the progress of the condition consists of the most effective way of keeping the blood pressure controlled and to avoid complications that may impact on quality of life.
5. It emphasizes that when patients clearly understands the links between elevation of blood pressure and consequences of poorly managed condition on one hand and the values of adherence and appointment-keeping on the other hand, there is an arousal of the desire to live,
6. It also emphasizes that living with controlled blood pressure is far better than living with infirmities and impairments caused by poor adherence.(*See detailed Session Implementation: Appendix 11*)

Control Group

The Control received no intervention but standard regular clinic activities provided at outpatient clinic of the University College Hospital Ibadan. This included greetings and prayers as the patient settled on arrival and the usual health talk which includedthe importance of health and well-being, therole of their medications and avoid excessive salt in their diet. This session lasts for about 15 minutes. At the end of the four weeks, questionnaire was administered as in baseline for a second data collection.

3.10.3 Follow-up after the Intervention

All study groups were followed up till the 13thweek from baseline with consensus to have clinic appointment every two weeks in order to follow-up and monitor the progress of participants, especially for medication consumption pattern. Unfortunately, the study lost twelve participants to attrition during this period. Pill-count and inventory of leftover pills was undertaken for the intervention and control groups and documented. At the end of the follow-up period, anoutcome evaluation was conducted with participants using the same questionnaire as baseline for data collection.

Table 3.2Data Collection for the Study.

Groups	**Measurements**		
	Base-line Data at the end of 4 Weeks	ImpactEvaluation at the end of 4th week	Outcome Evaluation at 13th week Follow-up
Experimental group-Arm-1:(Clinic attendees at OOUTH Sagamu	√	√	√
Experimental group-Arm-2:(Clinic attendees at LUTH Lagos)	√	√	√
Control group (Clinic attendees at UCH Hypertension outpatient clinic)	√	√	√

3.10.4 Key Informant Interview at 12th month after follow-up Evaluation

The researcher purposefully invited representatives of stakeholders who participated in the intervention from the two health facilities to be interviewed. Ten key-informant interviews consisting four patients, two Social support family members, two clinic nurses and two Senior Nurse Administrators of the cadre of chief matrons from the two intervention health facilities were conducted 12 months after follow up evaluation, to elicit opinions on the interventions and patients' adherence to medication and appointment keeping. The validated semi-structured key informant interview guide was used to explore reasons for attending the clinic at the health facility, Key Informants' perspectives of the health education intervention conducted, implications of incorporating such programmes within clinic activities, and suggestions for improvement for better outcome in the future. Interviews conducted lasted about 45 to 60 minutes and notes were taken.

3.11 Methods of Data Analysis

Data Analysis was accomplished by using the computer software statistical package for social sciences SPSS version 15. Data collected from participants using the instruments wasreviewed for completeness, edited, coded using a coding guide which had been designed before data collection, and entered into the computer by research assistants. Computations involving frequency distributions, summaries of descriptive statistics, independent sample t-tests and Analysis of Variance (ANOVA) have been used to process the data collected and to test the validity of the main hypotheses concerning medication-consumption, pill-count, appointment-keeping behaviours and blood pressure reduction of hypertensive patients who participated in the study.

All statistical tests are set at p=0.05 level of significance a cut off. The decision rule applied was that if computed $p \leq 0.05$, then the null hypotheses will be rejected in favour of the alternative hypothesis otherwise do not reject. In order to standardize the magnitude of the impact accountable to the intervention conditions, since the p-value cannot estimate this change but only expresses that the change is present and is significant at a predetermined cut off, hence the inclusion of Cohen's *d* also known as the effect size(ES) for difference in means of two independent groupsand the corresponding 95% confidence interval (95%CI).This became an effective tool to accurately estimate and compare the magnitude of the changes produced by the intervention across all variables of interest (Cohen, 1988; Nakagawa and Cuthill, 2007).

Data analysis for the interviews consisted of a review of interview transcripts and identifying emerging themes and sub-themes guided by the objectives and interview guide. Content analysis of data collected from in-depth interviews with key-informants involved thematic interpretive analysis with memorable quotes to validate their experiences. Respondents' verbatim statements were coded under emerging themes and sub-themes.Three emerging themes and seven sub-themes were identified from the key informant interviews.

CHAPTER FOUR

RESULTS

The result presented here considers prominent variables and sub-variables related to predisposing, reinforcing and enabling factors involved in medication-adherence and appointment-keeping as conceptualized in the PRECEDE model. Similarly, the outcome variables such as medication-adherence, pill-count validating self-reported medication-adherence, appointment-keeping and clinical outcomes are reported. The report is presented for the three intervention conditions in two major sections of basic results and hypotheses testing.

4.1 Demographic Characteristics of Participants

One hundred and eighty participants were initially enrolled at baseline following securing their consent to participate from sixty patients in each of the study groups. Of the 180 who entered the study at baseline, 12 (8 in the two intervention groups and 4 in the control group) did not complete the follow-up.

The overall mean age of the participants in this study was 50.52 ± 6.41 years {UCH (50.75 ± 6.20), OOUTH (52.10± 6.50) and LUTH (51.25 ± 7.20)} and there were more males (63.8%). The data shows that there is no significant difference in the distribution of females across the groups (p=0.18). Most of the participants(79.5%) had formal education at primary school (26.1%), secondary school (21.1%), post-secondary (18.9%) and University (13.3%) levels.However, there is no significant difference in the distribution of participants with non-formal education(p=0.4) and formal education (p=0.6) across the groups.Majority of the participants reported to be civil servants (50.6%) with 2.8% retired from active work. (See Table 4.1)

Table 4.1Demographic Characteristics of the participants in the study for each arm of the intervention at baseline.

VARIABLES	Control Group N=60		Intervention One N=60		Intervention Two N=60			
	Frequency N (%)		Frequency N (%)		Frequency N(%)		Total	P-value*
Gender:								
Males	37	(61.7)	43	71.7	35	58.3	115	P<0.05
Females	23	(38.3)	17	28.3	25	41.7	65	P=0.18
Ethnicity:								
Yoruba	45	(75.0)	48	80.0	40	66.7	133	…
Igbo	7	(11.7)	6	10.0	10	16.7	23	…
Hausa	4	(6.7)	4	6.7	6	10.0	14	…
Others	4	6.7	2	3.3	4	6.7	10	…
Education:								
Non-Formal	15	25.0	10	16.7	12	20.0	37	P=0.4
Primary	12	20.0	20	33.3	15	25.0		
Secondary	12	20.0	16	26.7	10	16.7	143	P=0.6
Post-Secondary	11	18.3	9	15.0	14	23.3		
University	10	16.7	5	8.3	9	15.0		
Occupation:								
Civil Servant	31	51.7	36	60.0	24	40.0	91	…
Self-Employed	11	18.3	8	13.8	20	33.3	39	…
Professional	9	15.0	12	20.0	10	16.7	31	…
Housewife	4	6.7	4	6.7	6	10.0	14	…
Retired	5	8.3	0	0.0	0	0.0	5	…

**Comparing certain demographic characteristics to demonstrate matched groups at baseline*

4.2 Baseline Results for the Three Groups in the Study

The basic results for the control and the two intervention groups for predisposing, reinforcing and enabling factors and the outcome variables of appointment-keeping, medication-adherence, pill-count and blood pressure measurements in the study are presented in this section for baseline measures.

4.2.1 Predisposing Factors involved in Medication Adherence and Appointment-keeping in Hypertension Treatment Measured at Baseline

In this study, predisposing factors was considered and involved knowledge related to hypertension treatment and medication adherence, symptoms of hypertension and reasons for appointment–keeping; perception of seriousness of poor medication adherence, perception of susceptibility to complications arising from poorly managedhypertension, perception of self-efficacy to take medication and attitudinal dispositions towards hypertension treatment. These were measured and presented as means, standard error of means (SE) and standard deviations (±SD).

Considering predisposing factors in this study, the result for thelevel of knowledge of participants about hypertension treatment requirements and possible outcomes,measured on a 23-point scale at baseline, showed that participants inthe control groupscored a mean of 12.12(0.25) with a SD of 1.97; for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale,the score was 10.03(0.14) with SD=1.06;perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 4.12(0.10) with SD=0.76 at baseline. Mean scores recorded for participants in the control group forperceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 8.72(0.12) with a SD of 0.90 and perceived self-efficacy to take medications regularly measured on 15-point scale was 4.85(0.20) with a SD of 1.54. Attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 18.78(0.17) and a SD of 1.28 for control. (See Table 4.2)

Furthermore, the study reported for intervention one group at baseline, a mean score of 11.67(0.23) with a SD of 1.77 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 9.88(0.13) with SD=0.98, perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 4.08(0.08) with SD=0.70 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 8.70(0.10) with a SD of 0.74. Perceived self-efficacy to take medications regularly for intervention one group measured on 15-point scale was a mean of 4.92(0.16) and SD of 1.27 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 18.80(0.18) and a SD of 1.30. (See Table 4.2)

Furthermore, the study reported for intervention two group at baseline evaluation, a mean score of 11.88(0.24) with a SD of 1.85 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 9.58(0.13) with SD=1.01, perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 4.00(0.08) with SD=0.64 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 8.68(0.11) with a SD of 0.85. Perceived self-efficacy to take medications regularly for intervention one group measured on 15-point scale was a mean of 4.62(0.20) with a SD of 1.56 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 19.03(0.17) and a SD of 1.33.(See Table 4.2)

When participants' mean scores related to predisposing factors involved in medication adherence and appointment-keeping measured in this study were compare for control, intervention one and intervention two groups respectively at baseline, ANOVA computations showed thatthere was no significant differencesat baseline. (See Table 4.3) However, marginal difference was recorded for perceived seriousness.

Table 4.2Comparison of Measures of Predisposing Factors involved in Medication Adherence and Appointment-Keeping in Hypertension Treatment at Baseline for all Groups in the study.

VARIABLES	Maximum Points on Scale of Measure	Control N=60		Intervention One N=60		Intervention Two N=60		p-value
		$\overline{X}(SE)$	±SD	$\overline{X}$ (SE)	±SD	$\overline{X}$ (SE)	±SD	
Knowledge	23	12.12(0.25)	1.97	11.67(0.23)	1.77	11.88(0.24)	1.85	0.42
Perceive Seriousness	21	10.03(0.14)	1.06	9.88(0.13)	0.98	9.58(0.13)	1.01	0.05
Perceived Susceptibility	9	4.12(0.10)	0.76	4.08(0.08)	0.70	4.00(0.08)	0.64	0.64
Perceived Benefits	18	8.72(0.12)	0.90	8.70(0.10)	0.74	8.68(0.11)	0.85	0.98
Perceived Self-Efficacy	15	4.85(0.20)	1.54	4.92(0.16)	1.27	4.62(0.20)	1.56	0.50
Attitudinal Dispositions	33	18.78(0.17)	1.28	18.80(0.18)	1.30	19.03(0.17)	1.33	0.50

Table 4.3ANOVA Comparing Means for Predisposing Factors in Medication-adherence intervention at baseline between experimental groups and control

VARIABLES	VARIATIONS	Sum of Squares	df	Mean Square	F-Statistic	p-value
Knowledge about Hypertension and Treatment	Between	6.078	2	3.039	0.874	0.42
	Within	615.700	177	3.479		
	Total	621.778	179			
Perceived Seriousness of Hypertension and its Complications when poorly Treated.	Between	6.300	2	3.150	3.052	0.05*
	Within	182.700	177	1.032		
	Total	189.000	179			
Perceived Susceptibility of Complications of Hypertension.	Between	0.433	2	0.217	0.442	0.64
	Within	86.767	177	0.490		
	Total	87.200	179			
Perceived Benefits of Treatment of Hypertension and Medication-Adherence	Between	0.033	2	0.017	0.024	0.98
	Within	123.767	177	0.699		
	Total	123.800	179			
Perceived Self-Efficacy to Take Medications	Between	2.978	2	1.489	0.696	0.500
	Within	378.417	177	2.138		
	Total	381.394	179			
Attitudinal Dispositions of Participants Towards Hypertension and value in Treatment	Between	2.344	2	1.172	0.692	0.50
	Within	299.717	177	1.693		
	Total	302.061	179			

**Marginally signficant*

4.2.2:Reinforcing and Enabling Factors involved in Medication Adherence and Appointment- keeping in Hypertension Treatment Measured at Baseline

The study considered certain reinforcing and enabling factors such as providing emotional support,reminders to take medications, appraisal support and tangible support that may be involved in medication adherence in the treatment of hypertension. Results recorded for reinforcing factors measured on a 15-point scale for control group was $\overline{X}$=4.45, (SE=0.23; SD= 1.76), intervention one group was $\overline{X}$=4.82, (SE=0.26; SD=2.03) and intervention two group was $\overline{X}$=4.90, (SE=0.25; SD=1.92) and showed no significant differences (p=0.39)at baseline (See Figure 4.1).Similarly results recorded for enabling factors measured on a 15-point scale for control group ($\overline{X}$=2.87, SE=0.15; SD= 1.19), intervention one group ($\overline{X}$=2.97, SE=0.18; 1.43) and intervention two group ($\overline{X}$=2.98, SE=0.18; SD=1.42) showed no significant differences (p=0.877) at baseline. (See Figure 4.1)

When participants' mean scores related to reinforcing and enabling factors involved in medication adherence and appointment-keeping measured in this study were compared for control, intervention one and intervention two groups respectively at baseline, ANOVA computations showed thatthere was no significant difference at baseline (See Table 4.4).

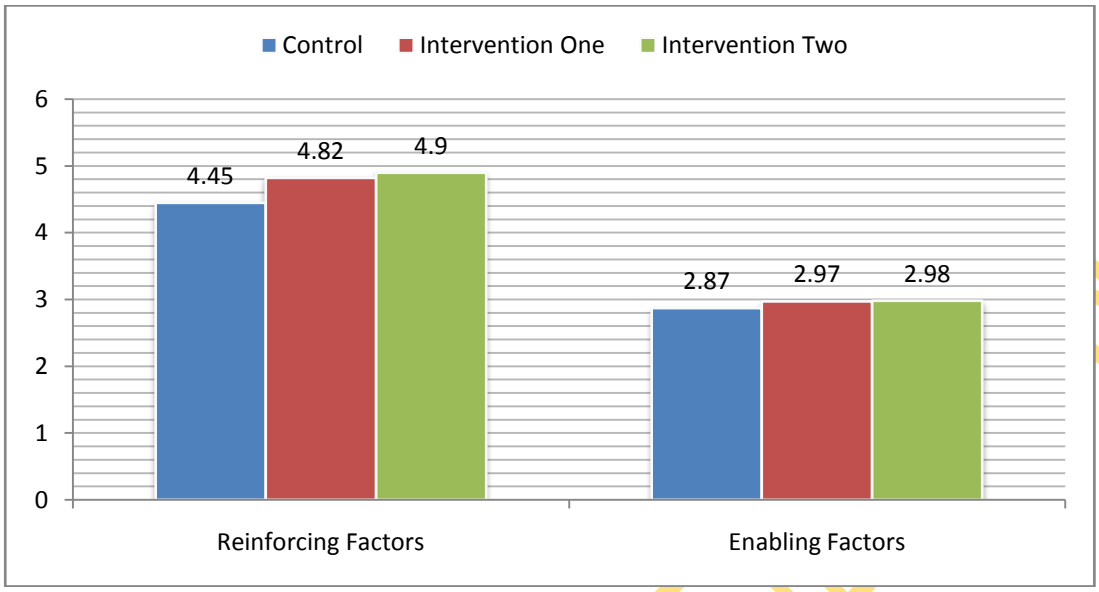


Figure 4.1 Comparison of Levels of Reinforcing and Enabling factors involved in Medication Adherence and Appointment-keeping in Hypertension Treatment measured at Baseline for all groups in the study.

Table 4.4 ANOVA Comparing Means for Reinforcing and Enabling Factors in Medication-adherence intervention at baseline between experimental groups and control

VARIABLES	VARIATIONS	Sum of Squares	df	Mean Square	F-Statistic	p-value
Reinforcing Factors	Between	6.878	2	3.439	0.946	0.390
	Within	643.233	177	3.634		
	Total	650.111	179			
Enabling Factors	Between	0.478	2	0.239	0.131	0.877
	Within	321.850	177	1.818		
	Total	322.328	179			

4.2.3 Outcome Measures for Medication Adherence, Appointment-Keeping and Blood pressure in Hypertension Treatment at Baseline

Assessing the level of Self-Reported Medication Adherence (SRMA) in hypertension treatment as a primaryoutcome among the participants, measured on a 15-point scale at baseline, it was observed that control group reported a mean score of 9.20(SE=0.14) with a SD of 1.06;while for intervention one group, a mean score of 9.13 (SE=0.13) with a SD of 1.02 and for intervention two group, showed no significant differences (p=0.618) at baseline for SRMA. (See Table 4.5) However, results for pill count representing average pill consumption at baseline for control group was 58.9% with a SD of 4.56%, rates recorded for intervention one group was 57.90% with a SD of 5.10% and for intervention two group was 54.3% with a SD of 8.6%, indicating a significant difference ($p<0.05$) that was marginal at baseline.(See Table 4.5)

Similarly, results recorded for self-reported appointment-keeping (AK) measured on a 9-point scale for control group ($\overline{X}$=5.10, SE=0.11; SD= 0.88), intervention one group ($\overline{X}$=5.20, SE=0.14; 1.70) and intervention two group ($\overline{X}$=5.07, SE=0.13; 1.02) showed no significant differences (p=0.747) at baseline. Furthermore, results recorded for systolic blood pressure measurementsfor control was a mean of 155.38±8.41 mm of Hg, intervention one group was a mean of 158.97±8.68 mm of Hg and intervention two 157.83±9.50 mm of Hg,also showed no significant differences (p=0.08) at baseline. (See Table 4.5)

When participants' mean scores related to self-reported medication , appointment-keeping, pill counts, systolic and diastolic blood pressure measured in this study were compared for control, intervention one and intervention two groups respectively at baseline, ANOVA computations showed thatthere was no significant difference at baseline (See Table 4.6). However, there was a significant differencerecorded for pill-count between the groups. (See Table 4.6)

Table 4.5Comparison of Outcome measures for Medication Adherence, Pill Count, Appointment-keeping and Systolic Blood pressure at Baseline for all groups

VARIABLES	Maximum Points on Scale of Measure	Control N=60		Intervention One N=60		Intervention Two N=60		p-value
		$\overline{X}(SE)$	±SD	$\overline{X}$ (SE)	±SD	$\overline{X}$ (SE)	±SD	
SRMA	15	9.32(0.13)	1.03	9.20(0.14)	1.06	9.13(0.13)	1.02	0.618
Appointment Keeping	9	5.10(0.11)	0.88	5.20(0.14)	1.70	5.07(0.13)	1.02	0.747
Pill Count	100%	58.90(0.60)	4.56	57.9(0.66)	5.10	54.27(1.11)	8.63	0.000*
Systolic BP	<140 mmHg	155.38(1.1)	8.41	158.97(1.12)	8.68	157.83(1.2)	9.50	0.08
Diastolic BP	<90 mmHg	103.72(1.7)	13.2	104.72(0.67)	5.22	103.37(0.8)	6.07	0.690

**Significant at p<0.01*

Table 4.6 ANOVA Comparing Means for Primary and Secondary Outcome measures for Medication-adherence intervention at baseline between experimental groups and control

VARIABLES	VARIATIONS	Sum of Squares	df	Mean Square	F-Statistic	p-value
Self-Reported Medication Adherence (SRMA)	Between	1.033	2	0.517		
	Within	189.517	177	1.071	0.483	0.618
	Total	190.550	179			
Appointment-Keeping (AK)	Between	0.578	2	0.289		
	Within	174.733	177	0.987	0.293	0.747
	Total	175.311	179			
Pill Count	Between	706.144	2	353.072		
	Within	7140.850	177	40.344	8.752	0.000*
	Total	7846.994	179			
Systolic Blood Pressure (SBP)	Between	402.544	2	201.272		
	Within	13942.450	177	78.771	2.555	0.081
	Total	14344.994	179			
Diastolic Blood Pressure (DBP)	Between	58.900	2	29.450		
	Within	14034.300	177	79.290	0.371	0.690
	Total	14093.200	179			

**Significant at P<0.01*

4.3 Immediate Post Intervention Results for the Three Groups in the Study

The results documented in this section considersmeasures of predisposing,reinforcing and enablingfactors involved in hypertension medication adherence at immediate post intervention, measured as mean scores and their corresponding standard deviations (SD).The impact of the interventions on these variables is derived by comparing, for each group, the differences in mean scores between baseline and post immediate intervention evaluations.

4.3.1 Predisposing Factors involved in Medication Adherence and Appointment-keeping in Hypertension Treatment Measured at Immediate Post Intervention

Predisposing factors documented in this section considered knowledge related to hypertension treatment,four perception sub-domains of seriousness of hypertension complications, susceptibility of complications due to poor adherence, benefits of medication adherence and self-efficacy to take medication and attitudinal dispositions towards hypertension treatment. In comparing the impact of the intervention on the variables, Cohen's effect size (ES) and the corresponding 95% confidence interval (95%CI) reflecting magnitude of any change observed for predisposing, reinforcing and enabling factors have been reported.

Results for Control at Immediate Post Intervention

Level of knowledge about hypertension treatment requirements and possible outcomes among participants in the control group, measured on a 23-point scale at immediate post intervention was a mean of 12.53(SE=0.24) with a SD of 1.83; for perceived seriousness of hypertension complications and threat to quality of life, a mean of 10.51(SE=0.16) with SD=1.21 was measured on a 21-point scale; perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale showed a mean score of 4.22(0.07) with SD=0.53 at immediate post intervention. Mean scores recorded for perceived benefits of medication adherence and appointment-keeping for the control group measured on 18-point scale was 9.00(SE=0.14) with a SD of 1.07 and perceived self-efficacy to take medications regularly measured on 15-point scale recorded a mean of 4.78(SE=0.18) and SD of 1.37. Attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 19.36(0.23) and a SD of 1.77. (See Table 4.7)

Furthermore, the study reported for intervention one group at immediate post intervention evaluation, a mean score of 20.47(SE=0.22) with a SD of 1.68 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 20.79(SE=1.28) with SD=9.65, perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 7.67(0.10) with SD=0.76 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 16.70(SE=0.23) with a SD of 1.71. Perceived self-efficacy to take medications regularly for intervention one group measured on 15-point scale recorded a mean of 11.91(SE=0.19) and SD of 1.46 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale also recorded a mean score of 29.93(0.17) and a SD of 1.26. (See Table 4.7)

Intervention two group at immediate post intervention evaluation, reported a mean score of 20.54(SE=0.23) with a SD of 1.71 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 19.74(SE=0.25) with SD=1.90, perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 7.65(0.11) with SD=0.80 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 16.56(SE=0.23) with a SD of 1.73. Perceived self-efficacy to take medications regularly for intervention one group measured on 15-point scale was a mean of 11.95(SE=0.20) with a SD of 1.47 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 31.35(0.20) and a SD of 1.50. (See Table 4.7)

When participants' mean scores related to predisposing factors involved in medication adherence and appointment-keeping measured in this study were compared for control, intervention one and intervention two groups respectively at immediate post intervention, ANOVA computations showed that there was a significant difference among the groups comparedfor all variables. (See Table 4.8)

Evaluating the impact of the intervention on predisposing factors by comparing baseline and immediate post intervention mean scores for control grouprevealed that there was no significant difference in mean scores.The effect size computed indicating the magnitude of the change in meansscores between baseline and immediate post intervention was very small. (See Table 4.9)

Evaluating the impact of the intervention on predisposing factors by comparing baseline and immediate post intervention mean scores for experimental one group, revealed that there was significant differences in mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and immediate post intervention was significant. (See Table 4.10)

Similarly, evaluating the impact of the intervention on predisposing factors by comparing baseline and immediate post intervention mean scores for experimental two group, revealed that there was significant difference in mean scores and the effect size computed indicating the magnitude of the differences in means between baseline and immediate post intervention was significant. (See Table 4.11)

Table 4.7 Comparison of Measures of Predisposing Factors involved in Medication Adherence and Appointment-Keeping in Hypertension Treatment at immediate Post Intervention for all Groups in the study.

VARIABLES	Maximum Points on Scale of Measure	Control N=59		Intervention One N=57		Intervention Two N=57		p-value
		$\overline{X}(SE)$	±SD	$\overline{X}$ (SE)	±SD	$\overline{X}$ (SE)	±SD	
Knowledge	23	12.53(0.24)	1.83	20.47(0.22)	1.68	20.54(0.23)	1.71	0.000
Perceive Seriousness	21	10.51(0.16)	1.21	20.79(1.28)	9.65	19.74(0.25)	1.90	0.000
Perceived Susceptibility	9	4.22(0.07)	0.53	7.67(0.10)	0.76	7.65(0.11)	0.80	0.000
Perceived Benefits	18	9.00(0.14)	1.07	16.70(0.23)	1.71	16.56(0.23)	1.73	0.000
Perceived Self-Efficacy	15	4.78(0.18)	1.37	11.91(0.19)	1.46	11.95(0.20)	1.47	0.000
Attitudinal Dispositions	33	9.55(0.10)	0.80	15.39(0.11)	1.88	16.91(0.14)	1.04	0.000

Table 4.8 ANOVA Comparing Means for Predisposing Factors in Medication-adherence intervention at immediate post intervention between experimental groups and control.

VARIABLES	VARIATIONS	Sum of Squares	df	Mean Square	F-Statistic	p-value
Knowledge about Hypertension and Treatment	Between	2478.024	2	1239.012	407.383	0.000
	Within	517.063	170	3.042		
	Total	2995.087	172			
Perceived Seriousness of Hypertension and its Complications when poorly Treated.	Between	3731.028	2	1865.514	57.606	0.000
	Within	5505.272	177	32.384		
	Total	9236.301	179			
Perceived Susceptibility of Complications of Hypertension.	Between	459.429	2	229.735	466.093	0.000
	Within	83.785	177	0.493		
	Total	543.214	179			
Perceived Benefits of Treatment of Hypertension and Medication-Adherence	Between	2264.891	2	1132.445	483.750	0.000
	Within	397.965	177	2.341		
	Total	2662.855	179			
Perceived Self-Efficacy to Take Medications	Between	1987.698	2	993.849	486.145	0.000
	Within	347.539	177	2.044		
	Total	2335.237	179			
Attitudinal Dispositions of Participants Towards Hypertension and value in Treatment	Between	1763.413	2	881.706	1065.209	0.000
	Within	140.714	177	0.828		
	Total	1904.127	179			

Table 4.9 Impact Evaluation for predisposing factors in medication-adherence in the treatment of hypertensionfor Control Group.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		Post- Intervention N=59		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}$ (SE)	±SD		
Knowledge	23	12.12(0.25)	1.93	12.53(0.24)	1.83	0.16(-0.19 to 0.53)	0.370
Perceive Seriousness	21	10.03(0.14)	1.27	10.51(0.16)	1.21	0.14(-0.23 to 0.51)	0.440
Perceived Susceptibility	9	4.12(0.10)	0.60	4.22(0.07)	0.53	0.36(-0.01 to 0.73)	0.051
Perceived Benefits	18	8.72(0.12)	0.83	9.00(0.14)	1.07	0.31(-0.06 to 0.68)	0.090
Perceived Self-Efficacy	15	4.85(0.20)	1.53	4.78(0.18)	1.37	0.14(-0.23 to 0.51)	0.462
Attitudinal Dispositions	33	18.78(0.17)	1.35	19.36(0.23)	1.77	0.22(-0.15 to 0.59)	0.242

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

Table 4.10 Impact Evaluation of predisposing factors in medication-adherence in the treatment of hypertensionfor Intervention One Group.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		Post- Intervention N=57		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Knowledge	23	11.67(0.2)	1.77	20.47(0.2)	1.68	4.87(4.13 to 5.61)	0.000
Perceive Seriousness	21	9.88(0.13)	0.98	20.79(1.2)	9.65	1.61(1.20 to 2.04)	0.000
Perceived Susceptibility	9	4.08(0.08)	0.70	7.67(0.10)	0.76	5.31(4.52 to 6.10)	0.000
Perceived Benefits	18	8.70(0.10)	0.74	16.70(0.2)	1.71	5.91(5.10 to 6.77)	0.000
Perceived Self-Efficacy	15	4.92(0.16)	1.27	11.91(0.2)	1.46	4.84(4.11 to 5.57)	0.000
Attitudinal Dispositions	33	18.80(0.2)	1.30	29.93(0.2)	1.26	8.39(7.23 to 9.55)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

Table 4.11 Impact Evaluation of predisposing factors in medication-adherence intervention for Intervention Two Group.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		Post- Intervention N=57		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Knowledge	23	11.88(0.24)	1.85	20.54(0.23)	1.71	5.02(4.27 to 5.77)	0.000
Perceive Seriousness	21	9.58(0.13)	1.01	19.74(0.25)	1.90	6.54(5.62 to 7.46)	0.000
Perceived Susceptibility	9	4.00(0.08)	0.64	7.65(0.11)	0.80	5.18(4.42 to 5.94)	0.000
Perceived Benefits	18	8.68(0.11)	0.85	16.56(0.23)	1.73	5.63(5.29 to 5.97)	0.000
Perceived Self-Efficacy	15	4.62(0.20)	1.56	11.95(0.20)	1.47	4.72(4.01 to 5.72)	0.000
Attitudinal Dispositions	33	19.03(0.17)	1.33	31.35(0.20)	1.50	8.85(7.65 to 10.10)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.3.2 Reinforcing and Enabling Factors involved in Medication Adherence and Appointment- keeping in Hypertension Treatment Measured at Immediate Post Intervention

The study also explored how reinforcing and enabling factors involved in hypertension treatment may influence medication adherence and clinical outcomes by the interventions.Level of reinforcing factors reported by participants measured on a 15-point scale at post immediate intervention for control group was a mean score of 4.50with a SD of 1.65, experimental one group was a mean of 7.95 with a SD of 1.06 and experimental two group was a mean score of 13.07 with a SD of 1.19 respectively,and showeda significant variations in mean scores recorded. (See Figure 4.2) Similarly, enabling factors offered as reported by participants in the control, experimental one group and experimental two group, measured on a 15-point scale at post immediate intervention was a mean of 3.19(0.17)±1.33, 7.60(0.25) ±1.90 and 9.74(0.35) ±2.64 respectively. (See Figure 4.2)

However, evaluating reinforcing and enabling factors at immediate post intervention by comparing baseline and immediate post intervention mean scores for control group revealed that there was no significant difference in mean scores, and the effect size computed indicating the magnitude of the differences in means between baseline and immediate post intervention was small,0.01(CI95%: -0.36 to 0.38) (See Table 4.12). On the other hand, comparing baseline and immediate post intervention mean scores for intervention one group, revealed that there was a significant difference in mean scores and the effect size computed indicating the magnitude of the impact of the intervention was substantial, 1.88(CI95%:1.44 to 2.33). (See Table 4.13) Similarly, comparing baseline and immediate post intervention mean scores for intervention two group, revealed that there was a significant difference in mean scores and the effect size computed indicating the magnitude of the impact of the intervention was substantially larger, 4.76(CI95%: 4.04 to 5.48). (See Table 4.12)

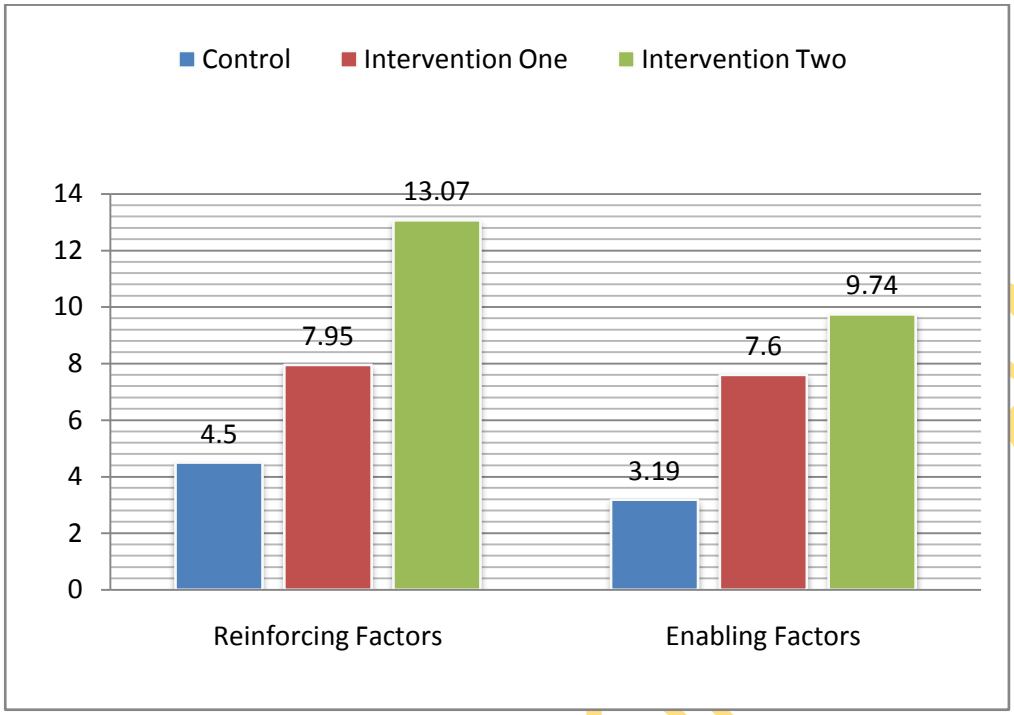


Figure 4.2Comparing Measures of Reinforcing and Enabling Factors involved in Medication Adherence and Appointment-Keeping in Hypertension Treatment among Groups at immediate post intervention in the study.

Table 4.12 Impact Evaluation for Reinforcing and Enabling Factors in medication-adherence intervention at immediate post intervention.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		Post- Intervention N=59		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Control N=59							
Reinforcing Factors	15	4.48(0.23)	1.81	4.50(0.22)	1.65	0.01(-0.36 to 0.38)	0.980
Enabling Factors	15	2.87(0.15)	1.19	3.17(0.17)	1.33	0.25(0.19 to 3.2)	0.170
Inervntion One N=57							
Reinforcing Factors	15	4.82(0.26)	2.03	7.95(0.14)	1.06	1.88(1.44 to 2.33)	0.000
Enabling Factors	15	2.97(0.18)	1.43	7.60(0.25)	1.90	2.75(2.23 to 3.27)	0.000
Inervntion Two N=57							
Reinforcing Factors	15	4.95(0.27)	2.12	13.07(0.16)	1.19	4.76(4.04 to 5.48)	0.000
Enabling Factors	15	3.42(0.21)	1.62	9.74(0.35)	2.64	2.87(2.35 to 3.39)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.4Outcome Evaluation at 13th Week follow-up for Control, Experimental One and Experimental TwoGroups in this Study

The study documents results for measures of predisposing,reinforcing and enablingfactors involved in hypertension medication adherence with their corresponding primary adherence measures and secondary clinical outcomes at 13th week follow-upas mean scores and their standard deviations (SD).In order to determine the magnitude of change occurring for these variables, baseline mean score for each variable has been compared with the corresponding means recorded at 13th week follow-up and reported.Intervention one and intervention two groups received intensive patienteducation interventionsas designed for this study, whilecontrol group received the usual clinic health education presentations with measurements of parameters similar to those carried out for the interventions and are presented.

4.4.1 Predisposing Factors involved in Medication Adherence and Appointment-keeping in Hypertension Treatment Measured at 13th week Follow up.

Evaluation of Control at 13th Week Follow-up

Level of knowledge about hypertension treatment requirements and possible outcomes among participants in the control group, measured on a 23-point scale at 13th week follow-up was a mean of 12.84(SE=0.23) with a SD of 1.76; measure for perceived seriousness of hypertension complications and threat to quality of life, was a mean score of 10.61(SE=0.16) with SD=1.19 was recorded on a 21-point scale; perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale showed that participants scored a mean of 4.39(0.07) with SD=0.50 at 13th week follow-up. Mean scores recorded for perceived benefits of medication adherence for the control group at 13th week follow-up measured on 18-point scale was 9.26(SE=0.13) with a SD of 1.00 and perceived self-efficacy to take medications regularly measured on 15-point scale recorded a mean of 5.14(SE=0.18) and SD of 1.31. Attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 20.14(0.17) and a SD of 1.27. (See Figure 4.3)

Experimental One Group at 13th Week Follow-up

Furthermore, the study reported for experimental one group at 13th week follow-up evaluation, a mean score of 20.42(SE=0.22) with a SD of 1.66 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 19.79(SE=0.23) with SD=1.76, for perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale, the result showed that participants scored a mean of 7.84(0.11) with SD=0.86 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 16.79(SE=0.22) with a SD of 1.67. Perceived self-efficacy to take medications regularly for recorded for experimental one group measured on 15-point scale was a mean of 12.07(SE=0.18) and SD of 1.36 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale also recorded a mean score of 30.18(0.16) and a SD of 1.21. (See Figure 4.3)

Experimental Two Group at 13th Week Follow-up

Experimental two group at 13th week follow-up evaluation, reported a mean score of 20.71(SE=0.22) with a SD of 1.63 for level of knowledge measured on a 23-point scale, for perceived seriousness of hypertension complications and threat to quality of life measured on a 21-point scale, was 20.00(SE=0.19) with SD=1.41, perceived susceptibility to hypertension complications resulting from poor medication adherence measured on a 9-point scale was a mean score of 7.87(0.11) with SD=0.84 and a mean score recorded for perceived benefits of medication adherence and appointment-keeping measured on 18-point scale was 17.26(SE=0.14) with a SD of 1.04. Perceived self-efficacy to take medications regularly for intervention one group measured on 15-point scale was a mean of 12.55(SE=0.19) with a SD of 1.39 and attitudinal dispositions towards treatment in hypertension measured on a 33-point scale recorded a mean score of 32.04(0.13) and a SD of 0.94. (See Figure 4.3)

When participants' mean scores related to predisposing factors involved in medication adherence and appointment-keeping measured in this study were compared for control, experimental one and experimental two groups respectively at 13th week follow-up, ANOVA computations showed that there was a significant difference among the groups compared for

mean scores of all variables. (See Table 4.13)

Evaluating the outcome of the intervention at 13th week follow-upfor predisposing factors by comparing baseline and 13th week follow-up mean scores for control group revealed that there was a significant difference in mean scores, however, the effect size computed corresponding to the magnitude of change in means scores between baseline and 13th week follow-up for all variables was very small. (See Table 4.14)

On the other hand, evaluating outcome of the intervention at 13th week follow-up for experimental one group, by comparing baseline and 13th week follow-up mean scores, revealed that there was a significant difference in their respective mean scores for variables of predisposing factors related to hypertension medication treatment.The effect size computed indicating the magnitude of the changes occurring between baseline and 13th week follow-up were substantially large (See Table 4.15). Again, whenbaseline was compared with13th week follow-up mean scores for experimental two groups,showed that there was a significant difference in mean scores derived, and the effect size computed indicating the magnitude of changes occurring as a result of the intervention was substantial.(See Table 4.15)

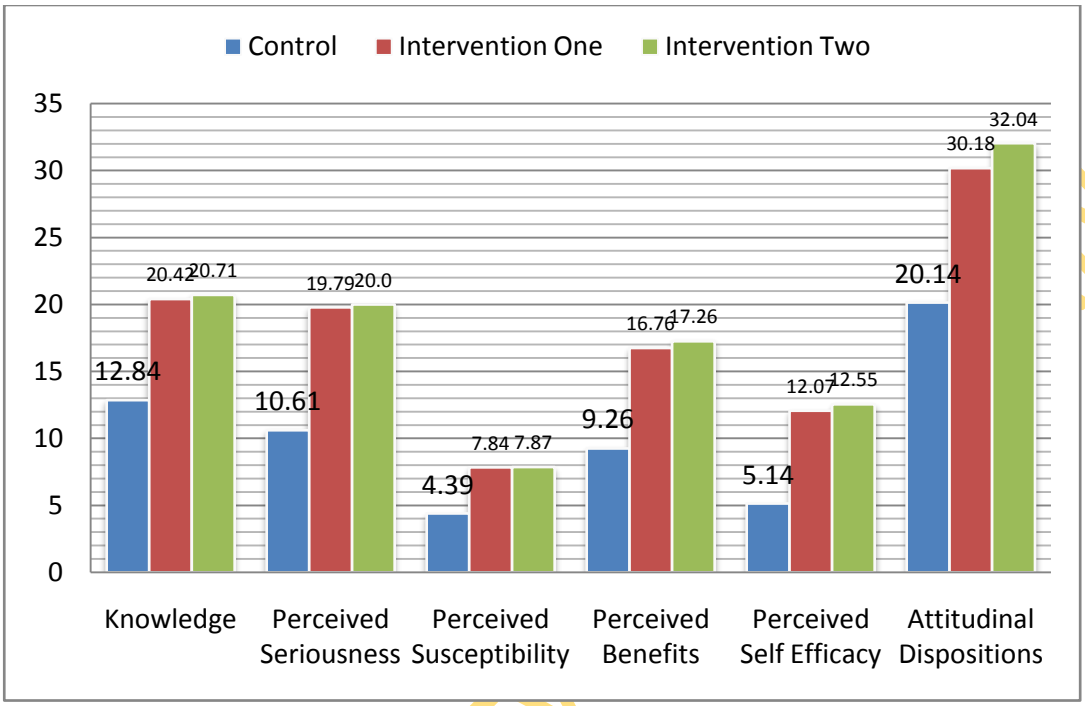


Figure 4.3Comparing Measures of Predisposing Factors involved in Medication Adherence and Appointment-Keeping in Hypertension Treatment among Groups at 13th week Follow-up in the study.

Table 4.13ANOVA Comparing Means of Predisposing Factors in Medication-adherence intervention between control, intervention one and intervention two groups at 13th week Follow-up.

VARIABLES	VARIATIONS	Sum of Squares	df	Mean Square	F	p-value
Knowledge about Hypertension and Treatment	Between	2253.891	2	1126.945	397.34	0.000
	Within	470.819	166	2.836		
	Total	2724.710	168			
Perceived Seriousness of Hypertension and its Complications when poorly Treated.	Between	3253.550	2	1626.775	748.08	0.000
	Within	360.982	166	2.175		
	Total	3614.533	168			
Perceived Susceptibility of Complications of Hypertension.	Between	455.182	2	227.591	405.35	0.000
	Within	93.197	166	0.561		
	Total	548.379	168			
Perceived Benefits of Treatment of Hypertension and Medication-Adherence	Between	2277.676	2	1138.838	702.88	0.000
	Within	268.963	166	1.620		
	Total	2546.639	168			
Perceived Self-Efficacy to Take Medications	Between	1944.631	2	972.316	534.04	0.000
	Within	302.233	166	1.821		
	Total	2246.864	168			
Attitudinal Dispositions of Participants Towards Hypertension and value in Treatment	Between	4625.388	2	2312.694	1736.74	0.000
	Within	221.050	166	1.332		
	Total	4846.438	168			

Table 4.14Summaries of descriptive statistics for predisposing factors in medication-adherence intervention at base-line, and 13th week follow up for control group.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		13th Week Follow-upN=57		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Knowledge	23	12.12(0.25)	1.93	12.84(0.23)	1.76	0.40(0.03-0.77)	0.020
Perceive Seriousness	21	10.03(0.14)	1.27	10.61(0.16)	1.19	0.47(0.40-0.54)	0.007
Perceived Susceptibility	9	4.12(0.10)	0.60	4.39(0.07)	0.49	0.50(0.43-0.57)	0.006
Perceived Benefits	18	8.72(0.12)	0.83	9.26(0.13)	0.99	0.59(0.52-0.66)	0.003
Perceived Self-Efficacy	15	4.85(0.20)	1.53	5.14(0.17)	1.30	0.21(-0.16-0.58)	0.150
Attitudinal Dispositions	33	18.78(0.17)	1.35	20.14(0.17)	1.27	1.04(0.65-1.43)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

Table 4.15Outcome Evaluation of predisposing factors in medication-adherence intervention at baseline and 13th week follow-up.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		13th Week Follow-up N=57		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Inervention One N= 57							
Knowledge	23	11.67(0.24)	1.77	20.42(0.22)	1.66	5.10(4.35-5.85)	0.000
Perceive Seriousness	21	9.88(0.13)	0.98	19.79(0.23)	1.76	7.29(6.28-8.30)	0.000
Perceived Susceptibility	9	4.08(0.08)	0.70	7.84(0.11)	0.86	4.78(4.06-5.5)	0.000
Perceived Benefits	18	8.70(0.10)	0.74	16.76(0.22)	1.67	6.19(5.31-7.07)	0.000
Perceived Self-Efficacy	15	4.92(0.16)	1.27	12.07(0.18)	1.36	5.43(4.64-6.22)	0.000
Attitudinal Dispositions	33	18.80(0.18)	1.30	30.18(0.16)	1.21	9.07(7.84-10.3)	0.000
Intervention TwoN=55							
Knowledge	23	11.88(0.24)	1.85	20.71(0.22)	1.6	5.09(4.33-5.85)	0.000
Perceive Seriousness	21	9.58(0.13)	1.01	20.00(0.19)	1.4	8.45(7.29-9.61)	0.000
Perceived Susceptibility	9	4.00(0.08)	0.64	7.87(0.11)	0.8	5.16(4.39-5.93)	0.000
Perceived Benefits	18	8.68(0.11)	0.85	17.26(0.14)	1.0	9.01(7.78-9.64)	0.000
Perceived Self-Efficacy	15	4.62(0.20)	1.56	12.55(0.19)	1.4	5.33(4.54-6.12)	0.000
Attitudinal Dispositions	33	19.03(0.17)	1.33	32.04(0.13)	0.9	11.40(9.87-12.9)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.4.2: Reinforcing and Enabling Factors involved in Medication Adherence and Appointment-keeping in Hypertension Treatment Measured at 13th Week Follow-up

The following section reports findings of evaluating the outcome of the intervention on the control and experimental groups for reinforcing and enabling factors involved in medication-adherence and appointment-keeping. The effects of the social support for reminding the patient to take medications and providing tangible assistance incorporated into the intervention were conceptually structured around reinforcing and enabling factors.

The study also explored how reinforcing and enabling factors involved in hypertension treatment may enhance medication adherence and clinical outcomes through assistance provided by social support. Level of reinforcing factors reported by participants measured on a 15-point scale at 13th week follow-upfor control group(4.58with SD of 1.61), experimental one group (7.98with a SD of 1.04) and experimental two group (13.78 with a SD of 1.08) respectively, showed significant variations ($p<0.0001$) in mean scores recorded. Similarly, enabling factors offered as reported by participants in the control, experimental one group and experimental two group, measured on a 15-point scale at 13th week follow-up was a mean of 3.32(0.14) ±1.06, 7.74(0.24) ±1.83 and 10.64(0.24) ±1.79 respectively. (See Figure 4.4)

When the study was evaluated for outcomes of reinforcing and enabling factors, through which the intervention applied social support to facilitate medication-adherence and appointment-keeping, between baseline and 13th week follow-up for all three study groups respectively; the following results were obtained.

Comparing reinforcing factors measured on a 15-point scale for control condition at baseline ($\overline{X}$=4.45, SE=0.23; SD=1.76) with 13th week follow-up measures ($\overline{X}$=4.58, SE=0.21; SD=1.61) showed a small effect size (ES) of 0.08; (95%CI: -0.29 to 0.45) that was not significant($p=0.350$) between baseline mean scores and the 13th week follow-up mean scores for participants in control condition. (See Table 4.16)

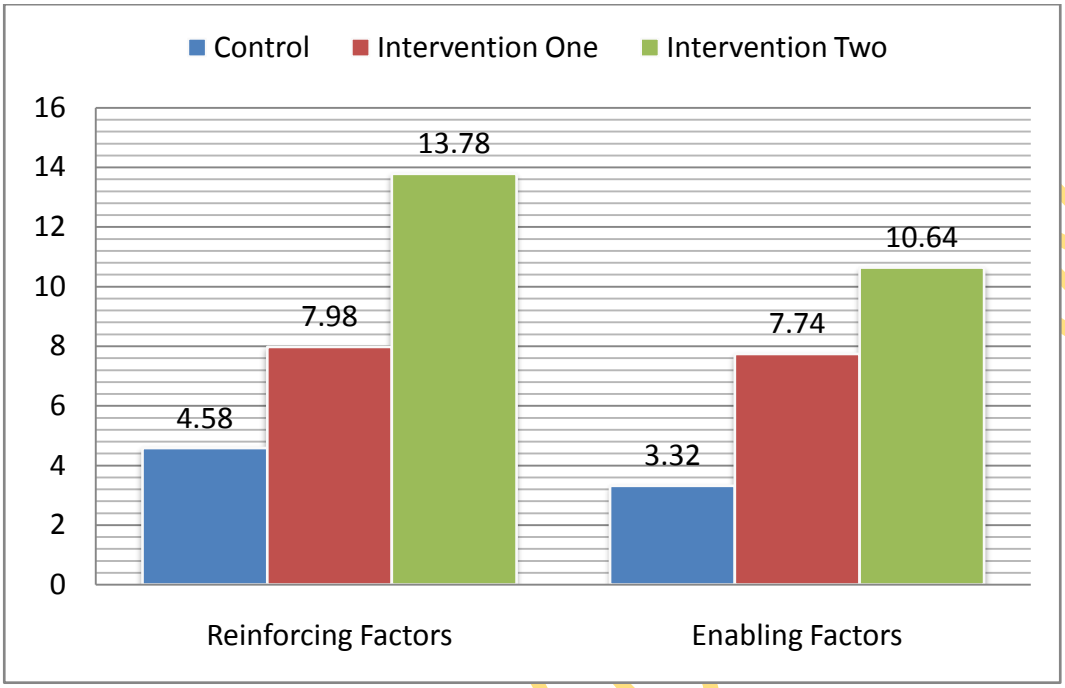


Figure 4.4Comparing Measures of Reinforcing Factors and Enabling Factors involved in Medication Adherence and Appointment-Keeping in Hypertension Treatment for Control, Experimental group one and two at 13th week Follow-up in this study.

Again, considering enabling factors measured on a 15-point scale for controlgroup at baseline ($\overline{X}$=2.87, SE=0.15; SD=1.19) with 13th week follow-up ($\overline{X}$=3.32, SE=0.14; SD=1.06) showed only a medium effect size (ES) of 0.40; (95%CI: 0.03 to 0.77), with p<0.05 between baseline mean scores and the 13thweek follow-up mean scores for participants in control group which was marginally significant. (See table 4.16)

However, comparing reinforcing factors measured on a 15-point scale for experimental one group at baseline ($\overline{X}$=4.82, SE=0.26; SD=2.03) with 13thweek follow-up ($\overline{X}$=7.98, SE=0.14; SD=1.04) showed a large effect size (ES) of 1.99; (95%CI: 1.54 to 2.44) between baseline mean scores and the 13thweek follow-up mean scores for participants in intervention one that was significant (p<0.0001). (See Table 4.16)

When enabling factors measured on a 15-point scale for experimental one group at baseline ($\overline{X}$=2.97, SE=0.18; SD=1.43) was compared with mean scores obtained at 13thweek follow-up ($\overline{X}$=7.74, SE=0.24; SD=1.83), showed a large effect size (ES) of 2.89; (95%CI: 2.36 to 3.42) between baseline mean scores and the 13thweek follow-up mean scores for participants in intervention one that was significant (p<0.0001). (See Table 4.16)

The study further evaluated the outcomes of reinforcing factors measured on a 15-point scale for experimental two group at baseline ($\overline{X}$=4.90, SE=0.25; SD=1.92) and compared it with what was obtained at 13thweek follow-up ($\overline{X}$=13.78, SE=0.15; SD=1.08) showed a large effect size (ES) of 5.78; (95%CI: 4.94 to 6.62) between baseline mean scores and the 13thweek follow-up mean scores for participants in intervention two that was significant (p<0.0001). (See Table 4.16)

Similarly, enabling factors in this study measured on a 15-point scale for experimental two group at baseline ($\overline{X}$=2.98, SE=0.18; SD=1.42) was compared with measures obtained at 13th week follow-up ($\overline{X}$=10.64, SE=0.24; SD=1.79) showed a large effect size (ES) of 4.73; (95%CI: 4.01 to 5.45) between baseline mean scores and the 13thweek follow-up mean scores

for participants in intervention two that was significant (p<0.0001). (See Table 4.16)

Table 4.16Comparing baseline with 13th week follow-up mean scores for Reinforcing and Enabling Factors in medication-adherence intervention.

VARIABLES	Maximum Points on Scale of Measure	Base-line N=60		13th Week Follow-up N=55		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Control N=55							
Reinforcing Factors in	15	4.45(0.23)	1.76	4.58(0.21)	1.61	0.08(-0.29-0.45)	0.350
Enabling Factors	15	2.87(0.15)	1.19	3.32(0.14)	1.06	0.40(0.03-0.77)	0.017
Intervention One N=57							
Reinforcing Factors	15	4.82(0.26)	2.03	7.98(0.14)	1.04	1.99(1.54-2.44)	0.000
Enabling Factors	15	2.97(0.18)	1.43	7.74(0.24)	1.83	2.89(2.36-3.42)	0.000
Inervention Two N=55							
Reinforcing Factors	15	4.90(0.25)	1.92	13.78(0.15)	1.08	5.78(4.94-6.62)	0.000
Enabling Factors	15	2.98(0.18)	1.42	10.64(0.24)	1.79	4.73(4.01-5.45)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

Comparing outcome mean scores of the two experimental groups at 13th week follow-up with respect to reinforcing factors showed that experimental two group mean scores ($\overline{X}$=13.78, SE=0.15; SD=1.08) were significantly (p<0.0001) better than experimental one groupmean scores ($\overline{X}$=7.98, SE=0.14; SD=1.04)with large effect size 5.47(95%CI:4.66 to 6.28). Enabling Factors at 13th week follow-up compared between experimental group two ($\overline{X}$=10.64, SE=0.24; SD=1.79) and experimental group one ($\overline{X}$=7.74, SE=0.24; SD=1.83) similarly showed significant difference in mean scores with large effect size of 1.60(1.17 to 2.03). (See Table 4.22)

Table 4.17 Comparing outcome mean scores of the two experimental groups at 13th week follow-up for Reinforcing and Enabling Factors in medication-adherence in this study.

VARIABLES	Maximum Points on Scale of Measure	Intervention One N=57		Intervention Two N=55		*ES (95%CI)	p-value
		$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Reinforcing Factors in Enabling Factors	15	7.98(0.14)	1.04	13.78(0.15)	1.08	5.47(4.66 to 6.28)	0.000
	15	7.74(0.24)	1.83	10.64(0.24)	1.79	1.60(1.17 to 2.03)	0.000

**ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.4.3: Outcome Evaluation of Medication Adherence, Appointment-Keeping and Blood Pressure measures in Hypertension Treatment at 13th Week Follow-up

The results presented in this section consider primary outcomes of self-reported medication-adherence(SRMA), pill-count(PC)for validating adherence measures and Appointment-keeping(AK) for control condition and the two experimental groups at 13th week follow-up. Furthermore, results of secondary outcome of clinical measures with respect to systolic (SBP) and diastolic (DBP) blood pressures are presented.

Medication Adherence and Appointment-Keeping in Hypertension Treatment for Control, Experimental One and Experimental Two Groups.

The basic results for all the groups are presented as means, standard error of means (SE), and observed effect size (ES) and their corresponding 95% confidence interval (95%CI) reflecting magnitude of any change observed for Adherence and clinical outcomes between baseline and 13th week follow up. The results presented in this section consider self-reported medication-adherence, pill-count to validate adherence measures and appointment-keeping for control condition and the two interventions at baseline and 13th week follow-up. (Se Table 4.18)

Self-Reported Medication-Adherence in Hypertension Treatment

Self-reported medication-adherence (SRMA) among participants measured on a 15-point scale (also adjusted to express the percentage of overall drugs consumed), recorded a mean score at baseline ($\overline{X}$=9.32, SE=0.13 or 62.1%), and at 13 weeks follow-up ($\overline{X}$=9.59, SE=0.13 or 63.3%) showed a small effect size (ES) of 0.27(95%CI: -0.0 to 0.64) between baseline mean scores and the 13th week follow-up mean scores for participants in control group.(See Table 4.19)

The study recorded for Self-reported medication-adherence among participants in intervention one a mean score at baseline of 9.20 (SE=0.14) or 61.3% rate for medicaion adherence, and at 13th week follow-up ($\overline{X}$=12.5, SE=0.14 or 83.0%). This result showed a significant (p<0.0001) difference with a large effect size (ES) of 3.14(95%CI: 2.60 to 3.70) between baseline mean scores and the 13th week follow-up mean scores for participants in

intervention one. (See Table 4.20)

Furthermore, Self-reported medication-adherence measure for intervention two group was a mean score of 9.13 (SE=0.13 or 61.0%) at baseline and at 13th week follow-up 14.4 (SE=0.09 or 96.0%);and this showed a large effect size (ES) of 6.22(95%CI: 5.81 to 6.63) with p<0.000 between baseline mean scores and the 13 weeks follow-up mean scores for participants in intervention two group. (See Table 4.21)

Pill-Count in Medication Consumption

Pill-count conducted during pre-intervention at baseline and at 13thweek follow-up to validate self-reported medication adherence for baseline ($\overline{X}$=58.9%, SE=0.59) and at 13thweek follow-up ($\overline{X}$=59.6, SE=0.60),showed a small effect size (ES) of 0.16(95%CI: -0.21 to 0.53) with p=0.40 (See Table 4.25). Pill-count for intervention one group at baseline ($\overline{X}$=58.9%, SE=0.70) compared with 13th week follow-up ($\overline{X}$=89.5, SE=0.60) respectively, showed a large effect size (ES) of 6.81(95%CI: 5.86 to 7.76) with p<0.0001(Se Table 4.20). While pill-count for intervention two group measured at baseline ($\overline{X}$=54.3%, SE=1.12) and 13th week follow-up ($\overline{X}$=94.0, SE=0.53), similarly showed a large effect size (ES) of 6.00(95%CI: 5.14 to 6.87) that was significant (p<0.0001). (See Table 4.21)

Appointment-Keeping in hypertension Treatment

Results of appointment-keeping measured on a 9-point scale reported for control at baseline ($\overline{X}$=5.28,SE=0.14 or 58.7%) and at 13thweek follow-up ($\overline{X}$=5.77, SE=0.14 or 64.10%) showed a medium effect size (ES) of 0.45 (95%CI: 0.08 to 0.82) with p=0.017 between baseline mean scores and 13thweek follow-up mean scores for participants in control group. (See Table 4.25) However, mean scores reported for intervention one group at baseline ($\overline{X}$=5.26, SE=0.14 or 58.73%) and 13th week follow-up ($\overline{X}$=8.50, SE=0.07 or 94.30%) showed a large effect size (ES) of 3.76 (95%CI: 3.16 to4.36) that was significant (p<0.0001). (See Table 4.26) Intervention two mean scores at baseline ($\overline{X}$=5.30, SE=0.14 or 58.7%) and 13thweek follow-up ($\overline{X}$=8.90, SE=0.04 or 98.8%) showed a large effect size (ES) of 4.52 (95%CI: 3.83 to 5.23) that was significant (p<0.0001). (See Table 4.21)

Clinical Outcomes of Blood Pressure and Pulse Rate

The result of the clinical outcome for blood pressure at baseline (*Systolic*: $\overline{X}$=155.38, SE=1.09 and *Diastolic:*$\overline{X}$=103.72, SE=1.70) and 13thweek follow-up (*Systolic*: $\overline{X}$=154.04, SE=0.92 and *Diastolic:*$\overline{X}$=103.98, SE=1.82), showed small effect size (ES) of 0.18 (95%CI: -0.10 to 0.64) for systolic pressure control (p=0.35) and 0.02 (95%CI: -0.35 to 0.39) for diastolic pressure (p=0.92) respectively when baseline mean Blood pressure readings was compare with corresponding 13thweek follow-up mean blood pressure reading for participants in control group. (See Table 4.19)

Similarly, the result of pulse rate measured for control at baseline ($\overline{X}$=79.50, SE=0.45) and at 13thweek follow-up ($\overline{X}$=78.59, SE=0.47), showed a small effect size (ES) of 0.25 (95%CI: -0.12 to 0.39) that was not significant (p=0.18). (See Table 4.19) The result of the clinical outcome for blood pressure measurements in intervention one at baseline (*Systolic*: $\overline{X}$=159.00, SE=1.12 and *Diastolic:*$\overline{X}$=104.70, SE=0.67) and 13thweek follow-up (*Systolic*: $\overline{X}$=150.00, SE=0.67 and *Diastolic:*$\overline{X}$=91.80, SE=0.54), showed large effect size (ES) of 1.28(95%CI: 0.88 to 1.68) for systolic pressure (p<0.0001) and 2.77 (95%CI: 2.26 to 3.28) for diastolic pressure(p<0.0001) respectively between baseline mean Blood pressure valuesand the corresponding 13thweek follow-up mean blood pressure for participants in intervention one group. (See Table 4.20)

Again, the result of the intervention one group for mean pulse rate at baseline ($\overline{X}$=80.40, SE=0.50) and 13thweek follow-up ($\overline{X}$=75.10, SE=0.30) showed a large effect size (ES) of 1.68 (95%CI: 1.26 to 2.11) that was significant (p<0.0001) between baseline mean pulse rate and the 13th week follow-up mean measure for participants in intervention one group. (See table 4.26). Mean blood pressure in intervention two group at baseline (*Systolic*: $\overline{X}$=157.80, SE=1.23 and *Diastolic:*$\overline{X}$=103.40, SE=0.80) compared with 13th week follow-up (*Systolic*: $\overline{X}$=134.20, SE=0.46 and *Diastolic:*$\overline{X}$=86.5, SE=0.50), showed large effect size (ES) of 3.37(95%CI: 2.80 to 3.94) for systolic pressure (p<0.0001) control and 3.40 (95%CI: 2.82 to 3.98) for diastolic pressure(p<0.0001) respectively. (See Table 4.21)

Similarly, the effects of intervention two condition on mean pulse rate at baseline ($\overline{X}$=79.6, SE=0.50) and 13thweek follow-up ($\overline{X}$=73.80, SE=0.37), showed a large effect size (ES) of 1.84 (95%CI: 1.61 to 2.10) that was significant (p<0.0001) between baseline mean pulse rate and the 13thweek follow-up mean measure for participants in intervention two group. (See Table 4.21)

Table 4.18 Comparing outcome Measures of Adherence and Blood Pressure in Hypertension Treatment among Groups at 13th week follow-up in the study.

VARIABLES	Control N=57		Intervention One N=57		Intervention Two N=55		p-value
	$\overline{X}(SE)$	±SD	$\overline{X}$(SE)	±SD	X(SE)	±SD	
Self-Reported Medication-Adherence* *(% or scale Points)*	63.3(0.83)% 9.59(0.13)	6.3% 0.95	83.0(0.01) 12.5(0.14)	6.80 1.02	96.0(0.006) 14.4(0.09)	4.40 0.70	0.000
Pill Count (%)	59.61(0.60)	4.51	89.5(0.60)	4.20	94.0(0.53)	3.90	0.000
Appointment-Keeping**	64.10(1.55) 5.77(0.14)	11.6 1.04	94.3(0.01) 8.50(0.07)	5.60 0.50	98.8((0.01) 8.9(0.04)	3.50 0.32	0.000
Systolic Blood Pressure	154.04(0.92)	6.90	150.0(0.67)	5.10	134.2(0.46)	3.40	0.000
Diastolic Blood Pressure *(mm of Hg)*	103.98(1.82)	13.6	91.8(0.54)	4.10	86.5(0.5)	3.70	0.000
Pulse Rate *(Beats/Min)*	78.59(0.47)	3.53	75.1(0.30)	2.60	73.8(0.37)	2.70	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale.*

Table 4.19Outcome Evaluation of the Educational Intervention on adherence and clinical outcomes between baseline and 13th week follow-up for control group.

VARIABLES	Base-line N=60		Outcome Evaluation at 13th week Follow-up N=57		***ES (95%CI)	p-value
	$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Self-Reported Medication-Adherence* *(% or scale Points)*	62.1(0.9)% 9.32(0.13)	6.9% 1.03	63.3(0.83)% 9.59(0.13)	6.3% 0.95	0.27(-0.10 to 0.64)	0.141
Pill Count (%)	58.90(0.59)	4.56	59.61(0.60)	4.51	0.16(-0.21 to 0.53)	0.392
Appointment-Keeping**	58.70(1.57)% 5.28(0.14)	12.3 1.1	64.10(1.55)% 5.77(0.14)	11.6 1.04	0.45(0.08 to 0.82)	0.017
Systolic Blood Pressure*(mm of Hg)*	155.38(1.09)	8.4	154.04(0.92)	6.90	0.18(-0.10 to 0.64)	0.345
Diastolic Blood Pressure *(mm of Hg)*	103.72(1.70)	13.2	103.981.82)	13.6	0.02(-0.35 to 0.39)	0.920
Pulse Rate *(Beats/Min)*	79.50(0.45)	3.50	78.59(0.47)	3.53	0.25(-0.12 to0.39)	0.182

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

Table 4.20Outcome Evaluation of the Educational Intervention on adherence and clinical outcomes between baseline and 13th week follow-up for Intervention one.

VARIABLES	Base-line N=60		Outcome Evaluation at 13 weeks Follow-up N=57		***ES (95%CI)	p-value
	$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Self-Reported Medication-Adherence* *(% or scale Points)*	9.20(0.14) 61.3(0.01)	1.06 7.03	12.5(0.14) 83.0(0.01)	1.02 6.80	3.14(2.60 to 3.70)	0.000
Pill Count (%)	58.0(0.70)	5.10	89.5(0.60)	4.20	6.81(5.86 to 7.76)	0.000
Appointment-Keeping**	58.73(1.58) 5.26(0.14)	12.3 1.11	94.3(0.01) 8.50(0.07)	5.60 0.50	3.76(3.16 to 4.36)	0.000
Systolic Blood Pressure	159.0(1.12)	8.68	150.0(0.67)	5.10	1.28(0.88 to 1.68)	0.000
Diastolic Blood Pressure *(mm of Hg)*	104.7(0.67)	5.21	91.8(0.54)	4.10	2.77(2.26 to 3.28)	0.000
Pulse Rate *(Beats/Min)*	80.4(0.50)	3.60	75.1(0.30)	2.60	1.68(1.26 to 2.11)	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value the level of significance*

Table 4.21 Outcome Evaluation of the Educational Intervention on adherence and clinical outcomes at 13th week follow-up for Intervention Two.

VARIABLES	Base-line N=60		Outcome Evaluation at 13th week Follow-up N=55		***ES (95%CI)	p-value
	$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Self-Reported Medication-Adherence* *(% or scale Points)*	61.0(0.01) 9.13(0.13)	6.80 1.02	96.0(0.006) 14.4(0.09)	4.40 0.70	6.22(5.81 to 6.63)	0.000
Pill Count (%)	54.3(1.12)	8.6	94.0(0.53)	3.90	6.00(5.14 to 6.87)	0.000
Appointment-Keeping**	58.7(1.60) 5.3(0.14)	12.3 1.11	98.8((0.01) 8.9(0.04)	3.50 0.32	4.52(3.83 to 5.23)	0.000
Systolic Blood Pressure	157.8(1.23)	9.5	134.2(0.46)	3.40	3.37(2.80 to 3.94)	0.000
Diastolic Blood Pressure *(mm of Hg)*	103.4(0.80)	6.07	86.5(0.5)	3.70	3.40(2.82 to 3.98)	0.000
Pulse Rate *(Beats/Min)*	79.6(0.50)	3.6	73.8(0.37)	2.70	1.84(1.61 to 2.10)	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.5Effects of the Two Educational Interventions on outcome Measures compared with Control Conditions.

In order to assess the effects of the two educational interventions on the outcome parameters, the outcomes of each intervention were first compared with baseline measures to determine the magnitude of the adherence and clinical outcomes, and then with control to determine which of the two interventions produced the most effective influence on the adherence and clinical outcomes.The results in table 4.22shows the outcome measures for intervention one compared with control condition and table 4.23 shows the outcome measures for intervention two compared with control. The basic results for outcome of intervention one and intervention two are presented as means and standard error of means (SE) with their corresponding observed effect size (ES) and the corresponding 95% confidence interval (95%CI) reflecting magnitude of any change observed for adherence and clinical outcome measures under the two intervention conditions.

4.5.1 Effects of the Intervention one on Adherence and Clinical outcome measures in Hypertension Treatment

The results presented in this section consider medication-adherence outcome measures and clinical outcome measures for intervention one compared with control at 13thweek follow-up.

Self-Reported Medication-Adherence in Hypertension Treatment

Self-reported medication-adherence (SRMA) among participants in intervention one conditions with a mean score of 12.5, (or 83.0.0%) at 13thweek follow-up compared with measures recorded for control ($\overline{X}$=9.59, or 63.3%),showed a large effect size (ES) of 2.91(95%CI: 2.38 to 3.44) that was significant at p<0.0001. (See Table 4.22)

Pill-Count in Medication Consumption

Pill-count conducted for control conditions ($\overline{X}$=59.6%, SE=0.60) when compared with mean pill-count for intervention one ($\overline{X}$=89.5, SE=0.60), showed a large effect size (ES) of 6.86(95%CI: 5.88 to 7.84) that was significant (p<0.0001). (See Table 4.22)

Appointment-Keeping in hypertension Treatment

The results of appointment-keeping measured at 13th week follow-up on a 9-point scale reported for control ($\overline{X}$=5.77,SE=0.14 or 64.1%) and for intervention one ($\overline{X}$=8.50, SE=0.07 or 94.3%) showed a large effect size (ES) of 3.31(95%CI: 2.74 to 3.88) that was significant at p<0.0001. (See Table 4.22)

Clinical Outcomes of Blood Pressure and Pulse Rate

The result of the clinical outcome for blood pressure mean value for participants in control conditions (*Systolic*: $\overline{X}$=154.04, SE=0.92) compared with mean value obtained in intervention one measures (*Systolic*: $\overline{X}$=150.0, SE=0.67) at 13th week follow-up showed a large effect size (ES) of 0.68(95%CI: 0.30 to 1.06) that was significant at p<0.0001. (See Table 4.22)

Similarly, the result of the clinical outcome for blood pressure of participants in control conditions (*Diastolic:*$\overline{X}$=103.98, SE=1.82) compared with mean intervention one measures (*Diastolic:*$\overline{X}$=91.8, SE=0.54) showed a large effect size (ES) of 1.21(95%CI: 0.81 to 1.62) that was significant at p<0.0001. (See Table 4.22)

The result for the effects of the intervention on mean pulse rate of control ($\overline{X}$=78.59,SE=0.47) compared with intervention one ($\overline{X}$=75.80, SE=0.30)also showed a large effect size (ES) of 1.12 (95%CI: 0.72 to 1.52) that was significant at p<0.0001 at 13th week follow-up. (See Table 4.22)

Table 4.22Evaluation of the outcomes of intervention one compared with control conditions at 13th week follow-up.

VARIABLES	Control N=57		Intervention One N=57		***ES (95%CI)	p-value
	$\overline{X}(SE)$	±SD	$\overline{X}$(SE)	±SD		
Self-Reported Medication-Adherence*	63.3(0.83)%	6.3%	83.0(0.01)	6.80	2.91(2.38 to 3.44)	0.000
(% or scale Points)	9.59(0.13)	0.95	12.5(0.14)	1.02		
Pill Count (%)	59.61(0.60)	4.51	89.5(0.60)	4.20	6.86(5.88 to 7.84)	0.000
Appointment-Keeping**	64.10(1.55)	11.6	94.3(0.01)	5.60	3.31(2.74 to 3.88)	0.000
	5.77(0.14)	1.04	8.50(0.07)	0.50		
Systolic Blood Pressure	154.04(0.92)	6.90	150.0(0.67)	5.10	0.68(0.30 to 1.06)	0.000
Diastolic Blood Pressure *(mm of Hg)*	103.98(1.82)	13.6	91.8(0.54)	4.10	1.21(0.81 to 1.62)	0.000
Pulse Rate *(Beats/Min)*	78.59(0.47)	3.53	75.1(0.30)	2.60	1.12(0.72 to 1.52)	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.5.2 Effects of Intervention two on Adherence and Clinical outcome measures in Hypertension Treatment

The results presented in this section considers medication-adherence outcome measures and clinical outcome measures for intervention two compared with control at 13th week follow-up.

Self-Reported Medication-Adherence in Hypertension Treatment

Self-reported medication-adherence($\overline{X}$=14.4, SE=0.01 or 96.0%) scores recorded for participants in intervention two conditions when compared with mean scores obtained for control ($\overline{X}$=9.59, SE=0.95 or 63.3%), at 13th week follow-up. (See table 4.23) show a large effect size (ES) of 5.91(95%CI: 5.54 to 6.29) that is significant at p<0.0001.

Pill-Count in Medication Consumption

Pill-count measured for control conditions ($\overline{X}$=59.6%, SE=0.60) compared with mean pill-count for intervention two ($\overline{X}$=94.0, SE=0.53)also shows a large effect size (ES) of 8.13(95%CI: 7.00 to 9.27) that is considered significant at p<0.0001.(See Table 4.23)

Appointment-Keeping in hypertension Treatment

Results of appointment-keeping measured on a 9-point scale reported for control ($\overline{X}$=5.77,SE=0.14 or 64.1%) when compared with mean scores for intervention two ($\overline{X}$=8.90, SE=0.04 or 98.8%),showed a large effect size (ES) of 4.10(95%CI: 3.44 to 4.76) that is significant at p<0.0001 (See Table 4.23)

Clinical Outcomes of Blood Pressure and Pulse Rate

The result of blood pressure measurement of participants in control conditions (*Systolic*: $\overline{X}$=154.04, SE=0.92) compared with mean blood pressure reading for intervention two (*Systolic*: $\overline{X}$=134.2, SE=0.46) showed a large effect size (ES) of 3.67(95%CI: 3.06 to 4.30) for systolic pressure difference that was significant at p<0.0001 at 13th week follow-up. (See Table 4.23)

The result of the clinical outcome for blood pressure of participants in control conditions (*Diastolic*:$\overline{X}$=103.98, SE=1.82) compared with mean measures forintervention two (*Diastolic*:$\overline{X}$=86.5, SE=0.50) showed a large effect size (ES) of 1.78(95%CI: 1.34 to 2.22) for diastolic pressure difference at p<0.0001 (See table 4.23).

The effects of the intervention on mean pulse rate for control group($\overline{X}$=78.59,SE=0.47) and intervention two group($\overline{X}$=73.80, SE=0.37) showed a large effect size (ES) of 1.54 (95%CI: 1.11 to 1.97) that was significant at p<0.0001 between mean pulse rates for participants in intervention two conditionand the mean rates recorded for participants in control conditions at 13thweek follow-up. (See Table 4.23)

Table 4.23Evaluation of the outcome of intervention two compared with control conditions at 13th week follow-up

VARIABLES	Control N=57		Intervention Two N=55		***ES (95%CI)	p-value
	$\overline{X}(SE)$	±SD	$\overline{X}(SE)$	±SD		
Self-Reported Medication-Adherence* *(% or scale Points)*	63.3(0.83)% 9.59(0.13)	6.3% 0.95	96.0(0.006) 14.4(0.09)	4.40 0.70	5.91(5.54 to 6.29)	0.000
Pill Count (%)	59.61(0.60)	4.51	94.0(0.53)	3.90	8.13(7.0 to 9.27)	0.000
Appointment-Keeping**	64.10(1.55) 5.77(0.14)	11.6 1.04	98.8((0.01) 8.9(0.04)	3.50 0.32	4.10(3.44 to 4.76)	0.003
Systolic Blood Pressure	154.04(0.92)	6.90	134.2(0.46)	3.40	3.67(3.06 to 4.30)	0.000
Diastolic Blood Pressure *(mm of Hg)*	103.98(1.82)	13.6	86.5(0.5)	3.70	1.78(1.34 to 2.22)	0.000
Pulse Rate *(Beats/Min)*	78.59(0.47)	3.53	73.8(0.37)	2.70	1.54(1.11 to 1.97)	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

4.6Hypotheses Testing

Five hypotheses were tested for this study to determine which of the two interventions produced the greater influence on primary outcome measures of medication adherence and secondary clinical outcome measures of systolic and diastolic blood pressure at 13thweek follow-up. In testing these hypotheses, independent sample t-test was conducted at 0.05 level of significance. The decision rule applied was that if the p-value computed was less or equal to the cut-off p-value of 0.05, the null hypotheses will be rejected in favour of the alternative hypothesis and vice-versa. In addition to considering p-values to determine whether to reject or not to reject the null hypotheses, all results presented in this study have considered Cohen's *d* (*a measure of the effect size or magnitude of the effects of the intervention and the 95% confidence interval*) for all impact analysis to quantify the size of the impact on the various measures.

Hypothesis 1: There is no significant difference between self-reported medication-adherence mean scores of participants in intervention one conditionand the mean scores for participants in intervention two condition at 13 weeks follow-up.

On a maximum scale of 15-points for Self-reported medication-adherence, the mean score for participants in intervention one conditions was$\overline{X}$=12.5, SE=0.14 or 83.0%,compared with $\overline{X}$=14.4, SE=0.01 or 96.0% recorded for intervention two at 13thweek follow-up (See Table 4.24). The result of a one-tailed independent sample t-test for statistical significance showed that a significant difference ($p<0.0001$) thus exist between scores recorded for intervention two and intervention one and had a large effect size (ES) of 2.28(95%CI: 1.80 to 2.76). (See table 4.24). Therefore, based on these values, self-reported medication-adherence mean score for intervention two is significantly different from mean score recorded for intervention one at follow-up, hence the null hypothesis is rejected. It can be said from the ongoing that intervention two condition had more influence on self-reported medication adherence than intervention one.

Hypothesis 2: There is no significant difference between mean pill-count recorded for

participants in intervention on conditionand the mean count recorded for participants in intervention two condition at 13 weeks follow-up.

Mean pill-count for participants in intervention one conditions was $\overline{X}$=89.5% with SE=0.60 and when compared with mean pill-count for intervention two ($\overline{X}$=94.0%, SE=0.53), using independent sample t-test to evaluate null hypothesis, showed that a significant difference ($p<0.0001$) thus exist between scores recorded for intervention two and intervention one and hada large effect size (ES) of 1.08(95%CI: 0.68 to 1.48). (See Table 4.24) Therefore, based on these values, mean pill-count recorded for participants in intervention two conditionsis significantly larger than mean count recorded for participants in intervention one conditions at 13thweek follow-up, therefore the null hypothesis is rejected.It can be said from the ongoing that intervention two condition produced more influence on pills consumption by the participants than intervention one.

Hypothesis 3: There is no significant difference between mean scores of appointment-keeping recorded for participants in intervention one conditionsand the mean scores recorded for participants in intervention two conditions at 13thweek follow-up.

On a maximum scale of 9-points for appointment-keeping, the mean score for participants in intervention one conditions was $\overline{X}$=8.50, SE=0.07 or 94.3%, compared with $\overline{X}$ =8.90, SE=0.04 or 98.8% recorded for intervention two at 13thweek follow-up (See Table 4.24). The result of a one-tailed independent sample t-test for statistical significance showed that a significant difference ($p<0.0001$) thus exist between scores recorded for intervention two and intervention one, and had a large effect size (ES) of 0.96(95%CI: 0.56 to 1.35). (See Table 4.24) Therefore, based on these values, appointment-keepingmean score for intervention two is significantly different from mean score recorded for intervention one at follow-up, hence the null hypothesis was rejected. It can be said from the ongoing that intervention two conditions had more influence on appointment-keeping than intervention one.

Hypothesis 4: There is no significant difference between mean systolic blood pressure recorded for participants in intervention one conditionand the mean systolic pressure recorded for participants in intervention two condition at 13thweek follow-up.

The mean systolic blood pressure measurement for participants in intervention one conditions was$\overline{X}$=150.0, SE=0.67 compared with mean blood pressure measurement of134.2 mmHg(SE=0.46), recorded for intervention two at 13thweek follow-up (See Table 4.24). When the two systolic blood pressures were compared intervention two value was less than that recorded for intervention one. The result of a one-tailed independent sample t-test for statistical significance showed that a significant difference ($p<0.0001$) thus exist between scores recorded for intervention two and intervention one and had a large effect size (ES) of 3.68(95%CI: 3.07 to 4.30). (See Table 4.24) Therefore, based on these values, mean systolic blood pressure measurements for intervention two is significantly different from mean score recorded for intervention one at 13th week follow-up, hence the null hypothesis is rejected. It can be said from the ongoing that intervention two conditions had more influence on systolic blood pressure reduction than intervention one.

Hypothesis 5: There is no significant difference between mean diastolic blood pressure recorded for participants in intervention one conditionand the mean diastolic pressure recorded for participants in intervention two condition at 13thweek follow-up.

The mean diastolic blood pressure measurement for participants in intervention one conditions was$\overline{X}$=91.81, SE=0.54, compared with $\overline{X}$=86.5, SE=0.50recorded for intervention two at 13 weeks follow-up (See Table 4.24). The question, which intervention produced the better reduction in diastolic blood pressure is anwered by the test. The result of a one-tailed independent sample t-test for statistical significance showed that a significant difference ($p<0.0001$) thus exist between mean diastolic blood pressure recorded for intervention two and intervention one and had a large effect size (ES) of 1.36(95%CI: 0.94 to 1.80). (See Table 4.24) Therefore, based on these values, mean diastolic blood pressure measurement for intervention two is significantly different from mean score recorded for intervention one at follow-up, hence the null hypothesis was rejected. It can be said from the ongoing that intervention two conditions had more influence on reducing diastolic blood than intervention one.

Table 4.24Evaluating of the outcomes of the two educational interventions at 13th week follow-up against their respective baseline parameters.

VARIABLES	Intervention One N=57		Intervention Two N=55		***ES (95%CI)	p-value
	($\overline{X}$=SE)	±SD	($\overline{X}$=SE)	±SD		
Self-Reported Medication-Adherence* *(% or scale Points)*	83.0(0.01)% 12.5(0.14)	6.80% 1.02	96.0(0.006)% 14.4(0.09)	4.40 0.70	2.28(1.80 to 2.76)	0.000
Pill Count (%)	89.5(0.60)%	4.20%	94.0(0.53)%	3.90	1.08(0.68 to 1.48)	0.000
Appointment-Keeping**	94.3(0.01)% 8.50(0.07)	5.60% 0.50	98.8((0.01)% 8.9(0.04)	3.50 0.32	0.96(0.56 to 1.35)	0.000
Systolic Blood Pressure	150.0(0.67)	5.10	134.2(0.46)	3.40	3.68(3.07 to 4.30)	0.000
Diastolic Blood Pressure *(mm of Hg)*	91.8(0.54)	4.10	86.5(0.5)	3.70	1.36(0.94 to 1.80)	0.000
Pulse Rate *(Beats/Min)*	75.1(0.30)	2.60	73.8(0.37)	2.70	0.53(0.15 to 0.91)	0.000

**Measured on a 15-point scale; ** Measured on a 9-point scale. ***ES; effect size of the intervention between baseline and impact evaluation computed from Cohen's d, the corresponding 95% CI; and p-value is level of significance*

When the magnitudes of the effects of the changes which occurred as a result of the interventions were compared across the three experimental groups, it was observed from computations of differences between baseline and end-line at 13thweek follow-up, that control condition reported the least mean differences **(**$\Delta\overline{X}$),most which are not significant,for all parametrs of adherence and clinical outcomes.Intervention two condition recorded the highest mean differences **(**$\Delta\overline{X}$) for adherence and clinical outcomes. (See Table 4.25)

Similarly, when the overall effects of the two interventions were evaluated against control at 13thweek follow-up, the results in this study demonstrated that intervention two produced the greater influence on all adherence and clinical outcome variables than intervention one condition. (See Table 4.25)

Table 4.25 Changes in Outcomes between baseline and 13th week follow-up for Adherence measures and clinical outcome of blood pressure for the two educational interventions compared with control conditions.

VARIABLES	Control Condition N=57		Intervention One N=57		Intervention Two N=55	
	Difference between baseline and Outcome measures ($\Delta\overline{X}$)	**ES (95% CI)**	**Difference between baseline and Outcome measure** ($\Delta\overline{X}$)	**ES (95% CI)‡**	**Difference between baseline and Outcome measures** ($\Delta\overline{X}$)	**ES (95% CI)‡**
Self-Reported Medication-Adherence % *(Adjusted)*	1.2	0.27 (-0.10 to 0.64)ns	21.70	3.14 (2.60 to 3.70)	35.00	6.22 (5.81 to 6.63)
Pill Count (%)	0.71	0.16 (-0.21 to 0.53)ns	31.50	6.81 (5.86 to 7.76)	39.70	6.00 (5.14 to 6.87)
Appointment-Keeping (%)	5.4	0.45 (0.08 to 0.82)	35.60	3.76 (3.16 to 4.36)	40.1	4.52 (3.83 to 5.23)
Systolic Blood Pressure *(mm of Hg)*	-1.36	0.18 (-0.10 to 0.64)ns	-9.00	1.28 (0.88 to 1.68)	-23.6	3.37 (2.80 to 3.94)
Diastolic Blood Pressure *(mm of Hg)*	0.26	0.02 (-0.35 to 0.39)ns	-12.90	2.77 (2.26 to 3.28)	-16.9	3.40 (2.82 to 3.98)
Pulse Rate *(Beats/Min)*	-0.91	0.25 (-0.12 to0.39)ns	-5.30	1.68 (1.26 to 2.11)	-5.80	1.84 (1.61 to 2.10)

($\Delta\overline{X}$), *difference in mean scores for control condition and the interventions between their respective baseline and outcome;mean score differences with negative values indicates reduction; ES, effect size and 95%CI; ns –not significant;* ‡*all differences are significant at p<0.001*

Table 4.26Evaluationof differences in outcomes of the two educational interventions at 13 weeks follow-up against their control conditions.

VARIABLES	Intervention One N=57		Intervention Two N=55	
	Difference between Control and Intervention ($\Delta\overline{X}$)	**ES (95% CI)**	**Difference between Control and Intervention** ($\Delta\overline{X}$)	**ES (95% CI)**‡
Self-Reported Medication-Adherence *(Adjusted % Scale)*	19.7%	2.91(2.38 to 3.4)	32.7%	5.91(5.54 to 6.29)
Pill Count (%)	29.9%	6.86(5.88 to 7.8)	34.4%	8.13(7.0 to 9.27)
Appointment-Keeping*(Adjusted)*	30.2%	3.31(2.74 to 3.9)	34.7%	4.10(3.44 to 4.76)
Systolic Blood Pressure	-4.04	0.68(0.30 to 1.1)	-19.8	3.67(3.06 to 4.30)
Diastolic Blood Pressure *(mm of Hg)*	-12.2	1.21(0.81 to 1.6)	-17.5	1.78(1.34 to 2.22)
Pulse Rate *(Beats/Min)*	-3.5	1.12(0.72 to 1.5)	-4.8	1.54(1.11 to 1.97)

($\Delta\overline{X}$*), differences in mean scores between the outcomes of control and the interventions; ES, effect size and 95%CI;mean score differences with negative values indicates reduction;*‡*all p-values expressed <0.001*

4.7 Results of Key Informant In-depth Interviews

In order to classify the discussion materials into an effective number of categories that represent similar meanings, the results have been organized within three major themes: 1) Clinical diagnosis of hypertension with a sub-theme of *clinic attendance and challenges,* 2) Key Informants' Perspectives of the Health Education Intervention(HEI) conducted which has four sub-themes*;* Patients' recall of the intervention at 12 months follow-up, difficulties or challenges encountered during follow-up period with regards to health condition, appointment-keeping and medication adherence. Influence of the intervention programme on respondent's perspectives in regard to their condition or appointment-keeping or medication-adherence. Suggestions for improvement of the intervention for better outcome in the future and 3) implications of incorporating such programmes within clinic activities, having two sub-themes; how Patient education is organized in the health facilities to facilitate self-management, organizing a structured patient education to facilitate better clinical outcomes and policy issues involved

Extracts from interview transcripts are used to illustrate the themes and experiences, and are identified by stakeholder status (Patient, social support, nursing staff, nurse administrator) and intervention groups (Intervention one Health Facility-I_1HF, Intervention two Health Facility- I_2HF).

Key Informant's Perspectives of the Health Education Intervention

1. *Patiens' Recall of the intervention at 12 months after follow-up evaluation*

All the patients invited to participate in the interview were able to recall the health education intervention which was conducted about a year previously. Similarly, both social support persons recalled the health education intervention which was conducted about a year previously;

> "…*a health education programme was conducted in the clinic last year sometime in March/April where you (Interviewer) and some other people interacted with us and*

informed us about the benefits of persistent taking of our medications for high blood pressure and meeting appointments with the doctors. The programme included how to take the drugs and results of not taking medications…" (Patient-Male, I_2HF).

"*…there was a health education programme carried out here in this clinic in which I participated along with other patients last year around march…"(Patient-Female, I_2HF)*

"*…a health education programme conducted about a year ago on how to take medications prescribed and the consequences of not taking medication for hypertension regularly. We were told failing to take these medications will result to serious high blood pressure which can kill..." (Patient-Male, I_1HF)*

During the intervention, the nursing staff from the clinics assisted in tracking and mobilizing the patients for the health education sessions at the two centers. They were also involved in implementing the one-on-one personal counselling sessions to the clients and their social support;

"…assisted in getting the patients organized and preparing them to be here every week during the time of the health education programme…" (Clinic Nurse, I_1HF)

"…assisted in providing counseling sessions on a person-to-person and measuring their BP and pulse rate for the programme..." (Clinic Nurse, I_2HF)

2. *Difficulties or challenges encountered during follow-up period with regards to health condition, appointment-keeping and medication adherence*

Reflecting on difficulties and challenges during the follow-up period experienced by patients seem to be on availability of prescribed medications when they need to refill because they now realize that stopping medication is at certain risk to them. The challenge experienced was to find sources where these brands are always available;

"*…my biggest challenge sometimes medications are not available in the pharmacy and I have to go to chemist shops to buy them…" (Patient-Male, I_1HF).*

"...the drugs are expensive and sometimes not available in the chemist shops, but I

have been able to locate pharmacy shop where they have my medicines…".(Patient-Female, I_2HF).

"…the number of patients in the clinic can be a lot and they have to wait…" (Clinic Nurse, I_2HF).

Influence of the intervention programme on respondent's perspectives in regard to their condition or appointment-keeping or medication-adherence

Again reflecting on the overall impact of the programme on key-informants' perspective of their conditions, medication adherence and appointment-keeping, they reported that the programme had positive impact on them. The patients interviewed stated that the outcome of treatment has been good at follow-up. Expressing their personal assessment of the intervention programme, the key-informants all commented that it was good and enabled them to understand the value of regular medication in the treatment of hypertension and helped them to resolve to adhere to their treatment regimens. In expressing their opinions about the programme, some stated that all they needed was someone to explain clearly the far reaching implications of their conditions and show how taking the drugs will help control their blood pressure. The responses are a demonstration of the value of a structured health education and counseling on outcome of hypertension treatment;

"…able to understand how the medicines can control blood pressure and what can happen to a person who is not taking the medicines regularly. I think the programme was useful". (Patient-Female, I_2HF).

"…now I clearly understand why I should not joke with my medications". "I understand better the nature of my condition and how it may become better or worse. I do not have to die of heart problem or stroke". "Everything about the treatment I am taking is reasonable". I now understand that appointment with the clinic is important to monitor the progress of treatment". (Patient-Female, I_2HF)

"…the programme was an eye-opener a life saver. If I did not receive the programme

probably my condition would be bad now. I am encouraged by what is happening to me now. I am able to link the drug activities with blood pressure control…" (Patient-Male, I_2HF)

"*…since being on the drugs regularly, she has not had any problems and her blood pressure is better than it was last year." (Social Support-Male, I_2HF)*

"…"I have taken it upon myself to go through this together so I have to put it into my daily routine to remember". "…the daily responsibility of being actively involved with her treatment" (Social Support-Female, I_2HF)

"*…The programme revealed so much about my condition…as has been told that failing to take medication may result to stroke; we were encouraged to take our medications regularly and further explained how the drugs work to reduce blood pressure." (Patient-Female, I_1HF)*

"…I gained a lot about why the drug am taking is useful for my condition, why I should not stop it except the doctor says so". "All I needed was someone to show me how taking the drugs will help stop my bp from being high". (Patient-Male, I_1HF)

In respect of the patient's condition and the outcome of consistent and persistent treatment, the social support seem to agree that the programme provided an opportunity for them to get to know what high blood pressure is and the consequences of poorly treated condition. Furthermore, both social supports were emphatic that gaining insight into the condition of the patient has aroused a sort of concern to become involved:

"…I now know that the drugs can control the pressure when it is taken regularly. We must not fail to take the medicines. I know that the patient can have many of the drugs at a time…" "…I now understand that appointment is very important because the patient need to be checked from time to time on how the drug is performing." *(Social Support, I_2HF).*

"*…having to understand why one should take the medication is very important. Now I*

understand, I want him to be ok. It is as if I am the one having the disease because I am always thinking about it." Social Support-Female, I_2HF).

"…most important thing here is for people like me to understand the nature of help we are giving to our loved ones. We are making it possible for them to live longer. Initially it was a burden to add extra load on my routine, but better because if anything should happen to her, it will affect me directly. So why not help now to avoid the trouble…" Social Support-Male, I_2HF)

Indicating their personal assessment of the intervention programme, the nursing staffs who participated commented that it was good and enabled the patents to understand the value of regular medication in the treatment of hypertension. However, the nursing staff noted that the programme gave the patients opportunity to ask questions about their conditions and treatments which they had not done with the clinic staff. The nursing staff also confirmed that the outcome of treatment has been good at follow-up even though some patients have not visited in a long time. It is possible that these patients have defaulted or have gone back from where they were referred. A number of the patients had complained about side effects of the drugs and cost of purchasing some of the medications:

"…thought it was a good programme but at the time, we were short-staffed some were on leave. The approach adopted was very patient-focused …" "…It was patient-focused and intense. The personal counseling session after medical consultations was reinforcing and effective." (Clinic Nurse, I_2HF)

"…with the initial orientation before the implementation… knew it was going to be effective; the programme was designed to help patients think seriously about the nature of their condition and make a decision about what they would desire happen. I was impressed with arrangement to follow up. The follow-up period show that it was different from what we do normally". (Clinic Nurse, I_1HF)

"…patients seem to be reluctant to ask detailed questions about their

treatment…andprefer to ask the nurses to explain their conditions and medications" (Clinic Nurse, I_1HF)

"*…treatment outcome is average to poor requiring follow up. Blood pressure measurements of some patients are controlled while some are borderline…Some come regularly but a few we have not seen in the last three months, maybe they have relocated. Some have complained of cost of the drugs." (Clinic Nurse, I_1HF)*

"…A number of them are no longer coming; may be they are attending clinics elsewhere. But the other patients that have not been exposed to the programme most are new patients have elevated blood pressure." (Clinic Nurse, I_2HF)

"…except coughing with a particular drug RAMIPRIL which has been changed or in some the dosage reduced…" (Clinic Nurse,I_1HF)

In expressing their opinions about the programme, the nursing staff confirmed that incorporating committed a member of the family to serve as social support actually made the difference and helped in achieving blood pressure control:

"…incorporating somebody to help them was a good way of approaching their treatment; it is motivating." (Clinic Nurse, I_2HF)

Implications of incorporating such programmes within clinic activities

How Patient education is organized in the health facilities to facilitate self-management

Exploring the perspectives of the nursing administrators and clinic nurses on how patient education is organized in the clinic revealed that it is expected that clinic nurses provide routine health education to inform patients. However, no structured patient education counseling is organized similar to what was implemented during the programme. It is the opinion of the clinic nurses focused patient education and counseling, even though it would take up time and more nursing staff, would produce lasting effects on the patients. Furthermore, incorporating such strategic health education programme into existing schedule would need administrative-level input.

"…what is being done in the clinic by providing information as in health talks may not be sufficient to produce any lasting effect as regularly done on clinic days. We are so short staffed in the clinic and so we have no time to carry out focused patient education and counselling as the intervention programme offered". (Clinic Nurse, I_2HF)

"…it would have been wonderful to have this approach here in the clinic but it would take a lot of staff for such focused patient care,…our clinic is always jammed packed with lots of patients seeking attention, so it may be difficult and slow…it would require strategic planning and implementation at administrative level…" (Clinic Nurse, I_1HF &I_2HF)

However in OOUTHSagamu, there is a community health unit with responsibilities for community health programmes. Similarly, at LUTH, Lagos there is an out-post community health facility at Pakoto, Lagos that conduct community health but not within the hospital complex;

"*…there is a community health unit that caters for health education and community clinical care for communicable diseases is in the complex. All nurses are able to provide health education. No special services are provided except the health talks given at the beginning of each clinic session." (Nurse Administrator, I_1HF)*

"…there is no designated unit within the hospital facility however; an outpost in Pakoto has a Health Education unit where all nurses with Public Health qualification are posted to serve at the community health center…"(Nurse Administrator, I_2HF)

"…if special group are employed to do this, it would mean extra burden on administration to finance so nurses employed should be able to do both clinical nursing care and health education function". (Nurse Administrator, I_2HF)

"...the hospital does not have specially designated nurses to perform this so every

nurse does it. Employing special health educators in the hospital would appear duplicating functions because of limited budget nurses regardless of their qualifications as general or post-basic is required to perform this aspect because it is believed that they can do it." (Nurse Administrator, I_2HF)

"…such a role exists but we have not thought of it as a specialized area since our nurses are able to provide patient education and counselling. The clinics are organized mainly for clinical care and we cannot afford focused patient education and counselling as your programme offered." (Nurse Administrator, I_1HF &I_2HF)
Organizing a structured Patient Education to facilitate better clinical outcomes and policy issues involved.

In regards to organizing a department to design and implement structured Patient Education to facilitate better clinical outcomes, there was agreement with the two nursing administrators that such a programme has it merits in facilitating effective clinical outcomes with patients in general and more specifically, those with chronic illnesses requiring long term treatment. The observed challenges are inherent system problems. However, there are administrative hurdles to overcome in establishing such departments at this time. There is some form of support facility offered by the social work department to provide some limited resources to assist patients in both health facilities where the intervention was carried out:

"…any change to be made in the present state of affairs in the hospital regarding this issue may require policy and approval from management…maybe in the future when the economy improves. No doubt focused patient education will be of immense benefits to patients with chronic illnesses that require persistence in medication and regular evaluation…" (Nurse Administrator, I_2HF)

"…present scheme of operation seems to be organized with nurses delivering health education in clinics. If there would be any need to change, this would have to go through policy change at management level…" (Nurse Administrator, I_2HF)

"…to change what is established sometimes maybe difficult especially with present

economic situation. The change will have to come from management. But I think the patients need the benefits of such a programme can offer them." (Nurse Administrator, I_1HF)

"…Social work takes care of patients with limited funds for treatment sometimes they link the patients to organizations they may provide charity…the number of patients in the clinic can be a lot and they have to wait…" (Nurse Administrator, I_2HF)

"…Social welfare organized by social work can assist in providing resources where it is critically needed." (Nurse Administrator, I_2HF)

Summary

There is an arrangement for patients to meet clinic appointments for follow-up evaluation of their conditions. Social supports who accompanied their relatives to assist in performing required errands such as filling prescription requests and payments to be made were a useful help. Similarly, nurses also reported being at hand to provide care by organizing initial health education on arrival and sorting case files for consultations. All KI recalled the health education programmes. Clinic Nursing staff were also involved in organizing session and implementing personal counseling sessions during the intervention period. Most important challenges reported were cost of refilling medication and availability of recommended medications. However, few adverse effects which were reported during the follow up period resulted in medication adjustments. The clinics were Short-staffed to enable focused health education and personal counseling as was done during the programme. The programme had positive impact on KIs' perspective of their conditions, medication adherence, appointment-keeping, as reported and better understanding of rationale for medication and appointments. The Clinic nurses in these facilities are expected to provide health education to patients on regular basis. Due to some of the inherent system issues, organizing any structured programme other than what is presently on ground would certainly require management input and policy directives.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

The hazards of sustained elevation of arterial blood pressure are well known and hypertension is considered to be one of the most important modifiable risk factor for cardiovascular morbidity and mortality. Many studies have confirmed that individuals of black ethnic decent are more susceptible to developing and sustaining high blood pressure than Caucasians (Kaufman, et al. 1999). It is also well known from studies that substantial number of individuals with high blood pressure appears to be ignorant of their health conditions and only seek medical attention when severe symptoms appear and persist. Even when treatment for hypertension is commenced, substantial proportions of these patients do not take their medication as they ought to for the control of their condition. Effective treatment modalities for the control of hypertension are available, however non-adherence pose a serious challenge to medical therapeutics of hypertension. Evidence-based health education interventions that can optimise patients' adherence to medication and appointment-keeping are few in Nigeria. On the basis of the evidence from systematic reviews of studies suggesting the need to develop innovative and effective theory-based health education programme that can be adopted in outpatient clinics, this study was conceived.

The purpose of this study was to evaluate the outcomes of two innovative theory-based health education interventions;Patient Education and Counselling (PEC) and a combination of PEC and Family Support (PECSS) on medication-adherence andappointment-keeping behaviours and consequently the clinical outcome of systolic blood pressure reduction among hypertensive patients in selected tertiary health facilities in South-westernNigeria. The health education interventions involvedhealth educator/nurse-administered patient-centred patient

education and counseling with family support that would not only arouse awareness of risks of failing to take medications regularly but provide social support for the patient, thus facilitating medication adherence among hypertensive patients in the medical outpatient department of the selected tertiary health facilities.

Itshould be borne in mindthat, those methodological approaches that particularly rely on the use of behaviour theories, provides empirical validity for the results obtained.It is essential in any behaviour change study, to apply behaviour change theories to guide conceptualization and implementation of programmes. An important feature of this intervention is the application of the PRECEDE meta-model in conceptualizing the design of the two health education programmes.In the design of this intervention, the model defines the theoretical constructs through which the variables related to personal-level factors and environmental-level factors in medication adherence in hypertension treatment are operationalized. Furthermore, the study which was a two arm quasi-experimental design with a control, addressed predisposing, reinforcing and enabling factors involved in medication adherence in order to influence medication adherence, appointment-keeping and clinical outcomes of blood pressure control.

5.2The Effects of the Health Education Interventions on Adherence and Clinical Outcomes

The intervention was implemented in four distinct phases with pre-intervention phase and the baseline defining the first phase, the second phase of implantation of PEC and PECSS ending with an impact evaluation and a follow-up phase ending with 13th week outcome evaluation. At twelve months following the end of outcome evaluation, a key informant in-depth interview was conducted to ascertain perspectives of the stakeholders regarding the intervention programme and its outcomes. The results reported in the preceding chapter are discussed in this chapter and implications derived.

5.2.1Baseline Results

The study explored all personal-level (predisposing factors) and environmental-level (reinforcing and enabling factors) variables defined by the conceptual model including

demographic characteristics of the participants in the study. The study showed that at baseline, there were no significant difference in the distribution of important demographic characteristics such as age, educational attainment (non-formal p=0.4 and formal p=0.6), the distribution of females (p=0.18) between the experimental groups and control group.The implication of this is that all groups were matched at baseline in terms of demographic characteristics, except that there was a significant difference in the distribution of men ($p<0.05$). Similarly, there were no significant differences in predisposing factors related to Knowledge (p=0.42), all aspects of perception sub-domain ($p>0.05$), attitudinal disposition (p=0.50) as measured at baseline. (See Table 4.2) The implications of this result are that for all groups, the participants were matched at baseline for personal-level predisposing factors. The study measured at baseline reinforcing and enabling factors involved in medication adherence defining the environmental-level factors likely to influence the outcome variables and the results also revealed that all the groups were matched since there were no significant differences for reinforcing (p=0.39) and enabling (p=0.88) factors. (See Table 4.4) At baseline, there were no significant differences in outcome measures among the three groups in respect of primary and secondary outcomes of SRMA, AK and blood pressure values ($p>0.05$). (See table 4.5)

A number of implications may be observed for findings in this study at baseline. Measures for SBP confirmed that the participants had elevated blood pressure, SRMA on average was about 60% when adjusted from the 15-point scale to percentage of scores; and when compared with pill count of 58.9% appear to validate SRMA very well. This result is important because it showed that medication adherence was below optimal level required to control blood pressure of the participants just before the intervention began and is consistent with findings from other studies which puts medication adherence at between 30% and 78% (DiMatteo, 2004; Viswanathan et al, 2012).

Evaluating the results for knowledge measured on a 23-point scale, showed that all knowledge scores recorded for the three groups when translated to percentages of maximum scores, was average scores. (See table 4.2). This observation was made for all variables defined by the predisposing factors involved in medication adherence and appointment-

keep.This is in keeping with factors identified that may seriously influence medication adherence. The findings in this study are consistent with that of Ogedegbe (2008) who confirmed that patients' beliefs about hypertension and its treatment are important factor in the control of blood pressure.

5.2.2 Impact Evaluation

A number of research questions were raised in this study among which was to find out the extent to which the two interventions will affect predisposing, reinforcing and enabling factors involved in hypertension treatment among the participants. At immediate-post intervention, the impact of the intervention was measured for personal-level predisposing factors and environmental-level reinforcing and enabling factors involved in medication adherence and appointment-keeping. Interestingly, all variables were influenced.Comparing measures derived for control and the two intervention groups respectively for these variables, showed significant differences between the groups for all the variables. (See Table 4.7) The impact of the intervention for the two experimental groups as measured by the effect size (ES) as defined by Cohen's d, for all the variables in predisposing factors showed large effect size that was significant at 95% confidence.(See Tables 4.10 and 4.11) However, changes for control group compared with baseline values recorded only a small effect size for each variable that was not significant.(See Table 4.9)

Educational approaches appear to be most effective in influencing predisposing factors improving the patients' understanding of the nature of the disease, consequences of poor medication regularity, and the over all attitudinal dispositions for engaging hypertension treatment.The results in this study are consistent with findings of other investigators who have demonstrated the relevance of personal-level factors such as health literacy, knowledge, perceptions, beliefs about illnesses and their treatment on medication adherence (Olubodun, et al., 1990; Nutbeam, 2000; Erhun, et al., 2005; Schuz, et al., 2011; Omeje and Nebo, 2011; Adeyemo, et al., 2013; Van Steenis, et al., 2014; Rajpura and Nayak, 2014).

Reflecting on the programme during the KIIs 12 months after follow-up, some of the participants stated that all they needed was someone to explain clearly the far-reaching implications of their conditions and show them how taking the prescribed drugs will help

control their blood pressure. The responses from these participants are a demonstration of the value of a structured health education and counseling on outcome of hypertension treatment;

> *"…able to understand how the medicines can control blood pressure and what can happen to a person who is not taking the medicines regularly. I think the programme was useful". (Patient-Female, I_2HF)*

> *"…now I clearly understand why I should not joke with my medications". "I understand better the nature of my condition and how it may become better or worse. I do not have to die of heart problem or stroke". "Everything about the treatment I am taking is reasonable". I now understand that appointment with the clinic is important to monitor the progress of treatment". (Patient-Female, I_2HF)*

The study also explored how reinforcing and enabling factors involved in hypertension treatment may be influenced by the intervention. Immediate post intervention evaluation of level of reinforcing factors showed that experimental one and experimental two groups were significantly impacted by the intervention unlike control that reported very small change from baseline. (See Table 4.12) Similarly, enabling factors reported by participants in the control, experimental one group and experimental two groups, measured at post immediate intervention and compared with baseline to derive the impact of the intervention showed that the effect size for control was small and was not significant, compared with the effect size computed for intervention one group and intervention two groups respectively.

Furthermore, comparing the impact of the intervention on both experimental groups showed that experimental two group results was better for reinforcing factors with larger effect size of 4.76(CI95%: 4.04 to 5.48) than experimental group one with 1.88(CI95%: 1.44 to 2.33). (See Table 4.12) This is expected because intervention two incorporated social support as offered by a family member. Combining educational strategy with social support provided the reinforcements offered by the behavioural techniques as predicted by the conceptual framework. As can be seen from the results at immediate-post intervention for experimental two group, which incorporated reinforcements as reminders offered by a family member,

encouragements and other support needed to drive adherence, the findings showed that reinforcement was more prominent in this group than in experimental one group or control.

Reflecting on the overall impact of the programme on Key Informants' perspective reported that the programme enabled them to understand the value of regular medication in the treatment of hypertension and helped them to resolve to adhere to their treatment regimens:

> *"…able to understand how the medicines can control blood pressure and what can happen to a person who is not taking the medicines regularly. I think the programme was useful". (Patient-Female, I_2HF)*

> *"…now I clearly understand why I should not joke with my medications". "I understand better the nature of my condition and how it may become better or worse. I do not have to die of heart problem or stroke". "Everything about the treatment I am taking is reasonable". I now understand that appointment with the clinic is important to monitor the progress of treatment". (Patient-Female, I_2HF)*

Some of the patients interviewed experienced some difficulties in purchasing their medications as these were out of stock and also expensive but since they had been counselled not to stop their medication it became a challenge they had to overcome:

> "…*my biggest challenge sometimes medications are not available in the pharmacy and I have to go to chemist shops to buy them…" (Patient-Male, I_1HF)*

> *"…the drugs are expensive and sometimes not available in the chemist shops, but I have been able to locate pharmacy shop where they have my medicines…"(Patient-Female, I_2HF)*

Some complained of adverse drug reactions during the follow-up period, but had their medications adjusted to enable them maintain adherence.

> *"…except coughing with a particular drug RAMIPRIL which has been changed or in some the dosage reduced…" (Clinic Nurse,I_1HF)*

5.2.3Outcome Evaluation at 13th week follow-up

The study sought to find out the extent to which the two interventions will affect medication adherence and appointment-keeping in hypertension treatment among the participants. Furthermore, the study also sought to find out which of the two interventions will be more effective in influencing medication adherence, appointment-keeping and control of blood pressure. Theoutcome of the intervention at 13th week follow-up on medication adherence, appointment-keeping and clinical outcomes showed significant differences betweenthe two experimental groups and control. (See Table 4.19) When self-reported medication adherence measures, pill count, appointment-keeping and blood pressure control were evaluated for each group between baseline and 13th week follow-up, it was observed that no significant changes occurred for control in respect of these outcome variables. (See table 4.20)

However, there was a significant difference in appointment-keeping for control group with respect to baseline. When changes in SBP with respect to baseline measure were evaluated, it was observed that a reduction in SBP of 1.36 mmHg was recorded and was not significant. (See Table 4.25) It was hypothesized that there will be a significant difference between SRMA scores of participants in experimental two and score reported for participants in experimental one group at 13th week follow-up. Results of test of this hypothesis was sustained because medication adherence recorded for experimental two was better than that recorded for experimental one group at $p<0.0001$. (See Table 4.24) Similarly, the Results of test of this hypothesis involving appointment-keeping was sustained because appointment-keeping recorded for experimental two was better than that recorded for experimental one group at $p<0.0001$. (See Table 4.24)

At 13th week follow-up, experimental group one showed significant differences in all outcome variables with large effect size for each variable. (See Table 4.20) There was a corresponding reduction in SBP of 9.0 mmHg which was significant. Again, the study recorded for experimental group two a SBP reduction from baseline of 23.6 mmHg which was significant. (See Table 4.25) It was hypothesized that there will be a significant

difference between mean SBP recorded for participants in experimental two group and that recorded for experimental one group. The test of this hypothesis was sustained because SBP reduction recorded for experimental two was better than that recorded for experimental one group at $p<0.0001$.

The study hypothesized that intervention two will produce better outcomes in respect of medication adherence and SBP reduction than intervention one. From all indications and comparing the magnitude of changes (Δ) derived for intervention two and one for all outcome variables, it will be observed that intervention two results were significantly higher. (See Table 4.25) The results have been adequately predicted by the pathways defined by the conceptual framework. Therefore, this study provides conceptual grounding for designing health education programmes around theories of health behaviours. The main strength of this study lie in the combination of both educational and behavioural interventions guided by an ecological model to address antecedent factors involved in hypertension treatment, which in turn facilitated changes in adherence and clinical outcomes. Furthermore, the results in this study represent test of the concepts and theories that guided the design and implementation of the study.

5.2.4Contributions of the Study to Body of Knowledge

This study was designed to address poor medication adherence issues identified from literature which has persisted and constituted a primary reason for poor treatment outcomes in the management of hypertension in Nigeria. Given that a significant proportion of population of patients with hypertension do not take their medications appropriately, for the various reasons documented in literature, and morbidity and mortality continues to rise, this study makes the following distinct contributions to existing body of knowledge as an attempt to provide solution for poor medication adherence;

1. The study is an intervention adopting quasi-experimental design with a control, in which the PRECEDE model was used to design the PEC programme and PECSS that was implemented. Literature search yielded only two intervention studies related to improving medication adherence among individuals with hypertension in Nigeria. These studies were not designed based on any health behaviour theory and did not employ controls.

Studies related to health behaviour, in order to be considered empirically sound should be grounded in behaviour theory. Therefore this study would be considered an important addition to other literatures in Nigeria as a result of the rigour involved in adopting health behaviour theoryin the design.

2. The study sample size was determined by considering 90% power of detecting 30% difference of adherence and clinical outcomes between intervention groups and control, as defined by baseline , with 95% confidence (two-sided).
3. The focused PEC with social support intervention implemented demonstrated a number of distinct defining characteristics which distinguished it as innovative because it strategically incorporated counselling activities which provided clearer understanding of the etiologic mechanism in the development of the disease, rationale for treatment, complications that may arise as a result of not following recommended treatment satisfactorily and changes in quality of life as a result of disabilities arising from poor treatment outcomes.
4. The results obtained in this study validate the pathways predicted by theory through which the interventions would successfully influence the behavioural and clinical outcomes. Therefore, it constitute a test of concept to validate the use of theory and particularly, the PRECEDE model. To date, there has been no comprehensive behaviour theory-based intervention to improve medication adherence in hypertension treatment in Nigeria.
5. Furthermore, the results presented in this study provides validity for the use of self-reported medication adherence measure to determine medication adherence as this compared favourably with pill count for all groups at baseline and at 13th week follow-up.

5.3 Conclusion

Considering the worsening blood pressure profile of Nigerians documented in literature over the passing decades and the predictions of more grim situations for the future, in order to contain the emerging epidemic of hypertension in the population and improve blood pressure control, there is a need to adopt a more deliberate and intensive approach to address this health problem in the healthcare system. Since it has been pointed out that medication adherence is a serious challenge in medical therapeutics for blood pressure control, therefore more evidence-based approach need to be adopted such as provided by this study. Consistent

blood pressure control requires that patients with hypertension follow their medication strictly and keep their appointment for regular evaluation of their conditions. The combined PECSS strategies ofintervention two had more significant impact on personal-level factors of predisposing, reinforcing and enabling factors involved in medication adherence and appointment-keeping leading to improved adherence and reduction in blood pressure. However, a number of lessons have been learned which includes the use of behaviour theory to design and implement health education research and programmes. This methodological approach has more merits because it provides rational basis for implementing intervention and strengthens any evidence derived from the study.

5.4Recommendations

It is with the foregoing conclusion in mind that the following recommendations are made. These have taken into consideration both practical issues in programme design,policy implications and logistics of modification of existing health education to accommodate the following recommendations:

1. Since the study revealed unsatisfactory levels of knowledge and perceptionsabout hypertension issues and treatment requirements among participants at baseline with poor medication adherence, and the intervention applied improved these personal-level factors, there is an urgent need to modify how patient education and counseling is implemented at clinics. Therefore, the study recommends that there should be more focused health education at clinics rather than the casual general health-talk model that is usually presented before consultations with the physicians.
2. Since one of the identifying characteristics that defined the effectiveness of the interventions appear to be in the benefits of the role played by social support offered by a family member in facilitating medication adherence and reduction in SBP, this study therefore recommends that family-support be incorporated in patient education strategies for effective control of hypertension.
3. Given the all-important role policy plays in the macro-social environment and systems, the outcome of this study provides the evidence required to inform policy regarding required policy reforms in the health systems. The study further recommends as a matter to be consider at policy-making level, to modify patient education and counseling strategies to adopt a more patient-focused approach, as evidenced by this study. It

recommends the establishment of functional health education units in hospitals and clinic where programmes such as this can be integrated with clinic consultations to provide more patient-focused and structured patient education and counseling with social support in order to produce the type of results documented in this study.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE

KNOWLEDGE, PERCEPTION AND MEDICATION-TAKING AND APPOINTMENT-KEEPING BEHAVIOUR OF HYPERTENSIVE PATIENTS AT IN THREE NIGERIAN TERTIARY HEALTH FACILITIES

Dear Respondents,

Greetings; I am a doctoral student from the department of Health Promotion and Education, Faculty of Public Health, College of Medicine University of Ibadan conducting an intervention to improve knowledge of hypertension, perception of benefit of medication in hypertension and medication-taking behaviour among individuals that have been diagnosed to have raised blood pressure. The study will involve Patient Education with counselling for four one-hour a week session during your clinic days. Please note that the completion of this questionnaire is entirely **voluntary**. All information gathered as a result of your participating in this study will be treated with utmost confidentiality. Your willingness to complete the questionnaire implies you have given consent to participate. Thank you for cooperating.
Kindly indicate willingness to participate by ticking in the BOX [ ].
Nnodimele Atulomah.

SECTION A: DEMOGRAPHIC CHARACTERISTICS
Kindly tick [√] in the appropriate space(s) representing you honest response(s) to the following questions.

1 **Gender:** 1. Male [ ]; 2. Female [ ]
2 **Age of Respondent at last birthday *(Years)*:** _____ years.
3 **Ethnicity;** 1. Yoruba [ ]; 2. Igbo [ ] ; 3. Hausa [ ] 4. Others Specify----------
4 **Educational attainment:** 1. Non-Formal [2. Primary School [ ];
3. Secondary School [ ]; 4. Post-Secondary, [ ]; 5. University Education, [ ];
5 **Occupational Status:** 1. Currently employed Full-Time 2. Employed Part-Time [ ];
3.Currently Unemployed [ ]; 4. Retired from active employment [ ]
6 **Nature of Occupation:**1.Civil Servant[ ]; 2. Business person Self -employed [ ];
3. Professional [ ]; 4. Housewife [ ]; 5. Retired [ ].
7 **When was your condition diagnosed?** . _____Months _____Weeks Ago
8 **Your last Blood Pressure reading was**. Systolic: _____mm Hg; Diastolic: _____mmHg
9 **Your last Pulse Rate was**:_____per Minute.

SECTION B: KNOWLEDGE ABOUT HYPERTENTION AND MEDICATIONS

Kindly tick **[√]** in the appropriate space(s) representing you honest response(s) to the following questions.

10. Hypertension begins with little or no symptoms. 1. Yes [ ]; 2. No [ ].

11. Hypertension can be cured. 1. **Yes [ ]; 2. No [ ]**.

12. Hypertension is cured when there are no symptoms while on medication.

1. **Yes [ ]; 2. No [ ].**

13. Which of the following is associated with Hypertension? 1. **Low Blood Pressure [ ];**
2. Raised Blood Pressure [ ]; 3. Normal Blood Pressure[ ].

14. For medication to be effective, recommended drugs should be taken: 1. **occasionally [ ];**
2. All of the time [ ]; 3. None of the time [ ].

15. Poorly treated hypertension may lead to; 1. **No harm at all [ ];**
2. Damaged end- organs [ ]; 3. Natural recovery [ ].

16. List three symptoms associated with hypertension? .

a. _____.

b. _____.

c. _____.

17. Which dietary restrictions accompany antihypertensive treatment

1. **Salt intake restriction [ ];2. Fat intake restriction [ ];**
3. Vitamin intake restriction [ ]; 4. Water intake restriction [ ].

18. Not regularly taking prescribed medications in hypertension can produce serious health problems: 1. **Yes [ ] ; 2. No. [ ]**

19. Missing your blood pressure medicines on a regular basis can result to which of the following conditions? *(You may choose more than one answer)*

1. **Serious Head- aches [ ]; 2. Feeling hungry all the time [ ]; 3. Possible Stroke [ ]; 4. Easily getting tired on exertion [ ]; 5. Feeling of much vitality [ ].**

20. Which of these conditions may result from not taking medication adequately? (*You may choose more than one answer*)

1. No harm[ ]; 2. Increased vitality [ ]; 3. Blood pressure would rise [ ]; 4. Possible stroke [ ]

21. When blood pressure treatment is strictly adhered to, which of the following would happen?

1. Blood pressure will increase [ ]; 2. Blood pressure will not be high [ ]; 3. Nothing will happen to the blood pressure. [ ].

22. Which one of the following may apply in hypertension? (*You may choose more than ONE answer*) 1. Hypertension has no known cause [ ]; 2. What a person eats could be a factor that may contribute in establishing hypertension [ ]; 3. Sustained stress may be involved in establishing **hypertension [ ]; 4.Poor medication taking may result in poor control of blood pressure. [ ];**

23. Which of these apply to the nature of the treatment of hypertension? (Only one response is required here) **1. Treatment for hypertension is life-long [ ]; 2. Stop when symptoms no longer appear [ ]; 3. Stop when blood pressure returns to normal.**

SECTION C: PERCEPTION OF HYPERTENSION SUB-SCALES

A number of things have been said about hypertension and the consequences of poor medication. The following statements are some; tick **[√]** in the appropriate column to indicate your views/opinion with regards to the subject matter as reflected in the statements below. You are to consider the response to each statement in terms of **SD = Strongly Disagree, D = Disagree, A = Agree and SA = Strongly Agree**.

	Perceive Seriousness of hypertension	**Response categories.**			
		SD	**D**	**A**	**SA**
24	I think that a person with hypertension which is not well treated is likely to result to serious health consequences.				
25	I am inclined to believe that there is no serious risk of a hypertensive event if I miss my medication.				
26	I think when there is elevation of blood pressure for any extended period of time, it calls for prompt medical attention because this condition may develop and harm the individual.				
27	I have not thought of hypertension as a serious health condition requiring serious medical attention.				
28	I do not think that constant blood pressure checking is necessary in hypertension.				
29	I am inclined to think that once symptoms of hypertension are absent, the condition is cured.				
30	It is dangerous for me to skip my hypertension medication for any extended period of time.				
	Perceived Susceptibility to complications of hypertension and Poor Medication Sub-variables .				
31	I think every person can experience the complications of hypertension as a result of not taking appropriate medications.				
32	If I am not taking my medications regularly, I can be affected adversely by hypertension.				
33	It does not really matter about dietary restrictions when it comes to hypertension treatment goals.				
	Perceived Benefits of taking recommended medication in hypertension				
34	I cannot see any improvement in my condition as a result of the medication I am taking.				
35	I have confidence that the medications I am taking will control my Blood pressure.				
36	Constant monitoring of my blood pressure is useful in my condition.				
37	I think that proper combination of hypertension drugs can control blood pressure adequately.				
38	Strict adherence to the doctor's instructions is important for controlling hypertension.				
39	I am taking my medications because I understand how these medicines can help in controlling my blood pressure.				

SECTION D: PERCEPTION OF SELF-EFFICACY TO TAKE RECOMMENDED MEDICATIONS IN HYPERTENSION

The following statements refers to how confident you are in taking your medications for the treatment of hypertension; tick **[√]** in the appropriate column to indicate how effectively you can follow the medication regimen. You are to consider the response to each statement in terms of **VC = Very Confident, C = Confident, CA = Confident but needing Some Assistance and NC = Not Confident at All.**

		Response categories.			
	Perceived Self-Efficacy in Medication Taking	**NC**	**CA**	**C**	**VC**
40	How confident are you to take all your prescribed antihypertensive medications regularly and at appointed time?				
41	How confident are you to identify your medications?				
42	How confident are you to remember to take your medication at appointed time?				
43	How confident are you in the effectiveness of the medications you are taking ?				
44	How confident are you to eat only low-salt foods?				

SECTION E: ATTITUDINAL DISPOSITIONS FOR TREATMENT ADHERENECE IN HYPERTENSION VARIABLES.

A number of emotions are aroused when certain subjects are raised, especially about hypertension and the consequences of poor medication. The following statements are some; kindly tick **[√]** in the appropriate column to indicate the way you feel about the subject matter as reflected in the statements below. You are to consider the response to each statement in terms of **SD = Strongly Disagree, D = Disagree, A = Agree and SA = Strongly Agree**.

	Attitudinal Dispositions Toward hypertension and Poor Medication Sub-variables .	**Response categories.**			
		SD	**D**	**A**	**SA**
45	I am apprehensive about complications that can result from uncontrolled Hypertension.				
46	I am willing to adhere to taking my antihypertensive medicine everyday as recommended for me in this condition.				
47	I am not really bothered about hypertension because it will go away with time.				
48	I am motivated to take my medicines because of advice from family members.				
49	I prefer using traditional herbs to treat this condition.				
50	I am not enthusiastic about the medication regimen I am on at the moment.				

	Value attached to Treatment adherence and health outcomes in hypertension				
51	I am motivated to take my medications because ofwhat I know the drugs can do for me in my condition.				
52	Controlling my blood pressure is the most important consideration to me now.				
53	I have no intention to invest time and money for the treatment of this condition.				
54	The treatment I am receiving is very important to my staying alive.				
55	I cannot afford to risk my health by not taking my medications as prescribed.				

SECTION F: REINFORCING AND ENABLING FACTORS IN HYPERTENSION TREATMENT OFFERED BY SOCIAL SUPPORT

The following statements refers to the nature and extent of support from family members you have received during your illness to facilitate treatment of hypertension; kindly tick **[**√ **]** in the appropriate column to indicate how much this has helped you to follow the medication regimen. You are to consider the response to each statement in terms of

SA = Strongly Agree, A = Agree, D = Disagree and SD = Strongly Disagree.

	Reinforcing Factors *(Emotional and Appraisal support)* subscale in Hypertension Treatment	**Response categories.**			
		SA	**A**	**D**	**SD**
56	No Family member has taken it as a duty to provide consistent care for me in my illness.				
57	Family members bring important information about my condition that encourages me to take my medication regularly.				
58	The love I am experiencing from family members has encouraged me to take my medications.				
59	Health care personnel are emotionally distant from me.				
60	At least one family member is willing to assist me in every way possible.				
	Enabling Factors (Tangible Services received) Subscale in Hypertension Treatment				
61	Financial resources to sustain my treatment are provided by me alone.				
62	A member of the family always assist in measuring my Blood Pressure				
63	No body to assist me run important Errands.				
64	A support group in the health care system provide medication subsidy for me, thus helping me cope with cost.				
65	I have someone who provides means of transportation to meet all my clinic appointments.				

SECTION F: MEDICATION ADHERENCE AND APPOINMENT-KEEPING BEHAVIOUR[1]

In this section you are required to kindly tick [√] in the appropriate column to correspond to your treatment /medication taking and appointment keeping activities in the last three months as a hypertensive. Please be as truthful as possible.

S/N	Medication-Taking and Appointment-Keeping behaviour Variables	Response Category.			
		None of the Time	Some of the Time	Most of the Time	All of the Time
66	How often do you forget to take your Blood Pressure medicines?				
67	How often do you decide not to take your High Blood Pressure medicines because you think you are better?				
68	How often do you stop your blood pressure medicines because you are experiencing side effects of the drugs?				
69	I am too busy to remember to take my medications.				
70	How often do you refill your prescription when it is finished?				
71	How often do you forget to meet scheduled clinic appointment with your healthcare giver?				
72	How often do you keep appointments scheduled by your doctor?				
73	How often do you miss scheduled clinic appointments?				

THANK YOU FOR ACCEPTING TO PARTICIPATE IN THIS STUDY.

[1] Adapted from the Hill-Born Compliance scale measure

APPENDIX 2

PILL COUNT INVENTORY SHEET

EFFECTS OF HEALTH PROMOTION INTERVENTIONS ON MEDICATION ADHERENCE AND APPOINTMENT-KEEPING AMONG HYPERTENSIVE PATIENTS IN THREE NIGERIAN TERTIARY HEALTH FACILITIES.

MEDICATION –TAKING INVENTORY FOR PILL COUNT
PRE-INTERVENTION COUNT (4 WEEKS)

S/N	No of drugs	Drug 1	Drug 2	Drug 3	Drug 4	Bp-1	Total Pills	Pill Count		Total Pills	Adhe. Score (%)
								1	2		
1											
2											
3											
4											
5											
6											
7											
8											

APPENDIX 3

FOCUS GROUP DISCUSSION GUIDE

Agenda for the discussion of major themes around the issue of Treatment Adherence in hypertension with regards to knowledge, perception and medication and appointment-keeping behaviour of participants.

The aim of this Focus Group is to uncover the experience, views and interpretation of events related to the disease conditions and treatment by participants with widely differing stakes and roles. It will be an opportunity for the patients to express their diverse and less prevalent views in order to provide a richer representation of the complexity of opinion and perspectives thereby obtaining a more complete picture of the experience of potential respondents in the study. This Focus Group Discussion will explore patient perspective about hypertension, treatment of hypertension, challenges the patients are experiencing and the various ways they can be assisted to gain more confidence from treatment and improve outcome of their treatment.

Preliminaries

- The moderator greets the participants warmly
- Proceeds to explain the purpose of the group discussion thus; to become well acquainted with certain issues surrounding their knowledge of hypertension, views, beliefs, feelings, and medication taking.
- Moderator seeks permission to record the discussions on tape for validating what the secretary has recorded on paper.
- Urges all participants to respond freely and assures that materials will be treated with utmost confidentiality.
- Moderator initiates self-introduction and encourage participants to introduce themselves.

Preamble

- What have been the challenges since the condition was diagnosed?

Probe Further: Are there any expectations since treatment began?
How far have these expectations been realized?
Do you think that this condition is curable?
What types of drugs were prescribed?

Probe Further: For what reasons were these drugs given?
Probe for dosages, contraindications and possible side effects.

Where do you get your medications? What instructions were given to you regarding taking your medicines?

Probe Further: What difficulties do you have understanding the instructions? Let us look at some of the instructions. (Mention)

What are the different things that you are asked to do concerning your treatment?
What things were you asked NOT to do concerning your treatment?

Probe Further: What things are difficulty to do and why?
Which of these things are easy to do and why? How will these difficulties affect your medication taking on a regular basis?

Describe the two proposed interventions;What is your opinion in respect of each intervention?

Which is likely to make hypertensive patients adhere better to medication taking and appointment keeping and why?

Probe Further: Which situation will make each of the interventions work better for hypertensive patients and why??
Which situations will not and why?

How would an intervention like this one proposed make hypertensive patients feel about missing appointments and their drugs? What suggestions do you have for inclusion in each intervention that would make each work better?Give a vote of thanks.

APPENDIX 4

IN-DEPTH INTERVIEW GUIDES

A. IN-DEPTH INTERVIEW GUIDE FOR CLIENT

Treatment Adherence in hypertension with regards to Medication and Appointment-keeping behaviour of patients.

Interviewee: _____ Designation: _____

Interviewer: _____ Date: _____

*Statements under **bold** headings are instructions/comments that the interviewer should provide to the Key informant (KI).*

[OTHER INSTRUCTIONS/COMMENTS INTENDED ONLY FOR THE INTERVIEWER ARE PROVIDED IN BRACKETS AND CAPS LETTERS AND SHOULD NOT BE READ TO THE KI].

Introduction

Thank you for agreeing to be interviewed. Your assistance and comments are valuable and important. This interview is informal, like a conversation.

Purpose

The aim of this interview is to find out what you think about the patient education intervention programme conducted to help patients improve their adherence to prescribed medication and appointment-keeping; and what could have been doneto assist them gain more confidence and improve the outcomes of their treatment.

I am very interested in all of your ideas, comments and suggestions. There are not right or wrong answers. Results from this interview will assist in making the final report of the intervention programme more comprehensive.

Procedure

This interview will last about 30 to 45 minutes. I will be taking notes and all information from this interview will be treated with utmost confidentiality. You may stop the interview at any time. As previously discussed, I will need your consent to proceed with the interview

[THANK KI FOR GIVING CONSENT TO DO THIS INTERVIEW AND PROCEED TO QUESTIONS]

1. Please kindly tell me what health condition brought you to this health facility?
   Notes:
   PROBE: How long have you had this condition?

2. Kindly describe what happens whenever you are here at this outpatient facility on a daily basis?
   Notes:
3. Kindly describe what have been your most difficult challenges since you were diagnosed of this condition?*Notes:*

   PROBE: How about treatment outcomes and your medications?

4. Can you recall the health education programme conducted sometimes last year?
   YES [ ] NO [ ]

   PROBE: Kindly describe what it was that happened?
   Notes:

5. What did you think about the programme?
   Notes:

   PROBE: Werethere any expectations you had for the programme? How far did the programme meet or not meet your expectations?
   Notes:

6. Are there difficulties you have encountered after the programme regarding medication-taking or appointment-keeping?
   Notes:

(a) Your Condition:

(b) Appointment-Keeping:

(c) Medication-taking:

PROBE:What things are difficulty to do and why?

7. Are there ways by which the programme has influenced your perspective in respect to your condition and medication- taking? How about attendance?
   Notes:

(a) Your Condition:

(b) Appointment-Keeping:

(c) Medication-taking:

PROBE: In your opinion, could there have been any other way the programme would have been better presented/carried out here?

Notes:

8. What suggestions do you have for future improvement of such interventions that would make patient adhere better to their condition and medication-taking?
   Notes:

9. We have covered very important details about your experiences with medication and the programme intervention. Is there anything else you believe I should know to make the interview more complete?
   Notes:

   [THANK THE INTERVIEWEE AND MENTION THATIT HAS BEEN VERY INFORMATIVE AND CLOSE].

   Demographic Characteristics

   Age of the Interviewee:

   Gender:

   Ethnicity:

B. IN-DEPTH INTERVIEW GUIDE FOR SOCIAL SUPPORT.CLIENT

Treatment Adherence in hypertension with regards to Medication and Appointment-keeping behaviour of patients.

Interviewee: _____ Designation: _____

Interviewer: _____ Date: _____

*Statements under **bold** headings are instructions/comments that the interviewer should provide to the Key informant (KI).*

[OTHER INSTRUCTIONS/COMMENTS INTENDED ONLY FOR THE INTERVIEWER ARE PROVIDED IN BRACKETS AND CAPS LETTERS AND SHOULD NOT BE READ TO THE KI].

Introduction

Thank you for agreeing to be interviewed. Your assistance and comments are valuable and important. This interview is informal, like a conversation.

Purpose

The aim of this interview is to find out what you think about the patient education intervention programme conducted to help patients improve their adherence to prescribed medication and appointment-keeping; and what could have been doneto assist them gain more confidence and improve the outcomes of their treatment.

I am very interested in all of your ideas, comments and suggestions. There are not right or wrong answers. Results from this interview will assist in making the final report of the intervention programme more comprehensive.

Procedure

This interview will last about 30 to 45 minutes. I will be taking notes and all information from this interview will be treated with utmost confidentiality. You may stop the interview at any time. As previously discussed, I will need your consent to proceed with the interview

[THANK KI FOR GIVING CONSENT TO DO THIS INTERVIEW AND PROCEED TO QUESTIONS]

10. Please kindly tell me why you are involved with the care of the patient?
    Notes:

    PROBE: Who is the patient to you and How long have you been involved with the condition?
11. Kindly describe what you do for the patient on a daily basis?

Notes:

12. Kindly describe what have been your most difficult challenges since you took up this role?*Notes:*

    PROBE: How about your work and other daily activities?

13. Can you recall the health education programme conducted sometimes last year?
    YES [ ] NO [ ]

    PROBE: Kindly describe what it was that happened?
    Notes:

14. What did you think about the programme?
    Notes:

    PROBE: Were there any expectations you had for the programme? How far did the programme meet or not meet your expectations?
    Notes:

15. Are there difficulties you have encountered after the programme regarding reminding and assisting in medication-taking or appointment-keeping for the patient?
    Notes:

(d) Your Condition:

(e) Appointment-Keeping:

(f) Medication-taking:

    PROBE: What things are difficulty to do and why?

16. Are there ways by which the programme has influenced your perspective in respect to your condition and medication- taking? How about attendance?
    Notes:

(d) Your Condition:

(e) Appointment-Keeping:

(f) Medication-taking:

PROBE: In your opinion, could there have been any other way the programme would have been better presented/carried out here?
Notes:

17. What suggestions do you have for future improvement of such interventions that would make patient adhere better to their condition and medication-taking?
Notes:

18. We have covered very important details about your experiences with medication and the programme intervention. Is there anything else you believe I should know to make the interview more complete?
Notes:

[THANK THE INTERVIEWEE AND MENTION THATIT HAS BEEN VERY INFORMATIVE AND CLOSE].

Demographic Characteristics

Age of the Interviewee:

Gender:

Ethnicity:

C. IN-DEPTH INTERVIEW GUIDE FOR CHIEF MATRON

Treatment Adherence in hypertension with regards to Medication and Appointment-keeping behaviour of patients.

Interviewee: _____ Designation: _____

Interviewer: _____ Date: _____

*Statements under **bold** headings are instructions/comments that the interviewer should provide to the Key informant (KI).*

[OTHER INSTRUCTIONS/COMMENTS INTENDED ONLY FOR THE INTERVIEWER ARE PROVIDED IN BRACKETS AND CAPS LETTERS AND SHOULD NOT BE READ TO THE KI].

Introduction

Thank you for agreeing to be interviewed. Your assistance and comments are valuable and important. This interview is informal, like a conversation.

Purpose

The aim of this interview is to find out how patient education is organized in the outpatient units to facilitate self-management of patients to improve their adherence to prescribed medication and appointment-keeping; and what can be doneto assist them gain more confidence and improve the outcomes of their treatment.

I am very interested in all of your ideas, comments and suggestions. There are not right or wrong answers. Results from this interview will assist in making the final report of the intervention programme more comprehensive.

Procedure

This interview will last about 30 to 45 minutes. I will be taking notes and all information from this interview will be treated with utmost confidentiality. You may stop the interview at any time. As previously discussed, I will need your consent to proceed with the interview

[THANK KI FOR GIVING CONSENT TO DO THIS INTERVIEW AND PROCEED TO QUESTIONS]

1. Please how long have you been in this health facility?
   Notes:

   PROBE FURTHER: Kindly state your present position in this health facility?

2. Is there a health education Unit in the Nursing department of this health facility?
   Notes:

   PROBE: Kindly describe what is organized for health education for the patient especially those attending the outpatient facility?

3. What are the most important challenges organizing patient education in this facility?
   Notes:

4. Just like Diabetes patients have support association (And I think glaucoma patients too) to assist in connecting resources such as information and subsidized drugs for their condition, is there such for hypertension patients?
   YES [ ] NO [ ]

   PROBE: Kindly describe how it operates here?
   Notes:

5. About a year ago, a health education programme was conducted to help patients understand the importance of using their medications regularly. How would such a programme be incorporated into the existing programmes in the clinical nursing system?
   Notes:

   PROBE: What supporting role would such a programme play in the over- all goals of the clinical nursing department; in terms of training nursing staff with additional skills (*Something like the special units such as clinical nursing audit; infection control unit)* to carry out patient education and counselling in the hospital?
   Notes:

6. Are there difficulties/complains or reports from your staff regarding their observations about patients' medication-taking experiences or appointment-keeping?
   Notes:

   PROBE:Do you have any suggestions of how improvements can be achieved with regards to patients':
   Notes;
   Conditions;

   Medication-taking;

   Appointment-keeping;

7. Are there ways by which you think such a PE programme I mentioned may play a role in influencing [DSCRIBE THE PE PROGRAMME IN MUCH DETAILS] patients' perspective in terms of their conditions and medication- taking?
   Notes:

Conditions;

Medication-taking;

Appointment-keeping;

8. We have covered very important details about how Patient Education is conducted in this health facility, the important ways additional resources may facilitate what is available to your department. Is there anything else you believe I should know to make the interview more complete?
   Notes:

   [THANK THE INTERVIEWEE AND MENTION THATIT HAS BEEN VERY INFORMATIVE AND CLOSE].

   Demographic Characteristics

   Rank of the interviewee:

   Age:

   Gender:

D. IN-DEPTH INTERVIEW GUIDE FOR STAFF

Treatment Adherence in hypertension with regards to Medication and Appointment-keeping behaviour of patients.

Interviewee: _____ **Designation:** _____

Interviewer: _____ **Date:** _____

*Statements under **bold** headings are instructions/comments that the interviewer should provide to the Key informant (KI).*

[OTHER INSTRUCTIONS/COMMENTS INTENDED ONLY FOR THE INTERVIEWER ARE PROVIDED IN BRACKETS AND CAPS LETTERS AND SHOULD NOT BE READ TO THE KI].

Introduction

Thank you for agreeing to be interviewed. Your assistance and comments are valuable and important. This interview is informal, like a conversation.

Purpose

The aim of this interview is to find out what you think about the patient education intervention programme conducted to help patients improve their adherence to prescribed medication and appointment-keeping; and what could have been doneto assist them gain more confidence and improve the outcomes of their treatment.

I am very interested in all of your ideas, comments and suggestions. There are not right or wrong answers. Results from this interview will assist in making the final report of the intervention programme more comprehensive.

Procedure

This interview will last about 30 to 45 minutes. I will be taking notes and all information from this interview will be treated with utmost confidentiality. You may stop the interview at any time. As previously discussed, I will need your consent to proceed with the interview

[THANK KI FOR GIVING CONSENT TO DO THIS INTERVIEW AND PROCEED TO QUESTIONS]

1. Please how long have you been in this health facility?
   Notes:

   PROBE FURTHER: As what?

2. Kindly describe what happens in this outpatient facility on a daily basis? Describe your role as a nurse-practitioner.
   Notes:

3. What are the most important challenges patients attending this outpatient clinic encounter with regards to their health conditions and treatment modality?
   Notes:

   [PROBE FURTHER ABOUT TREATMENT OUTCOME AND MEDICATIN ISSUES]

4. Can you recall the health education programme conducted sometimes last year?
   YES [ ] NO [ ]

   PROBE: Kindly describe the role you played.
   Notes:

5. What did you think about the programme?
   Notes:

   PROBE: Werethere any expectations from the programme? How far did the programme meet or not meet the expectations?
   Notes:

6. Are there difficulties you have observed from your patients after the programme regarding medication-taking or appointment-keeping?
   Notes:

   PROBE:Have they made any complains to you regarding difficulties with their:
   Notes;
   Conditions;

   Medication-taking;

   Appointment-keeping;

7. Are there ways by which you think the programme has influenced patients' perspective of their conditions and medication- taking?
   Notes:

   Conditions;

   Medication-taking;

   Appointment-keeping;

   PROBE: In your opinion, could there have been any other way the programme would have been better presented/carried out here?
   Notes:

8. What suggestions do you have for future improvement of such interventions that would make patents adhere better to their medication?
   Notes:

9. We have covered very important details about your patients' experiences with their medications and the intervention programme. Is there anything else you believe I should know to make the interview more complete?
   Notes:

   [THANK THE INTERVIEWEE AND MENTION THATIT HAS BEEN VERY INFORMATIVE AND CLOSE].

   Demographic Characteristics

   Rank/Position of the Interviewee:

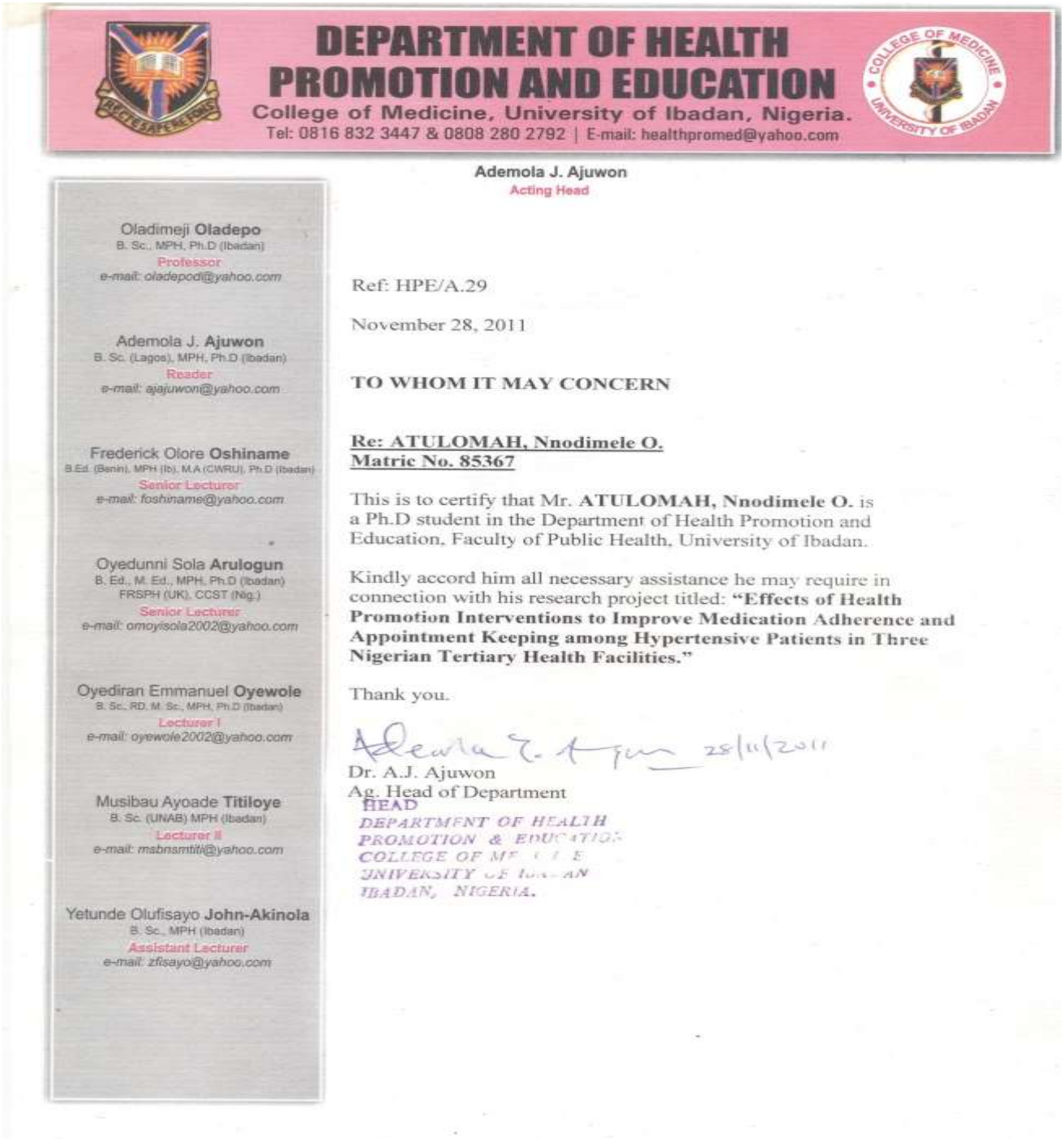
   Gender:

   Age:

   Ethnicity:

APPENDIX 5

LETTER OF INTRODUCTION FROM THE DEPARTMENT OF HEALTH PROMOTION AND EDUCATION



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B. Sc., MPH (Ibadan)
Assistant Lecturer
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Ref: HPE/A.29

November 28, 2011

TO WHOM IT MAY CONCERN

Re: ATULOMAH, Nnodimele O.
Matric No. 85367

This is to certify that Mr. **ATULOMAH, Nnodimele O.** is a Ph.D student in the Department of Health Promotion and Education, Faculty of Public Health, University of Ibadan.

Kindly accord him all necessary assistance he may require in connection with his research project titled: **"Effects of Health Promotion Interventions to Improve Medication Adherence and Appointment Keeping among Hypertensive Patients in Three Nigerian Tertiary Health Facilities."**

Thank you.

Ademola J. Ajuwon 28/11/2011

Dr. A.J. Ajuwon
Ag. Head of Department

HEAD
DEPARTMENT OF HEALTH
PROMOTION & EDUCATION
COLLEGE OF MEDICINE
UNIVERSITY OF IBADAN
IBADAN, NIGERIA.

APPENDIX 6

LETTER RELATED TO REQUEST FOR ETHICAL APPROVAL

DEPARTMENT OF PUBLIC HEALTH, BABCOCK UNIVERSITY,
ILISHAN REMO, OGUN STATE, NIGERIA.

March 4, 2013

Chairman,
Health Research Ethics Committee,
OOUTH, Sagamu.

Dear Sir/Madam,

CORRECTIONS ON APPLICATION FOR ETHCAL APPROVAL TO CONDUCT HEALTH EDUCATION RESEARCH

I write in response to your letter requiring the following amendments to be made in my research proposal application for ethical approval to carry out a health promotion research Titled: Effects of Health Promotion Interventions on Medication Adherence and Appointment-Keeping among Hypertensive Patients in Selected Tertiary Health Facilities in South-west Nigeria, in the Olabisi Onabanjo University Teaching Hospital, Sagamu.

Amendments;

1. Required to state the third tertiary institution,(Correction on p2; Aims & Objectives, p7)
2. Required to define the term "Hypertension", (Correction on p2 line one); and
3. Required to have both control and intervention groups in each institution.

The amendments (1) and (2) have been made in the proposal according to the pages stated and attached with this letter. However, I recalled that during the interactive session, it was agreed that for an intervention such as this, unlike drug clinical trial, to have both control and intervention groups in the same location would result in contamination since direct contact of participant will occur and information given to one group may be passed on to the others thus contaminating the study. Kindly grant this request.

Thank you.

Yours sincerely,

Nnodimele Atulomah

APPENDIX 7

ETHICAL APPROVAL

OLABISI ONABANJO UNIVERSITY TEACHING HOSPITAL, SAGAMU
P.M.B. 2001, SAGAMU, NIGERIA.

Chairman, BOM
cbom@oouth.com

Director of Administration and Secretary to the Board:
Mrs. A.O. Adebawo
B.A. MBA (IBUS, ADMIN)
Tel: 0802-388-5362; 0801-370-1703
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Ag. Chief Medical Director:
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MBBS (Lagos), FWACS (W. Afr.), FMCOph (Nig.), MNIM.
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cmd@oouth.com

Ag. Chairman, Medical Advisory Committee:
Dr. O.B. Ogunfowora
MBBS, FWACP (Paed).
Tel: 0805-038-0426; 0816-370-1057
E-mail: olufowora5@yahoo.com
cmac@oouth.com

Our Ref: OOUTH/DA.326//T/1 Your Ref: Date: 10th July, 2013

Dr. Nnodimele Onuigbo Atulomah,
Department of Health Promotion and Education,
Faculty of Public Health,
University of Ibadan,
Ibadan,
Oyo State.

Re: Effects of Health Promotion and Intervention on Medication Adherence and Appointment Keeping among Hypertensive Patients in Three Nigerian Tertiary Health Facilities in South-West Nigeria

I wish to inform you that OOUTH- Health Research Ethics Committee has granted you an approval to proceed on the above study following appropriate review.

2. You are to note that this approval is given on the basis of your corrected Protocol. Any proposed change in the protocol should be communicated to the Committee for consideration ahead of execution.

3. Kindly inform the Committee when the study is to commence to facilitate monitoring by designated representative(s) of the OOUTH Health Research Ethics Committee.

4. Please, regard this letter as the Certificate of OOUTH Health Research Ethics Committee Approval.

5. Many thanks.

Mrs. M. A. Osinleye,
Secretary, OOUTH-HREC
For: Chairman

SAVE A LIFE: DONATE TO OOUTH

APPENDIX 8

Informed Consent Form

OLABISI ONABANJO UNIVERSITY TEACHING HOSPITAL, SAGAMU
HEALTH RESEARCH AND ETHICS COMMITTEE (HREC)

CONSENT FORM

HREC approval number:_____
HREC Expiration Date: _____

Please tick one of the following:
You are an adult participant in this study [ ]
You are the parent or guardian granting permission for a child in this study [ ]
Are you participating in any other study? [ ]
Participant ID_____

A research study is designed to answer specific questions, sometimes about a drug's or device's safety and effectiveness. When you are a participant, the researcher will follow the rules of research study (protocol) as closely as possible, without compromising your health.
Title of the research: Effects of Health Promotion Interventions on Medication Adherence and Appointment-Keeping among Hypertensive Patients in Three Nigerian Tertiary Health Facilities in South-west Nigeria.

Name(s) and Affiliation(s) of researcher(s) or applicant(s):
(1). Nnodimele Onuigbo ATULOMAH,
(2). Professor Oladimeji OLADEPO
Department of Health Promotion and Education, Faculty of Public Health, University of Ibadan, Ibadan, Oyo State, Nigeria

Purpose of Research
You are invited to participate in a research study of health promotion interventions to improve Medication-Adherence and Appointment-Keeping among Hypertensive Patients attending the hypertension clinic at OOUTH in Sagamu South-west Nigeria. We hope to learn establish that with adequate health promotion and education patients with hypertension should be able to adhere to their treatment regime and benefit from the drugs their doctors have prescribed for them. You were selected as a possible participant in this study because you are a patient with hypertension and receiving treatment in this clinic.

Procedure of Research
If you choose to participate, the Protocol Director and his research study staff will describe all procedures to be followed.

1. You will receive counselling and Health education and promotion concerning hypertension, the type of drugs your doctor has prescribed for you and the importance of taking these drugs

regularly and visiting the clinic at appointment days. How can the programme assist you meet the challenges you are facing in meeting your adherence. You will also have opportunity to ask questions about your condition, and discuss issues pertaining to your treatment.

2. The research team would monitor your blood pressure during every health education session and may require you to fill questionnaires as a method of collecting very important information about what you are learning during the health education sessions.
3. The research team would also want to monitor the drugs you are taking, which has been prescribed by your Doctor, at every visit to the clinic.
4. You will be required to receive the health education sessions once every week for FOUR weeks.
5. Each session of the Health Education will only last ONE hour. If more time would be require, your express permission will be sort.
6. After the initial FOUR weeks of receiving the health education, we will require to meet with you every TWO weeks for a period of 6 weeks, on your clinic appointment days to see how you are doing and discuss matters related to the training you received.

Possible risks, discomforts and inconveniences:
We do not envisage any risk at all, since the research procedure is non-invasive requiring NO blood samples to be taken, nor tissue samples or any samples of that nature; but ONLY measurement of your blood pressure with a sphygmomanometer and stethoscope as the nurses usually perform on clinic days. You will ONLY be required to follow the treatment recommended by your Doctor.

Potential Benefits:
We cannot and do not guarantee or promise that you will receive any benefit from this study. However, it is expected that after the health education sessions you would learn a lot more about your condition and how to cooperate with your Doctors to keep you well. You would be better disposed to follow your treatment and derive the goals intended by your care-givers.

Cost to the participants, if any, of joining the research
There will be no cost to the participants as a result of participating in this study.

Due Inducements
There may not be any inducements, and if any, would only be a token.

Voluntariness
Your participation in this study is entirely voluntary. Your decision to participate or not in this study will in no way prejudice you or your medical care.

Confidentiality
All information collected in this study will be given code number to conceal the identity of the source and so no names will be recorded. All information gathered as a result of your participating in this study will be treated with utmost confidentiality and in such a way that even when it published in a report, it cannot be linked to you in any way since your name will not be required. We assure you that your identity will not be disclosed in any reports or publication that contains results of this study.

PARTICIPANT RESPONSIBILITIES

As a participant, your responsibilities include;

Following the instructions of the protocol Director and study staff,

Keep your study appointments. If it is necessary to miss an appointment, please contact the protocol Director or research study staff to reschedule as soon as you know you will miss the appointment,

Complete any questionnaires as instructed.

If you are willing to participate in this research following clear understanding of what ha ben read and explained to you regarding this study, kindly sign or place your thumb print below as appropriate;

_____ _____

Participants Sign/Thumb Print Date

_____ _____

Witness-Sign (Ressarcher) Date

APPENDIX 9

TRAINING MANUAL

EFFECTS OF HEALTH PROMOTION INTERVENTIONS ON MEDICATION ADHERENCE AND APPOINTMENT-KEEPING AMONG HYPERTENSIVE PATIENTS IN THREE NIGERIAN TERTIARY HEALTH FACILITIES

TABLE OF CONTENTS

1.0 INTRODUCTION

High blood pressure is an important preventable cause of premature death from cardiovascular diseases globally[1] and is increasingly becoming an important global public health problem of immense proportion and broad impact that require serious considerations in order to adequately meet the challenge it pose to the population[2].Many studies have confirmed that an important option for improving treatment outcome is improved medication compliance. An intervention has been designed to influence medication adherence and appointment –keeping among hypertensive patients receiving treatment for their conditions in three tertiary health facilities in Nigeria. This intervention will be executed in three phases over a period of 12 weeks. In the execution of the study, research assistants will be required to carry out a number of activities. In order to ensure the success of the study the research assistants recruited need to be trained.

1.1 Purpose of Training

The purpose of the training is to prepare research assistants with sufficient skills and understanding about the rationale of the intervention, to effectively perform designated roles and responsibilities that should contribute to the success of the intervention and monitoring procedures. Because there are series of activities required in the course of the intervention, the training require documentations of field procedures in order to maintain consistency at all times.

1.2 Training Objectives

By the end of the two-day 3- hour per day training programme, rsearch assistants enrolled for the interventionwould be able to;

A. Identify ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of public health research with human participants;

B. Identify the components of informed consent form and learn how to obtain a valid consent from research participants;

C. Conduct patient education and counselling designed for the intervention;

D. Conduct a Focus Group;

E. Supervise completion of questionnaire by participants,

F. Conduct pill count and record data obtained on the pill count data sheet.

1.3 General Training Prerequisites

The research assistant to be trained would be at least graduates of Public health bachelor or master's degree-level, nurse-practitioners. Training will take place in a classroom setting with materials to be used in the intervention.

2.0 TRAINING PROTOCOL

The training would involve review of the activities that would take place during the three phases of the intervention. Importantly, discussions of ethical issues to be considered include how to obtain informed consent from the participants. Skills of data gathering using questionnaire and pill count inventory sheet. One of the interventions would focus on Counselling incorporating Patient Education (PE) consisting cognitive-behavioural activities to address issues concerning the disease condition, causes and outcome of poor treatment resulting from poor adherence to medication, dietary recommendations-(eating low fat and low salt and meeting with appointment). Counselling on a one-to one basis would be conducted to influence attitudinal

disposition towards medication in hypertension and awaken health rewards derived from effective treatment reinforcing importance of medication adherence, appointment-keeping and dietary adherence. Further, counselling will be directed to value-clarification and motivation to adopt appropriate options of value.

2.1 Ethical Issues in Public Health Research

There are a number of key issues to be considered in this training; they include the principle of ***voluntary participation*** which requires that people should not be coerced into participating in research. This is especially relevant where researchers had previously relied on 'captive audiences' for their subjects -- prisons, universities, and places like that. Closely related to the notion of voluntary participation is the requirement of ***informed consent and confidentiality***. *(See samples of informed consent and aspect of the questionnaire).* Each participant will be required to understand the contents of the informed consent document and asked to accept or reject to participate. ***Disclosure***: The potential participant must be informed as fully as possible of the nature and purpose of the research, the procedures to be used, the expected benefits to the participant and/or society, the potential of reasonably foreseeable risks, stresses, and discomforts, and alternatives to participating in the research. There should also be a statement that describes procedures in place to ensure the confidentiality or anonymity of the participant. The informed consent document must also disclose what compensation and medical treatment are available in the case of a research-related injury. The researcher must be especially careful to ensure that the participants understands that their participation is entirely voluntary and that their refusal will not in any way impact not just the quality of their health care, but also their relationship with the members of their care team. *Note, demonstration of these principles will be done on the second day using materials in the appendix.*

2.2 Counselling Protocol for the Patient Education

The counselling protocol developed for the intervention will be reviewed by the research assistants identifying goals and contents to be communicated to the participants of the study. Importantly, in the counselling session, is value clarification; study participants need to be encouraged to focus on the following:

Wk	Counselling Goals	PE Protocol	Core Contents
1	To assist patient identify that they can experience acceptable quality of life even in their health condition, To engage the patient in an initial exploration of their compliance status. To identify their treatment modalities.	- Review Health. - Review functions of vital parts of the body associated with their condition, - Review their diagnosis -Review the patient's drug-taking history, diagnosis	- Discuss issues about health and well- being; What are necessary for health & body function? Explain functions of the health, blood vessels, liver etc Explain their present diagnosis and medication can still make them perform as anybody.
2	Identify probable reason for hypertension and consequences, Identify treatment modalities for treating hypertension, To identify patient's difficulties and barriers regarding compliance, provide understanding and value clarification.	-What hypertension is -Hazards of untreated hypertension, -Discuss patient's previous attempts to initiate regular drug taking, appointment-keeping and diet. -Explore any concern.	Discussions of drugs prescribed, and information given by health care providers.
3	Identify the Importance of treatment in hypertension, What to expect with drugs; Clarify importance of adherence to treatment and requirement for improved quality of life.	-Explanations required. -Therapeutic effects, -Adverse effects, -Role of multiple drugs; -Good lifestyle	Discussions and how to take medication and when to take them. Reporting symptoms of adverse effects, monitoring control.
4	To assist the patient to identify who can help, what can be done to help?	Discussion. This is for intervention 2 only.	Role of social support: to provide encouragement, assistance and reminders to take medications and keep appointments.

Counselling procedures will take the form of Group sessions and individual sessions. The group session will take place at the beginning with all participants before they have consultations with their clinician. The individual counselling sessions will take place as they conclude with their clinician for a 10 to 15 minute period for personal discussions to reiterate all that has been communicated during the general counselling session and answer any personal questions that may have emerged in the course of the interactions. *Note, demonstration of these principles will be done on the second day using materials in the appendix.*

2.3 Focus Group Protocol

Focus Group (FG) is a tchnique of exploring underlying principles that may influence behaviour in a particular situation. It seeks to identify reasons why a particular course of action is preferred and how problems arising from it may be addressed. The study will utilize FG to identify what challenges study participants are facing with medication adherence and how this can be addressed in the counselling sessions that will be used. The training will demonstrate how a FG is conducted using the FG guide developed fr the intervention. *Note, demonstration of these principles will be done on the second day using materials in the appendix.*

2.4 Questionnaire Administration and supervision

Questionnaire is the basic data collection instrument for this study. A 73-item questionnaire has been developed to gather information from the participant regarding their demographic characteristics, apects of their clinical variables, knowledge about their condition and requirements for treatment, perceptions they have about their condition, reinforcing and enabling factors involved in medication adherence and the outcome variables. Research assistants will become aquainted with the questionnaire so that they will be able to guide the respondents as they give their responses. During the study, the use of questionnaire will be required at three points; to collect baseline data at the beginning before the commencement of the series of counselling sessions, at the end of the last counselling session and at the last follow up day. Research assistants' rolee and responsibilities regarding providing the

participants with writing materials, distributing the questionnaire and guiding the participant for proper filling of the items will be discussed. *Note, demonstration of these principles will be done on the second day using materials in the appendix.*

2.5 Pill Counting Procedures and Recording

Similar to the questionnaire, the Pill Counting procedure require mastering and documentation because it is a data collection procedure. The procedure involve requesting research participants to always come with the remaining drugs that were prescribed from their last visit to the clinic. The research assistants will note the number of pills that was given at last visit for each prescribed medicine-(For the purpose of this intervention, prescriptions will be limited for 2 weeks since visits will be arranged for two weeks for ease of administering and monitoring the intervention protocol) and how many pills are remaining. The adherence will be determined from how many pills were consumed during the period. The drugs prescribed will be recorded along with the total number of pills remaing and quantity consumed. This will be done to establish pre-intervention and post-intervention adherence percentages for each participant. *Note, demonstration of these principles will be done on the second day using materials in the appendix.*

2.6 Follow up Schedule

A follow up schedule of two –week interval will be adopted in which pill counting will be performed to determine post-intervetion mdication adherence and to discuss any issues arising from the intervention. The follow-up will be at the clinic where the interventions where conducted. Home follow-up in beyond the scope of this study.

Informed Consent Form

OLABISI ONABANJO UNIVERSITY TEACHING HOSPITAL, SAGAMU
HEALTH RESEARCH AND ETHICS COMMITTEE (HREC)

CONSENT FORM

HREC approval number:_____
HREC Expiration Date: _____

Please tick one of the following: **You are an adult participant in this study [ ]** **You are the parent or guardian granting permission for a child in this study [ ]** **Are you participating in any other study? [ ]**
Participant ID_____

A research study is designed to answer specific questions, sometimes about a drug's or device's safety and effectiveness. When you are a participant, the researcher will follow the rules of research study (protocol) as closely as possible, without compromising your health.
Title of the research: Effects of Health Promotion Interventions on Medication Adherence and Appointment-Keeping among Hypertensive Patients in Three Nigerian Tertiary Health Facilities in South-west Nigeria.

Name(s) and Affiliation(s) of researcher(s) or applicant(s):
(1). Nnodimele Onuigbo ATULOMAH,
(2). Professor Oladimeji OLADEPO
Department of Health Promotion and Education, Faculty of Public Health, University of Ibadan, Ibadan, Oyo State, Nigeria

Purpose of Research
You are invited to participate in a research study of health promotion interventions to improve Medication-Adherence and Appointment-Keeping among Hypertensive Patients attending the hypertension clinic at OOUTH in Sagamu South-west Nigeria. We hope to learn establish that with adequate health promotion and education patients with hypertension should be able to adhere to their treatment regime and benefit from the drugs their doctors have prescribed for them. You were selected as a possible participant in this study because you are a patient with hypertension and receiving treatment in this clinic.

Procedure of Research
If you choose to participate, the Protocol Director and his research study staff will describe all procedures to be followed.

7. You will receive counselling and Health education and promotion concerning hypertension, the type of drugs your doctor has prescribed for you and the importance of taking these drugs

FOCUS GROUP GUIDE/SCHEDULE

Focus Group Discussion Guide

Questionnaire

Questionnaire on Knowledge, Perception and medication-Taking and appointment-keeping behaviour of Hypertensive Patients at in three Nigerian Tertiary Health Facilities

Dear Respondents,

Greetings; I am a doctoral student from the department of Health Promotion and Education, Faculty of Public Health, College of Medicine University of Ibadan conducting an intervention to improve knowledge of hypertension, perception of benefit of medication in hypertension and medication-taking behaviour among individuals that have been diagnosed to have raised blood pressure. The study will involve Patient Education with counselling for four one-hour a week session during your clinic days. Please note that the completion of this questionnaire is entirely **voluntary**. All information gathered as a result of your participating in this study will be treated with utmost confidentiality. Your willingness to complete the questionnaire implies you have given consent to participate. Thank you for cooperating.

Kindly indicate willingness to participate by ticking in the BOX [ ].

Nnodimele Atulomah.

PILL COUNT INVENTORY SHEET

Effects of Health Promotion Interventions on Medication Adherence and Appointment-Keeping among Hypertensive Patients in Three Nigerian Tertiary Health Facilities.

MEDICATION –TAKING INVENTORY FOR PILL COUNT

S/N	No of drugs	Drug 1	Drug 2	Drug 3	Drug 4	Bp-1	Total Pills	Pill Count		Total Pills	Adhe. Score (%)
								1	2		
1											
2											
3											

Module One of the Intervention

Module for Patient Education and Counseling (PEC) to Enhance Medication Adherence and Appointment-Keeping

Module Two of the Intervention

Module for Social Support (SS) to Enhance Medication Adherence and Appointment-Keeping

APPENDIX 10

Module One of the Intervention

Module for Patient Education and Counseling (PEC) to Enhance Medication Adherence and Appointment-Keeping

Focused health education and communication delivered through well designed counseling protocol is considered a strategic approach to awaken certain conscious awareness and arouse appropriate feelings that are essential to stimulating personal involvement and commitment to drive behavior change, especially in medication adherence and appointment-keeping. Most of the times, care in hypertension treatment is provided through self-management by the patient. They need instructions and encouragement to acquire the skills required to successfully implement effective hypertension self-care activities.

Communication enhances and establishes learning, comprehension and good understanding when strategically incorporated in patient education that is structured to enhance knowledge about consequences of untreated or poorly treated hypertension.Patient education and counseling awakens an understanding of the benefits of persistence in medication-taking and appointment-keeping within the context of hypertension self-care activities. Personal interpretations of the nature of hypertension and the risks involved in not taking medication can also be correctly modified and reinforced with clarification of the benefits derived from medication adherence during counseling sessions. When the patient is engaged in communication and able to clarify issues that appear shrouded in superstition, outcome becomes better.

Therefore, this module has been designed tohighlight and discuss probable reasons for developing hypertension and consequences of poorly treated conditions, identify rationale for treatment modalities in hypertension, identify patient's difficulties and barriers regarding compliance, provide understanding of the implications of non-adherence to treatment and appointment-keeping and reinforce attitudinal orientations required facilitate medication adherence and appointment-keeping.

The Patient Education and Counseling Module Consists of Four Sessions of 45 minutes each offered as general/group and individual counseling.

Session One Introduction: An Overview of the rationale for patient's diagnosis, medication-taking history and its implications for health and well-being.

Session Two Hypertension: Treatment modalities and expected outcomes.

Session Three: The importance of medication adherence and appointment-keeping in hypertension treatment.

Session Four: Self-management in hypertension and Communicating important signs about the health of the patient to their health care workers**;** This module was prepared using the information obtained from the FGD and baseline measures with regard to the specific needs of the patients defined by predisposing, enabling and reinforcing factors associated with medication adherence and appointment-keeping in the treatment of hypertension. The needs assessment during phase one of the intervention was conducted, in part, in order to strengthen the module and contextualize the contents.

Table 1. Session Outline for the Intervention one

SESSION OUTLINE

Session Titles	**Counselling Goals are to**:	**Specific Objectives:** By the end of each of the sessions, Patients will;	***Patient Education Protocol involved General and individual counseling;**
Introduction: An overview of the rationale for patient's diagnosis, drug-taking history and its implications for health and well-being.	-Engage the patient to review the reasons why they have come to the clinic; -Engage the patient in an initial exploration of their compliance status; -Identify their treatment modalities. -Assist patient identify that they can experience acceptable quality of life even in their health condition, if	- Identify which organs of the body are involved in their present health condition and how these are related to well-being; - Identify why they are taking the prescribed medications; - Identify the implications of their diagnosis and medication-taking; -Make a commitment to take medications	- Review Health/wellness. - Review functions of vital parts of the body associated with their condition, - Review their diagnosis -Review the patient's diagnosis and drug-taking history; -Review rationale for maintenance of medication regularity and appointment-

	they can maintain medication and keep specific appointments with medical team at the clinic.	more regularly than before now.	keeping with health personnel. -Guide and encourage the client in making an informed decision to be adherent to medications prescribed.
Hypertension, Treatment modalities and expected outcomes.	-Identify probable reasons for hypertension and possible consequences of natural history of untreated or poorly treated cases, -Identify treatment modalities for hypertension and assist the patient identify their medications and how to take them; -Identify patient's difficulties and barriers regarding compliance, provide understanding and value clarifications for making decision to adhere to recommended treatment.	-Identify what hypertension is and symptoms associated with the disease, - Identify the likely consequences of poorly managed hypertension, - Identify rationale for the treatment of hypertension. -Identify expected outcome of following treatment modality as recommended. -Identify the medications recommended by the physician and how to take these medications.	-Review the disease condition known as hypertension and the various parts of the body systems associated with it; -Review what may happen to a person identified as having hypertension but not treated or poorly treated possibly as a result of poor adherence to recommended medication or wrong diagnosis and treatment; -Review the rationale for treatment in hypertension and expected outcomes when proper treatment has been recommended by the physician and followed carefully by patient. -Review the medications and discuss how to take them; -Clarify the danger of self –diagnosis and treatment.

SESSION OUTLINE CONTINUED

Session Titles	**Counselling Goals are to**:	**Specific Objectives:** By the end of each of the sessions, Patients will;	***Patient Education Protocol involved General and individual counselling;**
The importance of medication adherence and appointment-keeping in hypertension treatment.	-Identify that hypertension is a chronic disease that sets in gradually with little or no symptoms initially; -Emphasize that as a chronic disease, it stays for life but can be managed adequately with medications and diet with other life-style activities; -Identify medication adherence as an essential aspect of keeping the disease controlled; -Identify appointment-keeping as another essential aspect of monitoring the disease and ensuring that the patient is doing well;	-Identify hypertension as a disease condition that is life-long; -Identify hypertension as a disease that starts with little or no symptoms but progress to cause symptoms and serious damage over a long time; -Identify that proper diagnosis and treatment can control the disease progression and halt any further damage to body and general health; -identify medication adherence as an important action by the patient that can achieve control of the disease progression; -Identify appointment-keeping as another action by the patient	-Review and emphasize that hypertension is a chronic illness that establishes gradually in the body with little or no initial symptoms; -Emphasize the dangers of ignoring to properly treat the disease at the earliest possible stage identifying damages that can occur; -Review and emphasize the value and benefits of proper diagnosis and treatment in hypertension; Review the importance of medication adherence and benefits to patients; Review the importance of appointment-keeping and the benefits to patients in the control of the disease; -Review how to overcome challenges related to medication adherence emerging from forgetfulness, busy schedule or financial difficulties. *(This includes*

			weighing the benefits against poor outcomes of the disease).
Self-management in hypertension and Communicating important signs about your health to the health care workers	-Demonstrate that self-management is an important step of becoming involved in taking control of health outcome in hypertension; -Show the client what is meant by self-management care; -Encourage clients to always communicate signs and how they feel with their care-givers; -Encourage clients to desire to know more about their conditions and their treatment; -Encourage clients to ask their care-givers questions about matters that are not clear such as instructions related to medication-taking and refills;	-To identify what constitute self-management care practices in hypertension; -To link self-management care with medication adherence, appointment-keeping and other instructions given by health care givers that will enhance control of their condition; -To ask questions about their medications, appointments and clarifications about issues that appears uncertain to them;	-Review activities that constitute self-management care patient can perform in the course of treatment in hypertension; -Remind the clients that these activities are essential to life support as feeding is to living; -Review how self-help is important in reinforcing dignity and maturity in a person's life; -Review the benefits of controlling the condition in relation with quality of life; -Remind and encourage clients to communicate symptoms and uncertainties about their conditions and treatment to their care-givers; -Review and emphasize that they need to know everything about their condition and treatment in order to enhance their understanding of what is involved.

The following consist of details of contents for presenting the Patient Education and counseling Module developed for the above outline.

SESSION ONE: Introduction: An Overview of patient's diagnosis and drug taking history and its implications in health and well-being.

Table 2 Details of Contents Developed for Intervention one Protocol

Patient Education Protocol will involve General and Individual Counseling;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
- Review Health. - Review functions of vital parts of the body associated with their condition, -Review the patient's diagnosis and drug-taking history; -Review rationale for maintenance of medication regularity and appointment-keeping with health personnel; -Guide and encourage the client in making an informed decision to be adherent to medications prescribed.	- **Discuss issues about health and well-being**; *Quality of life* is when an individual is able to perform basic functions related to life's activities without assistance, such as walking, eating, bathing, going to toilet, reading. If an individual has disabilities that prevent them from performing these activities, life will lose its meaning and become a burden. Health is related to quality of life. *[Emphasize the importance performing these basic activities, they give meaning to life; possibly arouse feelings of desire to live]* -**What are necessary for health & body function**? Every part of the body is essential for health and well-being. When any part is disturbed by injury or pain it manifests as a problem to the whole person's general comfort level. -**Explain the functions of the heart, blood vessels, liver, the brain, the eyes and the limbs;** *[Note, these are organs likely to be affected in poor outcome of hypertension treatment resulting to losing the their functions; Emphasize the importance of these organs]* -**Explain the patients' present diagnosis and the purpose of their medication;** Patients are consulting in this clinic because a diagnosis has been made concerning their health status. Blood pressure is raised to a level that puts them at risk of complications that	- *General Counseling* will be offered by the researcher at the beginning of the clinic session immediately after patients' records have been sorted and have had their vital signs recorded by Nursing staff for 45 minutes. - *Individual counseling* will be offered to the patients as they come from consulting with the Physicians at the clinic by the Research Assistants to reinforce what was offered during the general counseling session. Opportunity offered to the client to clarify any unclear issues; to close with each patient, an attempt to guide the patient to make a commitment regarding the points of counsel.

	will affect their quality of life. The treatment offered is capable of keeping the BP down so that these complications will not happen and they will be able to perform all the basic things with little or no assistance. *(At the individual counselling, these points will be reinforced, medications prescribed will be identified and purpose for prescribing them reviewed. Prescriptions dispensed are counted. Confirm and secure a commitment for the next appointment and bid patient fair well).*	

SESSION TWO: Hypertension, Treatment modalities and expected outcomes.

Patient Education Protocol will involve General and Individual Counseling;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities and Remarks For Action**
-Review the disease condition known as hypertension and the various parts of the body systems associated with it; -Review what may happen to a person identified as having hypertension but not treated or poorly treated possibly as a result of poor adherence to recommended medication or wrong diagnosis and treatment; -Review the rationale for treatment in hypertension and expected outcomes	- **Discuss hypertension as a disease entity and how it relates to the heart, blood vessels and the kidneys**; Hypertension is a disease that produces a gradual but sustained rise in blood pressure over a prolonged period. In establishing hypertension, the heart begins to pump more blood with more force than usual at rest as the blood vessels begins to resist easy passage of blood flow. This situation may continue until symptoms such as headaches and visual phenomena begin to occur as the BP approaches levels not compatible with well-being. When the BP is measured at 140/90 mm of Hg, at rest on more than one occasion, one is said to have hypertension; *[Explain the two readings, systolic/Diastolic]* -**Review the natural history of undiagnosed hypertension or poorly treated hypertension;** The natural history of untreated hypertension is that the BP will continue to rise over a prolonged period producing gradual changes in the size of the heart, structure and function of the kidneys, retina of the eyes are	- *General Counseling* will be offered by the researcher at the beginning of the clinic session immediately after patients' records have been sorted and have had their vital signs recorded by Nursing staff for 45 minutes. - *Individual counseling* will be offered to the patients as they come from consulting with the Physicians at the clinic by the Research Assistants to reinforce what

when proper treatment has been recommended by the physician and followed carefully by patient. -Review the medications and discuss how to take them; -Clarify the danger of self –diagnosis and treatment. .	affected and general well-being which culminates in a stroke or heart attack or kidney failure or even earlier than these, blindness occurring as a result of rupture of retinal blood vessels. A similar event may occur in poorly treated hypertension resulting from poor medication adherence and poorly monitored patients who do not keep appointment. *[Explain that appointment-keeping would afford opportunity to detect these changes on time]*. -**Review the rationale for treatment in hypertension and expected outcomes;** The main goal in the diagnosis and treatment of hypertension is to identify that the disease is present, evaluate whether any damage to the system has been established and prescribe combinations of drugs that will reduce the BP to what would be considered appropriate to the patient and halt any further damages. When the BP is controlled, no further damages will be produced. *[Emphasize that when BP is controlled with the most appropriate combination of medications, no further damage will occur. Importantly, patients MUST visit the hospital to have these check-ups, medications and patient educationand counselling]*. -**Review the medications of the patients and discuss how to take them;** The medications prescribed for your conditions consists more than one medicines and are so to reduce the BP with little or no side effects; *[During individual counselling, identify each drug and discuss what functions they perform in the treatment and mode of administration as instructed. Furthermore, clarify the danger of self-diagnosis and treatment]*. *(At the individual counselling, these points will be reinforced, medications prescribed will be identified and purpose for prescribing them reviewed. Prescriptions dispensed are counted. Confirm and secure a commitment for the next appointment and bid patient fair well).*	was offered during the general counseling session. Opportunity is offered to the client to clarify any unclear issues; to close with each patient, an attempt to guide the patient to make a commitment regarding the points of counsel.

SESSION THREE: The importance of medication adherence and appointment-keeping in hypertension treatment.

Patient Education Protocol will involve General and Individual Counseling;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
. -Review and emphasize that hypertension is a chronic illness that establishes gradually in the body with little or no initial symptoms; -Emphasize the dangers of ignoring to properly treat the disease at the earliest possible stage identifying damages that can occur; -Review and emphasize the value and benefits of proper diagnosis and treatment in hypertension; -Review the importance of medication adherence and benefits to patients; -Review the importance of appointment-keeping and the benefits to patients in the control of the disease; -Review how to overcome challenges related to medication adherence emerging from forgetfulness, busy schedule or financial difficulties. *(This includes*	- **Review the nature and characteristics of hypertension as a chronic illness**; Hypertension is a disease which begins with little or no symptoms but progresses to produce high blood pressure that can damage various vital parts of the body systems. The effects of hypertension on the general health of a person can be crippling with damage to the eyes, kidneys, heart, the brain and slow death. *[Prayer: May this not be your portion Amen]* -**Explain the dangers of ignoring proper treatment at the earliest possible opportunity;** It is important for people to always check themselves that all is well. *[Illustrate this with a new car; we carry out routine checks to ensure the car is performing as expected]*. Appointment-keeping is important for you to know that all is well because it is at these visits that proper monitoring is performed by the experts and any adjustments needed are done early and quickly avoiding the damages that comes with delays or ignoring to act appropriately. -**Explain the importance of medication adherence;** The medicines prescribed are effective in reducing and controlling blood pressure. *[Emphasize that great considerations have been given in order to identify the combination that fits each patient just like shoe sizes]*.The only condition to derive the benefits of the effectiveness of the prescribed medications would be to take them regularly as prescribed. Similarly, keeping appointments with the clinic is an important way of ensuring that your condition is monitored well. With regular taking of prescribed medicines and monitoring at each appointment, your health is assured and there will be no changes to damage any part of your vital organs. Remember, the treatment is for life just like feeding is for life; this you MUST accept as part of your life.	- *General Counseling* will be offered by the researcher at the beginning of the clinic session immediately after patients' records have been sorted and have had their vital signs recorded by Nursing staff for 45 minutes. - *Individual counseling* will be offered to the patients as they come from consulting with the Physicians at the clinic by the Research Assistants to reinforce what was offered during the general counseling session. Opportunity offered to the client to clarify any unclear issues; to close with each patient, an attempt to guide the patient to make a commitment regarding the points of counsel.

weighing the benefits against poor outcomes of the disease).	-**Review how to overcome challenges related to medication adherence;** Accept that taking these medications has become part of your life just like eating or any other daily activities. Become aware of the time of the day required to take these medicines and plan a reminder. Similarly with appointments; however, even if you miss an appointment do not miss taking your medications. Even when busy, plan to take medications. *[Emphasize, that most people will still remember to eat even when they are busy]. (At the individual counselling, these points will be reinforced, medications prescribed will be identified and purpose for prescribing them reviewed. Prescriptions dispensed are counted. Confirm and secure a commitment for the next appointment and bid patient fair well).*	

SESSION FOUR: Self-management in hypertension and Communicating important signs about your health to the health care workers.

Patient Education Protocol will involve General and Individual Counseling;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
-Review activities that constitute self-management care patients can perform in the course of treatment in hypertension; -Remind the clients that these activities are essential to life support as feeding is to living; -Review how self-help is important in reinforcing dignity and maturity in a person's life; -Review the benefits of controlling the condition in relation with quality of life;	- **Discuss the importance of self-management care in chronic illnesses**; *Quality of life* is when an individual is able to perform basic functions related to life's activities without assistance, such as walking, eating, bathing, going to toilet, reading. If an individual has disabilities that prevent them from performing these activities, life will lose its meaning and become a burden. Health is related to quality of life. When an individual fails to take their medications regularly as prescribed and the blood pressure becomes uncontrolled, the likelihood of an adverse cardiovascular event happening is high and resulting to damaged health. An important self-management activity recommended for patients receiving treatment for hypertension include; medication-taking, rest, eating low salt diet and avoiding fatty foods, *[Emphasize medication-taking and dietary practice]*. -**Review how self-care reinforces dignity,**	- *General Counseling* will be offered by the researcher at the beginning of the clinic session immediately after patients' records have been sorted and have had their vital signs recorded by Nursing staff for 45 minutes. - *Individual counseling* will be offered to the patients as they come from consulting with the Physicians at the clinic by the

-Remind and encourage clients to communicate symptoms and uncertainties about their conditions and treatment to their care-givers; -Review and emphasize that they need to know everything about their condition and treatment in order to enhance their understanding of what is involved.	**maturity and self- esteem in illness;.** Self-management provides assurance of the extent to which individuals have control over the prevailing conditions around them. It is important that clients engage in activities that give them this assurance such as medication-taking and ability to recognize the instructions given regarding diet and rest.. -**Review the benefits of controlling the illness in relation to quality of life and outcome expectancy;** By ensuring that the medications are regularly taken and constant monitoring of the outcome of treatment through appointment-keeping, the blood pressure becomes well controlled and any likely damage to vital organs is halted. Hypertension-specific Quality of life such as walking, other movements, and seeing, relative comfort is improved and maintained. *[Emphasize that when BP is controlled, the impact of hypertension on vital organs such as visual and renal impairment are prevented and possible stroke and heart attack averted with improved quality of life],*-**Explain the importance of communicating symptoms and uncertainties about illness to care-givers;** Communication enhances understanding and facilitates decision-making by both patient and care-givers. Communicating important information serve to empower the patient and eliminate suspicion or uncertainties. Be informed that it is your right to be informed about your health condition and the medications you are taking; request to know more about everything you need to know. *(At the individual counselling, these points will be reinforced, medications prescribed will be identified and purpose for prescribing them reviewed. Prescriptions dispensed are counted. Confirm and secure a commitment for the next appointment and bid patient fair well).*	Research Assistants to reinforce what was offered during the general counseling session. - *Pill counting conducted at this time*.

APPENDIX 11

Module Two of the Intervention

Module for Social Support (SS) to Enhance Medication Adherence and Appointment-Keeping

Contemporary health care is beginning to consider ways by which social support may play significant role in contributing to health promotion. The importance of extending care to include the family members or other social network around the patient is becoming well accepted. Family involvement is very important when providing social support for chronically ill patients, because the burden of the disease on the patient can be better alleviated when shared. In this relationship, good social support is associated with improved psychological disposition of the patient and provides advantage in facilitating some changes in the behavior of patients that can be sustained to reinforce self-care.

Therefore, this module will define key functions of the social support in providing assistance to the patient in order to enhance medication adherence and appointment-keeping that will produce improved clinical outcome. This counseling session will be offered to reinforce what has been presented during the forty five minutes general patient education and counseling session.

The social support Counseling/Training Module Consists of Four Sessions of 15 minutes each, given to a family member to offer social support;*

Introduction: An overview of Hypertension, medication and chronic illnesses. .

Social Support One: Principles and Functions of Social Support in Hypertension Treatment and involvement of family members.

Social Support Two: Areas of hypertension Treatment in which the Social support or family members may participate effectively and activities that they can perform which will support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

Social Support Three: Rationale for involvement of the immediate family members to support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

Table 1 Session Outline for Training Family Support in assisting Hypertension Patient.

Session Titles	**Counseling Goals are to**:	**Specific Objectives:** By the end of each session, Social Support will;	***Social Support Counseling Protocol will involve only individual counseling;**
Introduction: An overview ofHypertension, medication and chronic illnesses.	-Assist Social Support identify how the diagnosed condition can affect hypertension-specific quality of life of the patient they are to assist in order to persist in the medication-taking;, -Emphasize the importance of medication adherence for their patient's well-being and appointment-keeping for monitoring progress of the treatment.	- Recognize that untreated or poorly treated hypertension can damage vital organs of the body such as the eyes, kidneys, produce stroke and paralyze the patient, produce heart attacks that will kill the patient; - Identify why patients must take their prescribed medications regularly; - Identify some of the difficulties experienced by patients and how social support can help to overcome them.	- Review natural history of untreated or poorly treated hypertension; - Review implications of damages that may result from poor medication-taking; -Review rationale for maintenance of medication regularity and appointment-keeping with health personnel.
Social Support One: Principles and Functions of Social Support in Hypertension Treatment and involvement of family members.	-Identify who is a social support, -Identify what social support do during treatment of hypertension and ways they can assist the patient identify their medications and remember to take them; -Encourage patients overcome specific difficulties involved with the treatment.	-Identify the role of social support, -Identify areas of difficulties for patients social support may be involved; - Identify the likely activities of social support during treatment of hypertension related to medication adherence and appointment-keeping;	-Review the rationale for social support in the treatment of hypertension; -Review likely challenges patients may encounter with hypertension treatment; -Review the rationale for treatment in hypertension and expected outcomes when proper treatment has been recommended by the physician and followed carefully by patient. -Review the four aspects social support may be offered.

SESSION OUTLINE CONTINUED

Session Titles	**Counseling Goals are to**:	**Specific Objectives:** By the end of each session, Social Support will;	***Social Support Counseling Protocol will involve only individual counseling;**
Social Support Two: Areas of hypertension Treatment in which the Social support or family members may participate effectively and activities that they can perform which will support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.	-Remind social support that the treatment of hypertension is life-long because the disease condition is also life-long; -Emphasize that in hypertension, the social support may offer emotional support, tangible aid directed to the patient's physical needs, provide information or advice the patient can use such as reminders and provide encouragements to the patient about the progress they are making in the treatment schedule; -Emphasize the all-important role social support may play to enhance medication adherence and appointment-keeping.	-Identify hypertension as a disease condition that is life-long and hence treatment is also life-long; -Offer to the patient; empathy, affection, reminders to take medication, encouragements about progress of treatment and any tangible assistance needed to enhance well-being t as social support activities to be performed.	-Review and emphasize that hypertension is a chronic illness that establishes gradually in the body with little or no initial symptoms and does not have a cue but requires life-long management that involves regular medication-taking, appointment-keeping, dietary restrictions of salt, fat with appropriate rests; -Review the importance of medication adherence and benefits to patients of assisting in reminding patients to take their medications always; -Review the importance of appointment-keeping and the benefits of encouraging patients to have regular check-ups to evaluate the progress of treatment to control the disease; -Review and emphasize how other social support activities may assist the patient to overcome challenges related to medication adherence emerging from forgetfulness, busy schedule or financial difficulties. *(This includes appraisals of the benefits of gains*

			made in the treatment against consequences of poor outcomes of the disease resulting from giving up).
Social Support Three: Rationale for involvement of the immediate family members to support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.	-Emphasize the reasoning underlying social support in hypertension treatment; -Identify how social support may provide the needed support to enhance medication adherence and appointment-keeping that will improve patient's health outcome. -Emphasize that patients receiving treatment require regular positive reinforcements only the social support can offer.	-Identify why the patient needs social support to reinforce self-management care practices in hypertension; -Recognize to the link between the support offered and how this will enhance control of their condition;	-Review activities that constitute self-management care patient can perform in the course of treatment in hypertension and how social support may assist the patient; -Remind the social support that the assistance provided through social support activities is essential to halting any depreciation that would occur in the life of the patient without the support; -Review the benefits of controlling the condition in relation with quality of life; -Remind and encourage social support to be there for the client and never to give up their role as social support.

**Since the social support in this study will be present at the general Patient Education counseling session, the present module is tailored to be a face-to-face session with social support for 15 minutes to reinforce their special role in the treatment modality.*

The following consist of details of contents for presenting the Patient Education and counselling Module developed for the above outline.

Detailed Contents of Training Protocol for Family Support Intervention.

SESSION ONE: Introduction: An overview of Hypertension, medication and chronic illnesses.

Social Support Counseling Protocol will involve only individual counseling to;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
- Review natural history of untreated or poorly treated hypertension; - Review implications of damages that may result from poor medication-taking; -Review rationale for maintenance of medication regularity and appointment-keeping with health personnel.	**-Review the natural history of undiagnosed hypertension or poorly treated hypertension;** Hypertension is a disease that produces a gradual but sustained rise in blood pressure over a prolonged period. When the BP is measured at 140/90 mm of Hg or more, at rest on more than one occasion, one is said to have hypertension; *[Explain the two readings, systolic/Diastolic]* The natural history of untreated hypertension is that the BP will continue to rise over a prolonged period producing gradual changes in the size of the heart, structure and function of the kidneys, retina of the eyes are affected and general well-being which culminates in a stroke or heart attack or kidney failure or even earlier than these, blindness occurring as a result of rupture of retinal blood vessels. A similar event may occur in poorly treated hypertension resulting from poor medication adherence and poorly monitored patients who do not keep appointment. *[Explain that appointment-keeping would afford opportunity to detect these changes on time]*. **-Review the rationale for medication persistence and appointment-keeping in hypertension and expected outcomes;** When hypertension is controlled by reducing the blood	- *Individual counseling* will be offered to the Social Support after the clients have seen the Physicians. Reinforcing what was offered during the general counseling session with the patients. At this time Social Support would be offered opportunity to clarify any unclear issues regarding what has been discussed.

	pressure, further depreciation and damage to vital organs such as the eye, heart, kidneys and general health of the patient is halted. This can only be achieved through regular medication as prescribed and monitoring of the progress of the treatment through appointment-keeping. *[Emphasize that when BP is controlled with the most appropriate combination of medications, no further damage will occur. Importantly, patients MUST visit the hospital to have these check-ups, medications and patient education and counselling]*. ***.[Commend the decision of the social support to assist in this wise, to preserve the life of the client and close the counselling]***	

SESSION TWO: Social Support One: Principles and Functions of Social Support in Hypertension Treatment and involvement of family members**.**

Social Support Counseling Protocol will involve only individual counseling to;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
-Review the rationale for social support in the treatment of hypertension; -Review likely challenges patients may encounter with hypertension treatment; -Review the rationale for treatment in hypertension and expected outcomes when proper treatment has been recommended by the physician and	**-Review the rationale for social support in the treatment of hypertension;***["Help offered makes light burden carried by the chronically ill patient"]* Help offered by friends and Family members are an important part of support during the treatment of chronic illnesses. Naturally, chronic illnesses can progressively produce depreciation in the ability of an individual to perform natural activities related to the treatment, especially if not properly and adequately treated. This may pose additional burden on the individual if left on their own. Guide the social support to review their role in the treatment of hypertension, **-Identify areas of difficulties for**	- *Individual counseling* will be offered to the Social Support after the clients have seen the Physicians. Reinforcing what was offered during the general counseling session with the patients. At this time Social Support would be offered opportunity to clarify any unclear issues regarding what has been discussed.

followed carefully by patient. -Review the four aspects social support that may be offered.	**patients that would involve social support;** The nature of chronic illness and treatment modality would require life-long medication-taking and regular appointment-keeping with healthcare givers for routine check-up/monitoring of progress made. This is essential for the control of the condition in order to halt depreciation and appearance of complications that may produce poor clinical outcome; therefore, social support is very important to assist the patient remember to take prescribed medications and encourage them to keep any appointments scheduled with their care-givers. **- Identify the likely activities of social support during treatment of hypertension related to medication adherence and appointment-keeping;** Hypertension is a disease that produces a gradual but sustained rise in blood pressure over a prolonged period. When the BP is measured at 140/90 mm of Hg or more, at rest on more than one occasion, one is said to have hypertension; *[Explain the two readings, systolic/Diastolic]* The natural history of untreated hypertension is that the BP will continue to rise over a prolonged period producing gradual changes in the size of the heart, structure and function of the kidneys, retina of the eyes are affected and general well-being which culminates in a stroke or heart attack or kidney failure or even earlier than these, blindness occurring as a result of rupture of retinal blood vessels. A similar event may occur in poorly treated hypertension resulting from poor medication adherence and poorly monitored patients who do not keep appointment. *[Explain that appointment-keeping would afford opportunity to detect these changes on*	

	time]. **-Review the rationale for medication persistence and appointment-keeping in hypertension and expected outcomes;** When hypertension is controlled by reducing the blood pressure, further depreciation and damage to vital organs such as the eye, heart, kidneys and general health of the patient is halted. This can only be achieved through regular medication – taking as prescribed and monitoring of the progress of the treatment through appointment-keeping. *[Emphasize that when BP is controlled with the most appropriate combination of medications, no further damage will occur. Importantly, patients MUST visit the hospital to have these check-ups, medications and patient education and counselling].**[Commend the decision of the social support to assist in this wise to preserve the life of the client and close the counselling]***	

SESSION THREE: Social Support Two; Areas of hypertension Treatment in which the Social support or family members may participate effectively and activities that they can perform which will support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

Social Support Counseling Protocol will involve only individual counseling to;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
-Review and emphasize that hypertension is a chronic illness that establishes gradually in the body with little or no initial symptoms and does not have a cue but requires life-long	**-Emphasize hypertension as a disease condition that is life-long and hence treatment is also life-long;** Review hypertension , a chronic illness that establishes gradually in the body with little or no initial symptoms and does not have a cue but requires life-long management that involves regular medication-taking, appointment-keeping, dietary restrictions of salt, fat	- *Individual counseling* will be offered to the Social Support after the clients have seen the Physicians. Reinforcing what was offered during the general counseling session with the patients. At this time Social Support would be

management that involves regular medication-taking, appointment-keeping, dietary restrictions of salt, fat with appropriate rests; -Review the importance of medication adherence and benefits to patients of assisting in reminding patients to take their medications always; -Review the importance of appointment-keeping and the benefits of encouraging patients to have regular check-ups to evaluate the progress of treatment to control the disease; -Review and emphasize how other social support activities may assist the patient to overcome challenges related to medication adherence emerging from forgetfulness, busy schedule or financial difficulties.	with appropriate rests and mild exercises. At times patients may feel that they are healed when the blood pressure reading has been controlled and no apparent symptoms such as headaches are manifest, would stop taking their medications or decide not to visit their care givers for continued evaluation. This is dangerous. *[Emphasize that on no account should this happen; patient MUST NOT stop their medications unless instructed by their care-givers. The social support should be on the look- out for such and remind the client against doing so.]* **-Review the importance of medication adherence;** When the patient persist in taking their prescribed medications by your constant reminders and assistance, the following benefits to patients will be produced; there will be reduction in blood pressure to levels that is compatible with health, this reduced blood pressure means that all possible damages such as stroke or kidney failure and heart attack will not take place. There will be better control of the BP profile. **-Review the importance of appointment-keeping;** When treatment is at the early stage, BP may go up and down, the care-giver would prescribe combination of medications that best fit the particular patient, hence a constant monitoring is required in order to achieve a suitable control. Therefore, regular appointments would be needed to monitor how well the treatment is going with appropriate adjustments until the reduction in BP is suitable and stable. The Social Support should encourage and remind the client to visit the care-givers at the appointment. **-Review and emphasize how other social support activities may assist the patient**; Emphasize that the assistance	offered opportunity to clarify any unclear issues regarding what has been discussed.

	the social support will be offering is life-saving and will be significant in enabling the client to overcome a lot of challenges. The Social Support is to offer to the patient; empathy, affection, reminders to take medication, encouragements about progress of treatment and any tangible assistance needed to enhance well-being t as social support activities to be performed. *[This includes appraisals of the benefits of gains made in the treatment against consequences of poor outcomes of the disease resulting from giving up.* ***Commend the social support role and close the counseling****]*.	

SESSION FOUR:Social Support Three: Rationale for involvement of the immediate family members to support the patient's psychological and physical needs required to enhance medication adherence and appointment-keeping.

Social Support Counseling Protocol will involve only individual counseling to;	**Core Counseling Contents;** *[Contents in italics are for the counselor to note]*	**Counseling Activities**
-Review activities that constitute self-management care patient can perform in the course of treatment in hypertension and how social support may assist the patient; -Remind the social support that the assistance provided through social support activities is essential to halting any depreciation that would occur in the life of the patient without the support; -Review the benefits of controlling the	**-Review activities that constitute self-management care patient can perform in the course of treatment in hypertension;** When patients are under treatment for chronic illnesses such as hypertension or diabetes, there a number of activities expected of them to perform to facilitate control of their condition and maintenance of life. These include taking their medications as prescribed, observing other instructions related to diet, low level physical activities, observing rest, appointment-keeping and sanitary activities. These activities need to be incorporated into the life routine of the client and when these are performed regularly, they usually facility well-being.	- *Individual counseling* will be offered to the Social Support after the clients have seen the Physicians. Reinforcing what was offered during the general counseling session with the patients. At this time Social Support would be offered opportunity to clarify any unclear issues regarding what has been discussed.

condition in relation with quality of life; -Remind and encourage social support to be there for the client and never to give up their role as social support.	**-Identify why the patient needs social support to reinforce self-management care practices in hypertension**; The patient with hypertension seriously needs to control the rising BP as quickly as possible. The additional activities to their life may be a burden and would need assistance especially to remind them when to perform these activities. It becomes most significant if they are advanced in age. *[Emphasize to the social support that they have to assist the clients to learn the new self-management introduced]* **-Review the benefits of controlling the condition in relation with quality of life;** Emphasize what may happen when the BP is not controlled as a result of poor medication-taking or proper monitoring of the treatment; *[Review that: Stroke may leave the patient with paralyzed arms or limbs with serious difficulty of movement, the kidneys may failand death will come prematurely; blood vessels in the retina of the eye may rupture and produce blindness]*. All these may seriously affect how much the patients can help themselves; one can- not estimate how far-reaching this can impact on the entire family. **-Emphasize and explain the link between the support offered and how this will enhance control of their condition;** With ALL the support discussed in these counseling sessions offered to the patient, there is no doubt that the BP will be controlled because, these are treatment modalities test to be effective but the reasons why hypertension treatment appear to be a failure in majority of cases is that these patients do not take their medications regularly and are not monitored well. The assistance offered to the patient in	

	this case will change the likely outcome to a successful BP control and improve quality of life for the patient. **-Remind and encourage social support to be there for the client and never to withdraw support;** The role played in providing assistance for the patient is very important for survival, do not withdraw it at any time. If it appears you may not be available to perform the reminders, appoint somebody you trust will do this on your behalf and try and verify by any means available to you that it has been done. ***[Emphasize and commend the great assistance taken up by the Social Support. Close the counseling]***.	