

UNIVERSITY OF CAPE COAST

ASSESSING KNOWLEDGE, ATTITUDE AND PRACTICES OF
LIFESTYLE MODIFICATION AMONG PERSONS WITH
HYPERTENSION IN CAPE COAST METROPOLIS

BY

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Thesis submitted to the School of Nursing, University of Cape Coast, in partial
fulfillment of the requirements for the award of Master of Nursing Degree

JULY 2018

DECLARATION

Candidate's declaration

I hereby declare that this thesis is the results of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature..... Date.....

Name.....

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of the thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature..... Date.....

Name.....

Co-Supervisors' Signature..... Date.....

Name.....

ABSTRACT

Control of blood pressure is one of the major public health challenges. Uncontrolled blood pressure is linked to cardiovascular diseases. Adhering to lifestyle modification strategies would ensure adequate blood control and therefore reduce cardiovascular morbidity and mortality. The objective of this study was to measure knowledge, attitude and practices amongst clients with hypertensive. The study also sought to determine barriers influencing the adherence to lifestyle modification strategies. A hospital based study was conducted in the Cape Coast Metropolis involving three hospitals namely Cape Coast Teaching Hospital, Metropolitan Hospital and University of Cape Coast Hospital. Among participants of the study, 85 (21.5%) were obese and 118 (29.8%) were overweight. Overall, 70.7% had good knowledge on hypertension. However only 32.8% had controlled blood pressure and the majority (67.2%) had uncontrolled blood pressure. Additionally 55.1% had adequate knowledge on lifestyle modification strategies. However only 17% had positive attitude towards lifestyle modification. It is therefore recommended that health care workers should motivate clients to adapt to lifestyle modification strategies.

KEY WORDS

Lifestyle modification

Hypertension

Cardiovascular Diseases

Control of high blood pressure

Health Education

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisors, Prof. Janet Gross and Dr Mate Siakwa both of the School of Nursing and Midwifery for their professional guidance, advice and encouragement. I do appreciate their effort and energy towards this work.

To Prof Adu Oppong, your pieces of advice and support are very much appreciated.

A loving thank you to my husband, Mr. Ato Darko

To all the clients who participated in my study I offer kind regards and blessings for their willingness to participate in my study

I am also grateful to Mrs Alberta Boakye for her generous contribution to make this work better.

Finally I wish to thank my family and friends for their support, especially, my brother, Daniel, Theodora and Vivian for all their support.

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LIST OF ACRONYMS

BP	Blood Pressure
DASH	Dietary Approaches to Stop Hypertension
DBP	Diastolic Blood Pressure
HBM	Health belief model
OPD	Out Patient Department
SBP	Systolic Blood Pressure
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

This chapter presents the background, problem statement, objectives of the study, research questions and the conceptual framework for the study.

Background to the Study

Hypertension is one of the most prevalent chronic diseases, a leading risk factor for cardiovascular disease, and the number one cause of death globally (Manju, 2012). An estimated 17.7 million people died from cardiovascular diseases (CVDs) in 2015, representing 31% of all global death (WHO, 2015). Over 80% of cardiovascular disease's deaths take place in low- and middle-income countries and occur almost equally among men and women (Smith, Ralston & Taubert, 2012). The increasing prevalence of hypertension in developing countries is of great concern.

Trends in hypertension prevalence and incidence continue to grow in Ghana (Bonsu, 2010). Effective control of hypertension is one of the most important preventable measures for premature morbidity and mortality. Despite all that has been shown about adverse health consequences, high blood pressure is still poorly controlled. For example in the United States, only about one third of patients with hypertension have achieved the National High Blood Pressure Education Program goal of 140/90 mmHg or lower (Cutler, Sorlie, Wolz, Thom, & Roccella, 2008). Studies from African countries have shown lower high blood pressure control. Kenya reported a control rate of 29% (Mathenge, Foster & Kuper, 2010). In Ghana, the control rate of hypertension ranges from 1.7% in the rural communities to 12.7% in the urban communities (Addo, Agyemang, Smeeth, de-Graft Aikins, Edusei & Ogedegbe, 2012).

This makes it necessary for understanding the disease and controlling it with lifestyle modification measures are key to the reduction of high prevalence of high blood pressure in a developing country like Ghana.

Prescribers in Ghana assess the indices of hypertension such as cholesterol level, body mass index and blood pressure to evaluate the effectiveness in the management of hypertension. High cholesterol is associated with an elevated risk of cardiovascular disease, which includes coronary heart disease, stroke, and peripheral vascular disease. High cholesterol has also been linked to diabetes and high blood pressure (D'Agostino, *et al.*, 2008). The American Heart Association recommends total cholesterol levels of < 200 mg/dL for ideal cardiovascular health (Lloyd-Jones, Hong, *et al.*, 2010).

Health practitioners must recognize the hurdles they face when advocating for lifestyle changes. In the United States the mainstay of hypertensive therapy is pharmacotherapy (Wexler & Aukerman, 2006). Interventions such as lifestyle and dietary modification are often overlooked (Okwuonu, Ojimadu, & Okaka, 2014). The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends lifestyle modification for all patients with hypertension or prehypertension. (Cornelisse & Smart, 2013).

Authors of major position statements and systematic literature reviews have concluded that lifestyle modification has a major impact on prevention and management of hypertension (Chobanian, Bakris, Black, Cushman, Green, Izzo *et al.*, 2003). Studies have revealed that healthy eating, active living, and achieving a healthy weight have a major impact on prevention and management of hypertension (Dietz *et al.*, 2015). More specifically, the risk factors such as

overweight, physical inactivity and high sodium intake appear to be major independent contributors to hypertension (Simces, Ross & Rabkin, 2012). A paper published by the American Heart Association's Council on Epidemiology and Prevention suggested that a multidisciplinary approach, combining diet, exercise, and behavior change, is more effective in reducing risk factors for cardiovascular disease than treatment options that promote only one of these variables alone (Kumanyika *et al.*, 2008). Five lifestyle modifications are recommended for reducing blood pressure: (1) reducing sodium intake, (2) increasing exercise, (3) moderating alcohol consumption, (4) following the Dietary Approaches to Stop Hypertension (DASH) and (5) losing weight. These modifications have been shown to reduce blood pressure, although their direct impact on morbidity and mortality is not yet known (Wexler & Aukerman, 2006).

Lifestyle modification is recommended for all patients with hypertension, regardless of drug therapy, because it may reduce the need for antihypertensive drugs (Shah, Maxwell, Shapiro, & Joseph, 2015). *United States Healthy People 2000* (2010), guidelines are primarily prevention focused and have strongly recommended lifestyle modification to prevent and treat hypertension (Rakumakoe, 2011). In non-hypertensive individuals, including those with pre-hypertension, lifestyle modifications have the potential to prevent hypertension and more importantly to reduce blood pressure (BP) and lower the risk of BP-related clinical complications. In hypertensive individuals, lifestyle modifications can serve as initial treatment before the start of drug therapy and as an adjunct to drug therapy in persons already on medication. These therapies can facilitate drug step-down in individuals who can sustain

lifestyle changes. In addition to the immediate goal of lowering blood pressure, the recommended lifestyle changes confer a range of health benefits, including better outcomes of common chronic diseases (Huang, Duggan & Harman, 2008).

Weight loss is an important lifestyle modification in reducing blood pressure. A reduction of 10 pounds can help reduce blood pressure or prevent hypertension (Rocha-Goldberg *et al.*, 2010). A reduction of approximately 20 pounds (9 kilograms) may produce a reduction in systolic blood pressure of 5 to 20 mmHg. The PREMIER clinical trial by Funk *et al.* (2008) assessed the impact of comprehensive lifestyle changes on blood pressure. Participants in the lifestyle changes-only group had a greater reduction in blood pressure than those in the usual care group. This was further enhanced with the addition of the DASH (Dietary Approaches to Stop Hypertension) eating plan. This was the first trial to demonstrate that all recommended lifestyle changes can be combined to reduce blood pressure successfully.

Limiting alcohol consumption is an important lifestyle modification for reducing blood pressure. In a meta-analysis of a randomized control trials by Hollis *et al.*, (2008), reductions of 3 mm Hg in systolic blood pressure and 2 mmHg in diastolic blood pressure for patients in the alcohol reduction groups (average reduction of 67% from an average intake of 3 to 6 drinks per day at baseline) was seen. As part of a comprehensive lifestyle program, it was recommended that men should have no more than two alcoholic drinks per day and women not more than one per day.

Studies have shown that aerobic exercise has positive effects on blood pressure whether or not a person has hypertension, producing average

reductions of 4 mmHg in systolic blood pressure and 3 mmHg in diastolic blood pressure (James, Oparil, Carter *et al.*, 2014). The authors recommended that patients with prehypertension or hypertension should exercise for 30 minutes on most days of the week.

Smoking cessation is an additional important lifestyle change. Nicotine released while smoking cigarettes is believed to impact blood pressure through arousal of the sympathetic nervous system followed by the release of norepinephrine and epinephrine (Al-Shammari, 2012). In one study, cigarette use caused a 4 mmHg increase in systolic blood pressure and a 3 mm Hg increase in diastolic blood pressure compared with placebo (Weber *et al.*, 2014). Although some lifestyle modifications may seem to offer only minimal blood pressure–lowering effects, they should not be discounted (Wexler & Aukerman, 2006).

Statement of the Problem

Achieving blood pressure control with antihypertensive drugs alone is not effective (Yaxley & Thambar, 2015). Some may cause side effects such as dizziness, headache, fatigue, chest discomfort, cough, and sexual dysfunction. These side effects prompt some patients to discontinue therapy (FDA, 2014). Achieving blood pressure control therefore becomes a challenge with medication alone. It has been estimated that only 60% of patients take their medication as prescribed (Schulz, Cook, Roller, Fincham, & Gowan, 2007). Thus, there is an urgent need to implement non-pharmacological methods such as salt reduction, weight loss, and exercise to improve prevention and treatment of this major cause of death. Health care workers can assess and contribute to the management of hypertension if the patient is educated and convinced that

lifestyle changes are essential and indeed the most cost effective method of obviating cardiovascular disease. The fact however remains that, across the globe, life style modifiable factors are not easily embraced by clients with hypertension (Addo *et al.*, 2012). Hypertensive clients in Western countries have been shown to implement lifestyle modification strategies better than clients from sub Saharan African regions (Rigsby, 2011). Despite such reports, a study in South Africa revealed disturbing trends on risk factors for hypertension where all modifiable risk factors with the exception of tobacco increased over a ten (10) year period (Mungal-Singh, 2012). Also, the South African Hypertension Practice Guideline reiterates the fact that lifestyle modification is the cornerstone to managing hypertension but this practice is significantly low among African hypertensive clients in comparison to Western counterparts (Visser, 2015). More so, data from the World Health Organization's Study on Global Ageing and Adult Health (SAGE) reaffirms the poor adaptation of lifestyle modification practices among African countries despite these interventions being the surest way to managing hypertension especially among the poorer classes of society (Lloyd-Sherlock, Beard, Minicuci, Ebrahim, & Chatterji, 2014). Similar trends have been reported for West African countries with Nigeria been a good example where there have been reports of a poor adoption or an abandonment of lifestyle modification strategies for hypertension among clients (Okwuonu, Emmanuel & Ojimadu, 2014; Osuala, Oluwatosin & Kadiri, 2014).

The prevalence of hypertension in rural and urban Ghana ranges from 19% to 48% (Bonsu, 2010). The number of hypertensive patients in the Cape Coast Metropolis has increased over the years. There has been an increase in

cases reported at the Outpatient Department in recent years, from 8.5% in (2009) to 18.5% in (2011) (Central Regional Health Directorate, 2011). Notwithstanding the diverse amount of studies involving clients with hypertension in Ghana, few studies have made attempts to address the trend of effective lifestyle modifiable factors among these hypertensive clients (Wamala, Karyabakabo, Ndungutse, & Guwatudde, 2009). Since little research on these modifiable factors has been conducted in Ghana, and particularly the Cape Coast Metropolis, this study aims to assess the knowledge, attitude, and practice of life style modification among clients with hypertension in selected hospitals of the Cape Coast Metropolis.

Research Objectives

1. To assess the level of knowledge of clients with hypertension on life style modification.
2. To assess the attitude of clients with hypertension towards lifestyle modification.
3. To determine the association between knowledge, attitude, or practices and selected demographic variables of hypertensive clients.
4. To identify barriers that influence client adherence to life style modification.
5. To determine the relationship between level of knowledge and indices of hypertension.

Research Questions

1. What is the level of knowledge of clients with hypertension on life style modifications?

2. Is there an association between knowledge of life style modifications and selected demographic variables?
3. What is the level of attitude of clients with hypertension towards lifestyle modification?
4. What are the perceived barriers that influence the adherence to life style modifications?
5. Is there an association between the level of knowledge of life style modifications and indices of hypertension?

Significance of the Study

The results of the study would assist health care professionals to plan and provide health information which would be culturally acceptable to the Ghanaian client with hypertension. This will also assist policy makers in developing context specific and relevant policies capable of improving health education on lifestyle modification strategies.

Delimitation of the Study

For purposes of this study, participants were clients attending hypertensive clinics at the three hospitals involved in the study. The hospitals involved were University Hospital, Metropolitan Hospital and Cape Coast Teaching Hospital.

Limitations of Study

The study was conducted in a tertiary and secondary setting where most clients with hypertension with uncontrolled blood pressure levels and complications would be referred for proper management and therefore it cannot be assumed that the responses expressed here would be similar to those in other primary settings. The results of the study cannot be applied to those who have

difficulties accessing health care in general. Clients may have selected socially acceptable responses.

The study is organized in five chapters. Chapter two is the literature review for the study. The methodology and research design are presented in chapter three. Chapter four presents and discusses the results of the study while the last chapter summarizes the study and outlines the recommendations.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents an overview of the literature on knowledge, attitude and perception on lifestyle modification. The chapter discusses both the theory and conceptual models used. This review was conducted by doing a computer-assisted literature search of the following five databases: Medline, CINAHL HINARI, Google scholar, and EBSCO. To limit the number of studies, a time frame from 2004 to 2015 was set and only articles that were peer-reviewed and written in English were selected for review.

The chapter is organized based on the following headings. Literature on hypertension, then discusses the related research review on the study. This is followed by a discussion of the conceptual framework underpinning the study.

Defining Blood Pressure

High blood pressure is a measure of the pressure exerted against the artery walls by circulating blood carrying vital oxygen and other nutrients throughout the body. Blood pressure (BP) is the result of two forces. The first force is of blood pumping out of the heart into the arteries, which carries blood throughout the body in the circulatory system. It is measured as the systolic BP. The second force is the result of the heart resting between heartbeats. It is measured as the diastolic BP. Optimal blood pressure is a systolic BP less than 120mmHg, and a diastolic BP less than 90mmHg (Ostchega, Dillon, Hughes, Carroll, & Yoon, 2007). If either variable increases significantly, blood pressure will increase (Kaplan, 2008). In addition to cardiac output and peripheral resistance, other physiological mechanisms involved in the maintenance of normal blood

pressure include the renin angiotensin system, the sympathetic nervous system, and endothelial dysfunction (Breen, 2008).

Hypertension is diagnosed when readings from three separate visits are averaged and the resulting systolic blood pressure (SBP) is equal to or greater than 160 mm Hg, or the diastolic blood pressure (DBP) is equal to or greater than 100 mm Hg. Hypertension can also be diagnosed when readings from five visits to a physician or clinic are averaged and the SBP is equal to or greater than 140 mm Hg, or the DBP is equal to or greater than 90 mm Hg (Daskalopoulou *et al.*, 2012).

While an elevated BP from more than one reading is required for a diagnosis of hypertension, a single reading can be enough to identify hypertensive urgency or a hypertensive emergency, conditions that require immediate management. The features of a hypertensive crisis include asymptomatic DBP elevation equal to or greater than 130 mm Hg or hypertensive encephalopathy with associated headache, irritability, alteration in consciousness, and other manifestations of central nervous system dysfunction. Hypertensive crisis can also be described as presence of marked blood pressure elevation in association with conditions such as acute aortic dissection, acute left ventricular failure, or acute myocardial ischemia. (Daskalopoulou *et al.*, 2012).

Physiology of Hypertension

The renal system plays an important role in the pathogenesis of hypertension. Blood is selectively filtered by the kidneys to maintain vital components and excrete excess fluids. When too much fluid is retained, as in the case with excess sodium intake, blood volume increases, and as a result,

blood pressure rises. Likewise, if excess fluid is excreted, blood pressure will be lowered (Packham *et al.* 2015). Renin, which is secreted from the juxtaglomerular apparatus of the kidney in response to diminished blood volume, is responsible for converting renin substrate (angiotensinogen) to angiotensin I. Angiotensin I quickly convert to angiotensin II in the lungs by angiotensin converting enzyme (ACE). Angiotensin II is a potent peripheral vasoconstrictor, creating a rise in blood pressure. This delicate feedback mechanism is known as the renin-angiotensin system. The sympathetic nervous system, a component of the autonomic nervous system, can cause arteriolar constriction and arteriolar dilation, and therefore has a very important role in maintaining normal blood pressure.

It is an important consideration in treatment of short-term changes in blood pressure due to stress or physical exercise (Kaplan, 2008). Vascular endothelial dysfunction plays a key role in blood pressure regulation by producing a number of potent local vasoactive agents such as the vasodilator molecule nitric oxide and the vasoconstrictor peptide endothelia. Many other vasoactive systems and mechanisms affect sodium transport and vascular tone that are involved in the maintenance of normal blood pressure (Lee & Oh, 2010). It is likely that hypertension is related to interplay between the autonomic system and the renin-angiotensin system, influenced by other factors, such sodium intake, circulating volume, and hormones that affect vascular resistance (Kaplan 2008). When arteries are healthy, the muscle and semi-flexible tissue lining them stretches like elastic. As the blood pumps more forcefully, the arteries will stretch to allow blood to flow through easily. Over time, persistent and/or frequent periods of forceful blood flow will cause the

tissue that lines the walls of arteries to get stretched beyond its healthy limit (ACCF/AHA, 2010). In other words, if elevated blood pressure is not properly controlled, over time, it could lead to serious deterioration in one's health.

Most patients with hypertension have no symptoms, and therefore it is usually discovered on a routine examination or a medical encounter to address another condition. Because so many individuals have no symptoms to indicate that their blood pressure is elevated, hypertension has earned an appropriate nickname: the silent killer (Amkongo, 2012). Symptoms are more likely to occur in patients who experience an abrupt and extreme elevation in blood pressure. These symptoms may include headache, dizziness, ringing in the ears, chest pain, shortness of breath, nausea and vomiting, seizures and loss of consciousness. Unfortunately, these signs and symptoms occur only in a small percentage of patients with hypertension, and the majority of clients with hypertension must rely on access to quality healthcare services to help manage the condition and reduce the associated morbidity and mortality that could result from long term elevated blood pressure (Kaplan, 2008).

Potential problems associated with uncontrolled high blood pressure include vascular weakness, vascular scarring, increased risk for blood clots, tissue and organ damage from narrowed and blocked arteries, and increased workload on the circulatory system

Table 1: Categorization of Hypertension

CATEGORY	SYSTOLIC BP(mmHg)	DIASTOLIC BP(mmHg)
Normal /Optimal BP	<120	<80
Pre- hypertension	120-139	80-89
Stage 1 Hypertension (mild)	140 – 159	90 – 99
Stage 2 Hypertension	160 and above	100 and above

(JNC, 2014)

Table 1 represents the classification of hypertension. This classification was adapted from the Joint National Committee (JNC) 8 (The eighth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [JNC], 2014). According to JNC, blood pressure can be classified into in four categories: normal or optimal, pre-hypertension, Stage 1 hypertension, and Stage 2 hypertension. The pre-hypertension category recognizes the need for prevention strategies and healthy lifestyle promotion by health care and public health professionals to reduce blood pressure levels and prevent the progressive development of hypertension in the general population (James, Oparil, Carter *et al*, 2014).

Hypertension can also be categorized by etiology or source. Primary or essential hypertension occurs in 90–95% of high blood pressure cases in adults (Carretero & Oparil, 2000). Primary hypertension tends to develop gradually over many years, and exists in the absence of specific identifiable causes. The remaining 5 to 10% of cases of high blood pressure are referred to as secondary hypertension. This type of hypertension tends to appear suddenly and results from conditions such as renal disease or aortic coarctation. Investigations for

secondary causes of hypertension should be initiated for patients with clinical features or laboratory findings suggestive of severe hypertension or hypertension resistant to multiple medications (Daskalopoulou *et al.*, 2012)

Other Types of Hypertension

There are several other types of hypertension. White coat hypertension, also known as anxiety-induced hypertension, is characterized by an elevation in blood pressure when measured by a physician or healthcare provider, but presumably normal at other times (Robinson, 2012). Isolated systolic hypertension (ISH) refers to a condition in which systolic BP is consistently above 160mmHg, while the diastolic BP remains below 90mmHg (Kearney, Whelton, Reynolds, Muntner, Whelton & He, 2005). Although patients with ISH are usually asymptomatic, this condition carries a significantly high risk for cardiovascular and cerebrovascular disease (Arboix, & Alió, 2012).

Gestational hypertension is the presence of elevated blood pressure that results from increased estrogen levels during pregnancy. This condition is transient, as blood pressure usually normalizes within 12 weeks postpartum (Krane & Hamrahian, 2007). Other more extreme forms of high blood pressure experienced during pregnancy include pre-eclampsia and eclampsia. Eclampsia is considered life threatening, with the risk for seizures and coma secondary to hypertensive encephalopathy (Garovic, & Hayman, 2007).

Labile hypertension refers to a situation in which blood pressure fluctuates abruptly and repeatedly, often causing headaches or tinnitus when the blood pressure is elevated. Labile hypertension may be caused by emotional stress, and as such, tends to be resistant to traditional blood pressure lowering therapies and more responsive to anti-anxiety medications (Krane &

Hamrahian, 2007). Finally, malignant or accelerated hypertension is characterized as an abrupt and extreme elevation in blood pressure, rapidly leading to end-organ damage. If malignant hypertension is not managed aggressively, the one-year mortality rate is greater than 75% (Kaplan, 2008).

Consequences of Uncontrolled Hypertension

The overstretching of the arterial walls creates weak areas in the vessels, making them more vulnerable to vessel rupture. Vascular weakness and vessel rupture can cause problems such as stroke and aneurysm (Marik & Varon, 2007). The overstretching of the arterial walls can cause tiny tears in the blood vessels that leave scar tissue on the walls of the arteries and veins. Fragments of cholesterol, plaque and blood cells can stick to the tears and scar tissue in the vessel walls, which could result in a heart attack or stroke if the vessels become completely blocked. Blood that gets trapped in the arterial wall tear and scar tissue can form clots that can narrow and sometimes block the arteries. These clots sometimes break off, travel and become lodged in blood vessels located in other parts of the body, potentially disrupting blood flow to the surrounding organs there (Kaplan, 2008).

As a result of vascular scarring, clot formation, and plaque build-up, the arteries and veins on the other side of the blockage do not receive enough freshly oxygenated blood, which results in tissue and organ damage. Vulnerable organs include the brain (stroke and TIA), eye (vision loss, retinal damage, glaucoma), heart (angina, heart attack, heart failure), kidney (kidney failure), and legs (peripheral vascular disease).

The arteries may lose elasticity due to overstretching resulting in plaque build-up and scarring the heart pumps harder to get blood through the narrowed

arteries. Overtime, this increased workload can result in damage of the heart itself. The muscles and valves in the heart can become tired, weakened, and damaged, resulting in one of several forms of heart failure. (Kaplan, 2008).

Risk Factors for Hypertension

Risk factors for high blood pressure can be placed into two groups: ones that can be controlled, and ones that cannot be controlled. Risk factors that can be controlled include being overweight or obese, physical inactivity, tobacco use, high sodium diet, too little dietary potassium, and drinking too much alcohol (Zhang, 2011). Lifestyle modifications which lower blood pressure are weight reduction, adopting the Dietary Approach to Stop Hypertension (DASH) eating plan, reducing alcohol consumption, reducing dietary salt intake and doing regular exercise (Elmer, Obarzanek, Vollmer, Simons-Morton, Stevens, Young, *et al.* 2006). Lifestyle modifications reduce BP, enhance antihypertensive drug management, prevent or delay the onset of hypertension and reduce cardiovascular risk. A combination of two or more lifestyle modifications achieves better results (Look AHEAD Research Group, 2010). For overall cardiovascular risk reduction, patients are strongly advised to quit smoking.

Obesity, as defined by body mass index (BMI) ≥ 30 kg/m², is an increasingly prevalent risk factor for the development of hypertension and cardiovascular diseases. The greater the weight, the more blood needed to supply oxygen and nutrients to organs and tissue throughout the body. If the volume of blood circulating through the blood vessels increases, so will the pressure or force on the artery walls increase (Kaplan, 2008). One can achieve a reduction in systolic blood pressure of approximately 5-20 mmHg per 10 kgs

of weight loss (Tejada, Fornoni, Lenz, & Materson, 2006). Blood pressure increases with a body mass index (BMI) of 25 or higher. Overweight is defined as a BMI of 25 to 29.9, obesity as a BMI of 30 or higher. While most overweight or obese adults can lose weight by eating a healthy diet or increasing physical activity, doing both is most effective. The DASH eating plan provides the following key elements: an abundance of plant foods (fruits, vegetables, whole-grain breads or other forms of cereals, beans, nuts, and seeds), minimally processed foods, lean meats, poultry, and fish, and seasonally fresh foods.

Physical inactivity increases the risk of being overweight, and also leads to the possibility of having a higher heart rate. Multiple studies have shown the benefits of aerobic exercise for individuals with HTN. Decreased physical activity and lack of regular aerobic exercise are linked to poor cardiovascular health in general and worsening HTN in particular. The higher one's heart rate, the harder the heart must work with each contraction, and thus increasing the force on the artery walls (Kaplan, 2008). Engaging in regular aerobic physical activity can achieve reduction in systolic blood pressure of approximately 4-9 mmHg ((Tejada, Fornoni, Lenz, & Materson, 2006).). Although there is less data on the impact exercise has on blood pressure, data suggests that exercise of moderate intensity has a favorable effect on reducing blood pressure (Fagard, 2006). JNC 7 documents that maintaining normal body weight (body mass index of 18.5–24.9 kg/m²) can result in a reduction in systolic blood pressure of approximately 5–20 mm HG/10 kg (Go *et al.*, 2013). The management of hypertension should include losing weight gradually by making permanent changes in the daily diet of the entire family (Flack *et al.*, 2010). Not only does smoking cause an immediate temporary rise in blood pressure, but the chemicals

in tobacco can also damage the arterial walls, leading to vascular narrowing and increased blood (Thomopoulos, Parati & Zanchetti, 2014).

Abstaining from smoking is recommended for overall cardiovascular risk reduction (Kaplan, 2008). Smoking is considered a primary risk factor for cardiac disease. Therefore, smoking cessation has immediate as well as long-term benefits for patients with hypertension and the people with whom they live.

Excess dietary sodium can lead to fluid retention and increased circulating volume, resulting in an increase in blood pressure (Raiz, 2014). A reduction in dietary sodium to no more than 2.4g per day can achieve a reduction in systolic blood pressure of approximately 28mmHg (Robinson, 2012). It is well accepted by many that sodium intake is a known risk factor for high blood pressure and heart disease, yet about 90% of American adults exceed their recommendation for sodium intake (USDHHS, 2010). Because nearly half of sodium intake comes from processed foods, and an additional 40–45% is added during food preparation, it is extremely difficult for even the most motivated person to reduce sodium intake to the former ADA recommended daily allowance of 2400mg per day (He, & MacGregor, 2010). Decreased salt intake not only reduces blood pressure and related CVD risk, but has other beneficial cardiovascular effects that are independent of and additive to its effect on blood pressure (Cappuccio, Strazzullo, Barbato, Galletti, Barba, Siani *et al.*, 2006). The latest ADA recommendations presents an even greater challenge, with suggested daily sodium intake of 2300mg per day for the general population, and 1500mg per day for persons who are over the age of 50 or who are African American or have hypertension, diabetes, or chronic kidney disease (Lloyd-Jones, *et al.*, 2010). Few intervention studies have been conducted to show that

a reduction in salt intake and an increase in potassium improve the blood pressure in African populations. A study done in Tanzania indicated that a low sodium diet leading to a low urinary excretion level of 52 mmols per day, reduced blood pressure in normotensive people significantly within four to five days (van de Vijver, *et al.* 2014)

Potassium helps maintain balance of sodium in cells, which in turn impacts circulating fluid volume. If adequate amounts of potassium are not consumed or maintained, too much sodium could accumulate in the blood stream, resulting in elevated blood pressure (McGoon, MD, Krichman, A., Farber, HW, Barst, RJ, Raskob, GE, Liou, TG *et al.* 2008). Low intake of fruit and vegetables consumption varies considerably among countries, reflecting economic, cultural and agricultural production environments. Most of the benefits of fruits and vegetables come from reduction in CVD and risk factors, particularly hypertension (Brown, M. C., Best, K. E., Pearce, MS., Waugh, J. & Robson, S. C., 2013). Popkin (2006), reported that, many people in Africa often eat insufficient fruits and vegetables, resulting in low potassium intake which is associated with higher blood pressure in some patients. Adopting a diet rich in fruits and vegetables to ensure adequate potassium, calcium, and fiber intake, and choosing low fat dairy products along with items that are low in saturated and total fat, can achieve a reduction in systolic blood pressure of approximately 8-14mmHg (Cappuccio *et al.*, 2006). A study in Kenya reported that supplementation with potassium in newly diagnosed patients with hypertension reduced the blood pressure to a level similar to that found in patients treated with a diuretic (Van de Vijve *et al.*, 2014)).

Excessive alcohol consumption may cause a release of hormones that increase blood flow and heart rate, thus causing temporary elevation in blood pressure. Over time, heavy drinking can damage the heart and increase the risk of stroke (Breen, 2008). Alcohol consumption is relatively frequent in Africa (Beaglehole, Bonita, Horton, Adams, *et al.*, 2011). There is a direct effect between high levels and specific patterns of alcohol consumption (such as binge drinking) and rising risk of hypertension

(Roerecke & Rehm, 2014). More recently, several studies have suggested an independent association between alcohol consumption and blood pressure levels in samples from general populations (Robinson, 2012). Limiting consumption of alcohol to no more than two drinks (1oz or 30ml ethanol) per day for most men, and to no more than one drink per day for women and lighter weight men, may achieve a reduction in systolic blood pressure of approximately 2-4 mmHg (Robinson, 2012).

In the COMBINE study to determine whether heavy drinking was associated with hypertension by Stewart, Latham, Miller, Randall, & Anton in 2008, blood pressure changes occurring during treatment for alcohol dependence was evaluated. Appropriate methods for repeated measures data were used to assess the relationship of percentage of drinking days to SBP and DBP over a 16week treatment period. Blood pressure reduction was evident in persons who were above the median BP at baseline. SBP decreased by an average of 12mmHg and DBP decreased by an average of 8mmHg. BP reduction occurred during the first month of treatment and the effect was similar regardless of age, sex, BMI, reported history of hypertension and use of antihypertensive medications.

Stress has become a prevalent part of people’s lives and its effect on blood pressure is of great public health importance. Although it does not directly cause hypertension it can lead to repeated blood pressure elevations which finally lead to hypertension. Stress can cause hypertension through repeated blood pressure elevations and also by stimulation of the nervous system to produce large amounts of vasoconstriction hormones that will increase blood pressure. There is emerging evidence that the various risk factors for hypertension do not work in isolation but tend to interact in clusters. So exposure to stress will not only increase BP levels but will also lead to increased alcohol and fat intake. A final common pathway for many of these risk factors is the sympathetic nervous system which is involved in the development of essential hypertension in its early stages and in the hypertensive effects of salt, obesity, and possibly stress as well (Landsberg *et al.*, 2013)

Table 2: Lifestyle Modifications to Prevent and Manage Hypertension

Modification	Recommendation	Approximate systolic blood pressure reduction rate
Weight Reduction	Maintain normal body weight (body mass index 18.5-24.4kg/m ²)	5-20mmHg/10kg weight reduction
Adopting the DASH Eating Plan	Consume a diet rich in fruits, vegetables and low fat dairy products with a reduced content of saturated fat and total fat	8-14mmHg
Dietary Sodium Reduction	Reduce dietary sodium intake to no more than 100mmolper day (2.4g sodium or 6g sodium chloride)	2-8mmHg

Physical Activity	Reduce dietary sodium intake to no more than 100mmolper day (2.4g sodium or 6g sodium chloride)	2-8mmHg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (eg. 24 oz beer, 10oz wine or 3oz 80proof whiskey) per day in most men and to no more than 1 drink per day in women and lighter weight persons	

(Seedat, & Rayner 2012).

Table 2 explains the various recommendations of lifestyle modification and their respective approximate systolic blood pressure reduction rate.

There are also risk factors that cannot be controlled or modified. These include family history, age and race. High blood pressure tends to run in families (Kaplan, 2008). The risk of high blood pressure increases with age (older than 55 for men, and 65 for women). People of color have the highest prevalence of hypertension and hypertension related complications (Robinson, 2012).

A review of population based studies done in Ghana on hypertension by Addo *et al.* (2012), conducted between the years 1973-2009 showed that the prevalence of hypertension was higher in urban than rural areas. This review was conducted in studies that covered both areas and hypertension increased with increasing age with prevalence ranging from 19.3% in rural areas to 54.6% in urban areas. The lack of awareness and inadequate treatment of patients with hypertension compounds the high burden of hypertension.

A study was conducted by Maafo, Owusu- Daaku, Opare Addo and Saana (2014) to evaluate the level of knowledge of hypertensive patients with regard to administration of medicines and life style modifications for the

management of hypertension. Five hundred sixteen (516) clients were interviewed using a semi-structured questionnaire. Participants included 193 (37%) males and 323(63%) females. About one-third of participants (36%) had middle school education. 195 (37%) of respondents were aware of lifestyle modification such as reducing dietary salt intake and avoiding cigarette smoking. It was revealed from the study that, patient's knowledge of lifestyle practices for the management of blood pressure could be graded as average. Results showed a significant relationship between alcohol intake and knowledge of hypertension ($p = 0.002$). Majority (91%) of those who reported to be trying to lose weight had a good knowledge of hypertension. Also, a negative association was revealed between participants' knowledge of hypertension and recent weight gain ($t = 1.171$; $p = 0.279$). This finding could imply that participants' knowledge of hypertension was not adequate to enable them to make healthy choices about weight management. This study confirmed that a relation existed between the knowledge of hypertension, demographic factors and lifestyle practices among participants. Hypertension is a chronic but preventable disease; and adequate knowledge of the disease and lifestyle modification are important features in its effective control and management.

A study by Busari *et al.* (2010) was to assess the knowledge, attitudes and practices on hypertension of 240 adult Nigerians with hypertension and the impact on compliance. A descriptive survey of 240 adult patients with hypertension who attended the Cardiology Clinic of the Federal Medical Centre was carried out between April 2008 and March 2009. The study results revealed that less than half (47.1%) showed good knowledge of hypertension. Knowledge of hypertension was better in women than in men (59.3% vs 40.7%).

It could be concluded from the studies that, majority of clients with hypertension still have poor knowledge of their disease. The authors stated there was a need to invent more effective education strategies directed towards the public in general and the patients in particular.

Viera, Kshirsagar and Hinderliter (2007) in their study, used data from a population-based sample of hypertensive adults (N=28 457) in America and examined variations in reports of receiving lifestyle modification advice by patient characteristics. Most adults (90, 3%) with known hypertension reported receiving some advice. Education on exercise was reported most frequently (74, 6%), followed by education to reduce salt intake (69, 3%), change eating habits (61, 9%), and reducing alcohol intake (43, 5%). Compared with adults aged 60 years or older, patients aged 18 to 39 years reported receiving more health education. Overweight and obese persons reported receiving health education on weight management.

A study conducted by Alm –Roijer, Staqmo, Uden, and Erhardt, (2004), to investigate if knowledge of risk factors for cardiovascular disease, would have an effect on compliance to lifestyle changes. Three hundred and forty-seven patients answered the questionnaire regarding their general knowledge of risk factors for compliance to lifestyle changes to attain treatment goals and adherence to drug therapy. Results showed general knowledge about risk factors for cardiovascular diseases promotes compliance to certain lifestyle changes such as weight, physical activity, stress management, diet, and attainment of lipid level goals. General knowledge of risk factors had no correlation to blood glucose or blood pressure levels or on smoking habits or treatment patterns for prescribed lipid- and blood glucose-lowering drugs. The authors concluded that

knowledge correlates to patient behavior with respect to some risk factors, which should be recognized in preventive programs.

Another study was conducted by Osei- Owusu, (2005) to assess factors that contributed to improper management of hypertension in Swedro Hospital in Ghana. This study involved 200 hypertensive patients that visited the hospital from 8th July 2005 to 16th September 2005. Both retrospective and interview methods were employed. The inclusion criteria were all hypertensive patients with BP of less than 250 /100mm Hg and greater than 120/80mmHg that attended the hospital during the study period. Findings from the survey revealed that 46% of participants had their BP controlled to 140/90. 25% had their BP fairly controlled to 150/90 and 29% of participants did not have their Controlled. The study revealed that education on lifestyle modification was not adequately given to clients. The study identified the factors that contributed to the inappropriate management of hypertension and made recommendation that effective education on lifestyle modification should be given to client to achieve control of hypertension.

Tagoe and Dake (2011), conducted a study to assess healthy lifestyle behavior among Ghanaian adults. Descriptive, bivariate and multivariate regression techniques were employed on two nationally representative surveys to arrive at the results. While the prevalence of some negative lifestyle behaviours like smoking had reduced, others like alcohol consumption had increased. Relatively fewer people adhered to consuming the recommended amount of fruit and vegetable servings per day in 2008 compared to 2003. While more females (7.0%) exhibited healthier lifestyles, more males (9.0%) exhibited risky lifestyle behaviours after the introduction of the policy. The improvement

in healthy lifestyle behaviours among female adult Ghanaians will help promote healthy living and potentially lead to a reduction in the prevalence of obesity among Ghanaian women. The increase in risky lifestyle behaviour among adult male Ghanaians even after the introduction of the health policy could lead to an increase in the risk of non-communicable diseases among men and the resultant burden of disease on them and their families will push more people into poverty.

Rakumakoe (2011) determined knowledge, attitudes and perceptions towards lifestyle modification among clients with hypertension. There were 110 participants. Participants were clients attending outpatients department of Carletonville Hospital, South Africa. A cross sectional descriptive study design was used. At the time of the study 69% had blood pressure (BP) levels above 140/90mmHg. Seventy seven percent (77%) believed that exercise lowers BP yet only 30% reported having received such advice from a medical professional. Ninety five percent (95%) believed that a balanced diet was important in controlling hypertension and 51% reported having been advised by a medical professional about a balanced diet. Ninety four percent (94%) knew that adding salt to food affected BP and 69% reported having been told by a medical professional about the effects of excessive salt intake in their diets. Eighty percent (80%) believed that alcohol affected blood pressure and 44% reported having received such information from a medical professional. Seventy five percent (75%) believed that smoking affected BP. Thirty six percent (36%) got this information from a medical professional. The results indicated that respondents reported having received education on lifestyle modification from medical professionals. The education varied between areas of lifestyle change, which included education on diet, alcohol, smoking and exercise. The most

frequently given advice was on diet and salt intake, with the least information provided by medical professionals on exercise. Reduced salt intake advice was the most frequently reported (69%), followed by a balanced diet (51%), reduced alcohol intake (44%), not smoking (35%) and benefits of exercise (30%). Despite this, most of the respondents were leading sedentary lifestyles, were overweight (BMI>25) and had BP's greater than 140/90mmH. The reasons provided for not exercising varied from not being used to it, no-time to body pain. Twenty one percent (21%) were not on a proper diet due to financial reasons, 16% stated lack of information as the reason and 9% just found unhealthy food to be very tempting.

Benue *et al.* (2010), conducted a study to evaluate the effect of a practice-based, culturally appropriate patient education intervention on blood pressure (BP) and treatment adherence among patients of African origin with uncontrolled hypertension. Participants were either Surinamese or Ghanaian. Research design used was cluster randomized trial involving and 146 clients. Intervention group was made up of 75 participant and control group made up of 71 participants. Participants were clients who received the usual hypertension care from four Dutch primary care centers. The intervention-group was also offered three nurse-led, culturally appropriate hypertension education sessions. BP was assessed with Omron 705-IT and treatment adherence with lifestyle- and medication adherence scales. Results revealed SBP reduction of ≥ 10 mmHg in 48% of the intervention group and 43% of the control group. Mean scores for adherence to lifestyle recommendations increased in the intervention group, but decreased in the control group. After adjustment, the between-group difference for adherence to lifestyle recommendations was 0.34 (0.12 to 0.55;

P=0.003). For medication adherence it was -0.09 (-0.65 to 0.46 ; $P=0.74$). The culturally significant health education intervention led to significant improvements in DBP and adherence to lifestyle recommendations, supporting the need for culturally appropriate hypertension care.

A cross-sectional study conducted by Okwuonu, Emmanuel, and Ojimadu (2014) involved adult clients with hypertension. A structured self-administered questionnaire was used for data collection. A total of 110 individuals participated in the study with 58 (57.4%) males and 43 (42.6%) females. Mean systolic and diastolic BP were 143 ± 17 mmHg and 80 ± 12 mmHg respectively. Up to 87.1% were unaware that regular exercise was part of lifestyle modification while 60% were unaware of the need for moderation of alcohol intake. More than 80% were unaware of the roles of vegetables, fruits, unsaturated oil and reduction in diary food intake in the control of BP. Among 88 participants with some knowledge of salt restriction, 68.2% practiced salt reduction. This also applied to 8.6%, 7.5%, 32.3%, 12.9% and 6.5% of those with knowledge of regular exercise, weight reduction, alcohol moderation, fruit intake and cigarette smoking respectively. There was a negative correlation between the level of practice and both systolic and diastolic blood pressures. The study reported that awareness level and practice of lifestyle modification in blood pressure control among the studied cohort was poor. The authors recommended that concerted strategies need to be taken to improve lifestyle modification practices.

The PREMIERE trial that compared three interventions among patients with pre- or mild hypertension showed that the prevalence of hypertension was lower in the group that received established recommendations plus the DASH

diet than in the group that received advice only (Elmer, Obeazane & Vollmer, 2006). There was also fair evidence from meta-analyses of small studies with some methodological flaws that a weight-reducing diet and salt and alcohol restrictions were associated with significant reductions in blood pressure. However, it was unclear whether these short-term lifestyle changes could reduce the need for medications or improve morbidity and mortality (Horvath, Jeitler, Siering *et al.* 2008, and Dickinson 2006).

A randomized controlled clinical trial to determine the clinical effectiveness of lifestyle modifications to reduce cardiovascular risk in pre-hypertensive individuals was conducted in the Mexico PREHIPER I Study by Márquez-Celedonio, Téxon-Fernández, Chavuz-Negrete and Berlin-Lascurain (2009). The researchers randomly assigned 92 patients into treatment and control groups and collected baseline data from both groups. The treatment group undertook a lifestyle modification programme involving dietary modification, physical activity, and educational sessions for a period of six months whilst the control group was managed following the usual recommendations provided by primary health care clinics in Mexico. The results showed that blood pressure, waist measurement, and body weight had improved in intervention group. There was no change in control subjects. The authors stated that, lifestyle modifications decreased cardiovascular risk in individuals with pre-hypertension.

Drevenhorn, Kjellgren Bengtson (2007), conducted a study to explore the effects of using a structured nursing intervention programme in hypertension care. The study was performed as a pre-test/post-test study. All 177 patients diagnosed with hypertension in Southern Sweden were invited to be counselled

by a public health nurse about hypertension, cardiovascular risk factors, and non-pharmacological treatment. The nurses were to follow up after 15 months to ascertain results. One hundred and seventeen patients participated in the study. At the end, there was an overall decrease in systolic blood pressure. From the group, three patients with high alcohol consumption were identified, and two smokers stopped smoking. It can be drawn from the study that effective lifestyle modification practices could control blood pressure. The author recommended that strategies need to be taken to improve lifestyle modification strategies.

A quantitative cross-sectional descriptive survey was carried out by Zunqu and Djumbe (2008) in Botswana among patients with hypertension attending clinic for follow-up care in Gaborone. The study involved 446 participants. The results showed that non-smokers were more likely to know more about hypertension than smokers (OR = 1.995; CI: 0.639 – 6.225).

Participants' level of knowledge varied from average to high as almost all of them (97%) gave a correct response for practices related to preventing smoking and reducing the levels of stress respectively. Only 37% of the participants scored greater than 75% for assessment of their knowledge regarding the acceptable lifestyle practices for persons with hypertension and cumulatively 59% could be rated as having acceptable knowledge of lifestyle practices in relation hypertension. These results showed low level of knowledge among participants involved in the study.

In the study was conducted by Aniebue, Aniebue and Nwankwo (2009) to evaluate the perception, knowledge and practices of Nigerian hypertensive patients regarding hypertension and lifestyle modification measures. The study

revealed that 50% of the patients thought that hypertension was caused by stress. Most knew about the lifestyle modification measures through health personnel. More than 50% adopted the lifestyle-modification measures once they became aware of the effects. This study showed a poor level of perception of hypertension and awareness of the lifestyle-modification measures but a high level of willingness to adopt the lifestyle measures.

The study by Zangu and Djumbe (2008), revealed that participant's knowledge of recommended lifestyle practices for hypertensive individuals varied from average to high as almost all of them (96.4%) gave a correct response for practices related to smoking and stress. Almost equal proportions were noted for the knowledge related to restricting alcohol intake (65.2%), dietary requirements (66.3%) and physical activity (56.4 %) in the form of exercise.

Barclay and Murata (2008), conducted a study to assess if stress management as part of lifestyle modifications help control blood pressure in elderly patient. This study compared 8 weeks of stress management (RR training) in 61 patient's vs lifestyle modification in 61 patients (control group). Inclusion criteria were 55 years of age or older, systolic blood pressure (SBP) 140 to 159 mm Hg, diastolic blood pressure (DBP) of less than 90 mm Hg, and use of SBP 2 or more antihypertensive medications. The main endpoint was a decrease in blood pressure after 8 weeks of the intervention. Those patients in whom SBP decreased by at least 5 mm Hg to below 140 mm Hg were permitted to enroll in additional training for 8 weeks, with supervised medication elimination. Mean SBP decreased by 9.4 ± 11.4 mm Hg in the RR group and 8.8 ± 13.0 mm Hg in the control group ($P < .0001$ for both), without a significant

difference between groups ($P = .75$). In a similar fashion, mean DBP decreased by 1.5 ± 6.2 in the RR group ($P < .05$) and 2.4 ± 6.9 mm Hg in the control group ($P < .01$), without a significant difference between the groups ($P = .48$). A limitation of the study included insufficient statistical power to detect a difference in the observed reductions in SBP between treatment groups; imbalance between treatment groups in the number of antihypertensive medications that subjects were taking at baseline. Although the study had these limitations, it can be deduced that stress management and lifestyle modification can be used to control blood pressure. In the RR group, 44 patients were eligible for supervised antihypertensive medication elimination, as were 36 in the control group. After controlling for differences in characteristics when medication elimination was started, patients in the RR group were more likely to be able to eliminate an antihypertensive medication (odds ratio, 4.3; 95% confidence interval, 1.2 - 15.9; $P = .03$). The study reported that, although both groups had similar reductions in SBP, significantly more participants in the relaxation response group eliminated an antihypertensive medication while maintaining adequate blood pressure control," the study authors write. "This result has clinical impact since reduction in SBP of 5 mm Hg reduces mortality by 7% and risk of stroke by 30%.

Barriers to Adherence to Lifestyle Modification Practice

A study by Okwonu, Ojimadi and Okaka (2014) was done to identify patient-related barriers in the control of hypertension among adults with hypertension in a semi urban community in South-East Nigeria. The study involved 252 participants. Among the 252 Participants, 32% had controlled blood pressure, while 39.3% and 27.8 % respectively had stage 1 and 2

hypertension. Only 23.4% knew the consequences of poor blood pressure control and 64% were expecting a cure from treatment even when the cause of hypertension was not known. Finally, knowledge and practice of the lifestyle modifications necessary for blood pressure control was inadequate among the participants. This study was a cross sectional descriptive survey of patients who had hypertension. The study also revealed that poor knowledge of hypertension, unrealistic expectation of treatment, unawareness of lifestyle modification and failure to apply these were identified as patient- related barriers to blood pressure control.

Jallinoja *et al.* (2007) reported a study on the views of physicians' and nurses' on patient and professional roles in the management of lifestyle-related diseases. The study was a descriptive survey design. Number of participants was 220. Study results concluded that a major barrier to treatment is that patients do not want to change their lifestyle or pattern of poor habits. A majority of physicians (88%) and nurses (95%) agreed that patients have to assume the obligation for lifestyle-related decisions. Patients' insufficient knowledge was considered as such a barrier less often. Self-care was actively encouraged. Although a majority of physicians and nurses agreed that providing information, and motivating and supporting patients in lifestyle change are part of their tasks, only (50%) estimated that they had sufficient skills in lifestyle counselling. Among nurses, those with less professional experience reported sufficient skills than those with more experience. Two-thirds of the respondents reported that they had been able to help many patients to change their lifestyles into healthier ones. The study reported that a major potential barrier to treatment is client reluctance to practice lifestyle modification strategies

Robinson (2012) examined relationships between hypertension management behaviors and beliefs among a sample of African American adults with diagnosis of hypertension. One hundred and sixty nine African American adults completed a 46-item questionnaire. Findings suggest that perceived barriers, self-efficacy, time with hypertension diagnosis, and age were critical factors to consider when developing intervention strategies aimed at improving hypertension control rates among African Americans. Public health efforts should focus on developing and disseminating intervention strategies that reduce real and perceived barriers and increase self-efficacy for adhering to hypertension management behaviors

Serour, Alqhenear Saqabi , Mustafa and Ben- Nakhi (2007) conducted a study involving 334 Kuwaiti adult males and females with hypertension, type 2 diabetes, or both, who completed a routine clinic visit in 1 of 6 family practice centres. The study was a prospective study using structured questionnaires to obtain a detailed medical history regarding exercise habits and barriers to compliance with diet and exercise programmes. Clinical criteria assessed were height, weight, and the control of blood pressure and blood sugar. Results from the study revealed 63.5% of patients reported that they were not adhering to any diet regimen, 64.4% were not participating in regular exercise, and 90.4% were overweight and obese. The main barriers to adherence to diet were unwillingness (48.6%), difficulty adhering to a diet different from that of the rest of the family (30.2%), and social gatherings (13.7%). The main barriers to adherence to exercise were lack of time (39.0%), coexisting diseases (35.6%), and adverse weather conditions (27.8%). Factors interfering with adherence lifestyle measures among the total sample were traditional Kuwaiti food, which

is high in fat and calories (79.9%), stress (70.7%), a high consumption of fast food (54.5%), high frequency of social gatherings (59.6%), abundance of maids (54.1%), and excessive use of cars (83.8%). The results of the study showed a majority of individuals in the sample were overweight, did not engage in recommended levels of physical activity, and did not follow dietary recommendations. The researcher recommended additional cultural and demographic variables need to be considered to improve adherence to lifestyle measures.

Sengwana and Puoane in 2004 conducted a study to explore the perceptions and attitudes of community health workers (CHWs) about hypertension, the level of knowledge of hypertension, as well as their personal attitude towards health education. CHWs, whose role in health promotion can help reduce the prevalence of hypertension by influencing the community to adopt healthy lifestyles. Forty-three CHWs in two study areas, Sites B and C in Khayelitsha in the Cape Peninsula, South Africa, were included in the study. Firstly, focus group discussions were conducted with 17 selected CHWs to explore attitudes, beliefs and perceptions of hypertension. Secondly, interviews were conducted to assess their basic knowledge about causes, prevention and control of hypertension. The focus group discussions revealed that CHWs were uncertain about the causes of hypertension. They also found it difficult to grasp the fact that people without risk factors, such as overweight or a family history of hypertension, could be hypertensive. Many CHWs believe in traditional medicines and home-brewed beer as the best treatment for hypertension. They believed that people who take medical treatment become sicker and that health deteriorates rapidly. Risk factors of hypertension mentioned during the

structured interviews include inheritance, lack of physical activity, consuming lots of salty and fatty food. Conclusions drawn from the findings of the CHWs' responses highlighted their insufficient knowledge about hypertension as a chronic disease of lifestyle. Meanwhile they are expected to play a role in stimulating community residents' interest in the broad principle of preventive health maintenance and follow-up.

The conceptual frame underpinning the study is about health education to change behavior. Healthy lifestyle modifications (such as the adoption of healthy eating habits, engaging in sufficient physical activity, abstaining from tobacco use, and limiting alcohol intake), have been recognized as the necessary steps for hypertensive patients to take to reach their blood pressure goals. Efforts to inform and motivate individuals on the how and why to make such lifestyle changes reflect the essence of the process of health education. Below is the conceptual framework for the study.

Theoretical Framework/Conceptual Base of the Study

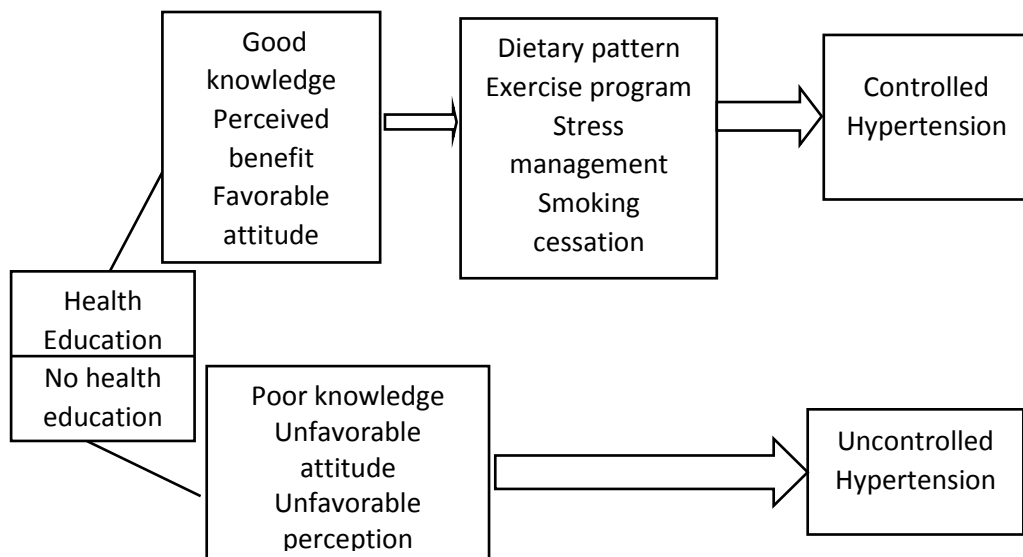


Figure 1: Conceptual model

The conceptual framework (Figure 1) for the study is an eclectic model with constructs from Health Belief Model by Becker (1974), Glanz, K., Rimer, B. K., & Viswanath, K. and Model of Theory of Planned Behavior by Ajzen, (2002). The conceptual framework shows that, the individual's perceived benefit will support behavior modification. A person's motivation and decision to engage or not engage in a particular behavior is likely to be influenced by the perceived value of the behavior itself as well as the perceived value of action to solve other problems, needs, or concerns. Through health education, an individual with hypertension can have a perceived benefit of controlled blood pressure. Understanding of the importance of lifestyle modification can motivate a person with high blood pressure to modify lifestyle. Attitude toward a behavior is the degree to which performance of the behavior is positively or negatively valued. According to the Theory of Planned Behavior by Ajzen (2002), Webb & Sheeran (2006) attitude toward a behavior is determined by the total set of accessible behavioral beliefs linking the behavior to various outcomes and other attributes.

The Health Belief Model is a framework for motivating people to take positive health actions that uses the desire to avoid a negative health consequence as the prime motivation. The Health Belief Model (HBM) (Rosenstock, 1988) is one of the most commonly used theories in health behavior research (Champion, & Skinner, 2008), and according to Theory at a Glance, it may be useful for developing strategies to deal with noncompliance with prescribed medicine or recommendations for lifestyle modification of persons who are high risk for heart disease and stroke (Ezzati, M., Henley, S.J. Thun, M.J. & Lopez, A.D., 2005). The original Health Belief Model directed

to preventive actions taken in the absence of compelling symptoms has been revised and expanded to help explain compliance with medical regimen after illness have been diagnosed. The expanded model include General health motivation based on measures of health concerns, practice and belief about prevention that are primarily nonspecific and stable across situations Susceptibility to illness previously contracted General faith in physicians and care Characteristics of regimen which might impair compliance. Health Believe Model seems to oversimplify this phenomenon to a belief-behavior relationship that rests solely on individual factors, with little consideration of socioeconomic factors that may also influence behavior (Hillsdon, Foster, Cavill, Crombie & Naidoo, 2005). Despite criticisms of the HBM, it is one of the most influential models in the history of health promotion practice, and has shown usefulness in predicting health behaviors among populations with or at risk for developing cardiovascular disease (Roden, 2004). The model includes the concept of barriers to action and cues which might prompt the behaviors (Ross, Walker & MacLeod, 2004).

In the above conceptual model, favorable attitude towards a behavior can be achieved through health education. The individual is made aware through health education that lifestyle modification is necessary to achieve a good outcome. According to Ajzen (2002), behavior is the manifest, observable response in a given situation with respect to a given target. In the conceptual model, behavior is a function of compatible intentions and perceptions of behavioral control. Conceptually, favorable perception is expected to moderate the effect of intention on behavior, such that a favorable perception produces the behavior only when perceived behavioral control is strong. In practice,

intentions and perceptions of behavioral control are often found to have main effects on behavior, but no significant interaction

Understanding of lifestyle modification strategies can be achieved through health education by health personnel or the media. An individual without health education may have a negative attitude towards modifying lifestyle leading to uncontrolled hypertension. Similarly, the perceived threat of a heart attack can be used to motivate a person with high blood pressure into exercising more often, avoiding a negative health consequence which is a key element Health Promotion Model.

In summary, the comprehensive literature review clearly shows that knowledge level of lifestyle modification is low among many groups of people. Additionally, the literature revealed that barriers such as inadequate client education, client's unwillingness to change, and health care workers inability to give culturally appropriate education on life style modification exist (Benue *et al.*, 2014), Determining the best way to adhere to lifestyle modification practices requires patient education and motivation by health workers (Jallinoja *et al.* (2007). Lifestyle modification strategies if adhered to, influence blood pressure. Clients with hypertension are at risk for various, severe complications and hence the need to control the disease. It is important for health professionals to ensure effective lifestyle modification education by eliminating as many barriers as possible. Encouragement of ways to manage the barriers that impede an effective teaching process in the hypertension population needs to be addressed. Although each factor typically has a modest effect, the combined effects can be substantial. From a public health perspective, even a small reduction in BP should have a tremendous, beneficial effect on the occurrence of hypertension

and its complications. In view of the current epidemic of BP-related diseases and the documented effects of lifestyle modifications on BP, the current challenge to health care providers, researchers, and public officials is to develop and implement effective clinical and public health strategies that achieve and maintain healthy lifestyle modification. The goal of this study was to identify knowledge, attitude and practices among clients with hypertension. In the next chapter, the design of the study will be presented which include ethical considerations, research methodology, population sample and size as well as specific methods for data collection.

CHAPTER THREE

RESEARCH METHODOLOGY

The purpose of this study was to assess the knowledge, attitude and practices of clients with hypertension by employing the constructs of the Health Belief Model, and Model of Theory of Planned Behavior by Ajzen, (2002). Participants' knowledge, attitude and practices of lifestyle modification were measured with a multi-scale questionnaire.

This chapter presents the elements of methodology that were applied in this study. The methodology was selected to meet the research objectives and address data gathering problems imminent in research. The major components of this chapter are the research design, study population, sample and sampling technique, data collection including sources of data, data collection instrument, validity of instruments and procedure for data collection. The methods and statistical tools used for analyzing the data from the field are also discussed in this chapter.

Research Questions

1. What is the level of knowledge of clients with hypertension on life style modifications?
2. Is there an association between knowledge of life style modifications and selected demographic variables?
3. What is the level of attitude of clients with hypertension towards lifestyle modification?
4. What are the perceived barriers that influence the adherence to life style modifications?

5. Is there an association between the level of knowledge of life style modifications and indices of hypertension?

Research Design

Thomas in 2013 stated that research design provides the glue that holds the research together. He explains that the design is used to structure the research, thereby showing how all the major parts of the research work together to address the central research question. Nwadinigwe (2005) asserts that, research design as an important aspect of research, must be the most appropriate to approximately measure what is being measured. A descriptive survey study design was used for the study. Descriptive survey design attempts to describe and explore a phenomenon in a real-life situation and also generates new knowledge about a topic (Burns & Grove, 2005). Also, according to Polit & Beck (2008), descriptive design enables the researcher to explore and describe information collected in the real-life situation the purpose of this study was to assess the knowledge, attitude and practice of lifestyle modification in clients with hypertension, thus justifying the use of a descriptive study design. According to Weber, Schiffrin, White, Mann, Lindholm, Kenerson *et al.* (2014), descriptive surveys gather data at a particular point in time when there is an intention of describing the nature of existing conditions or identifying standards against which existing condition can be compared. It also has the advantage of cost-effectiveness and also promotes faster and easier way to collect data. Because the study is within a limited time frame, descriptive study design therefore becomes an appropriate design to achieve the research objectives. In a descriptive survey, the collection of information typically involves one or more of the following data gathering techniques: structured or semi-structured

interview, self-completion or postal questionnaire, and attitude scales. A descriptive survey involves collecting data in order to answer research questions concerning the subject of study.

This design was appropriate for this study considering the objectives. This descriptive survey design was chosen because it helped to report frequencies, averages and percentages that were used in the discussion and gives room for generation.

Research Settings

The research was a hospital based study involving three hospitals in Cape Coast. Purposive sampling method was used to choose the three hospitals namely; University of Cape Coast Hospital, Teaching Hospital and Metropolitan Hospital.

Population

Population is the entire collection of people who have common characteristics (Polit & Beck, 2008). The target population for the study was clients with hypertension attending hypertension clinic at the selected hospitals. The total number of clients attending hypertension clinic in the three hospitals was 9327.

Sample and Sampling Procedure

Sampling is the process of selecting a subset of units from the population. Sampling formulas are used to determine how many to select because it is based on the characteristics of this sample that we make inferences about the population (Levy & Lemeshow, 2013). Probability sampling methods involve randomized selection, in which all members of the population, or target group,

have an equal chance of being selected for inclusion in a study (Henn, Weinstein & Foard, 2006)

To draw inferences from the sample about the population, attention was paid to the selection of the sample that reflects the population of the study.

In determining the sample size for the study, it was based on the formula for determining sample size by Glenn (1992), the calculations are as follows:

$$n_0 = \left[\frac{N}{1 + N(e)^2} \right]$$

Where,

n_0 – sample size

N – Total population

e – Desired margin of error (95% confident interval will be set for the margin of error)

1 is a constant value

The total number of clients with hypertension in the three hospitals was 9327 (Hospital Records for the three selected Hospitals for 2014).

$$\begin{aligned} n_0 &= \frac{9327}{1+9327(0.05)^2} \\ &= \frac{9327}{24.3} \\ &= 383.8 \end{aligned}$$

Thus n_0 was approximated to 400 participants.

Since the study involved three different hospitals, proportionate ratio was used to calculate the sample size for each hospital involved.

Below is the calculation of sample size using proportionate ratio.

U.C.C Hospital	$\frac{1884}{9327} * 400 =$	80
Cape Coast Teaching Hospital	$\frac{4776}{9327} * 400 =$	205
Metropolitan hospital	$\frac{2667}{9327} * 400 =$	114

The above proportions were chosen as sample sizes for the various hospitals.

Inclusion Criteria

The inclusion criteria were patients who were in the age group of 20-70, who have been diagnosed with hypertension and have attended hypertensive clinic at least twice.

Exclusion Criteria

Clients excluded from the study were, critically ill patients, clients who decide not to join the study, and clients with mental alterations such they can't answer questions.

Probability sampling technique was used because it gives equal opportunity for all the respondents to be selected. Thus, simple random sampling technique was used in obtaining the respondents for the study. Every other respondent was selected from the list of patients who reported on clinic days. Using even numbers, starting from the number 2, every other patient was selected until the required sample size is obtained.

Data Collection Procedure

Data collection took place on Hypertension Clinic days for the various hospitals. The hypertensive clinic is conducted once a week. A list of the clients

was obtained from respective hospital registry/records and a computer assisted random list of the appropriate sample sizes generated. Selected clients were then contacted so they could provide consent to take part in the study.

Visits were made on clinic days until the sample size was obtained. Assistants were trained for two (2) days. Training was on how to administer the questionnaires to the respondents without changing the original meaning to ensure consistency. The purpose of the study was made known to the respondents after the researcher and research assistants had introduced themselves. The data was collected on Tuesdays from 6am to 4pm. Data was not collected on public holidays because there was no clinic on those days. The procedures used were simple random sampling procedure as well as the purposive sampling procedure. The random sampling procedure was used to select clients with hypertension attending clinic at the hypertensive clinics at the various hospitals, while purposive sampling procedure was used to select the hospitals involved in the study. Every other respondents was selected from the list of patients who reported on clinic days. Using even numbers, starting from the number 2, every other patient was selected until the required sample size is obtained.

The questionnaires were distributed to respondents who provided consent, could read and understand the questions. For those who could not fill the questionnaires on their own because they could not read and understand, questionnaires were administered to them in the form of face-to-face interview by the researcher and the field assistant.

Instrumentation

The main data collection tool was a structured questionnaire (Appendix A). Some of the items in the questionnaire were developed by the researcher while others were adopted from research work in related areas. Those adopted from related research works were modified to make them more suitable for this study. This was done under the guidance of my supervisors. Items in the questionnaire were mostly close-ended. According to Spruyt and Gozal (2011) close-ended items are very easy to code, thus, making analysis easy. However, they are quite difficult to construct and also, there is the likelihood that individual respondents may have other responses either than the options provided. According to Burns and Grove (2009), a questionnaire is a list of questions specifically prepared to get information through written answers of the respondents. Participant's folders were also obtained and these information were recorded. Blood pressure, weight and height and cholesterol level. The questionnaire began with an introductory statement, which specified the purpose of the research and assuring the respondents of confidentiality of their responses.

The instrument was developed and written in English. Questions were asked based on the research objectives. Research assistants assisted those respondents who could not read and write and wrote the answers in the column provided.

Two research assistants were trained to assist participants who could not read and write. Research assistants were two junior colleagues from the School of Nursing and Midwifery. Two-hour training sessions were organized for the research assistants. The training included how to maintain confidentiality,

taking informed consent from participant, and how to explain questionnaire to participants who could not read and write.

The questionnaire contained five sections (Appendix A). Section A contained socio-demographic characteristics of the respondents like age, sex, occupation, educational background, family type marital status, religion, health insurance, and monthly income. It also included family history of hypertension, and number of years diagnosed with hypertension. Section B covered general knowledge about hypertension. Multiple item questions were asked to solicit information regarding knowledge about hypertension. Section C assessed knowledge level of lifestyle modification by clients with hypertension. This section contained multiple item questions and an open-ended question to solicit information to determine patient's compliance to diet, exercise, alcohol reduction and smoking stoppage. Also, Section E contained a checklist that was used to extract some information from the patient's folder like cholesterol level, blood pressure, and body mass index (BMI) (BMI was calculated from the data collected from their weight and height)

Respondents' folders were also used to confirm information given using a checklist.

The questionnaires were given to supervisors for their comments and suggestions after the design.

Validity and reliability

Validity refers to the degree to which an instrument measures what it is supposed to be measuring (Perroca, 2013). Face and content validity was assessed by submitting the questionnaire to experts for review. Pre-testing of an instrument is done to determine its feasibility and validity (Postlethwaite,

2005). The questionnaires were pre-tested before collecting the main data for the study. Pre-testing was carried out at Adisadel Health Center since it is in the same metropolis but not part of the population. This was done to authenticate the research instruments. According to King (2013) pre-test are small tests of single elements of the research instruments, which are predominantly used to check eventual mechanical problems of these instruments but Creswell (2008) pointed out that when one modifies an instrument or combines instruments in a study, the original validity and reliability may be distorted and it becomes important to re-establish validity and reliability. Pre-testing helps to determine the amount of time that would be spent in data collection and to determine the reliability of data that the instrument will collect. Cronbach's α (alpha) is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees (Helms, Henze, Sass & Mifsud, 2006). Cronbach alpha was applied to assess the internal consistency of questionnaire. The reliability coefficient obtained on the Practices Scale was .885 based on 7 items. The reliability coefficient obtained on the Knowledge Scale was .799 based on 9 items. The reliability coefficient obtained on the Attitudes Scale was .906 based on 10 items. The reliability coefficient obtained on the entire questionnaire was 0.894 based on 26 items. This value was greater than the cut-off point of .700; indicating that the entire questionnaire had an 'adequate' internal consistency, according to Cohen (cited in Leeh, Barrett & Morgan, 2005), and therefore, the Questionnaire for the Hypertension Patients was used without any major revisions or modification before the main data was collection. Reliability means the likelihood of obtaining the same results when the researcher measures the same variable more than once, or when more than

one person measures the same variable. Cronbach's alpha is the most widely used objective measure of reliability. It provides a measure of the internal consistency of a test or scale and is expressed as a number between 0 and 1 (Tavakol & Dennick, 2011). The closer Cronbach's alpha coefficient is to 1 the greater the internal consistency of the items in the scale. The Cronbach's Coefficient Alpha was calculated to test the reliability of the questionnaire, with specific reference to its internal consistency.

Ethical Considerations

According to Burns and Grove (2009), the protection of human subjects during the research process involves many areas of concern: "the right to self-determination, privacy, anonymity, confidentiality, fair treatment and protection from discomfort or harm is required during nursing research". During this particular study, the ethical principle of beneficence held true. There were no negative effects, temporary discomfort or risks of permanent or temporary damage to the volunteer. This study did not involve minors or anyone with diminished autonomy.

Approval from the Institutional Review Board of the University of Cape Coast was sought. Permission was obtained from the various hospitals involved in the study by sending letters explaining the details of the research. This was to seek permission from the management of the hospital to be able to carry out the study in the institution.

Ethical considerations refer to procedures that are followed to protect the rights of the institution and the respondents and to ensure scientific integrity (Polit & Beck, 2008). The principles of ethical considerations that were considered include confidentiality, anonymity, beneficence and nonmalficence.

Respondents were assured of anonymity and confidentiality of their responses for only the purpose for which the data were being solicited. As such, names of respondents were not recorded or collected. This was done to reduce non-response, and to ensure that respondents provided reliable data. The respondents were asked to fill questionnaires within 40 minutes. This enabled the respondents had adequate time to address issues in the questionnaires. More so, respondents were informed that they had the option to opt out of the study if they wished to do so.

All information related to ethical issues were written and read to participant in their language of understanding. During the actual data collection exercise, the team introduced themselves, and the purpose of the study was explained to the hospital management. The research team also sought for the consent of the respondents before giving them the research instruments. Respondents were made aware of the type of questions to expect from the questionnaire, and the purpose of the study.

Data Analysis

The results were analyzed according to the research questions. Data collected were coded, entered and analyzed using the Statistical Product and Social Solutions (SPSS) version 20.0. Data were analyzed using both descriptive and inferential statistical methods. Thus, the study used frequencies, percentages, means and standard deviations in order to make descriptions of certain variables of interest or summarise demographic characteristics. The Pearson`s chi-square test was then used to estimate the level of association between main outcome variables (knowledge, attitude and practices) and key

predictors (demographic characteristics). At the 95% confidence level, p-values less than 0.05 were considered statistically significant.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the results of the analysis of the data collected from the respondents. The major findings that emerged from the study are discussed. The study sought to assess the knowledge, attitudes and practices of lifestyle modification among clients with hypertension.

This study specifically attempted to answer the following research questions:

1. What is the level of knowledge of hypertension among clients with hypertension in Cape Coast Metropolis?
2. Do these clients have knowledge on lifestyle modification?
3. What attitudes do clients with hypertension have towards lifestyle modification?
4. What are the perceived barriers that influence the adherence to lifestyle modification?
5. What is the relationship between level of knowledge and indices of hypertension?
6. What are the socio-demographic factors that influence knowledge of lifestyle modification among the clients?

The sample size was 400 participants from three selected hospitals in the Cape Coast Metropolis. These included University of Cape Coast Hospital, Cape Coast Teaching Hospital and Cape Coast Metropolitan Hospital. Three hundred and ninety six (396) participants returned the questionnaire, resulting in a 99.0% response rate. The researcher employed both descriptive and inferential statistical tools in analyzing the data.

Results

Socio-demographic characteristics

Data on the characteristics of the respondents were collected to facilitate an understanding of the respondents' background. The characteristics examined included gender, age, educational level, occupation and family income. Table 3 presents a summary of these variables.

Table 3: Socio-Demographic Characteristics

Variables	Frequency	Percentage
Gender		
Males	202	51.0
Females	194	49.0
Age (in years)		
20 – 30	104	26.3
31 – 40	69	17.4
41 – 50	94	23.7
51 – 60	77	19.4
61 – 75	52	13.2
Educational Level		
None	43	10.9
Primary	41	10.4
Secondary	88	22.2
College of Educ/Poly	188	47.5
Degree	23	5.8
Others	13	3.2
Occupation		
Unemployed	112	28.3
Daily wages	68	17.2
Private employee	108	27.3
Government employee	96	24.2
Others	12	3.0
Family income (GH¢) per Month		
Less than GH¢ 500	140	35.4
GH¢ 501 – 1,000	103	26.0
GH¢ 1,001 – 1,500	104	26.3
Others	22	5.6
Non-response	27	6.7
Total	396	100.0

Table 3 shows more than half of the respondents, (51.0%) were males. With regards to age, 26.3% were aged 20-30 years, with the majority (56.3%) being 41 years and older. The mean age of the respondents was 42.9 years.

The majority of respondents 80.1 % had obtained formal education with only 43 (10.9%) reporting no formal education. Out of the 396 respondents, 112 (28.3%) were reportedly unemployed. A majority (61.4%) earned GH¢ 1000 or less per month. A little over a quarter of respondents (26.3%) earned above GH¢1,001.

The study also assessed respondents' family history of hypertension. This was to identify familial tendency that could have led to respondents' health situation. Table 4 presents the details of the results of this as well as other behaviors they reported to practice.

Table 4: Hypertension History

Response	Frequency	Percentage
Length of Hypertension (in years)		
5 or less	217	54.8
6 – 10	83	21.0
11 – 15	42	10.6
16 or more	14	3.5
Don't know	40	10.1
Whom do you live with?		
Extended family member	125	31.6
Spouse and children	206	52.0
Parent and siblings	2	0.5
Alone	1	0.4
Others	2	0.5
Immediate family having hypertension		
Parent	135	34.2
Siblings	61	15.4
Grandparents	106	26.8
Children	11	2.8
Non-response	83	21.0
Dietary pattern		
Vegetarian	31	7.8
Non-vegetarian	365	92.2
Behaviours		
Smoking	65	16.4
Drinking of alcohol	203	51.3
Tobacco chewing	32	8.1
Lack of exercise	96	24.2
Total	396	100.0

As shown in Table 4, majority of the respondents (54.8%) had been managing hypertension for 5 years or less, while 56 (14.1%) had lived with this condition for at least 11 years.

More than half (52.0%) reported that they lived with their spouses and children. Also, 125 (31.6%) of the respondents lived with their extended families.

Regarding familial tendency, 34.2% reported that their parents had also diagnosed with hypertension. Also, there were others who indicated that their siblings, grandparents and children has a similar condition. Only 83 (21.0%) did not indicate any of their relations as being victims of hypertension.

Majority of the respondents (92.2%) were non-vegetarians. Also, 16.4% smoked, 51.3% drank alcohol and 8.1% chewed tobacco. Only 24.2% did not practice any of the three risky behaviours.

Research question 1: *What is the level of knowledge hypertension among clients with hypertension in Cape Coast Metropolis?*

The study sought to assess the level of knowledge about hypertension by respondents. First, the researcher asked about the sources of information on hypertension. Table 5 presents their responses on the sources of information on hypertension.

Table 5: Sources of Information

Sources	*Frequency (N)	*Percent (%)
Radio	206	52.0
Health professional	194	49.0
Television	184	46.5
Newspaper	103	26.0
Friends	84	21.2
Family member	60	15.2

*Multiple choice responses

The main source of information on hypertension was the radio followed very closely by health professionals (49%) and television (46.5%).

Also, the knowledge level of the respondents was assessed with regard to normal and hypertensive BP readings. Table 6 is the summary of their responses.

Table 6: Normal and Hypertensive BP Readings

Response	Frequency	Percent
90/ 60 mm Hg	32	8.1
120/80 mm Hg	247	62.4
140/ 90 mm Hg	37	9.3
180/110 mm Hg	4	1.0
Non-response	76	19.2
Total	396	100.0

Meaning of Hypertension

Response	Frequency	Percent
BP above 140/90 mm Hg	274	69.2
BP 120/80 mm Hg	35	8.8
BP 90/50 mm Hg	15	3.8
BP 60/40 mm Hg	1	0.3
Non-response	71	17.9
Total	396	100.0

Table 6 shows that 396 respondents (62.4%) correctly indicated the average normal BP was 120/80 mm Hg. However, the remaining either got it wrong or did not respond. Table 6 also revealed that majority of the respondents (69.2%) reported that hypertension was when the BP was above 140/90 mm Hg. Meanwhile, 35 (8.8%) and 15 (3.8%) said that BP 120/80 mm Hg and BP 90/50 mm Hg respectively implied hypertension.

The researcher asked questions on the possible risk factors for hypertension. Different options were provided and the responses are presented in Table 7.

Table 7: Risk Factors for Hypertension

Risk factors	*Frequency (N=396)	*Percent (%)
Stress	281	71.0
Lack of exercise	263	66.4
Age	256	64.6
Too much salt	250	63.1
Hereditary	166	41.9
More blood	52	13.1

*Multiple choice responses

To many of the respondents (71%), stress was a risk factor for hypertension. Lack of exercise (66.4%); age (64.6%); and too much salt intake (63.1%) followed as important risk factors. However, less than half (41.9%) knew that hereditary influence could be a risk factor.

Knowledge level on methods to control hypertension was assessed. Table 8 has the details.

Table 8: Methods to Control Hypertension

Methods	*Frequency (N=396)	*Percent (%)
Regular exercise	295	74.5
Drug therapy	285	72.0
Diet control	255	64.4
Others	3	0.8

*Multiple choice responses

Among the respondents, regular exercise (74.5%) and drug therapy (72%) were selected as main practices for controlling hypertension. However (64.4%) said diet control could also be used to manage their condition.

Table 9 provides details of the responses on when they should take their medications.

Table 9: Time to Take Medication

Responses	Frequency	Percent
Under stressful situation	62	15.7
As a life long way to manage high BP	271	68.4
When activities require physical exertion	26	6.6
Whenever I feel bad	13	3.3
Other	1	0.3
Non-response	23	5.7
Total	396	100.0

Among the respondents, majority of them (68.4%) revealed that they took their medications as a life long way to manage high BP, while (15.7%) reported they did so under stressful situations.

Table 10 presents the responses on what diet adjustments are recommended for control of hypertension.

Table 10: Dietary Control for Hypertension

Therapy	Frequency (N=396)	Percent (%)
*Nutritional		
Water restriction	16	4.0
Decrease salt intake	345	87.1
Increase salt intake	18	4.5
Decrease calorie- rich food	167	42.2
Others	1	0.3

With respect to nutritional or dietary control practices, an overwhelming majority (87.1%) reported that decreasing salt intake was part of nutritional therapy. Less than half (42.2%) mentioned that a decrease in calorie-rich foods was part of nutritional therapy. However, (4.0%) and (4.5%) said water restriction and increased salt intake respectively were means of controlling hypertension

Respondents were asked to identify complications of hypertension. Table 11 gives the details.

Table 11: Complications of Hypertension

Complications	*Frequency(N=396)	*Percent (%)
Respiratory dysfunction	187	47.2
Liver dysfunction	142	35.9
Renal dysfunction	118	29.8
GI dysfunction	51	12.9

*Multiple choice responses

Results on Table11 show that (47.2%) of the respondents said respiratory dysfunction was an important complication of hypertension. Also, (35.9%) said liver dysfunction was a complication of hypertension.

Six key items above were used to determine the knowledge level of the respondents. These included normal and hypertensive BP readings; risk factors, dietary control of hypertension and complications. Therefore, a respondent could score between 0 and 6. , the researcher used a cut-off point of 50% for categorising/classifying respondents into those with adequate knowledge and respondent with poor knowledge. Respondents who scored 3 or more of 6 were considered to have adequate knowledge of hypertension, while those with less than 4 were regarded as having poor knowledge. The results from the classification are presented in Figure 2.

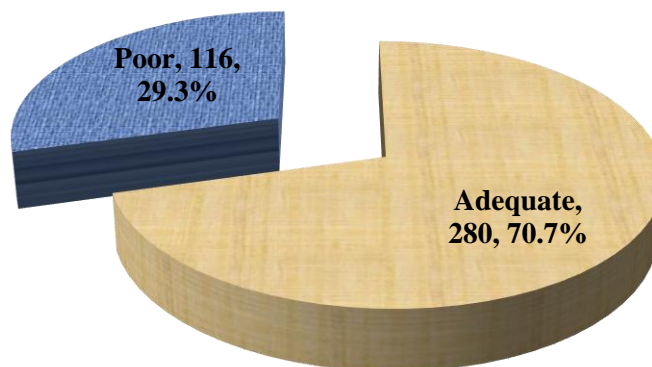


Figure 2. Level of knowledge on hypertension

Out of the 396 respondents, a majority of them (70.7%) scored at least 4 out of 8 on the knowledge scale. This means that 70.7% had adequate knowledge on hypertension, while the remaining (29.3%) had poor knowledge of hypertension.

Research Question 2: *Do clients with hypertension have knowledge on lifestyle modification?*

The researcher sought to determine if the respondents had knowledge of lifestyle modification practices. In the context of this study, concentration is on dietary modifications, stress management, and exercise therapies. First the researcher asked respondents to indicate if they had had any previous information regarding lifestyle modification. Figure 3 presents their responses.

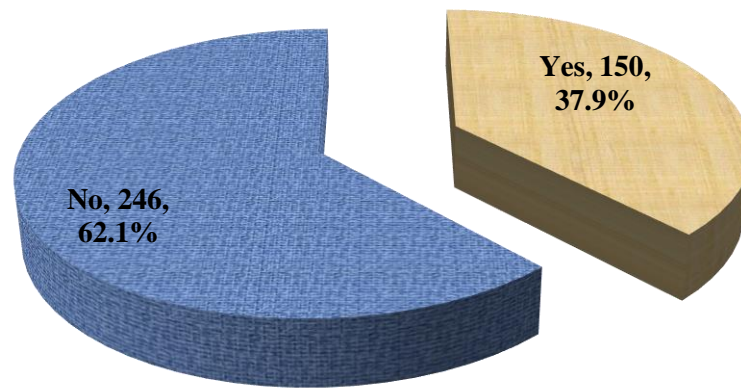


Figure 3. Previous information on lifestyle modification

Figure 3 shows the majority of the respondents (62.1%) had not had any previous knowledge of lifestyle modification. Table 12 provides the details of the dietary practices.

Table 12: Dietary practices

Recommended foods	*Frequency	Percentage (%)
Recommended Foods		
Salt rich foods	13	3.3
Fatty foods	10	2.5
Spicy foods	22	5.6
Vegetables	352	88.9
Others	39	9.8
Recommended salt intake		
Half teaspoon	120	30.3
One teaspoon	167	42.2
Two teaspoons	52	13.1
Others	9	2.3
Non-response	48	12.1
Total	396	100.0

*Multiple choice responses

A large proportion of respondents (88.9%) selected vegetables as the major recommended foods they should consume, Although spicy foods are recommended to help make foods more palatable, very few (20 representing 5.0%) selected them as a recommended food. Salt rich foods and fatty foods are not appropriate choices for patients with hypertension; however, some still believed they were recommended foods. With regard to the amount of salt that was recommended 72.5% indicated one teaspoon or less. It is of concern that 27.5% did not really have a good idea of the amount of salt that was recommended for patients with hypertension.

The respondents' knowledge of exercise therapy was also examined.

Table 13 presents the details.

Table 13: Exercise Therapy

Therapy	Frequency (N=396)	Percent (%)
*Ways to Maintain normal body weight		
Regular exercise	374	94.4
Calorie restrictions	76	19.2
Optimal calorie intake	49	12.4
Eating fatty foods	12	3.0
Others	3	0.8
Duration of exercise in a week		
5 minutes 5 times a week	43	10.9
10 minutes 3 times a week	99	25.0
30 minutes 3 times a week	220	55.6
No need to exercise	5	1.3
Non-response	19	4.8
*Forms of exercise good for control of hypertension		
Aerobics (walking, jogging)	341	86.1
Dancing	77	19.4
Weight bearing	71	17.9
Driving	14	3.5
Others	3	0.8

*Multiple choice responses

A majority of respondents (94.4%) revealed that regular exercise could help them to maintain their normal body weight. Only 19.2% also suggested calorie restrictions as a strategy for maintaining normal body weight.

With regard to the recommended duration of exercise in a week, 220 (55.6%) of the respondents correctly said they should exercise for 30 minutes 3 times a week. However, 142 (35.9%) responded that 5 minutes 5 times a week was ideal for the duration of exercise. With reference to the forms of exercises they should engage in, 341 (86.1%) responded engaging in aerobics such as walking or jogging. Although dancing could be considered an aerobic exercise, only 19.4% selected it as a form of exercise.

Respondents were asked what strategies they used to reduce stress. They mentioned different options. Table 14 presents strategies identified.

Table 14: Stress Reduction Strategies

Strategies	Frequency (N=396)	Percent (%)
Sleeping/resting	144	36.4
Exercise	91	23.0
Chat	12	3.0
Drink alcohol	6	1.5
Nothing	143	36.1
Total	396	100.0

Table 14 demonstrates that 36.4% use sleep to reduce stress. Meanwhile, 36.1% responded that they did nothing to reduce stress. Only 23% selected exercise as an appropriate strategy.

Respondents were asked the ideal number of hours for sleep per day.

Table 15 has the results.

Table 15: Hours of Sleep per Day

Hours	Frequency (N=396)	Percent (%)
Less than 6	16	4.0
8 – 10	266	67.2
12 – 14	90	22.7
Non-response	24	6.1
Total	396	100.0

A majority of them (67.2%) correctly indicated 8-10 hours of sleep in a day was appropriate. However, 16 (4.0%) of them were of the view that less than 6 hours per day was appropriate.

In order to categorise the respondents according to their responses on knowledge of lifestyle modification, responses were quantified and a cut-off value of at least 50% was determined as representing adequate knowledge. Poor knowledge was any value less than 50%. A total of 10 items in the tables above were considered during categorisation. Therefore, any respondent with a total score of 5 or more was considered to have adequate knowledge of lifestyle modification, while others with lower scores had poor knowledge of lifestyle modification.

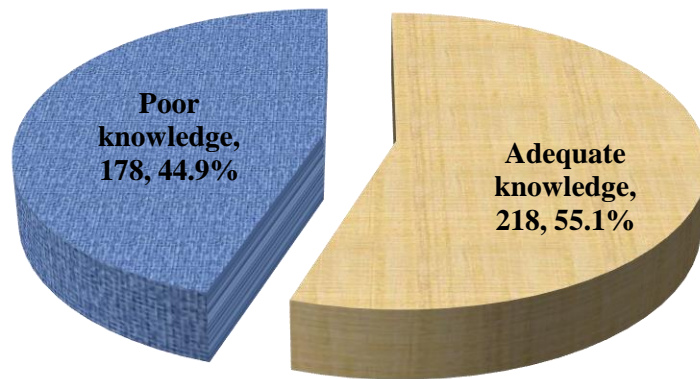


Figure 4. Level of knowledge of lifestyle modification

Figure 4 shows a majority of the respondents (55.1%) had adequate knowledge of lifestyle modification. However, a substantial proportion of them (44.9%) did not have adequate knowledge.

Research Question 3: *What attitudes do clients with hypertension have towards lifestyle modifications?*

Table 16: Attitudes towards Lifestyle Modifications (N=396)

Attitudes	Strongly Agree		Agree		Disagree		Strongly Disagree		*Mean	Std. Dev.
	Freq.	%	Freq.	%	Freq.	%	Freq.	%		
Persons with hypertension can eat fat rich foods	239	60.4	83	21.0	33	8.3	41	10.3	3.31	0.4522
Low intake of vegetables had no effect on BP readings.	216	54.5	92	23.2	35	8.8	53	13.5	3.19	0.5662
Persons with hypertension should abstain from sexual relationships	162	40.9	132	33.3	23	5.8	79	20.0	2.95	0.9825
If the BP is found normal, a person can choose to stop taking medicine	126	31.8	114	28.8	87	22.0	69	17.5	2.75	0.5626
Reducing alcohol intake helps to lower blood pressure	34	8.6	35	8.8	97	24.5	230	58.1	1.68	0.1227
Persons with hypertension need to maintain their weight within normal limits	9	2.3	20	5.1	122	30.8	245	61.8	1.48	0.8733
Stopping of smoking helps to lower blood pressure	12	3.0	17	4.3	115	29.0	252	63.7	1.47	0.8624
Persons with hypertension should avoid stress inducing situations	14	3.5	17	4.3	100	25.3	265	66.9	1.44	0.3232
Regular exercise helps to control hypertension	10	2.5	18	4.5	84	21.2	284	71.8	1.38	0.7700

*Mean=strongly agree (4); Agree (3); Disagree (2); and strongly disagree (1)

The results from Table 16 show that 81.4% of the respondents strongly agreed or agreed that persons with hypertension could eat fat rich foods. More than three-quarters (77.7%) agreed that low intake of vegetables would not affect the BP. They rated this statement with a mean value of 3.19 and variability of 0.5662.

Also, when asked whether persons with hypertension should abstain from sexual relationships, 294 (74.2%) agreed with the statement. Also, 126 (31.8%) and 114 (28.8%) indicated strongly agree and agree respectively to the statement that if the BP was found normal, a person could choose to stop taking medicines.

With a mean rating of 1.68 and standard deviation of 0.1227, a majority (82.6%) did not believe that reducing alcohol intake would help lower the blood pressure. It was also seen from Table 16 that only 29 (7.4%) of the respondents agreed that persons with hypertension needed to maintain weight within normal limits. Similarly, the respondents (92.7%) indicated that stopping smoking would not help to lower blood pressure. With reference to the statement that, “persons with hypertension should avoid stress inducing situations”, only 7.8% strongly agreed or agreed. The larger proportion of respondents disagrees with the statement. Only 28 (7.0%) of the respondents said regular exercise could help to control hypertension, while the larger percentage thought otherwise.

Table 16 is made up of 10 items and these were measured on a scale of 1-4. During the analysis, all negative statements had coding reversed. This means a respondent could obtain between 10 and 40 points. Then, individual scores were calculated. Attainment of 50% (20 points) or more was classified as a positive attitude. The study classified respondents into two distinct groups

based on the scores obtained; namely, those with positive attitudes and those with poor attitudes. Figure 5 presents the details of the results.

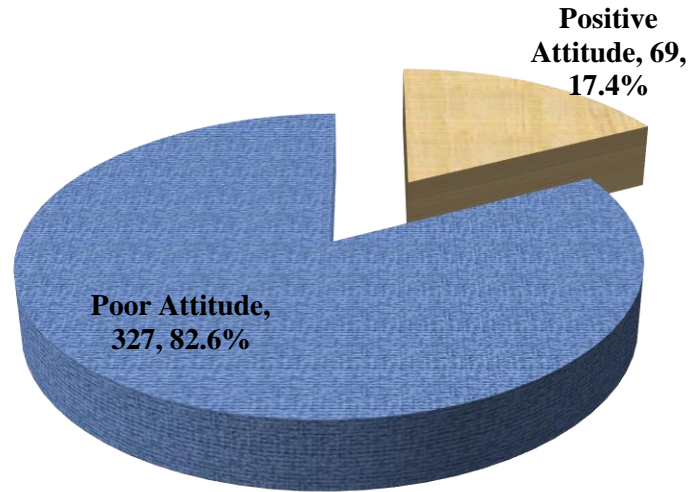


Figure 5. Attitude of respondents towards lifestyle modifications

The results of Figure 5 showed that a large majority of the respondents (82.6%) had poor attitudes towards lifestyle modification. Conversely, 69 (17.4%) of them had exhibited positive attitudes towards lifestyle modifications.

Research Question 4: *What are the perceived barriers that influence the adherence to lifestyle modifications?*

The study examined the barriers that prevented respondents from adhering to lifestyle modification regime and diet and exercise recommendations. The perceived barriers identified in the literature included lack of good teaching about lifestyle modification, lack of time to do the things that are recommended, and things that are recommended were considered too hard to do with a busy life. Results of perceived barriers are shown in Table 17.

Table 17: Perceived Barriers

	Frequency	*Percent
Barriers to Lifestyle Modifications	(N=396)	(%)
Lack of good teaching about lifestyle modification	205	51.8
Lack of time to do the things that are recommended	293	74.0
The things that are recommended are too hard to do with my busy life	107	27.0
I cannot see any difference when I do them	67	16.9
Others	7	1.8
Barriers to Diet Adherence		
I do not like the foods that are recommended	181	45.7
Difficulty adhering to diet that is different from the rest of the family	173	43.7
I prefer the traditional Ghanaian salty fish and meat	57	14.4
I have to attend social gatherings where the foods are not what is recommended	36	9.1
Barriers to Exercise Regime		
Lack of time	276	69.7
Feel weak sometimes	125	31.6
Lack of money to buy exercising equipment	60	15.2
Others	8	2.0

*Multiple choice responses

The main perceived barrier to adherence to lifestyle modification was the lack of time to do the things that were recommended. Two hundred and ninety-three representing 74.0% of them identified this as a barrier to practicing lifestyle modification strategies.

Another important barrier identified was the lack of good teaching about lifestyle modification (51.8%). As shown earlier in Figure 3, majority of the respondents (62.1%) had never heard of lifestyle modification in the management of hypertension until that time.

The results of Table 17 show that the main factor contributing to non-adherence with diet modifications was the fact that respondents (45.7%) did not like the foods that were recommended. Another important factor (43.7%) was that their recommended foods were different from that of the rest of the family. With regard to exercise, the main influencing factor was the lack of time (69.7%).

Research Question 5: *What is the relationship between level of knowledge of lifestyle modifications and indices of hypertension?*

This research question sought to assess the relationship between respondents' levels of knowledge of lifestyle modifications and three hypertension indices. These indices included the Body Mass Index (BMI), cholesterol levels, and the extent of control of BP. Figure 6 presents the B

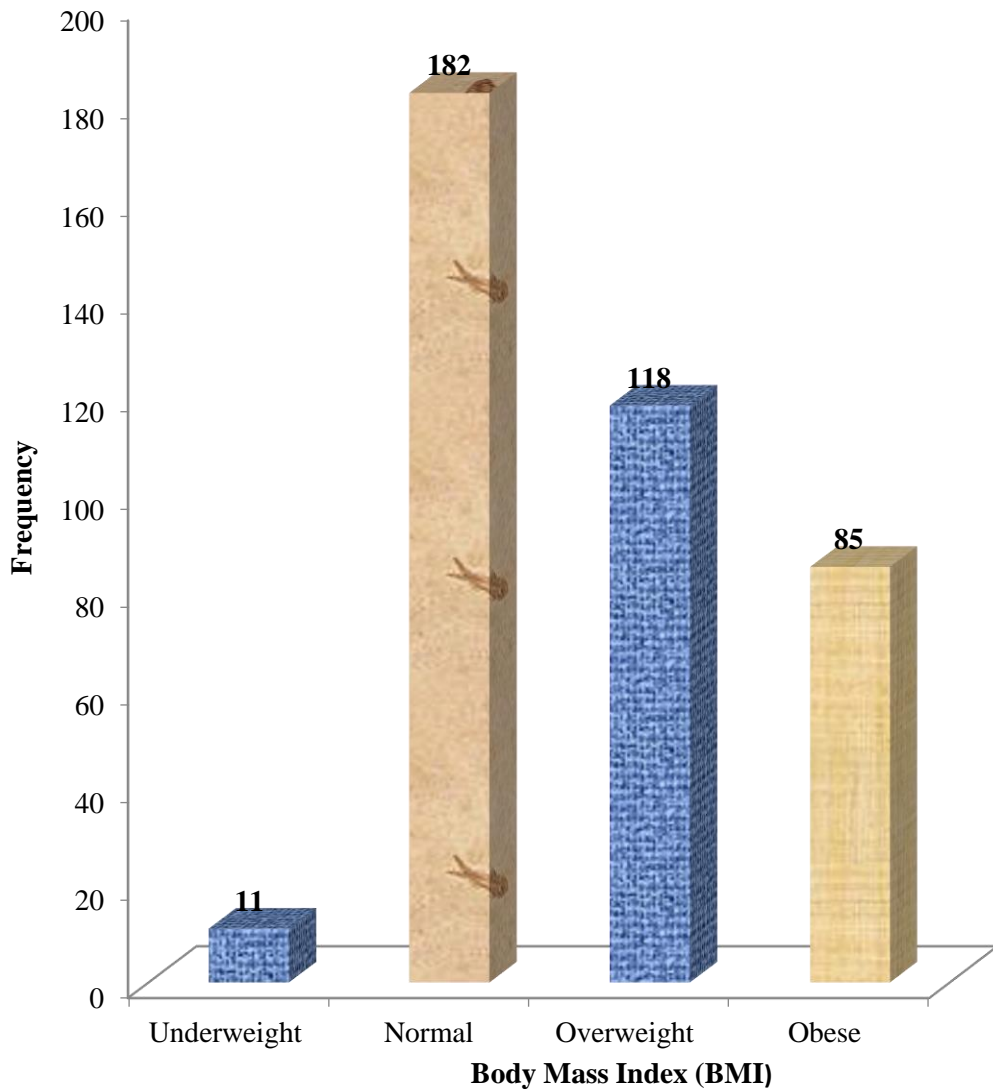


Figure 6. BMI of respondents

Figure 6 shows a substantial number of the respondents (182 representing 46.0%) were of normal weight. However, over 50% were overweight or obese.

Table 18: Cholesterol Level of Respondents

Level	Frequency	Percent
Normal level	107	27.0
High level	280	73%
Total	396	100.0

Table 19: Extent of Hypertension Control among Respondents

Description	Frequency	Percent
Uncontrolled	266	67.2
Controlled	130	32.8
Total	396	100.0

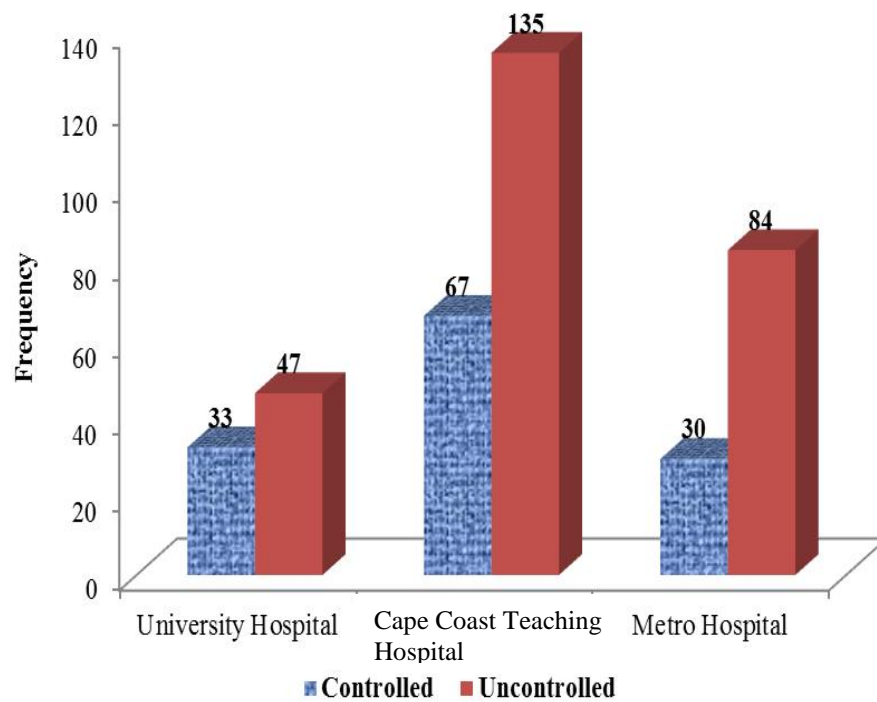


Figure 7. Extent of hypertension control by hospital

It can be seen from Figure 9 that out of the 80 respondents from the University Hospital, more than half (58.8%) did not control their conditions, while the remaining few did. Similarly, the number of uncontrolled hypertension was more than twice the number of controlled hypertensive clients accessing health care from the Teaching Hospital. With respect to respondents from the Metropolitan Hospital, only 30 (26.3%) of the 144 respondents were controlling their conditions.

In determining the relationship between knowledge of lifestyle modifications and indices of hypertension, Chi-square test was employed. The study used the 5% significance level and all conclusions were drawn based on the *p*-values of the respective variables. The results on lifestyle modification knowledge obtained from Figure 4, showed that 55 % had adequate knowledge on lifestyle modification, while the remaining 45% had poor knowledge. Table 20 presents the results.

Table 20: Knowledge of Lifestyle Modifications and Hypertension Indices

Hypertension indices	Knowledge of Lifestyle Modifications		χ^2	p-value
	Adequate (n=218)	Poor (n=178)		
BMI				
Underweight	6	5	0.227	0.973
Normal	102	80		
Overweight	65	53		
Obese	45	40		
Cholesterol level				
Low	57	50	0.188	0.665
High	116	128		
Extent of BP control				
Controlled	71	59	0.015	0.903
Uncontrolled	147	119		

The results from Table 20 show that with respect to BMI, 6 respondents who were underweight had adequate knowledge of lifestyle modifications while

the remaining 5 did not. Among the 118 overweight patients, 65 were classified as having adequate knowledge compared to 53 with poor knowledge of lifestyle modifications. Forty-five respondents who were obese had adequate knowledge while 40 did not. The Pearson`s chi-square test showed that there was no statistically significant association between knowledge of lifestyle modifications and BMI indicators.

With respect to the association between knowledge of lifestyle modifications and cholesterol level, 107 respondents had a normal cholesterol level. Of those, 58 compared to 50 had adequate knowledge. Also, among the 289 respondents with high cholesterol, 116 versus 128 were found to have adequate knowledge of lifestyle modifications. Using the Chi-square test, no significant association was found.

Out of 130 respondents who had controlled their conditions, 71 compared to 59 had adequate knowledge on lifestyle modifications. Similarly, 147 of those with uncontrolled hypertension were found to have adequate knowledge, while the remaining 119 had poor knowledge on lifestyle modification. Here again, there was no statistically significant association between the knowledge of lifestyle modifications and the extent of hypertension control.

Research Question 6: *What are the socio-demographic factors that influence knowledge of lifestyle modification among the clients?*

Five socio-demographic factors were identified for the purpose of determining if there was a relationship existed with knowledge of lifestyle modifications. These included gender, age, educational level, occupation and

family income per month. The results obtained from the Chi-square test are presented in Table 21.

Table 21: Influence of Socio-Demographic on Knowledge of Lifestyle

Socio-demographic variables	Knowledge on lifestyle modifications		χ^2	p-value
	Adequate (n=218)	Poor (n=178)		
Gender			1.887	0.17
Males	118	84		
Females	100	94		
Age (in years)				
20 – 30	63	41		
31 – 40	37	32		
41 – 50	45	49	3.686	0.440
51 – 60	45	32		
61 – 70	28	24		
Educational Level				
None	23	20		
Primary	20	21		
Secondary	43	45	5.337	0.376
College of Educ/Poly	110	78		
Degree	16	7		
Others	6	7		
Occupation				
Unemployed	56	56		
Daily wages	33	35		
Private employee	66	42	4.397	0.355
Government employee	56	40		
Others	7	5		
Family income (GH¢) per Month				
Less than GH¢ 500	78	62		
GH¢ 501 – 1,000	59	44		
GH¢ 1,001 – 1,500	59	45	5.642	0.228
Others	13	9		
Non-response	9	18		

With respect to gender, out of the 202 male respondents, 118 had adequate knowledge of lifestyle modification. Also, 100 versus 94 of the females were classified as having adequate knowledge of lifestyle modification.

The Pearson's chi square test revealed no significant association between gender and knowledge of lifestyle modifications.

Similarly, out of 104 respondents aged 20-30 years, 63 had adequate knowledge of lifestyle modification compared to 41 who did not. For other age groups the adequacy of knowledge of lifestyle modifications was close to being equally distributed. The Chi-square test results also revealed that there was no significant association between knowledge of lifestyle modifications and age ($p=.440$).

In assessing the relationship between lifestyle modification knowledge and educational level, it was found that 23 out of 43 respondents with no formal education had adequate knowledge of lifestyle modification. Similarly, among those with degrees, 16 compared to 7 had adequate knowledge. The chi square test also showed no statistically significant association between knowledge of lifestyle modifications and educational level ($p=.376$).

As to whether knowledge of lifestyle modification was associated with occupation and family incomes per month, the Pearson's chi square test further displayed no statistically significant associations with p-values of 0.355 and 0.228 respectively.

Discussion

This study sought to determine the knowledge, attitudes, and practices of clients with hypertension towards lifestyle modification within the Cape Coast Metropolis. It specifically examined the level of knowledge on hypertension among clients with hypertension in the Metropolis, knowledge on lifestyle modification, attitudes towards lifestyle modification, and perceived barriers that influence the adherence to lifestyle modification. The study also

assessed the relationship between level of knowledge and indices of hypertension as well as the influence of some selected socio-demographic factors on knowledge of lifestyle modification.

Background of the Respondents

Study results revealed that majority (56%) of respondents were 41 years and older. The mean age of the respondents was 42.9 years. This finding suggests that the incidence of hypertension increases with age. From the responses on risk factors on hypertension, 64.6% stated that parents or siblings had also been diagnosed with hypertension. This results confirms the findings of Kaplan (2008), and McGoan, *et al.* (2008) that family history (hereditary) and age increases the risk of high blood pressure. In addition, findings revealed that 26% of clients were between the ages of 20 and 30. This informs the necessity of health education through the mass media on lifestyle modification practices to prevent hypertension. Interestingly, majority of respondents had obtained formal education with only 43 (10.9%) reporting no formal education. Out of the 396 respondents, 112 (28.3%) were reportedly unemployed. Owusu (2005) asserted that, the lowest treatment cost pharmacologically is recorded to be 7.5-12% of the monthly income of the average worker in Ghana. In effect, drugs for controlling blood pressure will be unaffordable for unemployed or low-income clients. This supports the importance for clients to adopt lifestyle modification strategies.

Knowledge on Hypertension

The study revealed that main sources of information on hypertension were radio (52.0%), health workers (49.0%) and television (46.5%). The fact that less than half of respondents had received health education from a health

worker confirms the study of Rakumakoe (2011) who reported that only 30% of respondents stated having received education on lifestyle modifications from a medical professional. Yet almost half of the respondents had obtained high school or technical education which suggests they had the necessary skills to learn if the education had been provided. Meanwhile health education should be part of client's treatment plan. This finding reveals the need for health workers to inculcate health education on hypertension and its management in client's treatment strategies. Also, the large proportion of respondents stated they had education on hypertension from the media; thus radio (52.0%) and television (46.5%). This finding reinforces the need to use these medium as a means to give health education for the larger section of Ghanaians on issues concerning hypertension. The impact of such education may have attributed to more than half of the respondents 62% knowing that the average normal BP was 120/80 mm Hg.

Based on the findings, the general implication is that majority of respondents (70.7%) had adequate knowledge of hypertension. Meanwhile only 29.8% of respondents could state the complication of hypertension correctly. This finding suggests that, clients were not made aware of the implications of not adhering to treatment strategies. This confirms the results of Okwonu, Ojimadi, and Okaka (2014) who reported that only 23.4% of their respondents knew the consequences of poor blood pressure control. The conceptual framework in Figure 1 (p. 53), clearly defined that perceived consequences can lead to behavior change. Based on the results of the study, the respondents did not perceive they would suffer consequences from hypertension therefore they were not motivated to adopt lifestyle modifications.

However, the level of knowledge on hypertension was better in this study compared to what Busari *et al.* (2010) found among 240 adult Nigerians with hypertension where less than half (47.1%) of the respondents had good knowledge on hypertension. Also conflicting to the results of this study, Addo *et al.* (2012) reported that lack of knowledge on hypertension was a reason for low levels of control.

Knowledge of Lifestyle Modifications

Results showed that more than half of the respondents (55.1%) had adequate knowledge on lifestyle modification strategies. The results confirms the study by Marfo, Owusu- Daarku, and Opare Addo Saana (2014) who reported patient's knowledge on lifestyle practices for the management of blood pressure could be graded as average. On the contrary, Aniebue *et al* (2010) reported that knowledge and practices regarding lifestyle modification measures were poor. On the contrary, Okwuonu, Emmanuel & Ojimadu (2014) reported that 87.1% were unaware regular exercise was part of lifestyle modification while 60% were unaware of the need for moderation of alcohol intake, more than 80% were unaware of the roles vegetables, fruits, unsaturated oil and reduction in diary food intake play in the control of BP. Similarly, the study of Okwonu, Ojimadi, and Okaka (2014) revealed inadequate knowledge and practice of lifestyle modifications for blood pressure control.

Attitudes towards Lifestyle Modification Strategies

Study results showed that larger portion of participants (82.6%) had poor attitudes towards lifestyle modifications. However 55% of respondents had adequate knowledge on lifestyle modification. The study results for participant's attitude and knowledge levels are not complementary. Although

there is evidence of adequate knowledge it is not reflected in a positive attitude towards lifestyle strategies. The findings confirm what Rakamakoe (2011) reported that despite the fact that more than 50% of the respondents had adequate knowledge, most were not practicing lifestyle modification strategies and this was reflected in their BMI and blood pressure readings. This finding also confirms the study by Okwuonu, Emmanuel, and Ojimadu (2014) who reported that percentage of practice were 8.6%, 7.5%, 32.3%, 12.9% and 6.5% for regular exercise, weight reduction, alcohol moderation, fruit intake and decreased salt intake respectively.

Findings of the study suggest that if respondents have adequate knowledge and a poor attitude then health education and client motivation are not effective. This statement can be supported with a finding which revealed that 29.8% of respondents did not know the complications of hypertension. Aniebue *et al.* (2010) reported that more than 50% of participants in their study adopted and practiced lifestyle-modification measures once they became aware of the effects of complications of hypertension. Similar results were reported by Serour, Alqhenear, Saqabi, Mustafa and Ben-Nakhi (2007) who found out that majority of respondents were overweight, did not engage in recommended levels of physical activity, and did not follow dietary recommendations even though majority of respondents had adequate knowledge on lifestyle modification.

Health education should inform clients of the benefits of adherence and consequences of not adhering to recommended strategies. This will help clients to make informed decisions. According to Ajzen (2002), client's beliefs can motivate them to adhere to recommended lifestyle practices. The individual is

made aware through health education that lifestyle modification is necessary to achieve a good outcome.

Also, results showed that the majority of respondents (82.6%) did not know that reducing alcohol intake would help control blood pressure. In addition to the above statement, (51.3%) stated that they consumed alcohol. Also 65 (16.4%) stated they smoked. However, Tagoe and Dake (2011) conducted a study in Ghana and reported that while the prevalence of some negative lifestyle behaviours like smoking had reduced, others like alcohol consumption had increased and that fewer people adhered to consuming the recommended amount of fruit and vegetable. The results of the study showed that 81.4% of the respondents strongly agreed or agreed that persons with hypertension could eat fat rich foods. Additionally, 77% agreed that low intake of vegetables had no effect on their blood pressure readings. This finding was similar to the study by Okwuonu, Emmanuel, and Ojimadu (2014), who reported that more than 80% of respondents were unaware of the roles of vegetables, fruits, unsaturated oil and reduction in diary food intake in the control of BP and only 12, 9% practiced recommended diet. Popkin (2006) reported that many people in Africa often eat insufficient fruits and vegetables, resulting in low potassium intake which is associated with higher blood pressure in some patients Stephen *et al.* (2013) reported that, low intake of fruit and vegetables consumption varies considerably among countries, reflecting economic, cultural and agricultural production environments. Health education on vegetables should focus on what clients consume. Eating of locally available vegetables should be encouraged because they are cost effective and available in the market.

Planned health education can help clients make informed decisions which will help modify client's attitude towards lifestyle modification. It can be deduced that understanding of the importance of lifestyle modification can motivate a person with high blood pressure to modify lifestyle. Ajzen (2002) asserted that attitude toward behaviour is determined by the total set of accessible behavioral beliefs linking the behavior to various outcomes and other attributes. From the above statements it can be inferred that health education should be planned and made part of client's treatment.

Even though 55.1% had adequate knowledge of the lifestyle modification strategies only 17.8% had good attitude towards these strategies. This confirms why knowledge of lifestyle modification strategies is not reflecting in the indices of hypertension. It can be deduced that clients are not effectively practicing lifestyle modification strategies. This implies that clients should be motivated through health education on the need to practice lifestyle modification.

Barriers to Lifestyle Modification

Similar to the findings of Serour *et al.* (2007), this study found that lack of teaching about lifestyle modification (51.8%) and lack of time (74.0%), were the main barriers to practicing lifestyle modification strategies. This finding is consistent with the study result that showed that only 49% of respondents reported having received health education on hypertension from health workers. This finding reinforces the need for education on lifestyle modification at the various hypertensive clinics. Some studies have shown that lack of teaching about lifestyle modification by health workers is the main barriers to lifestyle modification practices. Rakumakoe (2011), determined knowledge, attitude

and perception towards lifestyle modification among clients with hypertension and reported that lack of health information was the reason for non-adherence. Also Okwonu, Ojimadi, and Okaka (2014) found that poor knowledge on hypertension, and lack of awareness of lifestyle modification was the main patient- related barrier to life style modification strategies.

Almost half (45.7%) stated that they do not like the foods that are recommended. This finding confirms the study by Jallinoja *et al.* (2007), who reported that a major barrier to treatment is client reluctance to practice lifestyle modification strategies. Foods that are recommended should be considered alongside what clients already consume. Foods recommended have to be feasible and culturally appropriate. Benue, Moll, Charante, Beem, Mohrs & Bosu (2010) reported that culturally sensitive health care education intervention led to significant improvements in diastolic BP and adherence to lifestyle modification practices.

Study results showed that 14% of respondents stated that they could not stop eating the Ghanaian salted fish and meat. However, one could not be eating salted fist and adhere to the recommended daily allowance of salt. De Vijver *et al.* (2013) concluded from their study that there is a high intake of sodium in Africa and the reason is that salt is used more often to preserve food or to make it taste better. The Ghanaian salted fish and meat is added to most Ghanaian meals to improve flavor (Suter, Sierro & Vetter, 2002) asserted that it is extremely difficult for even the most motivated person to reduce sodium intake to the ADA recommended daily allowance of 2400 mg per day. When clients are made aware of the benefits of reducing salt intake, they may make every effort to adhere to recommended daily allowance.

Results showed that 39.0% of clients pointed out that adherence to exercise were hampered by lack of time. The conceptual framework also explains that through health education, an individual with hypertension can have a perceived benefit of controlled blood pressure. Understanding of the importance of lifestyle modifications can motivate a person with high blood pressure to modify lifestyle. Sullivan, White, Young, and Scott (2009) explored how knowledge and beliefs influenced intention and actual behavior and reported a regression analysis with HBM variables showed that health beliefs significantly predicted intentions to exercise ($p < 0.001$).

Relationship between Knowledge of Lifestyle Modifications and Hypertension Indices

The indices of hypertension are precursors to the condition of patients. A normal weight, low cholesterol, and controlled BP are positive indicators of a positive lifestyle. In this study 53.2% were of either overweight or obese, 73.0% had high cholesterol, and 67.2% were found to have uncontrolled hypertension. The study did not find any evidence of a significant relationship between knowledge of lifestyle modifications and hypertension indices such as BMI, cholesterol level, and extent of hypertension control.

Relationship between Knowledge of Lifestyle Modifications and Socio-Demographic Characteristics

Contrary to the findings of Marfo, Owusu-Daarku, Opare Addo & Saana (2014), this study found no significant relationship between knowledge of lifestyle modifications and respondents' socio-demographic factors including gender, age, educational level, occupation and monthly family income.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents a summary of the study and the most important findings from the data analysis. It also includes the conclusions drawn based on the findings as well as recommendations offered to draw attention to the knowledge, attitudes and practices of clients with hypertension towards lifestyle modification within the Cape Coast Metropolis.

Summary

The study sought to determine the knowledge, attitudes and practices of clients with hypertension towards lifestyle modification within the Cape Coast Metropolis and perceived barriers that influence the adherence to lifestyle modifications. The study also assessed the relationship between level of knowledge and indices of hypertension as well as the influence of some selected socio-demographic factors on their knowledge of lifestyle modification.

The researcher employed a descriptive survey design and a questionnaire was designed for data collection from patients with hypertension from three main health facilities in the metropolis. Ethical clearance was obtained from the University of Cape Coast's Institutional Review Board and a pre-testing of the research instrument was done at the Adisadel Health Centre. A reliability coefficient of .894 was obtained; indicating that the instrument had adequate validity.

A sample size of 400 respondents was used with a 99.0% retrieval rate. The socio-demographic characteristics of the respondents showed that majority (51.0%) were males. Also, the mean age of the respondents was 42.9 years. A large majority of them had obtained formal education.

Key Findings

The major findings that emerged from the study were:

1. Majority of the respondents (70.7%) had adequate knowledge of hypertension.
2. Almost half (45%) of the respondents had poor knowledge of lifestyle modifications.
3. Only 69 (17.4%) had positive attitudes towards lifestyle modifications.
4. Lack of teaching about lifestyle modifications (51.8%) and lack of time (74%) were identified as the main barriers to lifestyle modifications.
5. The hypertension indices identified that majority (53.2%) were either overweight or obese, according to their BMI, 73.0% had high cholesterol levels, while 67.2% had uncontrolled hypertension.
6. There was no significant relationship between knowledge of lifestyle modifications and hypertension indices or sociodemographic factors.

Conclusion

The study found that clients have knowledge but are not practicing lifestyle modification strategies. The need for lifestyle modification strategies should be part of a client's treatment plan. Life style modification strategies are positive steps towards improved hypertension indices such as normal BMI, low cholesterol level and controlled hypertension.

Further research studies can be done, to explore to identify the real factors influencing lifestyle modification knowledge will help in strategizing efforts and planning.

Recommendations

The following recommendations were made for practice, policy and further research:

Practice

1. Health authorities in the metropolis should continue to run the hypertension clinic for education and health care purposes. It is suggested that the clinic should be organized twice a week instead of once.
2. There is the need for health authorities to provide easy to read leaflets on hypertension on lifestyle modification strategies so that clients can read and understand these strategies better.
3. Education and counselling should be culturally sensitive.
4. Patients should be educated on the need to make time out of their busy schedules to exercise 30 minutes 5 times weekly.
5. Although adhering to the dietary regime is difficult particularly among working/busy patients, clients should be motivated by educating them on the benefits of eating only foods that are prepares by themselves at home using the right recommended ingredients.

Policy

1. The Ministry of Health (MoH) and Ghana Health Service (GHS) should implement lifestyle modification in their treatment protocols where interventions for hypertensive clients would include health

education and motivation of clients to practice life style modification strategies.

2. The Ministry of Health (MoH) and Ghana Health Service (GHS) should adopt more effective and comprehensive education strategies to reach the public on hypertension. This could be done through the use of television, radios, internet and other social media platforms.
3. The National Health Insurance Authority (NHIA) should consider absorbing the cost of treatment of hypertension. This will encourage early presentation at hospitals for early treatment and management.

Suggestions for Future Research

The following research areas are recommended for further investigations:

1. The study population could be expanded to include more respondents in the metropolis and/or country.
2. A study can be conducted to assess ways by which patients can mitigate barriers confronting them in the maintenance of a healthy lifestyle.
3. A study to assess support systems available to hypertensive patients in the metropolis.
4. A study to explore ways of improving patients' attitudes towards lifestyle modification in the metropolis.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

UNIVERSITY OF CAPE COAST

SCHOOL OF NURSING AND MIDWIFERY

QUESTIONNAIRE

Instructions: I request you to kindly go through each question and give your response by placing a tick mark [√] in the box provided. No answer is wrong. I am just seeking your opinion about the question. Information provided by you will be kept confidential and used for the purposes of this study only.

Section A: Socio – demographic data

1. Age

- a. 20-30 years []
- b. 31-40 years []
- c. 41-50 years []
- d. 51-50 yeas []
- e. 61- 70 years []

2. Gender

- a. Male []
- b. Female []

3. Education

- a. None []
- b. Primary []
- c. Secondary []
- d. Tertiary []

c. Degree [] Specify _____

d. Other Specify.....

4. Occupation

a. Unemployed []

b. Daily wages []

c. Business []

d. Government employee []

5. How long have you known you had hypertension

a. 5 years or less []

b. 6 – 10 years []

c. 11 -15 years []

d. Other Specify

6. Family income

a. Less than GHC 500 per month []

b. GHC 501-1000 per month []

c. GHC 1000-1500 per month []

d. Other Specify.....

7. Who do you live with?

a. Extended family []

b. Spouse and children []

c. Other Specify.....

8. Does anyone else in your immediate family have hypertension?

a. Parent []

b. Siblings []

c. Grandparent []

d. Children []

9. Dietary pattern

a. Vegetarian []

b. Non vegetarian []

10. Which of the following behaviors do you do? Tick all that apply

a. Smoking []

b. Alcohol []

c. Tobacco chewing []

d. Other Specify.....

11. Have you had teaching on life style modification?

a. Yes []

b. No []

If the answer is yes, please specify who provided the teaching

12. Source of health information Tick all that apply

a. Friends []

b. Family member []

c. T.V []

d. Radio []

e. Newspaper []

f. Health professional []

Section B: General information about hypertension

13. What is the average normal reading (BP)?

a. 90/ 60 mm Hg []

b. 120/80 mm Hg []

- c. 140/ 90mm Hg []
- d. 180/110mm Hg []

14. What is meant by hypertension?

- a. BP above 140/90 mm Hg []
- b. BP 120/80 mm Hg []
- c. BP 90/50 mm Hg []
- d. BP 60/40 mm Hg []

15. Which of the following is a risk factor for hypertension? Tick all that apply

- a. Stress []
- b. Age []
- c. Hereditary []
- d. More blood []
- e. Too much salt []
- f. Lack of exercise []
- g. Other, specify _____

16. What are considered complications of hypertension? Tick all that apply.

- a. Liver dysfunction []
- b. GI dysfunction []
- c. Respiratory dysfunction []
- d. Renal dysfunction []

17. Which of the following methods are used to control hypertension? Tick all that apply.

- a. Diet control []
- b. Drug therapy []

c. Regular exercise []

d. Other specify.....

18. What is the nutritional therapy for hypertension? Tick all that apply.

a. Water restriction []

b. Decrease salt intake []

c. Increase salt intake []

d. Decrease calorie rich food []

e. Other. Specify _____

19. Which kind of foods should you eat? Tick all that apply.

a. Salt rich []

b. Fatty foods []

c. Spicy foods []

d. Vegetables []

e. Other please specify.....

20. Which of the following is a salt rich food? Tick all that apply

a. Processed or dried fish []

b. Processed or canned beef []

c. Vegetables []

d. Canned food []

e. Other Specify.....

21. How much salt are you allowed each day?

a. Halve teaspoon []

b. One teaspoon []

c. Two teaspoon []

d. Other Please specify

SECTION C: Information regarding lifestyle modifications

22. How can you maintain normal body weight? Tick all that apply

- a. Eating fatty foods []
- b. Regular exercise []
- c. optimal calorie intake
- d. Calorie restrictions []
- e. Other please specify

23. How long should a person exercise weekly?

- a. 5 minutes five times a week []
- b. 10 minutes three times a week []
- c. 30 minutes five times a week []
- d. No need to exercise []
- e. Other please specify

24. What form of exercise is good for control of hypertension? Tick all that apply

- a. Aerobics (walking ,jogging) []
- b. Weight bearing (give example) []
- c. Driving a car []
- d. Dancing []
- e. Other Specify []

25. What do you do to reduce stress?

.....

26. When should you take ordered hypertensive medications?

- a. Under stressful situation []
- b. As a life long way to manage high BP []
- c. When activities require physical exertion []
- d. Whenever I feel bad []

e. Other. Specify _____

27. How many hours of sleep does a person with hypertension need each day?

- a. < 6 hours []
- b. 8-10 hours []
- c. 12-14 hours []

28. What prevents you from adhering to lifestyle modification strategies?

- a. Lack of good teaching about the modifications.
- b. Lack of time to do the things that are recommended.
- c. Unwilling to make these changes in the way I live.
- d. The things that are recommended are too hard to do with my busy life
- e. I can't see any difference when I do them.
- f. Other Specify

29. What factors prevent you from adhering to prescribed diet?

- a. I don't like the foods that are recommended.
- b. Difficulty adhering to diet that is different from the rest of the family
- c. I have to attend social gatherings where the foods are not what is recommended
- d. I prefer the traditional Ghanaian salty fish and meat

30. What factors prevent you from exercising?

- a. Feel weak sometimes
- b. Lack of time
- c. Lack of money to buy exercising equipment
- d. Other Specify

APPENDIX B

ATTITUDE SCALE

Tick (√) the column which corresponds to your opinion to the statements given below:

The response ranges from strongly agree (SA) to strongly disagree (SDA)

	Statements	Strongly agree SA	Agree A	Disagree DA	Strongly disagree SDA
30	Stopping of smoking helps to lower blood pressure.				
31	If the BP is found normal, a person can choose to stop taking medicine.				
32	Reducing alcohol intake helps to lower blood pressure				
33	Persons with hypertension can eat fat rich foods				
34	Regular exercise helps to control hypertension				
35	Persons with hypertension can take fat rich food				
36	Persons with hypertension need to maintain their weight within normal limits				
37	Persons with hypertension should avoid stress inducing situations				
38	Lack of proper rest and sleep does not affect BP				
39	Persons with hypertension should abstain from sexual relationships				

