COMPLIANCE WITH PRESCRIBED DIETARY REGIMEN AMONG HYPERTENSIVE OUT-PATIENTS AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN, OYO STATE

BY

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DEDICATION

This project is dedicated to God Almighty and to my lovely parents who gave me the motivation and necessary support to pursue my ambition.

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Afeez Olaiya OLAJIRE

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ABSTRACT

Hypertension among patients could be well managed if patients comply with the prescribed dietary regimen. Noncompliance with prescribed dietary regimen is one of the major causes for poor control of hypertension among hospital clients. Not much work has been done on compliance to prescribed dietary regimen among hypertensive patients in tertiary health facilities. This study was therefore designed to assess hypertensive out-patients' compliance with prescribed dietary regimen and associated factors at the University College Hospital, Ibadan.

A cross-sectional study was conducted among 300 selected hypertensive outpatients. A pre-tested interviewer-administered semi-structured questionnaire which contained a 45-point knowledge scale, 24-points dietary intake pattern's scale and 30 points food frequency scale was used to obtain information on respondents' socio-demographic characteristics, hypertensive diet(nutritional) knowledge,compliance to prescribed dietary intake, food frequency of hypertensive patient, factors influencing compliance to dietary regimen and the observational features observed. Knowledge scores of 0 – 30, >31 ≤ 38 and ≥39 were classified as poor, average, and good respectively. Dietary intake pattern scores of 0 – 12, >13 ≤ 17 and ≥ 18 were categorised as poor, fair and good dietary intake patterns respectively and food frequency scores < 17, >18 ≤ 23 and ≥24 were categorised as poor, average and good food frequency respectively. Descriptive statistics and Chi-square test were used to analyse the data with level of significance set at 0.05.

Mean age of respondents was 55.88 ± 16.24years, 52.3% were females and 82.0% were married. More than (50%) of the respondents were aged between 41 years and above when first diagnosed of hypertension. Majority (85%) of them have been receiving treatment for hypertension in the hospital for the past 6years. Only 12% of the respondents have good nutritional knowledge while almost two thirds, (60%) have average nutritional knowledge. Some of the factors deduced to be influencing the nutritional knowledge of the hypertensive patients include age (X^2=26.067, p=0.0001), age when first diagnosed of hypertension (X^2=25.345, p=0.0001), sex (X^2=10.225, p=0.006) and occupation (X^2=27.076, p=0.001). More than half (53.7%) of the respondents have partial compliance level to their dietary regimen. A major

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reported barrier to compliance with prescribed dietary intake was difficulty in sticking only to the prescribed diet (52.3%). The dietary food intake frequency showed appreciable intake of some of the prescribed food between 4-7times in a week: fruits (78%.3) and vegetable (79.7%). Consumption of fried food, 'chin chin' and biscuits was shown not to improve weight loss, blood pressure and lipid profile. Vegetable improves blood pressure while carbonated drinks improve the lipid profile.

The respondents' knowledge on hypertensive diet was average which has a direct effect on their dietary intake pattern and their food frequency. Difficulty in sticking to only the recommended diet was found to be the main factor influencing non-compliance to their dietary regimen. Therefore, there is need for training programmes for dieticians and all health workers involved in dietary modification to always consider the availability, affordability and suitability of diet before prescription of diet to the patients.

KEYWORDS: compliance, dietary regimen, hypertensive out-patients.

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CERTIFICATION

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

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body mass index
BP	Blood Pressure
CHD	Coronary Heart Diseases
CVD	Cardiovascular Diseases
DASH	Dietary Approach to stop Hypertension
HDL	High density lipoprotein
HIV	Human Immuno-deficiency virus
HTN	Hypertension
LDL	Low density lipoprotein
MOH	Ministry of health
NCD	Non-communicable disease
SHMS	School for hotel, Hospitality and Events Management
UAE	United Arab Emirate
UCH	University College Hospital
USDA	United State department of Agriculture
USDHHA	United State department of Health and Human services
WHO	World Health organization

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Key concepts and working definitions

A number of concepts and working definitions have been adopted in this dissertation which includes:

- **Hypertensive patient:** It refers to an individual who has been diagnosed with high blood pressure and he/she is already attending hospital for treatment.
- **Compliance to dietary regimen:** It refers to how hypertensive patients comply with the food modifications prescribed by health care personnel.
- **Dietary intake pattern:**It refers to the pattern of consumption of various food items compared to the ideal pattern of consumption.
- **Scope of the study:** The study focuses on diagnosed hypertensive out-patients and their compliance behaviour.
- **Food Frequency Questionnaire** (**FFQ**): This is a limited checklist of foods and beverages with a frequency response section for subjects to report how often each item was consumed over a specified period of time.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Hypertension is a chronic, sometimes acute, condition characterized by an abnormally raised blood pressure resulting in end organ damage. Hypertension is strictly limited to arterial blood pressure. Normally the maximum pressure exerted via blood on the arterial walls by the heart during a contraction (systolic pressure) is below 140 mmHg while the minimum pressure on the arterial wall when the heart is relaxing between contractions is below 90mmHg (diastolic pressure). When the cause is unknown it is designated essential hypertension. Secondary hypertension is where the cause is identified as in: chronic kidney disease; adrenal gland disorders; pregnancy; or drug induced hypertension (Mungati, Manangazira, Takundwa, Gombe, and Rusakaniko, 2014)

According to(Bell and Bryant, 2013)**,** In patients with high-normal BP, appropriate dietary and lifestyle measures can lower and maintain the blood pressure levels that may not require medical treatment. In addition, those on medical treatment may need lower dosages or fewer drugs if the dietary and lifestyle risk factors are well addressed. Some of these measures include lowering weight for those overweight and obese, restricting salt intake and saturated fats, exercising regularly, reducing alcohol consumption, and quitting smoking and improved consumption of fruits and vegetables (Awosan, Ibrahim, Essien, Yusuf and Okolo, 2014).

However, patient compliance is a challenge to the management of hypertensive patients in health facility settings. The various types of noncompliance include therapeutic or medication non-compliance, appointment noncompliance and dietary noncompliance in which the patient fails to follow the diet recommendations. Dietary noncompliance could be due to several reasons including unaffordable cost of the diet, complicated dietary plan, difficulty in preparation of diet, dislike of the recommended diet by the patient, recommended diet conflicting with patient food habit and/or culture as well as patient not satisfied with the quantity consumed. Other reasons why patients may fail to follow nutritional advice are patient dissatisfaction with the Nutritionist/Dietician, poor Nutritionist/Dietician-patient relationship, lack of

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Nutritionist/Dietician's concern, distrust with Nutritionist/Dietician's advice, or long waiting times to obtain appointments could increase the risk of non-compliance. This study assessed the compliance of hypertensive out-patients to dietary recommendations.

1.2 Statement of the problem

Hypertension and other NCDs are increasingly becoming diseases of public health importance owing to the upward trend in their prevalence especially in the developing countries. In 2008, WHO estimated the global prevalence of hypertension in adults aged 25 years and above to be 40%, being highest in Africa at 46%. It is estimated that hypertension accounts for about 7.5 million deaths globally in a year (12.8% of total annual deaths), and NCD deaths are projected to increase by 15% by 2020 (WHO report, 2010).

Hypertension is the commonest non-communicable disease in Nigeria with a prevalence of about 20-25 per cent in adult Nigerians (Alebiosu, 2010). The silent nature of hypertension often encouraged the tendency of patients to be non-adherent. The reasons for non- adherence are complex which include; ambivalence about taking drugs, concerns over side effects, and complexity of treatment regimen (Ekwunife, Udeogaranya and Adibe, 2010).

Food-related behavior is usually determined by the interplay of many factors, including physiological factors, socio-demographic factors, behavioural and lifestyle factors such as physical activity, smoking, knowledge, attitudes related to diet and health (Gonzalez, Garcia, Ruilop, 1998).Unhealthy diet affects the development of atherosclerosis, cause of Cardiovascular Diseases (CVDs). Diet affects serum cholesterol levels, body weight, BP, and blood glucose level. Changing these lifestyle habits including the way people eat has been known to be an effective key in managing these risk factors.

My experience during my Youth service corps at the University of Benin teaching hospital dietetics department and during my industrial attachment at the University college hospital Ibadan stimulated my interest in this study as I found that many patients defaulted their treatment citing community perspective that hypertension is incurable which influences their decision to pay less attention to the dietary advice while some believe that the disease is hereditary and

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dietary compliance has nothing to do with its management. Hence, the need to conduct this study

1.3 Justification of the study

In view of the need to prevent or delay the development of hypertension complications in hypertensive patients in a resource limited setting, identifying factors that influence peoples' non-compliance will go a long way to reducing the alarming growth rate of hypertension in Nigeria. This study would identify various factors influencing the compliance level of hypertensive patients and suggest the likely means to address them. This study findings would also influence hospital policies on how health workers, particularly health educators could design better strategies for improving compliance of hypertensive patients to their prescribed dietary regimen.

1.4 Research Questions

The following research questions were generated:

1. What is the knowledge of hypertensive diet among hypertensive out-patients attending clinic at UCH, Ibadan.
2. What is the compliance level of hypertensive out-patients in UCH, Ibadan to prescribed dietary regimen?
3. What factors influence respondent's compliance to prescribed dietary regimen?

1.5 Broad Objective

To evaluate the compliance level of hypertensive out-patients with prescribed dietary regimen among patients attending clinic at University College Hospital, Ibadan.

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1.5.1 Specific Objectives

1. To assess the knowledge of hypertensive out-patients in UCH, Ibadan on hypertensive diet

2. To assess respondents' level of compliance to their prescribed dietary regimen.

3. To identify the factors influencing respondents' compliance to prescribed dietary regimen.

1.6 Research Hypotheses

1. There is no significant difference between respondent's knowledge of hypertension and their socio demographic characteristics (sex, age, marital status, level of education, religion, and monthlyincome)

2. There is no significant difference between respondent's dietary intake and their blood pressure, lipid profile, weight loss and exercise

3. There is no significant difference between the respondents' hypertensive diet(nutritional) knowledge and the factors influencing compliance

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CHAPTER TWO

REVIEW OF LITERATURE

The concept of hypertension is explored at the beginning of this chapter. The burden of hypertension and dietary diet as well as the patients' knowledge about hypertensive diet is reviewed. The many factors influencing patients' compliance with prescribed dietary regimen are described.

2.1 The Concept of hypertension

Hypertension, also known as high or raised blood pressure is a global public health issue. It contributes to the burden of heart disease, stroke and kidney failure and premature mortality and disability. It disproportionately affects populations in low and middle-income countries. Hypertension rarely causes symptoms in the early stages and many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term.

There are significant health and economic gains attached to early detection, adequate treatment and good control of hypertension. Treating the complications of hypertension entails costly interventions such as cardiac bypass surgery, carotid artery surgery and dialysis, draining individual and government budgets.

Addressing behavioural risk factors, e.g. unhealthy diet, harmful use of alcohol and physical inactivity, can prevent hypertension. Tobacco use increases the risk of complications of hypertension. If no action is taken to reduce exposure to these factors, cardiovascular disease incidence, including hypertension, will increase. Salt reduction initiatives can make a major contribution to prevention and control of high blood pressure. However, vertical programmes focusing on hypertension control alone are not cost effective.

Integrated non-communicable disease programmes implemented through a primary health care approach are an affordable and sustainable way for countries to tackle hypertension. Prevention and control of hypertension is complex, and demands multi-stakeholder collaboration, including

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governments, civil society, academia and the food and beverage industries. In view of the enormous public health benefits of blood pressure control, now is the time for concerted action.

2.1.2 Grades of Hypertension

According to (Gupta and Guptha, 2010), hypertension has been grouped into the following grades:

1**. Normal blood pressure:** Systolic Blood Pressure< 130mmHg and Diastolic Blood Pressure of < 85mmHg.

2. **High normal blood pressure:** Systolic Blood Pressure 130mmHg – 139mmHg and Diastolic Blood Pressure of 85mmHg – 90mmHg.

3. **Grade 1 (Mild hypertension):** Systolic Blood Pressure 140mmHg – 150mmHg and Diastolic Blood Pressure of 90mmHg – 99mmHg.

4. **Grade 2 (Moderate hypertension):** Systolic Blood Pressure 160mmHg – 175mmHg and Diastolic Blood Pressure of 100mmHg – 109mmHg.

5. **Grade 3 (Severe hypertension):** Systolic Blood Pressure ≥180mmHg and Diastolic Blood Pressure of ≥110mmHg where health systems are weak.

2.1.1 Risk factors of hypertension

A number of risk factors for hypertension have been identified. Hypertension has been shown to increase with age, being more prevalent in older persons. Increased body mass index (BMI) [overweight and obesity] has been associated with the development of hypertension. So also have diabetes mellitus, heavy alcohol consumption and a family history of hypertension. Other risk factors include; heredity, race and tobacco use, salt, psychosocial stress, sedentary or inactive lifestyle, low potassium diet, contraceptive use, and low birth weight (Ifunanya, 2010).

The risk of developing hypertension can be affected by a number of factors, including adopting a healthy lifestyle that includes practicing regular exercise, maintaining a healthy body weight,

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managing stress, limiting alcohol consumption, quitting smoking and eating a healthy diet low in sodium, with adequate fresh fruits, vegetables limited fat and simple sugars (Khatiband El-Guindy, 2005). It is well known that food is important for health but it can also be the cause of ill health. The foods we eat contain protein, fats, carbohydrates, salts, minerals and vitamins. Each of these has a role to play in sickness and in health. Although genetic factors play a significant role in determining who will become hypertensive, lifestyle factors contribute strongly to the high prevalence of hypertension. Food-related behaviour was determined by the interplay of many factors, including physiological factors, socio-demographic factors, behavioural and lifestyle factors such as physical activity, smoking, knowledge, attitudes related to diet and health (Konzalez, Azpiazu , Kearney, 1998).

2.2 Prevalence of hypertension

2.2.1 Prevalence of hypertension globally

Hypertension is a common, important and major global public health problem. Its prevalence has been found to be 44% in Western Europe and 28% in North America. It has been documented as a threat to the health of people in sub-Saharan Africa and a major contributor to morbidity and mortality in the sub-region. There is emerging evidence to show that the pattern of diseases in sub-Saharan Africa is changing, with non-communicable diseases (NCD) responsible for about 22% of the total deaths in the region in 2000, cardiovascular disease alone accounting for 9.2% of the total mortality [World Health Organization (WHO) 2002]. According to (Kearney, Whealton, Reynolds, Montrer and Whealton, 2005) by 2025 about 75% of the world hypertensive population will be in developing countries. According to the World Health Report (2001), NCDs accounted for 22% of the total deaths in the region in the year 2000; cardiovascular diseases alone accounted for 9.2% of the total deaths, killing even more than malaria (WHO, 2002). Indeed, it has already been projected that up to three quarters of the world's hypertensive population will be in economically developing countries by the year 2025 (Kearney, Whelton, Reynolds , Montrer , and Whelton , 2005). With increased prevalence of hypertension and the resultant greater economic and health burden.

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The global prevalence of hypertension is on the increase. In 2000, 972 million people had hypertension with a prevalence rate of 26.4%. These are projected to increase to 1.54 billion affected individuals and a prevalent rate of 29.4% in 2025 (Kearney et al., 2005). The prevention and control of hypertension has not received due attention in many developing countries although it is one of the most modifiable risk factors for cardiovascular disease. Awareness, treatment and control of hypertension are extremely low in these developing countries as health care resources are overwhelmed by other priorities including HIV/AIDS, tuberculosis and malaria.

2.2.2 Prevalence of hypertension in Africa

Hypertension is the most common cardiovascular disease in Africans (Akinkugbe, 1985). Hypertension is regarded a major public health problem (Murray and Lopez, 1997) and it is an important threat to the health of adults in sub-Saharan Africa (Cappucio, Micah, Emmentt, Antwi, Martin-Pepprah, Phillips, Plange-Rhule, East-Wood, 2004.). Emerging evidence identifies hyper-tension as a major cause of morbidity and mortality globally including sub-Saharan Africa (Cappucio et al., 2004; 1997; Cooper et al., 1997; Olatunbuson, Kaufman, Cooper, Bella, 2000; Rufus, Chidozie, Luqman, Rasaq, Micheal and Anthony, 2008). There are indications that the burden of non-communicable diseases (NCDs) such as hypertension is increasing in epidemic proportions in Africa. According to the World Health Report (2001), NCDs accounted for 22% of the total deaths in the region in the year 2000; cardiovascular diseases alone accounted for 9.2% of the total deaths, killing even more than malaria (WHO, 2002). Indeed, it has already been projected that up to three quarters of the world's hypertensive population will be in the economically developing countries by the year 2025 (Kearney et al., 2005). Hypertension was thought to be rare in rural Africa (Shaper, Wright, and Kyobe, 1969; Pobee, Larbi, Belcher, Wurapa, and Dodu, 1977). However, it is now becoming more prevalent as urbanization increases and this has been shown in several studies in Africa (Cooper et al., 1998). Reliable epidemiologic data are useful for the design and implementation of effective strategies for the prevention and control of hypertension. As a result of changes in trends of prevalence and epidemiology of hypertension, there is need to regularly revisit the study on its prevalence to generate recent data in the developing countries especially sub-Saharan Africa. In this regard, efforts need to be made to generate comparable data to yield useful information

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needed to build the empirical evidence base that should be accumulated in order to trigger the necessary policy response.

2.2.3 Prevalence of Hypertension in Nigeria

Hypertension is regarded a major public health problem (Murray and Lopez, 1997) and it is an important threat to the health of adults in sub-Saharan Africa (Cappucio et al., 2004; 1997). Emerging evidence identifies hypertension as a major cause of morbidity and mortality globally including sub-Saharan Africa (Cappucio et al.2004; 1997; Cooper et al., 1997; Olatunbuson et al.,2000; Rufus et al., 2008). There are indications that the burden of non-communicable diseases (NCDs) such as hypertension is increasing in epidemic proportions in Africa.In Nigeria for example, it is the number one risk factor for stroke, heart failure, ischemic heart disease, and kidney failure. With an increasing adult population as well as rising prevalence of hypertension, Nigeria will experience economic and health challenges due to the disease if the tide is not arrested. As far back as the early 60s a lot of interest has been shown by workers on the blood pressure of Nigerian Africans. The essence of this work is to review studies on hypertension as well as hypertension research in the country.

According to the World Health Report (2001), NCDs accounted for 22% of the total deaths in the region in the year 2000; cardiovascular diseases alone accounted for 9.2% of the total deaths, killing even more than malaria (WHO, 2002). Indeed, it has already been projected that up to three-quarters of the world's hypertensive population will be in economically developing countries by the year 2025 (Kearney et al., 2005). With increased prevalence of hypertension and the resultant greater economic and health burden,Nigeria will feel the impact mostly due to its population size. Unfortunately, hypertension and other non-communicablediseases are not yet considered a problem in Nigeria. This problem is further magnified by paucity of data which may lead to the understanding that these diseases are not in existence. Assembling evidence available on the prevalence of hypertension in Nigeria could stimulate increased effort by health policy makers to control the emerging health burden. Such data could also have impact on daily medical practice as the need for prevention and control of hypertension would be obvious.

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2.3Approaches tolower hypertension

The 1993 recommendations included weight loss, reduced intake of dietary sodium, moderation in alcohol consumption, and increased physical activity as the best proven interventions for prevention of hypertension. Since then, further evidence in support of these recommendations has emerged. In addition, potassium supplementation and modification of eating patterns have been shown to be beneficial in prevention of hypertension. A summary of selected intervention efficacy experience published since 1993 is presented in the following sections.

2.3.1 Weight Loss

A comprehensive review of the evidence supporting the value of modest reductions in body weight is provided in the Clinical Guidelines for the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, 1998). It has been reported on the experience of 181 normotensive persons who had participated in Phase I of the Trials of Hypertension Prevention . During their initial 18 months of active intervention, those assigned to the weight loss group reduced their body weight by 7.7 lb (3.5 kg) and their systolic and diastolic blood pressures by 5.8 and 3.2 mmHg, respectively. After 7 years of follow-up, the incidence of hypertension was 18.9 per cent in the weight loss group and 40.5 per cent in the control group. These findings suggest that weight loss interventions produce benefits that persist long after the cessation of the active intervention. In phase II of the Trials of Hypertension Prevention, the 595 participants assigned to a weight loss counselling intervention experienced a 21 per cent reduction in incidence compared with 596 counterparts assigned to usual care (The Trials of Hypertension Prevention, phase II, 1997). Weight loss participants who were able to lose 9.7 lb (4.4 kg) or more and to sustain this weight loss through the 36 month period of follow-up experienced average reduction in systolic and diastolic blood pressure of 5.0 and 7.0 mmHg, respectively(Whelton, and Kotchen, 2002)

2.3.2 Dietary Sodium Reduction

At least three meta-analysis of the efficacy of reduced sodium intake in lowering blood pressure have been published since 1993 (Cutler, Grauda and Midgley, 2001).

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In all three reports, sodium reduction was associated with a small but significant reduction in systolic blood pressure in normotensive persons. In a meta-analysis of 12 randomized controlled trials conducted in 1,689 normotensive participants, (Cutler et al, 2001) estimated that an average reduction of 77 mmol/d in dietary intake of sodium resulted in a 1.9 mmHg (95 per cent confidence interval [CI], 1.2–2.6 mmHg) decrement in systolic blood pressure and a 1.1 mmHg (95 per cent CI, 0.6–1.6 mmHg) decline in diastolic blood pressure These findings are consistent with current national recommendations for a moderately low intake of dietary sodium (no more than 100 mmol/d: approximately <6 g of sodium chloride or <2.4 g of sodium per day) by all Americans and suggest that an even lower level of dietary sodium intake may result in a greater reduction in blood pressure.

2.3.3 Increased Physical Activity

A meta-analysis by (Whelton, Chin, Xin, and He, 2002). in which the experience of 1,108 normotensive persons enrolled in 27 randomized controlled trials was included, identified a 4.04 mmHg (95 per cent CI, 2.75–5.32) reduction in systolic blood pressure in those assigned to aerobic exercise compared with the control group.

The magnitude of the intervention effect appears to be independent of the intensity of the exercise program. In the Physical Activity and Health: A Report of the Surgeon General, it is recommended that persons exercise for at least 30 minutes on most, if not all, days of the week (U.S. Department of Health and Human Services. Physical Activity and Health, 1996).

2.3.4 Moderation of alcohol consumption

In a meta-analysis of 15 randomized controlled trials, (Xin, 2001), reported that decreased consumption of alcohol (the median reduction in self-reported consumption of alcohol was 76 per cent, with a range from 16 per cent to 100 per cent) was associated with a reduction in blood pressure, and that the relationship between reduction in mean percentage of alcohol and decline in blood pressure was dose-dependent.

Pooling of the experience of 269 normotensive participants enrolled in 6 randomized controlled trials identified a reduced consumption of alcohol as being associated with a 3.56 mmHg (95 per

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cent CI, 2.51–4.61) lower level of systolic blood pressure and a 1.80 mmHg (95 per cent CI, 0.58–3.03) lower level of diastolic blood pressure.

Therefore, it is recommended that alcohol consumption be limited to no more than 1 oz (30 mL) ethanol (e.g., 24 oz [720 mL] beer, 10 oz [300 mL] wine, or 2 oz [60 mL] 100-proof whiskey) per day in most men and to no more than 0.5 oz (15 mL) ethanol per day in women and lighter weight persons.

2.3.5 Potassium supplementation

Clinical trials and meta-analysis indicate that potassium supplementation lowers blood pressure in both hypertensive and normotensive persons. In a meta-analysis of the results from 12 trials with 1,049 normotensive participants, (Whelton et al 2002) reported that potassium supplementation (median, 75 mmol/d) lowered systolic blood pressure by 1.8 mmHg (95 per cent CI, 0.6–2.9) and diastolic blood pressure by 1.0 mmHg (95 per cent CI, 0.0–2.1).33M The effects of potassium supplementation appeared greater in those with higher levels of sodium intake.

2.4 Hypertension and dietary regimen

Interest in the relationship between hypertension and dietary regimen is an issue that needs to be understood for it has recently intensified that hypertension and non-optimal blood pressure levels are the most important contributors to cardio and cerebrovascular disease that is common not only to Filipinos but in the Pacific region with prevalence that is analogous to what is reported in developed countries. Thus, this needs an attention in which lifestyle would benefit these people. As such, diet is one of the important but neglected as a regimen. With this, the authors agreed to come up with a study to look for the level of awareness of fifty hypertensive young adults on hypertension and their compliance to dietary regimen and at the same time, to uncover if there is a significant relationship between the level of awareness on hypertension and the level of compliance to dietary regimen. Descriptive correlational study was employed and a reliable questionnaire that was formulated and utilized as the data gathering tool. Hypertensive young adults were found to be much aware of hypertension and they exhibited high compliant to dietary

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regimen. There is significant relationship between the level of awareness on hypertension and level of compliance to dietary regimen.

Since DASH diet has been designed in the frame of a dietary pattern, it can account for any interactions among the individual foods or nutrients. Hence, prescribing DASH diet is preferred to individual dietary recommendations. Although DASH is focusing on food groups, there are no declarations about the percentage of various macronutrients. Most of previous studies have prescribed 40-60% carbohydrate, 10-20% protein and 25-39% fat of total daily energy intake. Since the introduction of DASH 1995, many investigations have been conducted to evaluate its metabolic outcomes. Favourable effects of DASH diet on lipid profile, metabolic syndrome (MetS), diabetes, gestational diabetes, hypertension and CVDs by several studies. It has been reported that DASH diet also contains high amounts of antioxidants. Longitudinal studies have revealed an inverse association between DASH diet scores and mortality. Note that DASH is a dietary pattern, which includes different components. It is possible that similar scores in different populations do not necessarily reflect similar dietary patterns. Indeed, different components might be in accordance with DASH recommendations that lead to different interactions, and consequently, different health outcomes. Based on the usual dietary intake of Iranians, the main difference between Iranian dietary pattern and DASH dietary pattern is related to the consumption of whole grains.

2.5 Role of Diet in the management of hypertension

Findings from large number of both epidemiological and interventional studies indicated that adherence to DASH diet is associated with lower systolic blood pressure (SBP) (Kearney, 2013). In a study among Spaniards, hypertensive individuals had low accordance with the DASH diet. Consistently, in a cross-sectional study among Iranian female nurses, higher levels of DASH adherence reduced the risk of elevated blood pressure by 80 % (95% CI: 0.09, 0.67; P<0.01) (Saneei, 2014). This association has been also observed in a general population of middle-aged men and women (Harrington,Fitzgerald, Kearney, McCarthy, Madden, and Browne, 2013). However, there is debate over the beneficial effect of DASH diet on diastolic blood pressure (DBP). Another inconclusive aspect is regarding the effects of DASH diet in normotensive subjects in comparison with hypertensive individuals. On the other hand, it is not clear whether

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the magnitude of blood pressure change by prescribing DASH diet is equal in normotensive and hypertensive subjects or not. A recent meta-analysis on 17 clinical trials examining the influence of DASH diet on blood pressure revealed that it was more effective in reducing SBP than DBP in all subjects (both hypertensive and normotensive subjects) (-6.74 mm Hg vs. -3.54 mm Hg) . Beneficiary effect of DASH diet was greater in hypertensive subjects than normotensive individuals (SBP: -6.82 vs. -2.44 mm Hg; DBP: -3.59 vs. -1.69 mm Hg). Likewise, it has indicated that reducing the energy intake beside DASH diet led to more reduction in blood pressure. However, DASH diet could also reduce blood pressure independent of weight loss. Finally, by DASH eating plan, blood pressure was reduced more in men than in women (Saneei, 2014).

In a case control study conducted, some cases consume more fruits, a practice that should be encouraged. Legumes are excellent sources of fibre. Eating a high-fibre diet can significantly lower the risk of heart attack, stroke and colon cancer. Legumes are low in sodium and rich in potassium, calcium, and magnesium that decrease the risk of hypertension. The recommended daily intake is four times or more per week. Salt (or sodium chloride) may cause fluid retention and thereby cause pressure around the blood vessels, which can lead to hypertension. Most epidemiological studies have shown a positive association between dietary salt intakes, and the prevalence of hypertension. Reduction in salt intake significantly reduces both systolic and diastolic BP, CVD, and stroke (Khatib et al., 2005, USDHHS and USDA, 2005, Fung,Chiuve, McCullough , Rexrode, Logroscino, and Hu, 2008). Restriction of food is not accepted by public, results suggested that long-term compliance with salt restriction is poor in Japanese hypertensive patients.

Dietary approaches to stop hypertension (DASH) pattern refers to an eating plan to control blood pressure. The rational of DASH is findings from epidemiological studies showing that higher intakes of some specific minerals and fibre are associated with lower blood pressure (Haghighatdoost, Onvani, and Azadbakht, 2015). This dietary pattern, containing high amount of fruits, vegetables, whole grains and low-fat dairy products, has been designed to provide high amounts of potassium, calcium and magnesium. Other consideration in DASH eating plan is high consumption of fish, chicken and lean meats to reduce saturated fatty acids and cholesterol intake.

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2.6 The Concept of compliance

Traditionally, compliance is viewed in a relational context where the provider weighs the diagnosis and therapies in terms of risk and benefit, makes a decision, informs the patient and assumes the patient understands and will adhere. In this model, patient beliefs may even be viewed as an obstacle to treatment.

The concordance model of the patient – nutrition/dietician relation is characterised as: two sets of contrasted but equally cogent health beliefs - that of the patient and that of the doctor. The task of the patient is to convey his or her health beliefs to the doctor; and of the doctor, to enable this to happen. The task of the doctor or other provider is to convey his or her health beliefs to the patient; and of the patient, to entertain these. The intention is to assist the patient to make as informed a choice as possible about the diagnosis and treatment, about benefit and risk and to take full part in a therapeutic alliance. Although reciprocal, this is an alliance in which the most important determinations are agreed to be those made by the patient (Royal Pharmaceutical Society 1997).

Improved provider - patient communication is intuitively attractive to improve adherence and health outcomes. However, one very practical challenge is the enormous degree of non-concordance of patients and providers and how they rate the importance of adherence as a cause of care gaps and sub-optimal outcomes. Briefly, providers rate poor adherence as the greatest contributing cause; patients, on the other hand, rate it at zero.

A study showed that no major differences between cases and controls in following diet regimen and control reported more frequent food regimen than cases (65.1% vs. 44%). The findings come in accordance with a study conducted by Obaid (2010), in Palestine, revealed, that elderly people (63.4%) were asked by their doctors to follow special diet, due to high prevalence of chronic diseases, 87.8% were asked to follow low fat diet, 86.3% were asked to follow low salt diet, and 86.7% were asked to follow diabetic diet, but the compliance was only 34.6% among them (Obaid, 2010). Additionally, a study done by (Khellah, 2010) revealed that adult Palestinian people aged 19-59 years are at risk of chronic diseases, and 12.1% answered that they have a diet regimen, among them 7.3% was following a low salt diet, 5% was following a low fat diet and

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2.2% was following a diet special for DM (Khellah, 2010). In a study, patients with hypertension were not compliant to dietary regimen and they kept diet as a risk factor for hypertension and subsequent complications. Non-compliance to dietary recommendations is a major public health problem especially in developing countries. In a study in Pakistan more than three-quarters of the hypertensive patients were non-compliant. There is need for health professions to counsel their patients to prevent morbidities and mortalities because of non-compliance (Khan, Bawany, Mirza, Hussain, Khan and Lashari, 2014). Low counselling rates are reported in other study and the author suggested improvement of physicians' counselling skills so that they will be confident and effective in delivering this service to their patients. A model based on educating both physicians and patients may contribute to improve the care of hypertension (Anthony, Revital, Hava , Boaz, and Avi, 2011). A study conducted by USDHHS and USDA mentioned that adult and children should not avoid milk/product because of concerns that these foods lead to weight gain (USDHHS and USDA, 2005).

2.7 Hypertensive patients' compliance to prescribed dietary intake

Numerous studies have investigated the association between hypertensive patients' socio-demographic factors and their adherence to treatment regimens. For example, older patients report high adherence to antihypertensive regimens and better knowledge of their condition than younger patients. Interestingly, it was also found that males are more adherent than females but are less consistent in taking medication. One study found that females from poor socio-economic status and with low educational level were more likely to have low antihypertensive treatment adherence**.** Males with a similarly low level of education who were also from the same socio-economic class had higher antihypertensive treatment adherence. The interpretation of this result is that less educated females in lower classes are more liable to devote their time to their families instead of taking care of themselves (Alsolami, Hou and Correa-velez, 2012).

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2.8Factors influencing compliance to prescribed dietary regimen

According to the literature, individual factors affecting antihypertensive treatment adherence include socio-demographic factors, individual's knowledge and skills, personal beliefs and perceptions, and physical and mental ability of hypertensive patients.

2.8.1 Socio-demographic Factors

Numerous studies have investigated the association between hypertensive patients' socio-demographic factors and their adherence to treatment regimens. For example, older patients report high adherence to antihypertensive regimens and better knowledge of their condition than younger patients (Hadi, 2004). Interestingly, it was also found that males are more adherent than females but are less consistent in taking medication (Klootwyk, 2008). One study found that females from poor socio-economic status and with low educational level were more likely to have low antihypertensive treatment adherence. Males with a similarly low level of education who were also from the same socio-economic class had higher antihypertensive treatment adherence (Braverman, 2009). The interpretation of this result is that less educated females in lower classes are more liable to devote their time to their families instead of taking care of themselves. No similar study conducted in investigating the role of socio-demographic factors in relation to patients' adherence to antihypertensive treatments in Saudi Arabia.

2.8.2 Individual's Knowledge and Skills

There is positive relationship between patient's levels of knowledge of treatment and better adherence (Heyrettin, 2009). It was found that 43.7% of patients believe that antihypertensive drugs can be stopped once the blood pressure has stabilized. This shows how the lack of knowledge about treatment contributes to patient low adherence behaviour. Patients cannot necessarily be blamed for this as (Williams, 1998) have shown that patients' poor knowledge about medication is often related to the effectiveness of the health education they receive.

Some research in Saudi Arabia has been conducted to study the adherence practices of hypertension patients. These studies aimed to investigate patients' adherence and knowledge of hypertension, patients' treatment practices and hypertension control. The key findings included

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lack of patients' knowledge about hypertension, patients' hypertension practices need to change by improving their diet and life style to enhance their quality of life, low awareness of hypertension and also poor control of blood pressure and the use of its treatment. Despite this, the main strength of these studies is that they were conducted using large sample size. The limitation of these studies is the data collection methods employed. For example, a study has investigated hypertensive patients practice by using the WHO stepwise approach to surveillance (STEPS) of no communicable disease risk factors. However, the contents of this survey were created to be used to collect country-wide information about chronic disease risk factors rather than focusing on particular patients' practices. Therefore, further research is required in this area using a specifically designed tool to explore Saudi hypertensive patients' adherence behaviour (Alsolami, Hou, and Correa-velez, 2012).

2.8.3 Individual's Beliefs and Perceptions

Individual's Beliefs and Perceptions which affect patients' adherence to treatment often improves when they have positive beliefs about the efficacy of the treatment they take and trust that their treatment is working well to control their illness (Fraser, 2001). However, believing that treatments are not important or harmful is a barrier to adherence (Hayrettin, et al, 2009). Patients' beliefs about medical management and drugs in particular are driven by their knowledge. For example, some hypertensive patients hold the belief that taking antihypertensive treatments will result in side effects (Al-Sowielem, 1998). Cultural background also influences patients' beliefs about medication. A study of Chinese immigrants with hypertension living in the United States of America found they are lower adherent to antihypertensive treatments. In this case, adherence is influenced by the perceived benefits of Chinese herbs in controlling patients' blood pressure, and western medications for hypertension were shown to be perceived as less beneficial (Li, et al, 2006). Some religious beliefs contribute to patient practices regarding taking medications. For example, the Islamic faith supports the notion of taking what is beneficial for health to prevent harm and Muslim patients therefore take medication to manage and overcome illness. However, some Muslims from low socioeconomic backgrounds with a poor level of education might misunderstand this religious concept. This is the case for participants in a study conducted by Griffith and colleagues who stated that they were non-adherent to antihypertensive treatments among Muslims Bangladeshi patients because of the

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belief that their illness is predetermined from God (Allah) and therefore they are not required to intervene with treatment (Griffiths,, et al, 2005).

2.8.4 Physical and Mental Ability

Studies that address the role of physical and mental abilities and how they influence treatment adherence are rare. Physical, mental and sensory abilities, such as auditory or visual impairments, can have a negative impact on adherence (Park et al., 2008). One physical factor that can affect treatment adherence relates to the presence of co-morbidities. Patients with multiple health conditions receive different types of therapies. However, it was found that an increase in the number of drugs being taken is not associated with poor adherence to antihypertensive treatments (Inkster et al, 2006). This is because patients with co-morbidity who receive multiple medications consider the seriousness of their health condition (Inksteret al, 2006).

Psychological impairment also influences poor health outcomes (Berkman et al, 2003). Psychological conditions such as stress, fear and anxiety are linked to poor treatment adherence (Okken, et al, 2008). This is because patients experiencing these conditions are often unable to properly manage their conditions. In addition, the risk of low adherence to antihypertensive treatment is higher among patients who feel ashamed, guilty and dissatisfied regarding their non-adherence (Okken, et al, 2008). On the contrary, patients who are aware of the negative impact of stress show better adherence to antihypertensive medications (Hashmi, et al, 2007), which supports the significant role of knowledge in treatment adherence (Hayrettin, et al, 2009).

2.8.5 Health System-related Factors

The quality of the healthcare system is also an important factor that can help or hinder patients' adherence to treatments. In terms of hypertension management, the healthcare system is inclusive of policies, resources, and financial arrangements that determine the quality of medical services, for example, physician skills (Alsolami et al., 2012).

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2.8.6 Guidelines for Management and Policy

Hypertension guidelines consist of standardised information developed to enable healthcare practitioners to provide the best practices in terms of prevention, early detection and management of hypertension. All existing guidelines for hypertension management derived from WHO international recommendations and recent evidence-based research emphasise high quality of care (WHO, 1996).

Various hypertension management guidelines have been devised and distributed worldwide in order to improve the control of hypertension. Recommendations concerning screening, diagnosis and treatment of hypertension are contained in these guidelines. Following evidence from clinical trials, the guidelines for management of hypertension recommended certain classes of drugs for treating hypertension with and without co-morbidities. These drugs serve as the baseline in daily medical care when assessing the quality of pharmacotherapy (Ahmad et al, 2012).

A number of studies have investigated the quality of hypertension management in Saudi Arabia. These studies considered physician adherence to the hypertension management guidelines (Abdelmoneim, 2011) and the quality of hypertension management in primary care settings (Alnozha, 1997). Valuable findings include deficiencies in physicians' practices, poor hypertension control and the absence of an electronic patient record system revealed. However, results from these studies are questionable as they were local and evaluated only one primary healthcare centre (Alnozha, 1997) or were limited by a small sample size (Al-Rukban, 2007).

Barriers identified for physicians not adhering to the clinical guidelines are classified into three themes that include physicians' knowledge (lack of awareness, familiarity), attitudes (disagreement, outcome expectancy or lack of activity) or physicians' behaviour. Barriers present in one setting may not be present in another, therefore assessing these in different settings barriers is important in improving adherence to guidelines (Cabana, 1999).

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2.8.7 Quality of Healthcare Services

The quality of the healthcare system plays a role in patients' adherence practices. For example, the availability of a well-established system of keeping patient records is critical in tracking adherence (Bryson, 2009). Recording information about patients' regular follow-ups, current condition, the frequency of medication refills and the date of the last refill all are important in tracking patients' adherence and therefore in preventing complications via initiating suitable interventions for low adherent patients (Bryson, 2009). A cross-sectional study in Saudi Arabia that aimed to identify the management practices of hypertensive patients by evaluating patients' records showed poor recording of information, such as smoking status, any family history of cardiovascular disease and patients' body mass index (BMI). The study findings show that only a quarter of the 201 hypertension cases studied were sufficiently controlled (AL-Rukban, 2007). Another study evaluated 120 patients' records from two healthcare centres in Saudi Arabia based on the Quality Assurance Guideline introduced by the Saudi Ministry of Health. The data revealed that 63% of hypertensive cases were well controlled, 50% had good compliance with appointments and only 9% suffered from hypertension-related complications (Al-Homrany et al, 2008). The most important finding was that providers' hypertension management practices are not in accordance with the recommended national standard of care. Providing higher quality of care is associated with better hypertension control and the prevention of complications (Asch, 2005).

2.8.8 Cost of Treatment

The costs of medications have an inverse relationship with treatment adherence. It was reported that higher medication costs result in lower overall healthcare costs that in turn result from increased use of more expensive medications to treat chronic conditions, such as hypertension, diabetes mellitus, hypercholesterolemia and heart failure (Paramore, 2001).

Cost-related issues are considered as a possible reason for patients failing torespond to pharmacotherapy. In cases whereby the patient's health does not improve due to the underuse of medication because of its cost, a common response of a physician is to increase their dosage, or add augmentation therapy, which is unlikely to improve outcomes (Piette, 2004). Physicians

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should be familiar with the costs of drugs for their patients. One study found that costs increased in cases where the guidelines were not adhered to. This finding suggests that more expensive drugs were prescribed instead of cheaper drugs, such as diuretics, as a first line treatment (Abdulameer, et al.2012).

Prices of antihypertensive medications in Saudi Arabia are affordable and range from 1 US$ and ≤ 30 US$ according to the published Saudi Hypertension Management Guidelines that provided the list of the available oral antihypertensive agents in Saudi Arabia and the pricing list for these drugs (SHMS, 2011). However, most residents of Saudi Arabia (and the Gulf region in general) receive free health care. Prescription medication from governmental hospitals and primary health care clinics is also provided at no cost (Abou-Auda, 2003). Community pharmacies are also available and provide drug products available for purchase by households to supplement their medication requirements. There are >3000 community pharmacies in Saudi Arabia alone. The majority of these pharmacies are located in the regions of Riyadh and Jeddah (Abou-Auda, 2003).

However, with this privilege of receiving free cost therapy, patients' adherence behaviour in relation to free drug cost is unknown, and the assumption should not solely hypothesise that free drug cost is associated with increasing patients' adherence, because the adherence practice is influenced by different contextual factors other than drug price.

2.9 Improving Compliance

Among the factors which may modify compliance, some are unavoidable such as the duration of treatment or the absence of clinical signs associated with the hypertension (Mallion et al., 2001). However other means of improving compliance could be used such as:

• Detection of at risk patients. This is very difficult to achieve since there are large errors of prediction.

• Optimise and simplify treatment by using as much as possible slow release tablets and fixed combinations and by prescribing the best tolerated treatments.

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• Informing patients about hypertension and their own treatment. A study in 1997 by (Bailey et al 1999) on 66 patients showed that 78% wished to know the effects of irregular treatment compliance and 90% wished to know of side effects. 60% wanted to know about possible drug interactions and 82% the causes of arterial hypertension. It should be noted that many patients do not know the definition of hypertension and the normal values of blood pressure

Educating and involving patients so as to motivate and empower the person in order to make him aware of the necessity for treatment (Mallion et al., 2001). Thus the patient can be asked to measure his own BP. (Edmonds et al, 1985) studied 37 hypertension patients who had been treated for three months and who had been taught self-measurement. They showed that compliance went from 65% at the beginning of the study to 81% after three months of self-measurement and in addition 70% of the patients who were non-compliant at the beginning of the study became so (Mallion et al., 2001).

It was concluded that there are still many patients treated for hypertension with very poor control of BP. Despite a greater awareness of the importance of compliance, this factor remains important as a cause of poor control of hypertension and thereby is a cause of many hospital admissions and increased health care expenditure (Mallion et al., 2001). Thus, health care professionals should be more interested in public health problems and involve themselves in attempts to improve compliance with treatment.

2.10 Patients' knowledge on hypertensive diets

There is positive relationship between patient's levels of knowledge of treatment and better adherence (Heyrettin, 2009). It was found that 43.7% of patients believe that modified diet can be stopped once the blood pressure has stabilized. This shows how the lack of knowledge about treatment contributes to patient low adherence behaviour. Patients cannot necessarily be blamed for this as studies (Williams, 1998) have shown that patients' poor knowledge about dietary regimen is often related to the effectiveness of the health education they receive.

Some research in Saudi Arabia has been conducted to study the adherence practices of hypertension patients. These studies aimed to investigate patients' adherence and knowledge of hypertension, patients' treatment practices and hypertension control. The key findings included

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lack of patients' knowledge about hypertension, patients' hypertension practices need to change by improving their diet and life style to enhance their quality of life, low awareness of hypertension and also poor control of blood pressure and the use of its treatment. Despite this, the main strength of these studies is that they were conducted using large sample size. The limitation of these studies is the data collection methods employed. For example, a study has investigated hypertensive patients practice by using the WHO stepwise approach to surveillance (STEPS) of no communicable disease risk factors. However, the contents of this survey were created to be used to collect country-wide information about chronic disease risk factors rather than focusing on particular patients' practices.

2.11 Types of intervention used in the control of hypertension

Glynn (2010) revealed that there is little evidence as to how care for hypertensive patients should be organized and delivered in the community to help improve blood pressure control. His study was aimed to determine the effectiveness of interventions whose objective was to improve follow-up and control of blood pressure in patients taking blood pressure lowering treatment. The outcomes assessed were mean systolic and diastolic blood pressure, control of blood pressure and the proportion of patients followed up at clinic.

The interventions were aimed at improving control of blood pressure or clinic attendance and were classified as:

- Self-monitoring
- Educational interventions directed to the patient
- Educational interventions directed to the health professional
- Health professional (nurse or pharmacist) led care
- Organizational interventions that aimed to improve the delivery of care
- Appointment reminder system (Glynn, Murphy, Smith, Schroeder, and Fahey, 2010)

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2.12 Theoretical Framework

2.12.1 The Social-Ecological Model

The Social-Ecological model provides a framework for understanding how individuals and their social environments mutually affect each other across the lifespan. Drawing from the ideas of Kurt Lewin's A Dynamic Theory of Personality: Selected Papers (New York: McGraw-Hill, 1935), which conceptualized this relationship as an equation that yielded behaviour, Urie Bronfenbrenner's The Ecology of Human Development (Bronfenbrenner 1979, cited under History) extended the social ecological perspective to account for the complexity of individuals developing within embedded systems. Bronfenbrenner (1979) specified micro-, meso-, exo-, and macro- subsystems, which constitute the settings and life space within which an individual develops. In this model, each of the subsystems influences the individual and the other subsystems.

In his original theory, Bronfenbrenner postulated that in order to understand human development, the entire ecological system in which growth occurs needs to be taken into account. This system is composed of five socially organized subsystems that support and guide human development. Each system depends on the contextual nature of the person's life and offers an ever-growing diversity of options and sources of growth. Furthermore, within and between each system are bi-directional influences. These bi-directional influences imply that relationships have impact in two directions, both away from the individual and towards the individual.

In human nutrition,social ecological model is used as a model for nutrition research and interventions, it looks at multiple levels of influence on specific health behaviours. Levels include intrapersonal (individual's knowledge, demographics, attitudes, values, skills, behavior, self-concept, self-esteem), interpersonal (social networks, social supports, families, work groups, peers, friends, neighbours), organizational (norms, incentives, organizational culture, management styles, organizational structure, communication networks), community (community resources, neighbourhood organisations, folk practices, non-profit organizations, informal and formal leadership practices), and public policy level (legislation, policies, taxes, regulatory agencies, laws)

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2.12.2 Applying Social Ecological Model to factors influencing compliance of hypertensive patients to prescribed dietary regimen

Compliance to a prescribed dietary regimen is influenced not only by characteristics of the individual patient, but also by factors within the patient's environment, or so-called system level factors. Until now, however, health care system factors have received relatively little attention in explaining dietary noncompliance. Ecological models might serve as a framework to help explain the influence of health care system factors on patient behavior (e.g., compliance). In an ecological model, different levels of factors influence patients' behaviour, i.e. factors at the patient-level, micro- (provider and social support), meso- (health care organization), and macro (health policy) -levels. In order to understand dietary non-compliance and implement interventions to improve dietary compliance, factors at these different levels should be taking into consideration.

Intrapersonal: Many intrapersonal factors influence the compliance of hypertensive patients to their prescribed dietary regimen. The knowledge of individual about different food, as well as the skills in cooking the diet using the prescribed method. Also self-efficacy to make changes in diet depending on the changes observed.

Interpersonal(Family, friends, peers): Studies have shown that compliance is more difficult among the married one, these was traced to the fact that the pattern of food preparation in the household is being influenced by the family, friends or peers. The choice of food could also be influenced by the food habit of peers.

Organizational (Churches, stores, community organizations): Organizational factors such as food manufacturers, food availability and prices in local stores and restaurant play a major role in the compliance of hypertensive patients to their prescribed dietary regimen. Also, hypertensive patients' diets are being influenced by the food served at church dinners, party, seminar which makes it difficult for them to influence.

Community: Different community have dynamic norms regarding diet which prevent hypertensive patients from consuming some diet that are considered to be most suitable for their disease condition

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Public policy (Local, state, federal): Compliance can be increased through government effort to make regulations on fat and sodium content and labelling of foods so as to assist consumers to have deep knowledge on the content of the food items before consumption. More so, as a result of complains from hypertensive patients about the inability to purchase prescribed dietary regimen, government should place subsidies on agro products.

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SOCIAL ECOLOGICAL MODEL'S FRAMEWORK

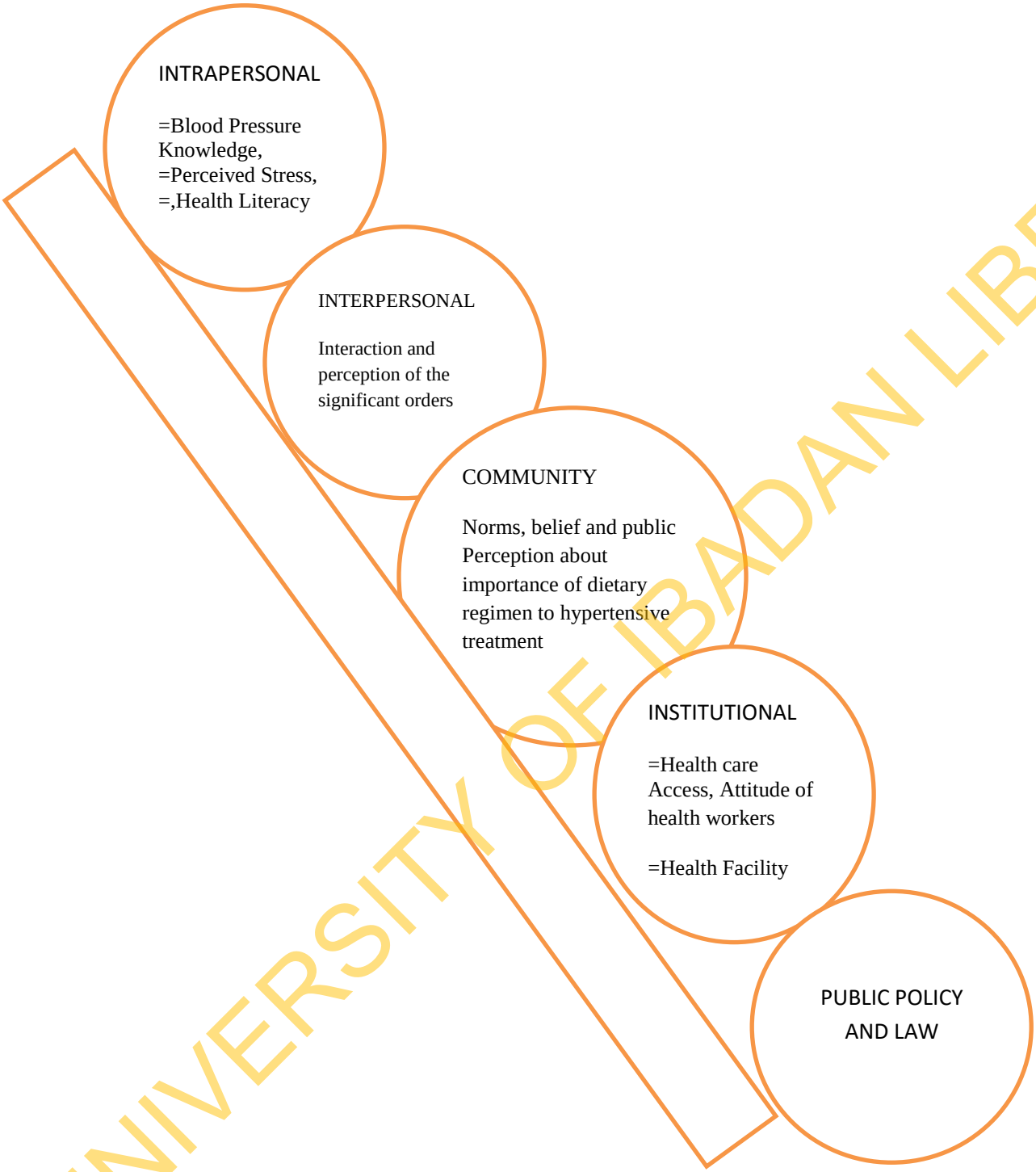

FIGURE 2.13 APPLICATION OF SOCIAL ECOLOGICAL MODEL TO THE STUDY

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CHAPTER THREE

METHODOLOGY

3.1 Study Design

The design for this study was descriptive cross sectional using interviewer-administered questionnaires and observational checklist. The study measured the compliance level of hypertensive out-patients to prescribed dietary regimen, the factors influencing their compliance to dietary regimen at the University College Hospital (UCH) Ibadan, Ibadan, Oyo State.

3.2 Description of Study Area

This study was carried out among hypertensive out-patients of UCH Ibadan, Ibadan, Oyo State. University College Hospital Ibadan was considered as an ideal study site considering the high influx of patients with hypertension and the increase in the prevalence of the disease among both elderly and adolescent. UCH is the only tertiary hospital in Oyo state and one of the biggest in Nigeria. It is the teaching hospital of the first University in Nigeria, University of Ibadan, Ibadan, Oyo State Nigeria. It runs different clinics for different cases on different days, but for hypertension, it runs clinic for them at different department such as Geriatrics, Medical outpatient clinic, and other clinics where outpatient are being attended to as the study aim to focus only on out patients since the in-patients are advised to comply to their dietary regimen prepared by the hospital dietetics clinic.

The three clinics used are geriatrics clinic, medical outpatient clinic and General outpatient clinic. These are the three clinics where outpatient hypertensive patients are being attended to. It is the dietician in each of these clinics that is in charge of dietary counselling and recommendation to the patients. Each of these clinics has one dietician attached to them except the general outpatient clinic where the dietary counselling is being carried out by a consultant who has background in nutrition, alongside the dietician at the various clinics, interns and student on industrial training are present at the dieticians office. The main activities at the dietetics unit of these clinics is to check the body mass index, educate the patient on need for compliance and prescribe a new dietary regimen with the assistance of a diet sheet which is been

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given to the patients to ensure continuity in dietary regimen. The diet recommended for hypertensive patients are mainly low salt (DASH diet) and low fat diet if there is other related disease conditions, e.g., obesity, overweight, hyperlipidaemia etc

Geriatrics clinic opens Monday to Friday from 8am to 4pm and since the clinic is mainly for elderly (60 years and above), all aging-related diseases are being attended to during every working hour of the week with an average of one hundred (100) hypertensive patients weekly while medical outpatient clinic for hypertensive patient are divided into two, the normal hypertensive clinic is between 12noon and 4pm on Tuesday and 9am to 12noon on Wednesday. While the cardiac clinic is between 9am and 12noon on Monday and Thursday. That makes it four clinic days at medical outpatient clinic. At General outpatient clinic, since it is the first line of contact for all patients coming into the hospital, some hypertensive patients are being managed there (Personal communication of author with Head of Department, Dietetics).

3.3 Study Population

The study population was hypertensive out-patients attending clinics for hypertension in the outpatient clinics of UCH and who are on a prescribed dietary regimen from the hospital's dietitian.

3.4 Inclusion Criteria

Registered Hypertensive out-patients who are not attending outpatient clinics for the first time. It is also inclusive of those whose length of diagnosis of the disease is not less than three (3) months prior to data collection. Those who give informed consent to participate in the study were recruited into the study.

3.5 Exclusion Criteria

Registered hypertensive out-patients who are attending outpatient clinics for the first time or whose length of diagnosis of the disease is less than three (3) months prior to data collection and any included patient who did not give informed consent to participate in the study.

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3.6 Sample Size Determination

The minimum sample size would be calculated based on the (Kasiulevicius et al., 2006) formula for sample size

$$n = \frac{Z_{\alpha}^2 P (1-P)}{d^2}$$

n= the minimum sample size

Zα = Standard normal value corresponding to 95% confidence level set at 1.96.

P= 22.7 % i.e. prevalence of hypertension in Nigeria (Sola, Chinyere, Stephen, and Kayode, 2013)

q=1.0-p=1- 0.227=0.773

d= degree of accuracy desired (0.05)

$$n = \frac{1.96^2 \times 0.227 \times 0.773}{0.05^2}$$

n= 269.64

n= 270

Adjusting the sample size for 10% Non-Response rate

$$n_f = \frac{n}{1 - NR}$$

Where NR= 10% non-response rate

n_f = adjusted sample size

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$$n_f = \frac{270}{1 - 10\%}$$

$$n_f = 300$$

3.7 Sampling Procedures

The study recruited all patients who fulfil the inclusion criteria of being out-patients and are being treated for hypertension in the clinics from July 6 to September 24 2015 and gave informed consent to participate in the study

3.8 Instrument for Data Collection

This study used a set of questionnaire to obtain information on socio economic and demographic characteristics, dietary habit, nutritional knowledge and factors affecting choices of food including observational checklist to obtain information about improvement in their blood pressure, lipid profile, weight loss and exercise. The questionnaire was divided into four sections as highlighted below.

Section 1: this section elicits information on socio-economic and demographic variables of the subject including age, sex, ethnicity, level of education, monthly income, occupation, and duration of diagnosis etc.

Section 2: Information on patient's knowledge on hypertensive diet was collected.

Section 3: This section contained questions to assess the dietary intake pattern of the prescribed regimen in the past three months using food frequency questionnaire to elicit information on the frequency of consumption of foods such as fried food, carbonated drink, fruits, vegetables etc.

Section 4: The factors influencing their compliance level to their prescribed dietary modification in the past three months was obtained using a list of questions on social, environmental, religious and cultural influences on the likely causes of noncompliance.

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3.9 Validity and Reliability

3.9.1 Validity of Instrument

The instrument was designed using simple English with its validity being ensured through extensive literature search on compliance level of patients to dietary regimen. The supervisor and other lecturers in the department of Health Promotion and Education oversaw the development of the instrument before its subsequent administration to ensure face and content validity. The corrections made by these experts were adapted to improve the instrument. Filter questions such as (consumption of snacks in place of main meal is beneficial to hypertensive patient, fats are essential in all diet) were strategically placed within the instrument to ensure that the respondents were not faking the responses. There was translation and back translation of the instrument between English and Yoruba (The local language of the target population) Languages.

Six research assistants were trained on the purpose of the study, the research assistants were taken through the details of the various sections and component of the questionnaire, this is to ensure that they understand the information they are expected to obtain from each respondents.

The questionnaire designed for collecting data was first pretested among 30 hypertensive patients at Ring road state Hospital, Ring road Ibadan. The pretesting was done to ensure the validity and reliability of the questionnaire and also to ensure that all the questions were relevant to the study and would solicit the desired responses from the respondents. The pretesting was carried out in June 2015, after obtaining oral consent from respondents the questionnaire was administered. The pretested questionnaires were coded, entered and analysed using SPSS version 20. Some problems detected during the pre-test included ‘question 5’ (Educational status) HND/Bachelor and Postgraduate were separated as single item, but after pretesting both were merged to just Postgraduate as an option for that question.. In addition, checklist was added to the main study as part of the instrument after pretesting to capture the current state of respondents’ health. The checklist contains indicators that the patients observed while adhering to hypertensive dietary regime. It includes weight loss, improved blood pressure, and improved lipid profile.

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3.9.2 Reliability of the Instrument

This defines the extent to which an instrument constantly yields the same results on repeated trials. This was ensured by pretesting 10% of the instrument on the hypertensive patients of State Hospital, Ringroad, Ibadan. This population has similar characteristics with the actual population but did not consist of those who will participate in the study. The findings from the pre-test were used to scrutinize and reset the items in the instrument for necessary adjustments before the main study. Also its internal consistency will be determined using the Cronbach's Alpha coefficient analysis. Results showing correlation coefficient greater than 0.5 are considered reliable. The Cronbach's Alpha coefficient for this study was 0.77.

3.10 Scales of Measurement

3.10.1 Scales of Measurement of Knowledge on hypertensive diet

Knowledge on hypertensive diet was measured by knowledge questions to assess how well hypertensive patients understand their diet. A total of fifteen (3) questions were asked and two (2) points were allocated to every correct answer and one (1) point to every fairly correct answer; thus bringing the total points to forty-five (45). Afterwards the points were categorized between 0-30 as Code 1, 31-38 as code 2 and ≥ 39 as Code 3. Participants that score between 0-30=Code 1 were adjudged to have poor nutritional knowledge on hypertension, 31-38 = code 2 were adjudged to have average nutritional knowledge and ≥ 39=Code 3 were adjudged to have good nutritional knowledge

3.10.2 Scales of Measurement of adherence to treatment

The dietary intake pattern was assessed by posing questions on how patients follow dietary instructions in relation to medical or health advice. A total of twelve (12) questions were asked and two (2) points were allocated to every appropriately correct answers and one (1) point to every fairly correct answers; thus bringing the total points to twenty-two (24). Subsequently the points were categorised between 0-12 as Code1, 13-17 as code 2 and ≥ 18 as Code 3.

Respondents that score between 0-12=Code 1 were adjudged to have poor dietary intake pattern, 13-17= code 2 as fair dietary intake pattern and ≥18=Code 3 as good dietary intake pattern

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3.10.3 Scales of Measurement of food frequency of hypertensive patients

Food items were listed to investigate their frequency of consumption. Food items are listed based on the food that are allowed and disallowed for hypertensive patients. A total of six (6) food items were listed and two (4) points were allocated to every appropriately correct answers and one (2) point to every fairly correct answers; thus bringing the total points to eighteen (30). Consequently the points were categorized between 0-17 as Code 1, 18-23 as Code 2 and ≥ 24 as Code 3. Respondents that score between 0-17=Code 1 were adjudged to have poor food consumption pattern, > 18-23=Code 2 as encompassing fair choice in food consumed and ≥24=Code 3 as encompassing good food frequency pattern.

The collected data was initially sorted out, coded manually, entered into the computer and analysed with SPSS version 20.0. Frequency distribution, cross tabulations, and Chi-square test were performed to test for associations between the variables of interest. The results were used to draw inferences.

The checklist results were analysed manually to obtain the various frequencies, then later cross tabulated with the food frequency sections to know how the choice of food consumed influence the outcome variables (blood pressure, lipid profile, weight loss).

3.11 Data Collection Procedure

Data were collected from July 6 – September 24, 2015 using interviewer administered questionnaire. The author paid visit to the hypertensive clinic for permission and planning prior to the commencement of the study.

The questionnaires were administered on hypertension clinic days of Mondays and Thursdays at medical out-patient clinics of the hospital, (Medical out-patients' clinic, geriatrics and General outpatient department; The nephrology clinic, cardiology clinic and diabetes because most diabetes patients are found to be hypertensive). Monday to Friday from morning till the close of clinic for each of the clinic days. Respondents who consented to be interviewed were administered the questionnaire after being duly informed about the study. Furthermore, the checklist was used to note the various observable symptoms among respondents in each of the clinic days.

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Data were collected at Medical out-patient clinic between 4th and 23rd of July with a total of 95 questionnaires administered in the department, the research team proceeded to geriatrics clinic where data were collected between July 27th – August 20th with a total of 105 questionnaires collected, the remaining questionnaires were administered at General outpatient department, cardiology clinic and diabetes clinic between August 24th and September 24th when data collection was concluded. An average of thirty questionnaires was administered on each clinic days.

All questionnaires administered were well administered with 100% accuracy in the collection; this was achieved through thorough training the research assistants were subjected to and the fact that research assistants are also student dieticians.

The respondents were adequately informed about the study and valid informed consents was gotten and signed by them. Afterwards, there was administration of an interviewer administered semi structured questionnaires to respondents by the researcher and trained research assistants.

3.12 Data Analysis

The questionnaires were collected sorted out, cleaned/ edited and coded before running the analysis on the SPSS statistical package version 20. Socio-demographic and economic characteristics were summarized using descriptive statistics such as mean, frequencies and percentages. The frequency was generated after data entry to serve as a tool for cleaning the data. This was done with the assistance of the project supervisor. The rating of the responses of the nutritional knowledge data were categorized into good and bad knowledge, the responses were scored and the mean expected score was generated. Individual values above the mean score were categorized as nutritional knowledge, while value below the mean score was categorized as bad knowledge and presented as percentages. Similar method of analysis of nutritional knowledge data was repeated for dietary intake pattern, food frequency questions and factors influencing compliance of patients. Correlation analysis was used to establish the factors influencing the choice of food intake among hypertensive patients, inferential statistics was used to get relationship between knowledge of patients and the factors influencing compliance, the food

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dietary intake pattern and the variables observed in the checklist (blood pressure, lipid profile, exercise and weight loss).

3.13 Ethical Consideration

Ethical approval was obtained from UI/UCH Ethical review committee.. Participants in the research were voluntary by the entire respondent with informed consent obtained from them before their participation.

1) All through the study, the respondents were asked not to provide any information that can disclose their identity to a third party; their anonymous personality will be maintained as much as possible. The study followed ethical principle guiding the handling of human participants in research. The study followed the ethical principles guiding the use of human participants in research, which include Respect for persons, Beneficence, Non–maleficence and Justice.
2) With respect to confidentiality, no identifiers such as name of respondents were used during the course of the study.
3) All information provided was kept confidential during and after the research.
4) All information was used for the purpose of the research only.

3.14 Limitations of the Study

There was no limitation to the study.

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CHAPTER FOUR

RESULT

4.1 Socio-demographic Characteristics of the respondents

Most of the respondents are Female (52.3%) and are married (82%). The mean age of the respondents was 55 years. The age distribution of the respondents in age groups is as follows: ≤40years (22.0%), 41-60years (38.3%), 61 and above (39.7%). Concerning marital status, majority of the respondents are married (82.0%), 9.3% are widowed, 7.0% are single while 1.7% are divorced. There are more respondents with HND/Bachelor degrees (42.3%), 25.7% ended up with only primary education, 13.0% had only secondary education, 11.3% had postgraduate education while 7.7% had no formal education. Regarding their occupation, 37.7% are civil servants, 25.0% are traders, 13.3% are artisans, 12.7% are retirees while 11.3% are business men and women.

The distribution of the respondents among the three main religions shows that 50.7% are Christians, 48.7% are Islamic adherents and the remaining 0.7% practiced traditional religion. Regarding their income, 51.0% earn more than 41,000 monthly, 29.7% earn below 20,000 while 19.3% earn between 21,000 and 40,000 monthly.

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Table 4.1 Socio-demographic characteristics of the respondents **N=300**

Variable		frequency	Per cent %
Age (years)	<=40years	66	22.0
	41-60years	115	38.3
	61 and above	119	39.7
	Mean	55.9	
	S.D	16.2	
Sex	Male	143	47.7
	Female	157	52.3
Marital Status	Single	21	7.0
	Married	246	82.0
	Divorced	5	1.7
	Widowed	28	9.3
Educational Status	No formal Education	23	7.7
	Primary Education	77	25.7
	Secondary education	39	13.0
	HND/Bachelor	127	42.3
	Postgraduate	34	11.3
Occupation	Trader	75	25.0
	Civil servant	113	37.7
	Artisans	40	13.3
	Retiree	38	12.7
	Businessman/ woman	34	11.3
Religion	Christianity	152	50.7
	Islam	146	48.7
	Traditional	2	0.7
Monthly Income	<=20,000	89	29.7
	21,000-40,000	58	19.3
	>=41,000	153	51.0

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4.2 Age at Diagnosis of Hypertension among respondents

Table 4.2 shows the age at diagnosis of hypertension. The age was categorised into three (<=40 years, 41-60 years and >60 years). Most respondents were below 40 years (45.3%) as at the time they were diagnosed of hypertension, 41.7% were aged between 41 and 60 years. Only 13% of the respondents are aged 61 years and above when hypertension was diagnosed in them.

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Table 4.2 Age when diagnosed hypertension **(N=300)**

Variable		Frequency	Per cent
Age (years)	<=40 years	136	45.3
	41-60 years	125	41.7
	61 and above	39	13.0

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4.3 Duration of accessing medical care for hypertension at University College Hospital, Ibadan

Descriptive statistics on the duration of accessing Medical care for the treatment of Hypertension is presented in Table 4.4a and 4.4b. The mean age is reported as 44 ±13.7 years. The duration was categorised into three categories (<=2years, 3-5years, >=6years). From Table 4.4, 45.7% of the respondents has been accessing medical services for the treatment of hypertension in the hospital for the past two years, 28.3% has been visiting the hospital for the past six years while 26.0% has been visiting the hospital for the treatment of hypertension for the past three to five years.

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Table 4.3 How long have you been accessing medical services for the treatment of hypertension in this hospital? (N=300)

Variable		Frequency	Per cent
Age (years)	<=2years	137	45.7
	3-5years	78	26.0
	>=6years	85	28.3
	Mean	44.1	
	S.D	13.7	

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4.4 Dietary Intake compliance and Hypertensive diet knowledge

The dietary intake compliance of most of the respondents was average (53.7%), as shown in Table 4.5a. Only 18.7% of the respondents complied poorly to dietary intake, while 27.7% of them complied very well with their dietary intake.

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Table 4.4Dietary Intake Compliance **(N=300)**

Variable		Frequency	Per cent
Age (years)	Poor Compliance	56	18.7
	Average Compliance	161	53.7
	Good Compliance	83	27.7

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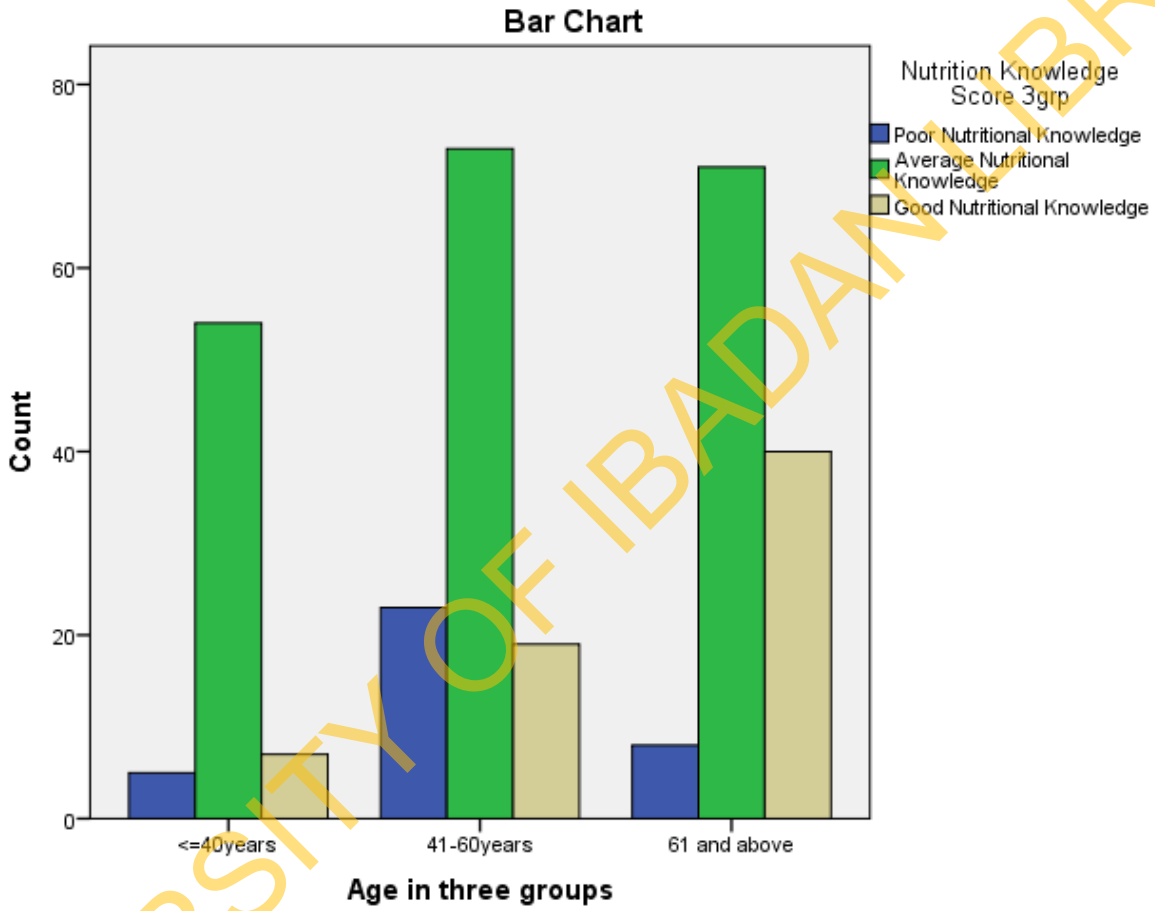

Fig 4.1. Hypertensive diet (Nutritional) knowledge by age categories.

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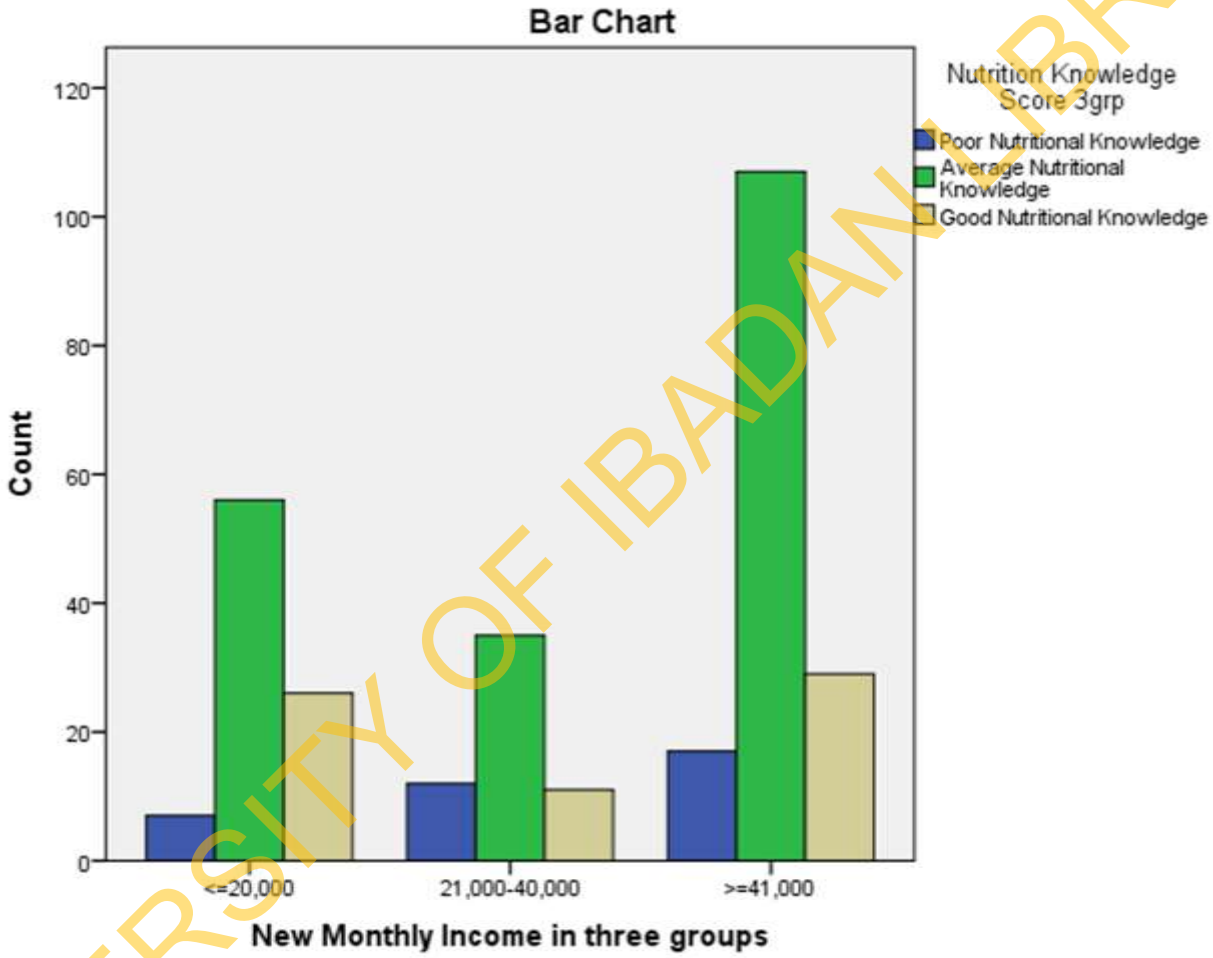

Fig. 4.2 Hypertensive diet (Nutritional) Knowledge of respondents and their monthly income

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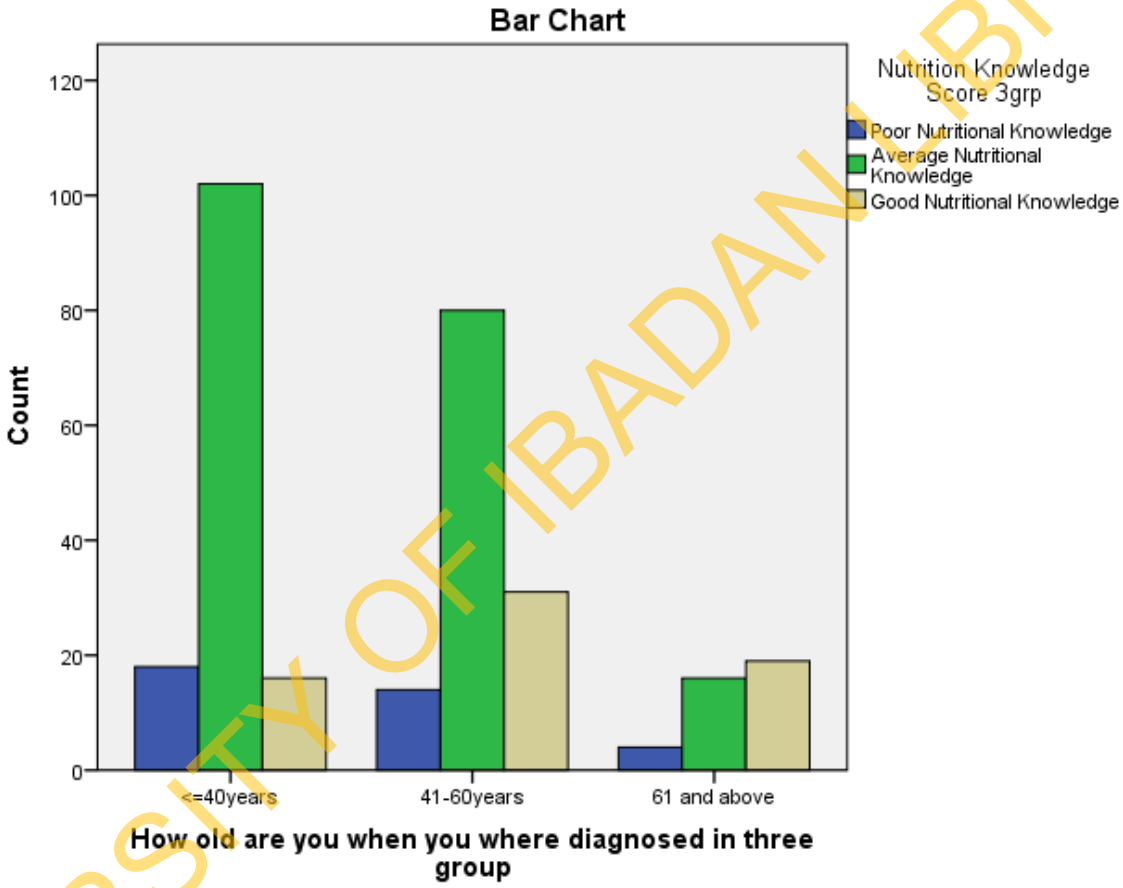

Fig. 4.3Hypertensive diet (Nutritional) Knowledge of respondents and their age at diagnosis.

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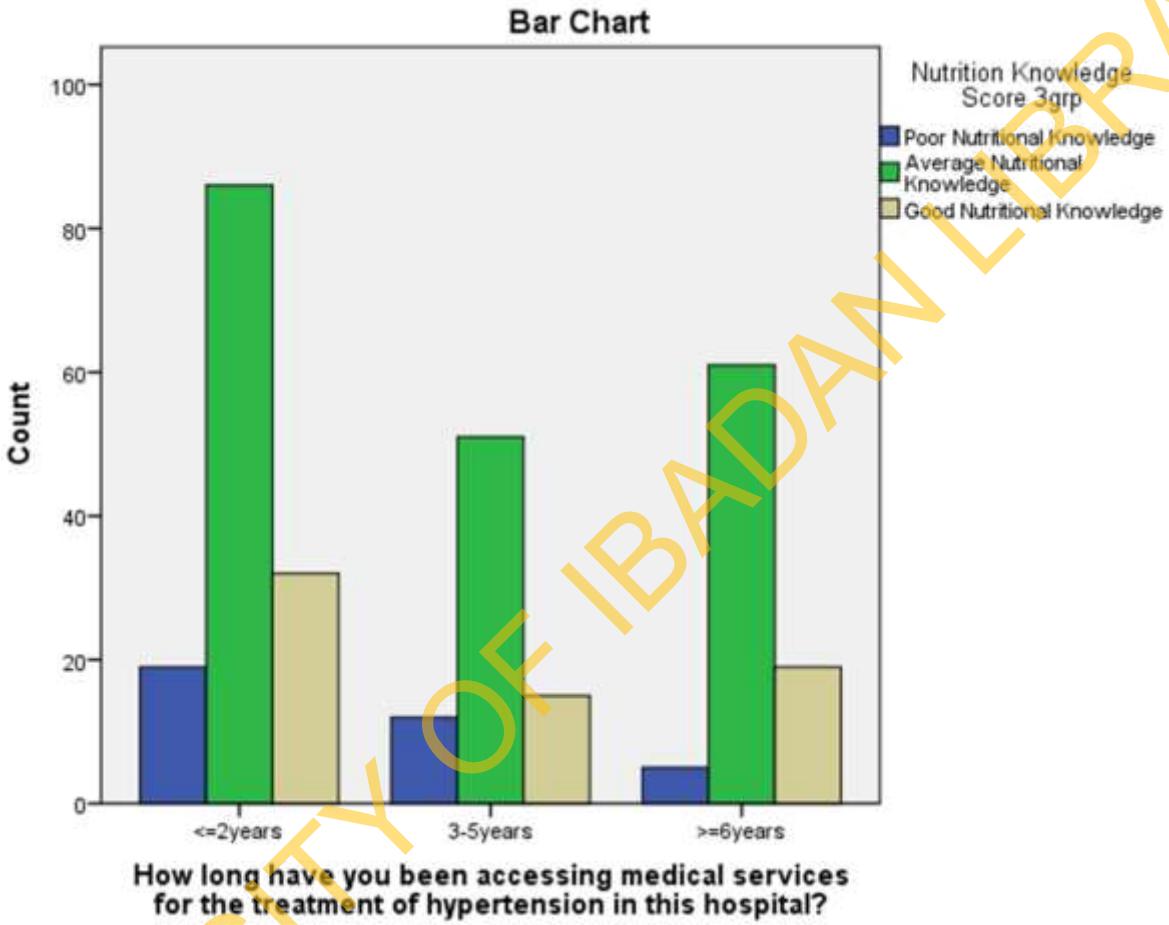

Fig 4.4 Hypertensive diet (Nutritional) Knowledge of respondents and their Length of assessing treatment.

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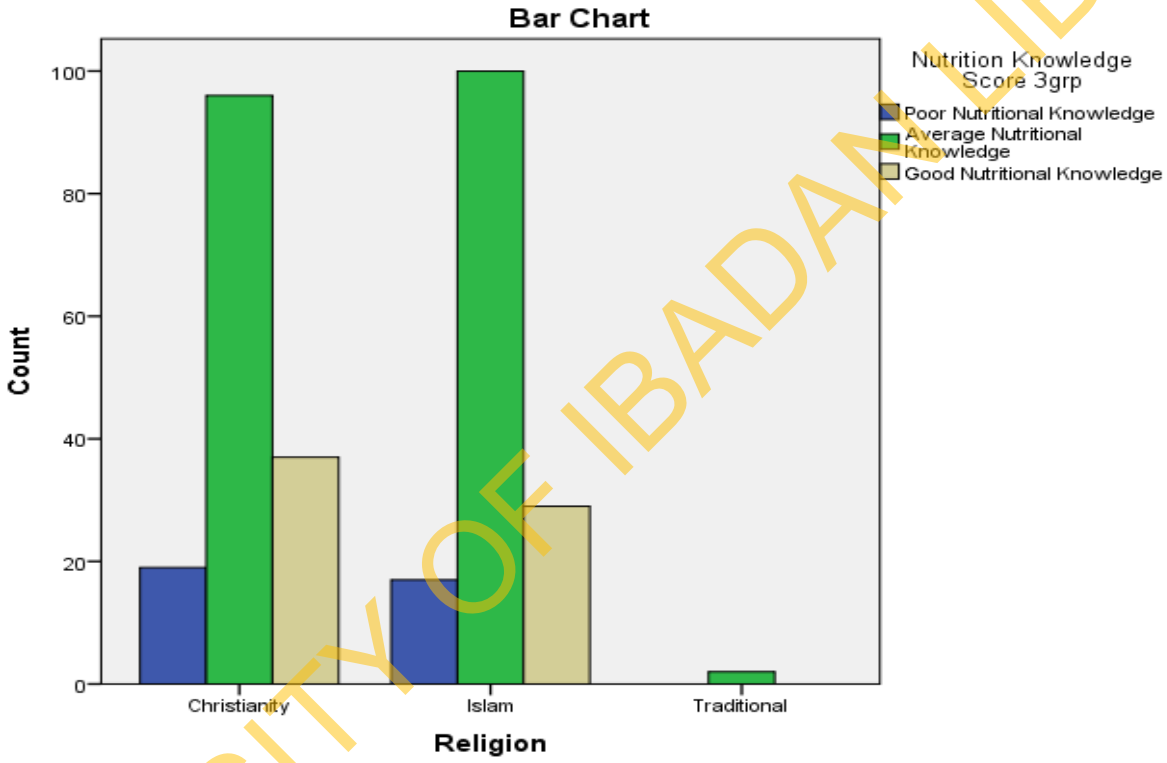

Fig 4.5Hypertensive diet (Nutritional) Knowledge of respondents and Religion.

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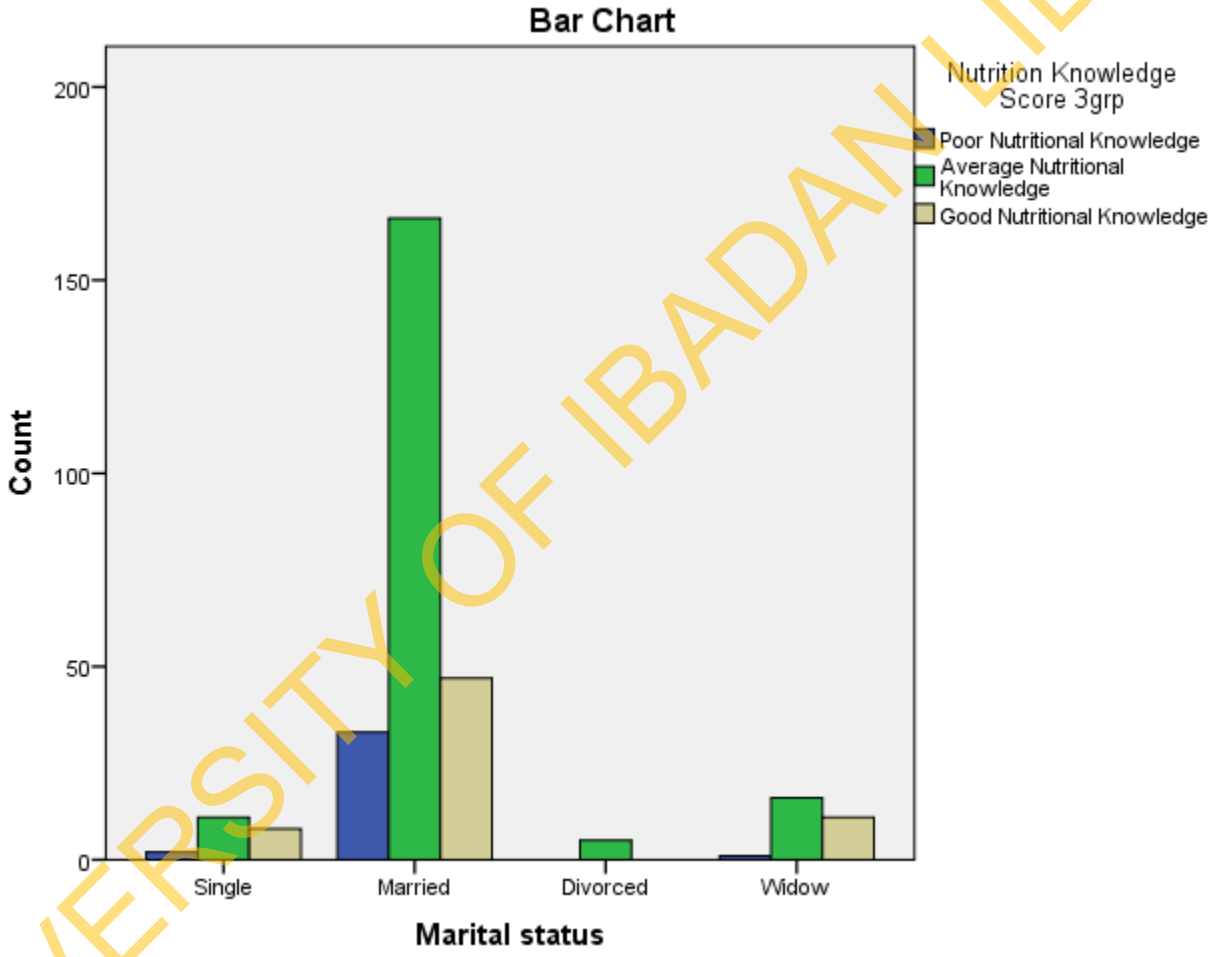

Fig 4.6Hypertensive diet (Nutritional) Knowledge of respondents and marital status.

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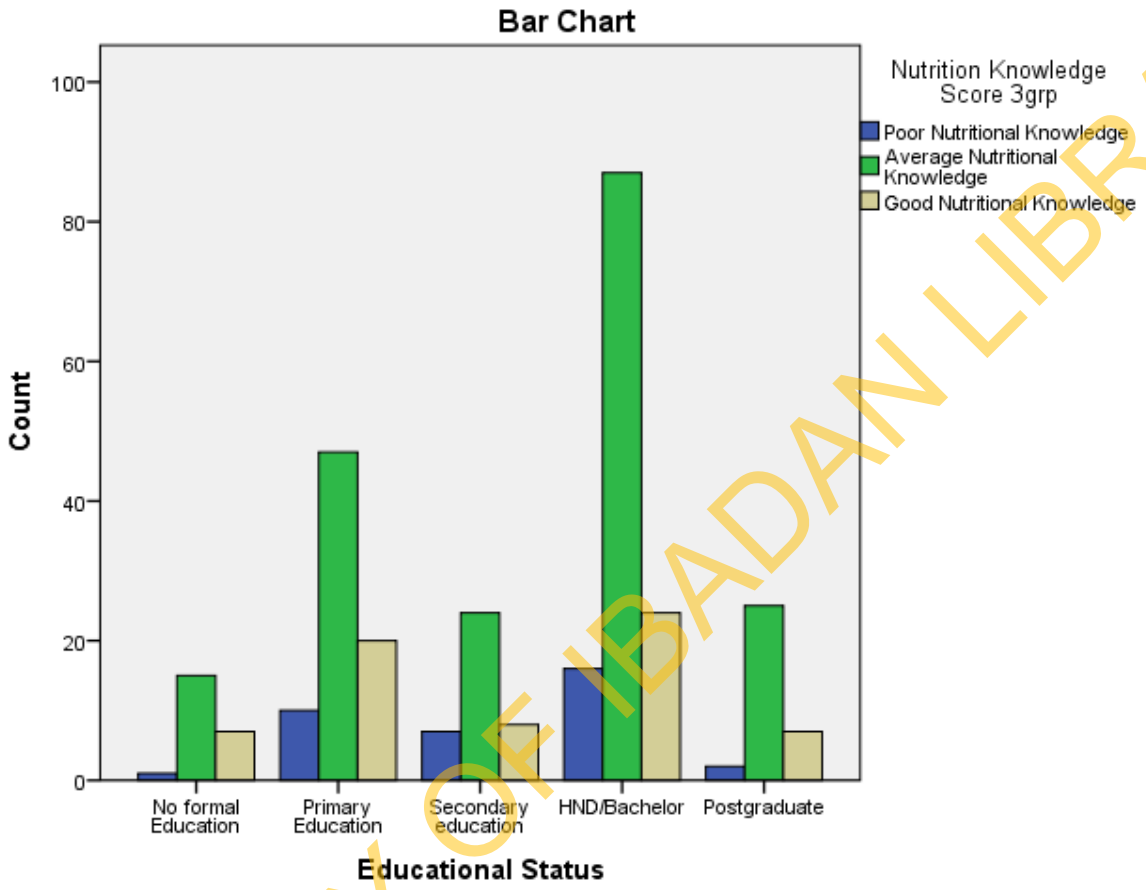

Fig 4.7 Hypertensive diet (Nutritional) Knowledge of respondents and educational status.

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4.5 Knowledge on hypertensive diet

Table 4.5 shows the knowledge of hypertensive diet among hypertensive out-patients attending University College Hospital. Majority (66.0%) of the respondent had average knowledge while only 22% of the respondents had good knowledge and only 12% of the respondents had poor nutritional knowledge.

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Table 4.5.Hypertensive diet knowledge (N=300)

Variable		Frequency	Per cent (%)
	Poor Nutritional Knowledge	36	12.0
	Average Nutritional Knowledge	198	66.0
	Good Nutritional Knowledge	66	22.0

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Table 4.6 Factors influencing compliance to dietary regimen (N=300)

Factors	Yes		No	
	Frequency	%	frequency	%
Negative attitude of health staff	59	19.7	241	80.3
Doctors/Dietician too busy to listen to complaints	39	13.0	261	87.0
Lack of availability of prescribed dietary regimen	61	20.3	239	79.7
Side effects from recommended diet	57	19.0	243	81.0
Forgetting to take prescribed diet	138	46.0	162	54.0
Long queues and waiting times in the clinic	139	46.3	161	53.7
Believe in prayer to cure the disease	85	17.7	215	82.3
Perception that hypertension is not a serious disease	53	32.7	247	67.3
Frequent change of medications	107	35.7	193	64.3
Difficulty in sticking only to recommended diet	157	52.3	143	47.7
Burden of ingesting the prescribed diet	98	32.7	202	67.3
Difficulty in Adjustment	119	39.7	181	60.3
Recommended diet are too expensive	92	30.7	208	69.3

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Stigma especially when in the midst of friends	124	41.3	176	58.7
Nature of job which prevents accessibility and compliance to prescribed diet	145	48.3	155	51.7
Poor access to information that will promote continuous use of the diet	105	35.0	195	65.0

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4.6 Food Consumption Frequency

The patient's frequency of consumption of different food items and the respective percentages is reported in table 4.7. The food items include Fried food, snacks, confectionaries, fruits and Biscuits. Others are "chin chin", vegetable and carbonated drinks. High proportion of the patients reported consuming some food items 0 time in a week. These food items include fried foods (51.7%), snacks (67.3%), confectionaries (65.3%), Biscuits (50.3%) and "chin chin"(49.0%). While more patients (60%) reported consuming carbonated drinks 1-3 times weekly, vegetables (56.7%) and fruits (47.0%) were reported to be consumed 7 times weekly by a larger proportion of the patients, these can be credited to brilliant effort of the health workers in reinforcing the need to improve consumption of those food items.

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Table 4.7 Food Consumption frequency

Food item	Frequency of Consumption	№	Per cent%
Fried food	0 time in a week	155	51.7
	1-3 times weekly	123	41.0
	4-6 times weekly	20	6.7
	7 times weekly	2	0.7
Snacks	0 time in a week	202	67.3
	1-3 times weekly	90	30.0
	4-6 times weekly	6	2.0
	7 times weekly	2	.7
Confectionaries	0 time in a week	196	65.3
	1-3 times weekly	90	30.0
	4-6 times weekly	14	4.7
Fruits	0 time in a week	17	5.7
	1-3 times weekly	27	9.0
	4-6 times weekly	115	38.3
	7 times weekly	141	47.0
Biscuit	0 time in a week	151	50.3
	1-3 times weekly	121	40.3
	4-6 times weekly	24	8.0

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	7 times weekly	4	1.3
Chinchin	0 time in a week	147	49.0
	1-3 times weekly	132	44.0
	4-6 times weekly	7	2.3
	7 times weekly	14	4.7
Vegetable	0 time in a week	23	7.7
	1-3 times weekly	38	12.7
	4-6 times weekly	69	23.0
	7 times weekly	170	56.7
Carbonated Drinks	0 time in a week	76	25.3
	1-3 times weekly	180	60.0
	4-6 times weekly	33	11.0
	7 times weekly	11	3.7

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4.7 Observational Checklist

Some variables were checked in the observational checklist and these are reported in Table 4.8 below with the proportion of those with those features. Some of the Variables include Weight Loss, Improved blood pressure, improved lipid profile, and Exercise. These variables are reported with high proportion in the patients.

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Table 4.8 Observational checklist

Variable			Per cent
Weight loss	Yes	159	53.0
Improved blood pressure	Yes	222	74.0
Improved lipid profile	Yes	202	67.3
Exercise	Yes	225	75.0

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4.8 Test of Hypothesis

4.8.1 There is no significant difference between respondent's hypertensive diet knowledge and socio demographic variables.

The association between hypertensive diet knowledge and age is shown in Table 4.9. Majority of those aged below 40 years have average hypertensive diet knowledge (81.8%). This is similar to that of those aged 41-60 years (63.5%), and 61 years and above (59.7%). The good hypertensive diet knowledge among those aged 61years and above can be related to the experience they have gathered due to their duration of assessing the facility. This relationship is significant (p-value< 0.0001).

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Table 4.9. Hypertensive diet (Nutritional) Knowledge and Age (in Categories) (N=300)

Age in three groups	Hypertensive diet Knowledge Score		
	Poor hypertensive diet Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
<=40years	5(7.6%)	54(81.8%)	7(10.6%)
41-60years	23(20.0%)	73(63.5%)	19(16.5%)
61 and above	8(6.7%)	71(59.7%)	40(33.6%)

X^2	Df	P-Value
26.067	4	<0.0001*

*Significant at 5% level

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Table 4.10 Hypertensive diet (nutritional) Knowledge of respondents and their income (N=300)

New Monthly Income in three groups	Hypertensive diet Knowledge Score 3grp		
	Poor hypertensive diet Knowledge	Average hypertensive diet Knowledge	Goodhypertensive diet Knowledge
<=20,000	7(7.9%)	56(62.9%)	26(29.2%)
21,000-40,000	12(20.7%)	35(60.3%)	11(19.0%)
>=41,000	17(11.1%)	107(69.9%)	29(19.0%)

X^2	Df	P-Value
8.779	4	0.067

Table 4.10 shows the association between hypertensive diet knowledge and Income level of the patients. Although the relationship is not statistically significant (p-value=0.067), most of the patients had average hypertensive diet knowledge regardless of their monthly income level. Patients earning less than or exactly ₦20,000 (62.9%), ₦21,000-₦40,000 (60.3%), or more than ₦41,000 (69.9%) all reported a high proportion having average hypertensive diet knowledge.

Table 4.11 Hypertensive diet Knowledge of respondents and their Age at diagnosis (N=300)

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		Nutrition Knowledge Score 3grp		
		Poor hypertensive diet Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
How old are you when you were diagnosed in three group	<=40years	18(13.2%)	102(75.0%)	16(11.8%)
	41-60years	14(11.2%)	80(64.0%)	31(24.8%)
	61 and above	4(10.3%)	16(41.0%)	19(48.7%)

X^2	Df	P-Value
25.345	4	<.0001*

*Significant at 5% level of Significance.

The relationship between hypertensive diet knowledge and age at diagnosis of the Patients is shown in Table 4.11. Except for those that were 61 years and above, when they were diagnosed, where most of the patients (48.7%) reported having good hypertensive diet knowledge, all reported a high proportion having average hypertensive diet knowledge. The relationship is statistically significant (P-value<0.0001).

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Table 4.12 Hypetensive diet Knowledge of respondents and their Length of assessing treatment. (N=300)

		Hypertensive diet Knowledge Score		
		Poor Hyper tensive diet Knowledge	Average Hypertensive diet Knowledge	Good hypertensive diet Knowledge
How long have you been accessing medical services for the treatment of hypertension in this hospital?	<=2years	19(13.9%)	86(62.8%)	32(23.4%)
	3-5years	12(15.4%)	51(65.4%)	15(19.2%)
	>=6years	5(5.9%)	61(71.8%)	19(22.4%)

X^2	Df	P-Value
4.834	4	0.305

The association between length of assessing treatment and hypertensive diet knowledge is shown in Table 4.12 above. Most of those with less than or equal to two years of accessing treatment have average hypertensive diet Knowledge (62.8%). Similarly, a high proportion reported having average hypertensive diet knowledge among those with 3-5years of accessing medicare (65.4%) and 6 or more years of accessing healthcare (71.8%). This relationship between length of assessing treatment and hypertensive diet knowledge is not significant (P-value=0.305).

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Table 4.13 Hypertensive diet Knowledge of respondents and sex (N=300)

		Hypertensive dietKnowledge Score 3grp		
		Poor Hypertensive diet Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
Sex	Male	25(17.5)	83(58.0)	35(24.5)
	Female	11(7.0)	115(73.2)	31(19.7)
Total		36(12)	198(66)	66(22)

X^2	Df	P-Value
10.228	2	.006*

The association between hypertensive diet knowledge and Sex is shown in Table 4.13 above. Both gender reported having average hypertensive diet knowledge. However, the proportion of females that had average hypertensive diet knowledge were more (73.2%) than those of male (58.0%) that has average hypertensive diet knowledge, this could be due to the fact that most domestic cores are being handled by females This relationship between length of assessing treatment and hypertensive diet knowledge is significant (P-value=0.006).

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Table 4.14 Hypertensive diet Knowledge of respondents and their Religion (N=300)

		Hypertensive diet Knowledge Score		
		Poor hypertensive diet l Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
Religion	Christianity	19(12.5%)	96(63.2%)	37(24.3%)
	Islam	17(11.6%)	100(68.5%)	29(19.9%)
	Traditional	0(0%)	2(100.0%)	0(0%)

X^2	Df	P-Value
2.083	4	0.720

Table 4.14 shows the association between hypertensive diet knowledge and religion. Generally, a high proportion of the patients have average hypertensive diet knowledge. Although this relationship between Religion and hypertensive diet knowledge is not significant (p-value=0.720). However, the proportion of Traditionalists with average hypertensive diet knowledge was high (100%).

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Table 4.15 hypertensive diet Knowledge of respondents and their Marital Status.

(N=300)

		Hypertensive diet Knowledge Score 3grp		
		Poor Nutritional Knowledge	Average Nutritional Knowledge	Good Nutritional Knowledge
Marital status	Single	2(9.5)	11(52.4)	8(38.1)
	Married	33(13.4)	166(67.5)	47(19.1)
	Divorced	0(0.0)	5(100.0)	0(0.0)
	Widow	1(3.6)	16(57.1)	11(39.3)

X^2	**Df**	**P-Value**
2.277	1	0.131

The association between hypertensive diet knowledge and Marital Status is shown in Table 4.15 below. A high proportion of the patients have average hypertensive diet Knowledge, according to their marital status, with values ranging from 52.4 to 100%. This relationship between Religion and hypertensive diet knowledge is not significant (P-value=0.131).

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Table 4.16: Hypertensive diet knowledge and Education Status of the Patients (N=300)

		Hypertensive diet Knowledge Score 3grp		
		Poor hypertensive diet Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
Educational Status	No formal Education	1(4.3)	15(65.2)	7(30.4)
	Primary Education	10(13.0)	47(61.0)	20(26.0)
	Secondary education	7(17.9)	24(61.5)	8(20.5)
	HND/Bachelor	16(12.6)	87(68.5)	24(18.9)
	Postgraduate	2(5.9)	25(73.5)	7(20.6)

X^2	Df	P-Value
6.175	8	0.628

The relationship between hypertensive diet knowledge and education status of the patients is shown in Table 4.16 above. A high proportion of the patients reported having average hypertensive diet knowledge, with the proportions having average hypertensive diet knowledge ranging from 61.0% to 73.5%. The relationship is not statistically significant (P-value=0.628).

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Table 4.17: Hypertensive dietknowledge and Occupation of the Patients (N=300)

		Hypertensive diet Knowledge Score 3grp		
		Poor hypertensive diet Knowledge	Average hypertensive diet Knowledge	Good hypertensive diet Knowledge
Occupation	Trader	7(9.3)	49(65.3)	19(25.3)
	Civil servant	9(8.0)	78(69.0)	26(23.0)
	Artisans	13(32.5)	24(60.0)	3(7.5)
	Retiree	5(13.2)	20(52.6)	13(34.2)
	Businessman/ woman	2(5.9)	27(79.4)	5(14.7)

X^2	**Df**	**P-Value**
27.076	8	0.001*

***Significant at 5% level of significance

Table 4.17 above shows the association between hypertensive diet knowledge and Occupation. Generally, a high proportion of the patients have average hypertensive diet Knowledge and the relationship between Occupation and hypertensive diet knowledge is significant (P-value=0.001). Among traders, for example, 65.3% reported having average hypertensive diet knowledge. This is similar to that of Civil servants (60.0%)

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4.8.2 Hypothesis two

There is no significant difference between the dietary intake and the observational checklist (blood pressure, lipid profile and weight loss)

The association between food frequency of respondents and observational checklist is shown in Table 4.18 below.

Consumption of fried food, fruits, biscuits, 'chin chin', vegetable, and carbonated drinks were significantly related with weight loss, with P-Values < 0.05. Consumption of Snacks and confectionaries were not significantly related with weight loss at 5% level of significance.

While consumption of fruits, biscuits, "chin chin", vegetables and carbonated drinks were statistically related with improved lipid profile; the association between consumption of fried food, snacks and confectionaries, and improved lipid profile were not statistically significantly related.

Improved blood pressure and consumption of "chin chin", vegetables and carbonated drinks were significantly related with each other. However, consumption of fried foods, snacks , confectionaries, Fruits, biscuits were not significantly related with improved blood pressure of the patients.

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Table 4.18 Relationship between respondents' dietary intake and their observational checklist

Food item	Observed feature	0 time in a week n (%)	1-3 times in a week n(%)	4-6 times in a week n(%)	7 times weekly n(%)	P-Value
Fried food	Weight loss	100(64.5)	52(42.3)	7(35.0%)	0(0%)	<0.001*
	Improved blood pressure	114(73.5)	90(73.2)	17(85.0)	1(50.0)	0.59
	Improved lipid profile	103(66.5)	85(69.1)	14(70.0)	0(0.0)	0.189
Snacks	Weight loss	106(52.5)	47(52.2)	4(66.7)	2(100.0)	0.519
	Improved blood pressure	149(73.8)	66(73.3)	6(100.0)	1(50.0)	0.244
	Improved lipid profile	137(67.8)	63(70.0)	1(16.7)	1(50.0)	0.067
Confectionaries	Weight loss	109(55.6)	43(47.8)	7(50.0)		0.455
	Improved blood	138(70.4)	71(78.9)	13(92.9)		0.081

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	pressure					
	Improved lipid profile	134(68.4)	61(67.8)	7(50.0)		0.365
Fruit	Weight loss	2(11.8)	13(48.1)	66(57.4)	78(55.3)	0.005*
	Improved blood pressure	9(52.9)	22(81.5)	87(75.7)	104(73.8)	0.181
	Improved lipid profile	14(82.4)	11(40.7)	75(65.2)	102(72.3)	0.007*
Biscuit	Weight loss	94(62.3)	61(50.4)	4(16.7)	0(0.0)	<0.001*
	Improved blood pressure	115(76.2)	88(72.7)	17(70.8)	2(50.0)	0.617
	Improved lipid profile	93(61.6)	84(69.4)	21(87.5)	4(100.0)	0.031*
"chin chin"	Weight loss	94(63.9)	60(45.5)	2(28.6)	3(21.4)	0.001*
	Improved blood	121(82.3)	84(63.6)	6(85.7)	11(78.6)	0.004*

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	pressure					
	Improved lipid profile	87(59.2)	94(71.2)	7(100.0)	14(100.0)	<0.001*
Vegetable	Weight loss	5(21.7)	17(44.7)	31(44.9)	106(62.4)	<0.001*
	Improved blood pressure	17(73.9)	32(84.2)	58(84.1)	115(67.6)	0.026*
	Improved lipid profile	18(78.3)	17(44.7)	49(71.0)	118(69.4)	0.013*
Carbonated drinks	Weight loss	53(69.7)	93(51.7)	10(30.3)	3(27.3)	<0.001*
	Improved blood pressure	55(72.4)	142(78.9)	17(51.5)	8(72.7)	0.012*
	Improved lipid profile	34(44.7)	133(73.9)	25(75.8)	10(90.9)	<0.001*

*Significant at 5% level of significant

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4.8.3 Hypothesis three

The association between Food frequency of Patients and observational checklist is shown in Table 4.18.

Consumption of Fried food, Fruits, biscuits, 'chin chin', vegetable, and carbonated drinks were significantly related with weight loss, with P-Values < 0.05. Consumption of Snacks and confectionaries were not significantly related with weight loss at 5% level of significance.

While Consumption of fruits, Biscuits, Chin Chin, Vegetable and Carbonated drinks were statistically related with Improved Lipid profile; the association between consumption of Fried food, Snacks and Confectionaries, and Improved lipid profile were not statistically significantly related.

Improved blood pressure and consumption of Chinchin, vegetables and Carbonated drinks were significantly related with each other. However, consumption of fried foods , Snacks , Confectionaries, Fruits, biscuits were not significantly related with improved blood pressure of the patients.

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Table 4.18 Association between food frequency of Patients and observational checklist.

Food item	Observed feature	0 time in a week n (%)	1-3 times in a week n(%)	4-6 times in a week n(%)	7 times weekly n(%)	P-Value
consumption of fried food	Weight loss	100(64.5)	52(42.3)	7(35.0%)	0(0%)	<0.001*
	Improved blood pressure	114(73.5)	90(73.2)	17(85.0)	1(50.0)	0.59
	Improved lipid profile	103(66.5)	85(69.1)	14(70.0)	0(0.0)	0.189
consumption of snacks	Weight loss	106(52.5)	47(52.2)	4(66.7)	2(100.0)	0.519
	Improved blood pressure	149(73.8)	66(73.3)	6(100.0)	1(50.0)	0.244
	Improved lipid profile	137(67.8)	63(70.0)	1(16.7)	1(50.0)	0.067
Consumption of confectionaries	Weight loss	109(55.6)	43(47.8)	7(50.0)		0.455
	Improved blood	138(70.4)	71(78.9)	13(92.9)		0.081

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	pressure					
	Improved lipid profile	134(68.4)	61(67.8)	7(50.0)		0.365
Consumption of fruit	Weight loss	2(11.8)	13(48.1)	66(57.4)	78(55.3)	0.005*
	Improved blood pressure	9(52.9)	22(81.5)	87(75.7)	104(73.8)	0.181
	Improved lipid profile	14(82.4)	11(40.7)	75(65.2)	102(72.3)	0.007*
Consumption of Biscuit	Weight loss	94(62.3)	61(50.4)	4(16.7)	0(0.0)	<0.001*
	Improved blood pressure	115(76.2)	88(72.7)	17(70.8)	2(50.0)	0.617
	Improved lipid profile	93(61.6)	84(69.4)	21(87.5)	4(100.0)	0.031*
Consumption of Chinchin	Weight loss	94(63.9)	60(45.5)	2(28.6)	3(21.4)	0.001*
	Improved blood pressure	121(82.3)	84(63.6)	6(85.7)	11(78.6)	0.004*

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	Improved lipid profile	87(59.2)	94(71.2)	7(100.0)	14(100.0)	<0.001*
Consumption of vegetable	Weight loss	5(21.7)	17(44.7)	31(44.9)	106(62.4)	<0.001*
	Improved blood pressure	17(73.9)	32(84.2)	58(84.1)	115(67.6)	0.026*
	Improved lipid profile	18(78.3)	17(44.7)	49(71.0)	118(69.4)	0.013*
Carbonated drinks	Weight loss	53(69.7)	93(51.7)	10(30.3)	3(27.3)	<0.001*
	Improved blood pressure	55(72.4)	142(78.9)	17(51.5)	8(72.7)	0.012*
	Improved lipid profile	34(44.7)	133(73.9)	25(75.8)	10(90.9)	<0.001*

*Significant at 5% level of significant

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CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Demographic characteristics of respondents

Findings from this study showed that most of the respondents were majorly between 41 years and above 61 years of age. This shows that most of the respondents were in their late adulthood and early elderly which is similar with previous studies (Cappucio et al., 2004; 1997). More than half of the respondents first diagnosed hypertension at the age of 41 and above. This age range might be because the study focuses on hypertension which is usually at the onset of adulthood. Most of the respondents were females which show that women value well-being.

5.2 Nutritional Knowledge of Respondents

From the study, the nutritional knowledge of most respondents on hypertension is on the average. There was an association between the nutritional knowledge of the hypertensive patients and their age. Those that are 61 years and above have good nutritional knowledge on hypertensive diet and this can be owned to their experience as a result of their long duration of receiving health care on the disease. According to (Hadi, 2004), older patients have high adherence level to dietary regimens and better knowledge of their condition than younger patients.

There was an association between respondents' ages and nutritional knowledge of diabetics. Those that were between the ages of 41 and 60 at the time of first diagnosis have good nutritional knowledge of hypertension. One might wonder why those with good nutritional knowledge of hypertension will still be having the most occurrence of hypertension. This explains the fact that many factors are responsible for hypertension apart from the diet of an individual (Khatib et al., 2005; Awosan, Ibrahim, Essien, Yusuf and Okolo 2014;) Those that are of 61 years and above as at the time of first diagnosis had the least nutritional knowledge of hypertension. This might be true owing to the fact that they are aged and may not be current with recent nutritional diets required to combat hypertension.

From the study, there was an association between the sex of the respondents and the nutritional knowledge. The male respondents showed to have good nutritional knowledge than female. This

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might be explained from the fact that the females are mostly involved in trading and business in the study area thereby hindering their time to access relevant knowledge concerning their health and food. Also, it coincides with studies that women are liable to devote their time to their families instead of taking care of themselves (Alsolami et al., 2012). Thus, they showed to have poor nutritional knowledge of hypertension.

There was an association between educational level and nutritional knowledge of hypertension. The civil servants were found to have good nutritional knowledge on hypertension. This can be explained by their level of exposure. They must have been exposed to lectures and seminars on health related issues in the civil service. This is one of the methods the government uses to improve the welfare of their workers occasionally. The artisans have poor nutritional knowledge. This is true as most of them have little or no education or exposure due to the nature of their work.

The study also revealed a poor knowledge of respondent on the question investigating the suitability of snacks for hypertensive patients where most (70%) respondent perceive snacks to be beneficial for hypertensive patients, this can be traced to the fact that snacks are been sold even on clinic days at the waiting point where patients wait for dietician without any objection from the hospital authority.

5.3 Compliance to Prescribed Dietary intake.

From the findings of this study, majority of the respondents are complying with the dietary regimen. More than three-quarters of the respondents consume fruit and vegetable at least 4 or more times in a week, this can be credited to the fact that consumption of fruit and vegetables are not only advised by the dietitians but by all health works that patients see on their clinic days.. This dietary approach will tend to reduce hypertension as the systolic and diastolic Blood pressure will reduce (Appel et al 1997, Zhang et al., 2009). There was low consumption of fried food, snacks, confectioneries, biscuit, chin chin and carbonated drinks by the respondents. This is a very good approach as low intake of this diet correlates with reduced hypertension (Appel 1997). This agrees with the rational of DASH (Dietary approach to stop hypertension) that a dietary approach is beneficial in prevention and treatment of hypertension.(Haghighatdoost et al., 2015)

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5.4 Factors influencing compliance to dietary regimen.

Some of these factors are, negative attitude of health staff, doctors/dietician too busy to listen to patients complaints, lack of availability of prescribed dietary regimen, side effects from recommended diet, forgetting to take prescribed diet and long queues and waiting times in the clinic. Others include believing in prayer to cure the disease, perception that hypertension is not a serious disease, frequent change of medications, difficulty in sticking only to recommended diet, burden of ingesting the prescribed diet, difficulty in adjustment, recommended diet are too expensive, stigma especially when in the midst of friends, nature of job which prevents accessibility and compliance to prescribed diet, and poor access to information that will promote continuous use of the diet.

The proportion that reported some of these factors are low, with values mostly below 40%. However, difficulty in sticking only to recommended diet was one major factor influencing compliance to dietary regimen, this can be justified by the fact that all hypertensive outpatient's case file contain same diet modification sheet which did not give room for modification based on availability and affordability of prescribed food item, where 52.3% of the patients chose it as the factor affecting their compliance.Forgetting to take prescribed diet, long queues and waiting times in the clinic,Stigma especially when in the midst of friends and nature of job which prevents accessibility and compliance to prescribed diet are some variables that reported not too low proportion of patients choosing them as the factor limiting their compliance. Respectively, the proportions were 46.0%, 46.3%, 41.3% and 48.3%.

From the study, the only factor that the patients considered that will influence their adherence to dietary regimen is the difficulty in sticking to recommended diet. This can be justified by the fact that all hypertensive out-patient's case file contains same diet modification sheet which did not give room for modification based on availability and affordability of prescribed food item. Meanwhile, there is scant literature that has identified this as a factor influencing compliance to dietary regimen, most of the reviewed literature has identified factors such as Knowledge, perception, occupation as the main factor influencing non-compliance. The difficulty in sticking only to recommended diet might be true as consuming only the recommended diet all the time may become non palatable to them, therefore they may try to stop taking them for some time.

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The respondents did not agree that negative attitude of health staff and the doctors' inabilities to attend to them due to their busy nature are the factors that can influence their adherence to dietary regimen. It might be assumed that the respondents have other sources of getting health information aside from the hospital. Other factors the respondents did not agree that can influence their adherence to dietary regimen include lack of availability of prescribed dietary regimen, side effects from recommended diet, the believe in prayer to cure the disease, perception that hypertension is not a serious disease, burden of ingesting the prescribed diet and difficulty in adjustment. The quality of healthcare system is also an important factor that can help or hinder patients' adherence to dietary regimen.

5.5 Association between type of food consumed and observational features

The study results showed that there exists some form of relationship between weight loss and eating of Fried food, Fruits, Biscuits, chinchin, carbonated drinks and vegetable.

Eating a high-fiber diet can significantly lower the risk of heart attack, stroke and colon cancer Legumes are low in sodium and rich in potassium, calcium, and magnesium that decrease the risk of hypertension; the recommended daily intake is four times or more per week (Monique et al., 2001, Bazzano et al., 2001). This study identified that improvement in lipid profile of the respondents and eating of Fruits, Biscuits, Chinchin, Vegetable, and carbonated drinks was significantly related.

Increased intake of fruits, vegetables, low-fat or fat free dairy products, whole grains, poultry, fish, and nuts; low intake of red meat, sweets, sugar containing beverages, total fat, saturated fat, and cholesterol positively correlates with reduced systolic and diastolic blood pressure (Appel et al., 1997). This is similar to the findings of this study where only eating of Chinchin, Vegetables, and Carbonated drinks was significantly related to improvement in the respondent's blood pressure and lipid profile. Numerous epidemiologic, clinical, and experimental studies also provide evidence that dietary sodium intake is linked to blood pressure, and a reduction in dietary salt intake has been documented to lower blood pressure (Frisoli, et al., 2012).

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5.6 Implication of findings for Health promotion and education

The study suggests that dietary regime compliance in hypertensive patients should be taken very seriously and the perceived factors of noncompliance with dietary regime should be looked at by policy makers. This study has important implications for current levels of clinical practice in the tertiary health facility, and public health burden of the hypertension in the elderly may be reduced significantly with implementation of effective and sustainable adherence policies and dietary programs. This is because strict adherence to dietary regime, an integral part of comprehensive hypertensive care in the elderly has been proven to enhance clinically meaningful hypertensive control.

Finally, informing policy makers about the study findings would increase their commitments to the recruitment of dieticians and training of health workers on means of monitoring patients' adherence to dietary regimen. Potential focus for future interventions must include public health policy to support promotion of adherence to diet, regular exercise and increase public awareness on the fatal consequences of not adhering to dietary regimen recommendations.

Health promotion and education strategy to be suggested after the findings are Advocacy, training, sustainability, reinforcement, health promotion and education, use of behavioural change communication tools.

- Advocacy to the chief medical director of the hospital on the need to ensure hospital environments are governed by instruction that promote health. Activities such as sales of healthy food in hospital environment, restricting sales of snacks to hypertensive patients on their clinic days.
- Reinforcement on the diet modification plan of the patients which has brought about a good compliance in the consumption of fruit and vegetables.
- Health workers should ensure link up with families and significant orders of patients to reduce the burden of compliance on the patients
- Promoting cultivation of vegetables should be so as to sustain its consumption.

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- Use of Behavioral change and communication materials like handbill, posters, bill board, etc. to improve the knowledge and level of compliance of the patients to their dietary modification.
- Training of patients on the ideal way to prepare their vegetables so as to retain its nutrient before consumption.

5.7 Conclusion

This study has demonstrated a good compliance to dietary regimen among out hypertensive patients attending clinic at University College Hospital, Ibadan. The study also revealed that low level of education is a major determinant of nutritional knowledge of hypertensive patients which therefore influence their dietary intake. Factors influencing respondents' compliance to dietary regimen among hypertensive patients include Stigma (especially while in the midst of friends), negative attitude of health staff, difficulty in sticking to the prescribed dietary regimen and availability of the prescribed regimen.

The food frequency pattern of respondents were assessed for their consumption of the following food items: fried food, biscuit, fruit and vegetable, confectionaries and "chinchin" were used to draw correlation with the variables that are tested in the observational checklist which include weight loss, improved blood pressure and improved lipid profile.

Most (52.3%) of the respondents highlighted difficulty to sticking to prescribed dietary regimen to be a major factor influencing noncompliance.

5.8 Recommendations

In the light of the findings of this study, the following recommendations are suggested:

1. Communication is the key. Adequate awareness should be made on the need for hypertensive patients on need to know and comply with the prescribed dietary regimens in combating hypertension. The communication should be extended to everyone from all works of life.
2. Dieticians and nutritionist should encourage patients on the need to practice peasant farming so as to have more access to local fruits, vegetables and other foods prescribed to them. These can help overcome the challenge of accessibility and availability.

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3. In as much as communication is the key, a compliance strategy should be adopted by health personnel to monitor the rate of compliance of the patients to the prescribed diet.
4. Much work need to be done by dieticians, nutritionists and scientists to work out dietary regimens that will allow the patients to alternate their diets if possible with normal food so as not dissociate them from their normal social life. This might help the patients a lot as sticking only to the recommended food has shown to be a factor militating against noncompliance.
5. Dieticians should ensure realistic prescription of diet, emphasis should not be placed on total avoidance of sodium and party foods as sodium is one of the nutrient required by the body. Rather, patients should be educated on the need to take these nutrients minimally.

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COMPLIANCE TO PRESCRIBED DIETARY REGIMEN AMONG HYPERTENSIVE OUT PATIENTS ATTENDING CLINIC AT UNIVERSITY COLLEGE HOSPITAL, IBADAN.

QUESTIONNAIRE:

My name **is OLAJIRE AFEEZ O**, am currently a postgraduate student of the Health Promotion and Education of the Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan Compliance to prescribed dietary regimen is a very crucial phenomenon in treatment of hypertension. It plays a large role in the response of a hypertensive patient to treatment and how fast the systolic and diastolic pressure becomes normal. This questionnaire is aimed at contributing to the improvement in compliance level of hypertensive patient in this institution and other part of the world and it is strictly for academic purpose. Please be informed that your honest response will be highly appreciated and the information collected will be kept confidential. Thanks for your cooperation.

Your sincere response is encouraged as participation in this study is voluntary, absolute anonymity and confidentiality shall be maintained as there is no wrong or right answers and the information provided will only be used for research purposes.

INSTRUCTION: Please complete the following questionnaire by ticking the space provided as appropriate.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age in years as at last birthday: ☐☐
2. Sex: a. Male ( ) b. Female ( )
3. Religion

   a. Christianity ( ) b. Islam ( ) c. Traditional ( ) d. Others ……..

4. Marital Status
   1. Single ( ) b. Married c. Divorced ( ) d. Widow ( ) e. Separated ( )

5. Educational status a. No formal Education ( ) b. Primary Education ( ) c. Secondary Education ( ) d. HND/Bachelor ( ) e. Postgraduate ( )

6. Occupation……..

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7. Monthly income (Estimated from all sources) ……

8. How old are you when you were diagnosed as hypertensive? _____

9. How long have you been accessing medical services for the treatment of hypertension in this Hospital? _____

SECTION B: NUTRITIONAL KNOWLEDGE

Please circle the numbers as applicable to your nutritional knowledge

Yes (1) No (2) I don't know (3)

10. Skipping breakfast can negatively affect hypertensive patient. 1 2 3

11. Will low salt diet decreases risk of hypertension? 1 2 3

12. Carbohydrates are less fattening than fatty foods. 1 2 3

13. Fats are essential in all diets. 1 2 3

14. Do you know anything about low salt diet 1 2 3

15. Consuming snacks in place of main meal is beneficial to hypertensive patients

1 2 3

16. Consumption of fruit and vegetables are very good for hypertensive patients

1 2 3

17. Consumption of canned and processed foods Increases risk of hypertension

1 2 3

18. Will usage of food seasoning affect hypertensive patients? 1 2 3

19. Will eating outside frequently increase your of hypertension? 1 2 3

20. Is there any relationship between low salt diet and fast food? 1 2 3

21. What do you understand about low fat diet?

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……

22. Give two examples of high fibre diet that you know?

……

23. Do you understands the term Low calorie diet? 1 2 3

If yes: List the ones you know

……

……

24. What do you understand by Weight reduction diet?

……

25. Frequent consumption of party food will increase risk of hypertension

1 2 3

SECTION C

DIETARY INTAKE PATTERN/ COMPLIANCE TO PRESCRIBED DIETARY INTAKE

	Compliance to dietary regimen in the past 3 months	**1. Always**	**2.Occasionally**	**3.Rarely**
26	How often do you forget to take your prescribed diet			
27	When you feel better, how regularly sometimes do you stop taking your prescribed dietary regimen?			
28	Sometimes if you feel worse with your health, how frequently do you stop complying with your			

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	prescribed regimen?			
29	How recurrently do you comply with your recommended food prescription?			
30	How often do you consume other diet prescribed outside your dietician's advice?			
31	How regularly do you take other food items prescribed by other friends or family?			
32	How frequently do you prefer medicines or drugs from local pharmacy store to the dietary regimen prescribed by the dieticians?			
33	How often do you eat too much of the diet (food) the dietician says you should be taking in little quantity?			
34	How often do your believe in prayer and faith healing prevent you from taking your prescribed drugs and sticking to recommended diet?			

FOOD FREQUENCY QUESTIONNAIRE OF HYPERTENSIVE PATIENT

Instruction: please tick the frequency of consumption of the following food items as appropriate

S/NO	Food item	O time in a week	1-3 times weekly	4-6 times weekly	7 times weekly
35	Fried food				
36	Snacks				
37	Confectionaries				
38	Fruit				
39	Biscuit				
40	Chinchin				
41	Vegetable				
42	Carbonated drinks				

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SECTION D

FACTORS INFLUENCING COMPLIANCE TO DIETARY REGIMEN

Instructions: The table below is a list of some factors that may affect the various factors influencing your compliance with the prescribed regimen in section D above

	Which of these factors influences your compliance with the prescribed dietary regimen in the past 3 months?	**Tick(√)**	
		1.Yes	**2.No**
43	Negative attitude of health staff		
44	Doctors/Dietician too busy to listen to my complaints		
45	Lack of availability of prescribed dietary regimen		
46	Side effects from recommended diet		
47	Forgetting to take diet prescribed by the doctor/dietician		
48	Long queues and waiting times in the clinic		
49	Believe in prayer to cure the disease		
50	Perception that hypertension is not a serious disease		
51	Frequent change of medication		
52	Difficulty in adjustment		
53	Burden of ingesting the prescribed diet		
54	Difficulty in sticking only to recommended diet		
55	The diet recommended by dietician are too expensive		
56	Stigma, especially when in the midst of friends		
57	Nature of job, which prevents accessibility and compliance to prescribed diet		
58	Poor access to information that will promote continuous use of the diet		
59	Others (specify) 1. 2.		

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OBSERVATIONAL CHECKLIST

Date of Assessment ----------

Time ----------

Instructions

The following contain indicators to be observed in patients. Tick Yes if applicable and NO if not applicable.

Indicators to be observed	Yes	No
Weight loss		
Improved Blood pressure		
Improved Lipid profile		
Exercise		

Thanks for your time.

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IBAMU PELU ITOSONA OUNJE TO A DA YATO FUN AWON ONI AISAN EJE RIRU TI ON GBA ITOJU NIILE IWOSAN EKOSE UNIVERSITY COLLEGE, IBADAN.

IBEERE:

Orukọ mini**OLAJIREAFEEZ**, Mo je omo ile eko giga, UniversityofIbadan, Eka eto ilera, Mo nsise loriìfaramọsiasayan ounje fun aisan eje riru . Aisan eje riru je oun kan ti o tobi. Ounje to eniyan nje si je nkan Pataki ti o nilo amojuto ti eniyan ba fe ki ifun pa tete was i ile lakoko. Ibeere yi wa lati mo nipa oun ti e lero nipa titele asayan ounje fun itoju aisan eje riru ati lati fi eko ti aba ri nibi ise yi lati gbe liana itoju aisan yi larunge papa julo ni ile itoju yi at kaakiri ile naijiria.

E ṣeun funifowosowopoyin.

A o dupe fun esi ododo lati owo yin. idiàìdánimọatiasirini a omuduronipa mima ko oruko si ori iwe yi ati aifi amin idanima Kankan si.

Jọwọ ri daju pe ikopa re ninu iwadi yi jẹ atinuwa nipa bibu owolu tabi atanpako titẹ sinu aye ti afi si isale yi.

Ibuwọlu O ṣeun pupọ.

Ẹkọ: Jọwọpariawọn wọnyiibeerenipafifala siawọn aayeti a pesebiyẹ.

IPINA:

1. Omo odun melo Niyin ni odun tokoja _____
2. Gender : a. Obinrin () b. Okunrin ()
3. Esin: a. Kristiẹniti () b. Islam () d.esin Abalaye () e. omiran .....
4. Ipo igbeyawo: ìgbéyàwó () ilemoṣu () Pínyà ()
5. Eko: a. ile iwe alakobere b. ile iwe girama c. ile eko gboniye d. ile iwe giga
6. Ise: a. ise ijobab. Adani d. ifeyinti
7. Eto ilera a. Adani b. Ijeoba d: omiran

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8. Omo odun melo niyin nigba ti aisan eje riru yi beere _____
9. O to osu melo ti e tin was i ileiwosan yi _____

IPIN B:

Jọwọ yi òdo si awọn nọmbati oba se je nipa imo re nipa ounje ti awon ti oba ni eje riru ma je

3. Beeni 2. Beeko 1 Miomo

10.	Nje pipa ounje aaro je le se akoba fun arun ejeriru	. 3	2	1
11.	Awọn ọlọjẹni o wati o dara juati julọdaradaraorisun agbara	. 3	2	1
12.	Nje aje ju iyo le se akoba fun aisan ejeriru	. 3	2	1
13.	Nje eroja carbohydrate fun ni ni agbaja ju ounje olora lo	. 3	2	1
14.	Nje ounje olora se koko ninu gbogbo ounje	. 3	2	1
15.	Nje o mo ounkoun nipa kekere iyo ounje ninu ounje	. 3	2	1
16.	Jije ipapanu ni ipo ounje gidi dara fun oni aisan ejeriru	. 3	2	1
17.	Nje Eso atiẹfọ jiji dara funaisan ejeriru	. 3	2	1
18.	Nje ounje inu agolo dara ninu ounje ti afe din iyi re ku	. 3	2	1
19.	Nje lilo oun idana maggi ati eroja re dara fun aisan ejeriru	. 3	2	1
20.	Nje jijeun ni ita nigbigbi igba le se akoba fun aisan ejeriru	. 3	2	1

IPIN D:

IBAMUPELE OUNJE ASAYAN FUN ARUN EJE RIRU

	IBAMUPELE OUNJE ASAYAN FUN ARUN EJE RIRU	nigbagbogbo	lẹẹkọọkan	ṣọwọn
21	Bawo ni ese ma ngbagbe lati je asayan ounje aisan ejeriru ti won so fun yin?			

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22	Ti ailera yin ba dara, bawo ni ese man da asayan ounje aisan ejeriru yin duro si?			
23	Nigba miranti ilera yin baburu , bawo ni ise man tele asayan ounje aisan ejeriru			
24	Ni lemolemo won i ema ntele asayan ounje aisan ejeriru			
25	Emelo ni eman je oun miran yato si asayan ounje aisan ejeriru ti won so funyin ni ile iwosan			
26	Emelo ni oma fo asayan ounje aisan ejeriru			
27	Bawo ni ose ma nwaye si ki e je ounje nipase imoran ebi ati ore			
28	Bawo ni ose ma n waye si ki e nife si ogu oyinbo tabi agbo nipo asayan ounje aisan ejeriru			
29	Bawo ni ose ma n waye si ki e je eroja ti onimo nipa ounje ni ki oje ni odiwon kekere ni odiwon topo			
30	Bawo ni ose man waye si ki oje ounje to onimo nipa ounje ni ki o ma je			
31	Bawo ni ose ma n waye si ki o gbagbo ninu adura ju jijeasayan ounje aisan ejeriru			

IPIN E: OUN TI OSE OKUNFA AI TELE OUNJE ASAYAN FUN AISAN EJE RIRU

ILANA: Awọn tabili ni isalẹ ni akojọ kan ti diẹ ninu awọn okunfa ti o le ni ipa ni orisirisi awon okunfa lara rẹ ibamu pẹlu awọn ogun awon ogun

OUN TI OSE OKUNFA AI TELE OUNJE ASAYAN FUN AISAN EJE RIRU		**Fa ila(√)**	
		Beeni	**Beeko**
32	Iwa ti ko dara ni ara awon osise ilera		
33	Onimo nipa ounje oni aye lati fi eti si edu okan mi		
34	Awon asayan ounje aisan ejeriru ko sin i arowoto		

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35	Ewu ton suyo nipase ounje		
36	Igbagbe lati je asayan ounje aisan ejeriru		
37	Diduro pe ki eniyan to ri osise ilera ni ojo iwosan		
38	Igbagbo pe adura le tojun aisan eje riru yi		
39	Ero pe aisan eje riru ko kin se oun ti o lewu fun ara		
40	ayipadaòògùn Loorekoore		
41	Owo lati ra asayan ounje aisan ejeriru		
42	Wahala ati je asayan ounje aisan ejeriru		
43	Inira nipase itele asayan ounje aisan ejeriru		
44	Owo lati ra asayan ounje aisan ejeriru ti poju		
45	Abuku, agaga ni arin awon ore		
46	Ilana ise ti koje ki o rorun lati tele asayan ounje aisan ejeriru		
47	Aini iroyin toto nipa idi lti tele asayan ounje aisan ejeriru		
48	Awọn oun miran 1. 2. 3.		

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APPENDIX

INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
College of Medicine, University of Ibadan, Ibadan, Nigeria.

Director: **Prof. Catherine O. Falade,** *MBBS (Ib), M.Sc, FMCP, FWACP*
Tel: 0803 326 4593, 0802 360 9151
e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Compliance to prescribed Dietary regimen among Hypertensive out-patients attending Clinic at the University College Hospital, Ibadan

UI/UCH Ethics Committee assigned number: UI/EC/15/0199

Name of Principal Investigator: **Afeez O. Olajire**

Address of Principal Investigator: Department of Health Promotion & Education, College of Medicine, University of Ibadan, Ibadan

Date of receipt of valid application: 10/07/2015

Date of meeting when final determination on ethical approval was made: **08/10/2015**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **08/10/2015 to 07/10/2016.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC early in order to obtain renewal of your approval to avoid disruption of your research.

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

UI/UCH EC
08 OCT 2015
APPROVED
COLLEGE OF MEDICINE, U.I.

Professor Catherine O. Falade
Director, IAMRAT
Chairperson, UI/UCH Ethics Committee
E-mail: uiuchec@gmail.com

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