

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
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**A COMPARATIVE STUDY OF THE COST OF
COMPLEMENTARY/ALTERNATIVE MEDICINE (CAM) AND
CONVENTIONAL TREATMENT OF HYPERTENSION AT THE LEDZOKUKU
KROWOR MUNICIPAL ASSEMBLY (LEKMA) HOSPITAL, ACCRA.**

BY

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DECLARATION

I, Jude Ekow Crentsil hereby declare that, with the exception of other people's work which has been duly acknowledged, this dissertation is the result of my own work done under supervision.

Jude Ekow Crentsil

Student

Signature

Date

Professor Moses Aikins

Supervisor

Signature

Date



DEDICATION

This dissertation is dedicated to my parents; Mr George Crentsil and Mrs Mary Baaba Crentsil for their prayers, untiring support and motivation throughout my Masters in Public Health Program.



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First of all, I am immensely grateful to Jesus for his grace, blessings, guidance and protection throughout my Masters of Public Health Program. I am also very grateful to my supervisor, Professor Moses Aikins, for his commitment and his invaluable guidance in aiding me complete my dissertation. Yet again, I especially thank the lecturers in the Health Policy Planning and Management (HPPM) department of the School of Public Health who have also guided me in many ways towards the completion of the MPH program. Finally I thank my parents, my sisters and all loved ones for their genuine support during my course. God bless them all.



ABSTRACT

Introduction

Hypertension, also known as high blood pressure, has been a financial and health burden to households on a global scale. The disease has been on an exponential increase since the onset of modernization. This study sought to compare the cost of hypertension treatment using Complementary and Alternative Medicines against Conventional Medicines among hypertensive patients attending the Ledzokukukrowor (LEKMA) Hospital in Accra.

Methods

This was a cross sectional cost-of-illness study. Quantitative data on cost was collected in June 2017 from 85 hypertensive participants who attended the LEKMA Hospital using a structured questionnaire. Total direct cost was estimated by summing direct medical and nonmedical cost the patients have incurred over the past month due to hypertension. Total indirect cost was estimated using the Human Capital Approach. Collected data was entered into SPSS 20, and analysed using SPSS 20 and Microsoft Excel Version 13. In order to determine the strength of the cost estimates, sensitivity analysis was done.

Results

The total cost of treatment were estimated to be GHS 2,650.77 for CAM and GHS 26,260.52 for Conventional Medicines. Total direct cost for both methods were found to be over 90% of the total costs, with the cost of laboratory treatment being the most expensive sub-category in the total direct cost section. The mean of the total costs of treating hypertension with CAM and Conventional medicines were GHS 265.08 (95% CI: 185.16-336.00) and GHS 350.14 (95% CI: 0-776.59) respectively, suggesting that it is relatively less expensive treating hypertension using CAM. The respective mean of total direct cost

for CAM and Conventional treatment were GHS 251.30 (172.45-330.15) and 316.89 (0-717.33); whereas the averages indirect costs for the two treatments were GHS 13.77 (95% CI: 0-28.41) and GHS 33.25 (95% CI: 0-101.01) respectively. The total cost of treatment were estimated to be GHS 2,650.77 for CAM and GHS 26,260.52 for Conventional Medicines.

Conclusion

Upon analysing the total cost estimate for both methods of treatment, it was found that the total cost of treating hypertension was less expensive with CAM as compared to Conventional Medicines treatment.



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LIST OF ACRONYMS

ABPM	-	Ambulatory Blood Pressure Monitoring
AHA	-	American Heart Association
AIDS	-	Acquired Immune Deficiency Syndrome
BP	-	Blood Pressure
CAM	-	Complementary and Alternative Medicine
CVD	-	Cardiovascular Disease
DfID	-	Department for International Development
GHS	-	Ghana Cedi
HBPM	-	Home Blood Pressure Monitoring
HIRA	-	Health Insurance Review and Assessment
HIV	-	Human Immune Deficiency Virus
JNC 7	-	Seventh Joint National Committee on Hypertension
KW	-	Korean Won
LEKMA	-	Ledzokuku Krowor Municipal Assembly
mmHg	-	millimetre of mercury
NCD	-	Non-Communicable Disease
NICE	-	National Institute of Clinical Excellence
SDGs	-	Sustainable Development Goals
UN	-	United Nations
WHO	-	World Health Organisation

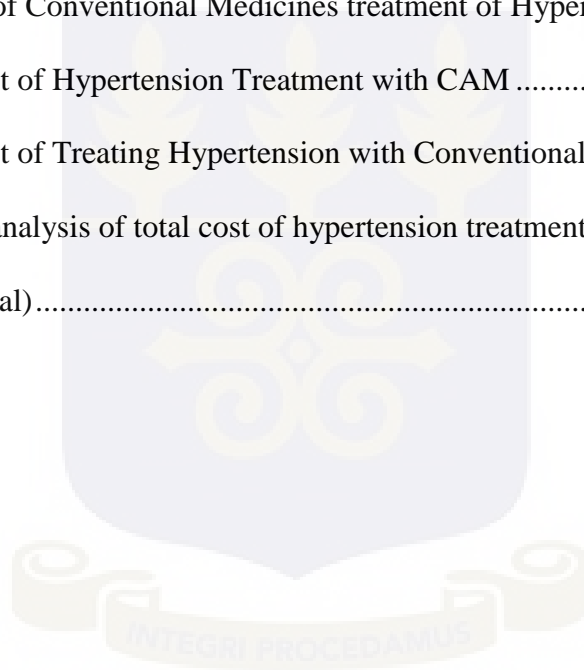
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CHAPTER ONE

INTRODUCTION

1.1. Background

In recent years, the pattern of diseases have changed from diseases that were communicable to non-communicable diseases; this change in disease pattern have happened as a result of industrialisation or modernisation (McKeown, 2009). This theory was originally suggested by Omran, (2001), where he expressed the fact that epidemiological transition (which accompanied modernization) accounts for the replacement of infectious diseases by chronic diseases over time due to expanded public health and sanitation. Hypertension has been rated as one of the top ten causes of death in the world today (World Health Organisation, 2014); it currently affects about a billion people globally and causes about nine million deaths every year (World Health Organisation, 2013). Hypertension has been named as one of the key risk factors for cardiovascular diseases (CVDs).

Hypertension is a term used to describe increased or high blood pressure and it occurs when the force of blood pumping against the walls of the arteries is too strong (U. S. National Library of Medicine, 2016).

Goal 3 of the SDGs imposes on all countries to ‘ensure healthy lives and promote well-being for all at all ages’ (United Nations, n.d.), which includes ensuring the prevention, awareness and treatment of non-communicable diseases such as hypertension. The SDGs are achievable through an inter-sectoral approach, thus, the World Health Organisation (WHO) is working to place health at the centre of Agenda 2030 (World Health Organisation, 2016).

According to Dr. Babatunde Osotimehin, the Executive Director of the United Nations Population Fund, one of the ways in which governments can achieve this goal is “to invest in a social protection floor so that people who want services can buy services” (United Nations, 2015). As the prevalence of hypertension has been on the rise globally, more and more families spend large portions of their resources to treat the condition, and it is becoming increasingly burdensome, in terms of cost, to treat and manage.

Numerous households spend a considerable proportion of their income on hospitalisation and care following complications of hypertension, including heart attack, stroke and kidney failure. Families face catastrophic health expenditure and spending on health care, which is often long term in the case of hypertension complications, pushing tens of millions of people into poverty (World Health Organisation 2013). Moreover, the loss of family income from death or disability can be devastating. In some low- and middle-income countries, 20% of the national health budget is expended on CVDs alone (World Health Organisation, 2013).

1.2. Problem Statement

Globally, hypertension is projected to contribute approximately 12.8% of all causes of deaths. High blood pressure has been determined to be a major risk factor for coronary and ischemic heart diseases as well as haemorrhagic stroke. Also blood pressure levels have been revealed to have a positive and a continuous correlation to the risk for getting stroke and coronary heart disease. The risk of cardiovascular disease is influenced by age, family history of the disease, life style and other factors. Apart from coronary heart diseases and stroke, some other complications of hypertension include peripheral vascular disease, heart failure, renal impairment, visual impairment and retinal haemorrhage (WHO, 2013).

In developed countries today, about 330 million people have hypertension, and approximately 640 million people in the developing countries have the condition; thus the burden of the condition falls heavily on developing countries. According to the World Heart Federation, (2015), it is estimated that in 2025 there will be about 1.56 billion adults living with high blood pressure worldwide. The increased prevalence have been accompanied by high cost of treatment and control of hypertension, which in this case will be a huge cost burden among hypertensive living in developing countries where the disease burden is highly prevalent (WHO 2013).

A study done in Italy revealed that the average total cost per patient at follow-up was 779.59 Euros; almost 46% of total cost was as a result of anti-hypertensive therapy, whilst other direct costs represented 54% of total patient cost in all cohorts. There is a possibility that co-morbidities play a significant role in this situation; in the study, patients aged 80–89 years generate higher costs, it is observed in this study that the average total cost per patient is likely to increase with age and co-morbidities (Berto et al., 2002).

In Ghana, Buabeng & Plange-Rhule (2004) highlighted the high cost of drugs as a major cause of non-compliance with hypertension medication; and from global estimates of the prediction of hypertension, the cost is forecasted to surge if measures are not put in place by governments and other stakeholders to reduce the risk of developing the disease and also to increase knowledge in the management of the condition.

There have been many published studies on hypertension in general, and some studies have been done on the cost burden of treating it; but not much research have been done on comparing the cost of treating hypertension using CAM with the cost of conventional methods of treating the condition. In Turkey for instance, the use of CAM in treating acute

and chronic diseases alike have taken a steep surge, as more and more Turks see the use of effective and relatively cheaper as compared to conventional medicines (Yel, 2014).

This study therefore seeks to compare the cost that hypertensive patients incur in treating high blood pressure using Conventional Medicines and CAMs; which in effect can help hypertensive patients make informed decisions on how to combine both methods and treatments.

1.3. Objectives

1.3.1 General Objective

The general objective of the study was to compare the total cost of Conventional Medicines and CAMs in treating hypertension.

1.3.2 Specific Objectives

The specific objectives are:

1. To determine direct cost of treating hypertension using CAM
2. To determine the direct cost of treating hypertension using conventional/orthodox medicines
3. To determine indirect cost of treating hypertension using CAM
4. To determine the indirect cost of treating hypertension using conventional/orthodox medicines

1.4. Research Question

What is the total cost patients incur in treating hypertension using either Conventional Medicines or CAM?

1.5. Justification

Hypertension, also known as high blood pressure is a global pandemic, and it increases the chances of getting heart diseases, stroke and heart failure in patients by about 50%. High blood pressure has become a worldwide public health problem; it is projected that about 4 out of 10 people aged 25 years and older are hypertensive, it also estimated that 9 out of ten adults above the age of 80 years will develop hypertension. (Lawes et al., 2008; Vasani et al., 2002; WHO, 2013). According to WHO (2013) hypertension has a big impact on low and middle income countries, where heart disease and stroke occur relatively frequently in younger people living in these countries as compared to young people in developed countries.

Treating hypertension is becoming increasingly expensive globally, as Gaziano et al. (2009) mentioned that hypertension has a major impact on health care spending; where households spend about 10% of their income on health conditions directly related to increased blood pressure. Treatment of the condition in lower middle income countries like Ghana therefore becomes very difficult, as many hypertensive do not seek to know their blood pressure status because of fear of spending resources in treating the disease, others also do not comply with the directions as to how to take their hypertensive drugs due to the high cost they incur; patients therefore take the drugs less frequently so that it “lasts longer” or does not get exhausted early, this directly affects quality of treatment as

many hypertensive patients do not have their conditions effectively managed, thereby increasing the risk of patients in acquiring other conditions like diabetes, heart failure and stroke among other conditions (Buabeng & Plange-Rhule 2004).

Even though there have not been a lot of published literature on the cost of treating hypertension in developing countries, the management and treatment of hypertension is largely dependent on the cost incurred in treating it on the part of patients (Buabeng & Plange-Rhule 2004), and this study sought to find out the comparative costs hypertensive patients incur in managing or treating high blood pressure using conventional medicines and CAMs.

1.6. Conceptual Framework

Figure 1 shows the two approaches towards treating hypertension; the conventional medicines treatment, and the Complementary and Alternative Medicines (CAM) treatment of the disease. A growing number of individuals and families alike have one or two family members suffering from chronic conditions like hypertension to deal with, and the cost involved in treating it is of critical importance. It is illustrated in the conceptual framework (Figure 1) the total conventional medicine treatment cost as well as the total CAM treatment costs; these are broken into direct cost and indirect costs.

The direct cost was made up of two components, namely medical and non-medical costs. Here, medical cost included expenditure on medical products and services such as pharmaceuticals, consultation fees and others. Non-medical direct costs include cost of visits to the health facility namely; transportation, feeding and other expenses. Apart from direct medical costs, hypertensive patients incur indirect costs due to their occasional

inability to meet certain day-to-day responsibilities; these are usually in the form productivity loss, travel time and waiting time at health facilities.

As illustrated in Conceptual Framework (figure 1), there are two separate sections for direct and indirect costs; and these fall respectively under the umbrellas of conventional treatment of hypertension and the CAM treatment of the condition. It is an approach to compare the “two types” of direct and indirect costs.

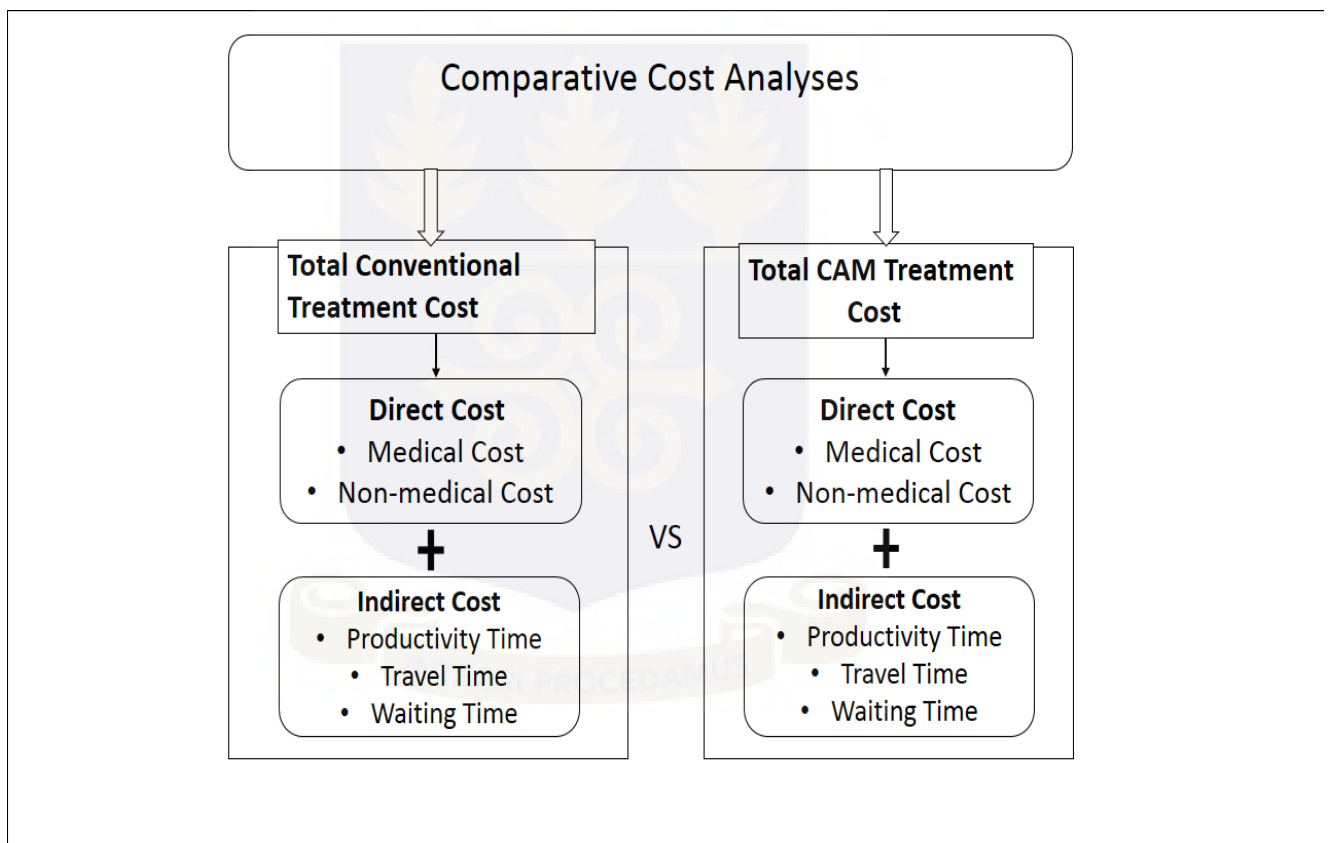


Figure 1. A framework of comparative cost analyses of hypertension treatment; CAM vs. Conventional

CHAPTER TWO

LITERATURE REVIEW

2.1. Definition of Hypertension

Blood pressure is often considered to have a normal distribution in the population. Yet still, there is no definite cut-off point above which 'hypertension' ultimately exists or below which it does not, complications occur when it is above a certain level (Beevers, Robertson, Lip, & Hall, 2007). In recent past years, hypertension has been defined by blood pressure level which is lowered from 160/90 mmHg to 140/90 mmHg (Fezeu, Kengne, Balkau, Awah, & Mbanya, 2010). Hypertension, also known as high blood pressure is defined as sustained elevated blood pressure (BP) greater than 140 mmHg systolic and 90 mmHg diastolic in a non-diabetic, or above 130/80 mmHg (mmHg - millimetre of mercury) in a diabetic, based on the average of at least two or more correctly measured blood pressure readings (Daskalopoulou et al., 2012).

In clinical practice, the diagnosis is usually made by using two or three blood pressure measurements done one week apart, this excludes individuals with a blood pressure reading of over 220/110 mmHg or when there is a target organ damage (Chobanian et al., 2003; NICE, 2011). However, the National Institute of Clinical Excellence (NICE) and the Canadian Guidelines on Hypertension recommends that individuals with BP of 140/90mmHg or higher be offered Ambulatory Blood Pressure Monitoring (ABPM) to confirm the diagnosis, and for those who cannot do ABPM, Home Blood Pressure monitoring (HBPM) be done (NICE, 2011; Quinn et al., 2010). Both the ABPM and HBPM are difficult to do in low-resourced settings where patients are unable to afford personal sphygmomanometers. Using the Seventh Joint National Committee on Hypertension (JNC 7), this condition can be classified into prehypertension (120-139/80-

89mmHg), stage 1 (140-159/90-99mmHg) and stage 2 (greater than 160/100mmHg) (Chobanian et al., 2003).

Blood Pressure (BP) readings are recorded as systolic and diastolic. The first (systolic) represents the pressure in your blood vessels when your heart beats. The second (diastolic) represents the pressure in your vessels when your heart rests between beats. BP levels are described as normal when the systolic is less than 120 mmHg, and the diastolic readings are less than 80mmHg. Blood pressure is said to be high or hypertensive when the systolic score is 140 mmHg or higher and the diastolic reading is 90 mmHg or higher (Division for Heart Disease & Stroke Prevention, 2008).

2.2. Epidemiology of Hypertension

The pattern of disease has changed from communicable to non-communicable diseases, this “double burden phenomenon” of infectious disease and non-infectious disease continues to rise in Africa (Olayemi, 2015). This is tantamount to the epidemiological health transitions with its attending consequence of poor health care delivery. With the increase rise in non-communicable diseases, many people with chronic conditions are failing to receive appropriate care (Dans et al., 2011). Furthermore, epidemiological transition explains a transition where infectious diseases like diarrhoea and pneumonia are no longer major causes of morbidity and mortality, but non-communicable disease like hypertension, diabetes mellitus, cardiovascular diseases becoming the leading causes of morbidity and mortality (Marshall, Edidin, & Arena, 2016). Furthermore, it is assumed that, improvements in medical care and vaccinations, provision of clean water and sanitation result in children living longer, leading to an aging population (Akinyemi, Bamgboye, & Ayeni, 2013). These older populations are at higher risk for chronic non-

communicable diseases like hypertension. Thus, non-communicable diseases and their complications accounted for more than two-thirds of all medical admissions and more than 50% of all deaths in a leading teaching hospital in Ghana (Addo et al., 2012).

Many developed countries such as China and Japan have completed this epidemiological transition (Lin, Zhang, Xu, & Xu, 2010), but, Ghana and many other developing countries are undergoing this change. This is evidenced by the increase in the life expectancy at birth for both genders in Ghana (Epping-Jordan et al., 2004). Consequently, with people living longer, there is an increase in the incidence of non-communicable diseases. The heaviest burden of non-communicable diseases are with the poor communities in urban areas (WHO, 2009b).

2.3. Global Prevalence of Hypertension

Hypertension is a primary risk factor for cardiovascular disease, it considerably influences the risk of a patient developing other cardiovascular ailments like myocardial infarction; stroke and congestive heart failure, and is a risk factor for developing other conditions like diabetes as well. Findings by the American Heart Association (AHA) shows the devastating health effect hypertension poses to patients as nearly 69% of individuals who have suffered a first heart attack, 77% who had their first stroke and 74% with congestive heart failure are hypertensive patients (AHA, 2010).

From the perspective of developed countries, approximately 75 million American adults have high blood pressure, that is, one in every three adults have the condition (Division for Heart Disease & Stroke Prevention, 2008), and out of this; only about half of the people with high blood pressure have been able to effectively control the condition. (Roger et al., 2012). Currently, developing countries have a higher prevalence of hypertension as

compared to developed countries, and Kearney et al., (2005) forecasted that hypertension occurrence will increase even further in 2025 by about 24% in developed countries and approximately 80% in developing countries. In addition to these findings, other study's discoveries revealed an early onset and higher mortality rate for cardiovascular diseases in developing countries (Tesfaye et al., 2009).

In Palestine, the rate of reported hypertension was 8.1% at age 40 to 49 years, 22.6% at 50 to 59 years, and 35.2% at 60 years and older (Palestinian family health survey, 2006). Hypertension was reported to be the eighth leading cause of death in the country, accounting for 13 deaths per 100,000 people and 5% of all deaths (Palestine Ministry of Health, 2012).

In similar studies, it was found that the prevalence of hypertension in Jordan according to Jaddou et al., (2011) ranges from 26.1 to 32.2%. In his study he examined prevalence, awareness, treatment and control of hypertension, its associated factors and to evaluate the trend in hypertension between 2009 (period 2) and 1994–1998 (period 1). A nationwide sample of 4,117 adults aged 25 years and older was selected, here, the prevalence rate of hypertension was 32.3% and was higher than the 29.4% prevalence rate reported in period 1. The survey found the prevalence rate of males to be significantly high, also older age groups, people of low education, the obese, and diabetics had a high prevalence of hypertension. The rate of awareness among hypertensives was 56.1% and was higher than the 38.8% rate reported form period 1 data. Further findings from the study indicated that the control rate of high blood pressure among treated hypertensives in period 2 was 39.6%; significantly higher than the 27.9% control rate in period 1. The management or control of high blood pressure was found to be positively associated with age but only for women. Jaddou et al., (2011) concluded that hypertension is on the rise in Jordan, and levels of awareness and management of the condition are below the ideal levels.

2.4. Regional¹ and Country Prevalence

Due to the magnitude and impact of this condition, hypertension is also addressed in global agreements such as the 2011 United Nations political declaration on the prevention and control of non-communicable diseases. Ghana is a middle income country according to the World Bank, (2016) and is a signatory to these global agreements. Unfortunately, about 80% of mortality caused by cardiovascular diseases occur in low- and middle-income countries. Here, cardiovascular disease related mortality occur at a younger age, as compared to people in high income countries, and this happens in their most productive years (Rosendaal et al., 2016). As with other non-communicable diseases, hypertension should be treated in a timely manner, however, prevention and control of hypertension is complex and quite costly (World Health Organisation, 2013). Pobee et al., (1979) described an epidemic of hypertension in Ghana as far back as in the late 1970s.

Numerous households spend a sizeable proportion of their income on health, which is often long term in the case of hypertension complications like stroke, kidney failure and heart attack; pushing tens of millions of people into poverty (World Health Organisation, 2013). Also, in cases of long term costs incurred on health care or death as a result of CVDs, many families in low and middle-income countries fall further below the poverty line.

Agyemang, Bruijnzeels, & Owusu-Dabo (2006) indicated a trend of data that showed an unfavourably low rate in hypertension awareness, treatment, and control in Ghana. In this situation, people do not even go to check their blood pressure (BP) status because of low family income. This leads to fear of finding out their BP status because they know they

¹ Refers to Africa Region

cannot afford to treat it. This goes a long way to impact on the total prevalence of hypertension in developing countries (WHO, 2013).

2.5. Hypertension and Cardiovascular Disease

In sub-Saharan Africa, morbidity and mortality from cardiovascular diseases are projected to increase over the coming decades (Kaufman et al., 1996). In 2007, the number of reported new cases of hypertension in outpatient public health facilities in Ghana increased more than tenfold from 49,087 in 1988 to 505,180 in 2007; and hypertension relative to the total reported outpatient diseases increased from 1.7% to 4.0% (Ghana Health Service, 2008). In most regions of Ghana, hypertension ranks as the fifth commonest cause of outpatient morbidity. However, in the Greater Accra Region, hypertension moved from fourth to become second to malaria as the leading cause of outpatient morbidity in 2007 (Ghana Health Service, 2008).

Pobee et al., (1979) described an epidemic of hypertension in Ghana in 1979; and this statement has been confirmed by many studies done on hypertension; in that, the epidemic has even taken an uptrend in more recent years. A review by Bosu (2010) demonstrated that the epidemic has persisted or increased. With a conservative estimate of 15.8 million adults aged 15 years or older in 2008, 48% urbanization, hypertension prevalence of 25% in urban and 20% in rural populations, it is estimated that, at least, 3.5 million adults have hypertension. In comparison, 236,151 adults were estimated with living with HIV and AIDS in Ghana in 2008. Yet, national response to hypertension is considerably much weaker (Ghana Health Service; DfID; WHO; Ghana AIDS Commission, 2009).

As found out in an article by Bosu (2010), hypertension is a significant problem not only in urban populations within the country of Ghana; but also in poorest and leanest rural

populations. That notwithstanding, even in relatively young populations with a mean age of 36 years, 29% are hypertensive. These observations should help dispel the prevailing myth that hypertension is a major problem in only affluent or elderly populations (Agyemang 2006). Considering the steady increase in urbanisation within the country, the psychosocial distress associated with migration, diet and physical activity becomes more and more sedentary, hypertension will most likely persist or increase. This issue of cost of treatment was however not covered in Bosu's (2010) article.

2.6. Use of Complementary and Alternative Medicines (CAM)

More and more adults living in the United States are increasingly patronizing the use of CAM. The substitution in their preference has been as a result of the increased cost of prescriptions over the years; where the cost of prescriptions doubled in about a decade; that is between 2000 and 2010 (The Henry J. Kaiser Family Foundation, 2012). Although most of these cost-related CAM substitutions may be benign, some might lead to ineffective treatment, and in some cases react dangerously with prescription drugs. Future research is justified to study the health risks of such CAM substitution on health outcomes (Wang, Kennedy, & Wu, 2015).

Hypertension is largely treated using conventional medicines, but as mentioned earlier, a growing number of people use CAM to treat or manage different kinds of chronic and even acute conditions. In a study in South Africa, Hutchings et al. (1996) conducted an extensive inventory on Zulu medicinal plants and recorded uses for 1,032 plant species, of which 32 species were used for cardiac problems, including hypertension. With his methods, Hutchings et al. gained most of the information from literature and interviews

with *nyangas* (Zulu herbal doctors). The study described the use of CAMs as a way of life; part of the Zulu culture.

Another study in South Africa found strong evidence that lay people, in this case those who are not herbal doctors, use plant medicines (CAM) in treating and managing hypertension among other noncommunicable and communicable ailments, hypertensive respondents however indicated reluctance in disclosing their use of plant medicines to their physicians. In this case, there is a high probability of adverse reactions with conventional medicines prescribed to them as the CAMs are not taken under professional advice (de Wet, Ramulondi, & Ngcobo, 2016).

With regards to the effective use of CAMs in treating hypertension in different countries, traditional healers in South Africa however have been striving to get an Act fully implemented; The Traditional Health Practitioners Act No. 22 (2007) is till date still not fully functional, after a 45 year unofficial struggle and a seven year official petition. It was passed as a bill in 2003; 'The Traditional Health Practitioners Bill of 2003' but still has not been made an act, as petitioned for by the traditional healers and their stakeholders in the country. Traditional healers in South Africa still do not have an official license to operate (Louw & Duvenhage, 2007).

In sharp contrast to the situation in South Africa, the Ministry of Health in Turkey has legalised and institutionalised the use of CAM. According to Yel, (2014), the use of CAM or traditional medicines in treating chronic diseases like hypertension is spreading rapidly throughout the country. Malaysia has also showed a growing support for the use CAM to conventional medicines (Lee, Mokhtar, Krauss, & Ong, 2014).

2.7. Cost of Hypertension Treatment

Hypertension has been a major cause of death for more than 410,000 Americans in 2014 that is almost 1,100 deaths each day. High blood pressure costs the nation approximately \$48.60 billion every year; and this total includes the cost of health care services, medications to treat high blood pressure, and missed days of work (Kochanek et al., 2011). The costs following cardiovascular events in hypertensive patients are reportedly substantial; and the estimated direct and indirect costs of hypertension among Americans in 2007 summed up to roughly \$66.40 billion, making hypertension the second most costly cardiovascular-related disorder (Rosamond et al., 2007).

In Israel, chronic diseases claim more than 30,000 lives every year, which is more than 70% of all deaths in the country. Non-communicable Diseases account for more than 75% of the country's \$1.40 trillion medical care cost (National Centre for Chronic Disease Prevention and Health Promotion, 2008). And even though chronic diseases impose a weighty economic burden on various households, the society in its entirety and the healthcare system, little data is available in representing the exact extent of this heavy economic load (Israel Central Bureau of Statistics, 2008).

A study by Chodick et al, (2010) sought to examine age specific direct medical costs of chronic diseases in men and women. The results of the research indicated the substantial economic burden that treatment of chronic diseases imposes on public healthcare services in Israel. The study focused on the direct costs of treating chronic conditions like cardiovascular diseases, diabetes mellitus, hypertension and cancer in both sexes.

The results showed that the total direct cost of treating hypertension in men was \$ 81,434,628, topping the total direct cost of treating other chronic diseases studied (11.7%), and in women the total direct cost for treating hypertension was also the highest

among other chronic diseases studied; total direct cost was \$ 56,963,093 which also was about 9.5% among the same chronic diseases studied in men plus cost of treating infertility in women.

As hypertension is a major risk factor for other cardiovascular diseases, the total direct medical cost of other cardiovascular diseases have also been reviewed from the study. In men, the total direct cost of treating other cardiovascular disease was \$ 66,047,020 this covered 9.5% of the chart. The total direct cost of treating other cardiovascular ailments in women was found to be \$ 35,547,429, which took about 5.9% (Chodick et al., 2010).

A study in South Korea by Min et al, (2014), calculated the direct medical costs of treating hypertension and its associated comorbidities. The study analysed data from the 2009 South Korean Health Insurance Review and Assessment Service-National Patients Sample (HIRA-NPS) data. The HIRA database contains reimbursement records of all medical facilities, this included both hospitalized cases and outpatient cases in South Korea. The 2009 HIRA-NPS contains approximately 700,000 in patients (13% of total in patients) and approximately 400,000 outpatients (1% of total outpatients) extracted from a random and representative sample of the all-patient populations reimbursed in 2009, a total of 119,450 patients less than 19 years were also included in the present study. According to the findings, total medical cost of treating hypertension among patients 65 years and older in 2009 was KW 2,704,856 (Korean Won-KW), which is approximately \$ 2,265; this was a summation of Prescription medical cost (KW 449,590) and Medical practice cost (KW 1,764,250). In a relatively younger population, the cost of treating hypertension was less; where the total cost of treating hypertension was estimated to be KW 1,679,753 (\$ 1,406.47). This figure was also a total of prescription medical cost (KW 338,604) and medical practice cost (KW 1,017,093). The cost of treatment shoots up sharply when comorbidities are present, as it was found that in patients who suffered 3 or more

comorbidities, the total cost of treatment between 19 years – 64 years was \$ 10,759, and total cost of treatment patients 65 years and older paid was about \$ 8,846.

Other literature reviewed in the study by Min et al., (2014) showed that, the cost of hypertension therapy increased in four years (2005 - 2009) by about 64.3%; that is, from \$1.40 billion to \$2.30 billion. From this study, people 30 years or older had a total hypertension prevalence rate of 26.9%, and the medical expenditure to treat all hypertensive diseases was estimated to be about 2.5 trillion Korean Won, or 2.2 billion US dollars.

In China, Le et al., (2012) conducted a community based cross-sectional study on the economic cost of hypertension treatment in a rural community. A total of 9,396 respondents who were 18 years and older, from 3,500 corresponding households were interviewed for the study. The study respectively estimated the mean of direct medical costs (\$467.20), direct non-medical costs (\$20.10), morbidity costs (\$23.50) mortality costs (\$8265.10), intangible costs (\$417.40) and cost of illness (\$9393.30) of hypertension treatment. The estimated total cost of hypertension treatment nationwide was about \$232 million. The survey had four major cost components, namely; total direct costs, total indirect costs, total intangible costs and total cost of illness. The direct cost was a summation of direct medical costs and direct non-medical costs, and indirect costs were estimated by summing morbidity costs and mortality costs. As with most literature, direct medical costs often constitutes the larger percentage of direct costs, and total indirect cost according to most literature constitutes less as compared to direct costs when estimating the total cost of treatment, but in this study, the means of the total indirect cost (\$8288.60) was more than that of total direct cost (\$487.30).

Similarly, Elliot, (2003) undertook a study on the annual expenditure on hypertension treatment in the United States of America, in the study, he analyzed the data that had been gathered by the American Heart Association (AHA) on the cost of treating some selected cardiovascular diseases in 2003, but for research conducted by Elliot, (2003), the cost of treating cardiovascular diseases were limited to; heart failure, coronary heart disease, stroke and hypertension. In his study, he estimated the direct costs and indirect cost of the chronic conditions and summed up their respective costs to make up the cost of total cardiovascular diseases. The sub-components of the direct costs were; inpatients, professional services, medical durables and home health care. Indirect costs were made up lost productivity related to morbidity and mortality respectively. Total direct cost for hypertension treatment was estimated to be \$37.20 billion, and the estimates for total indirect cost was \$ 13.10 billion; making a total of \$ 50.30 billion for hypertension treatment alone in that year.

A survey in Malaysia that sought to calculate the direct and indirect cost in hypertension management interviewed 300 hypertensive respondents, and collected data on cost of medical services, laboratory expenses and cost of medication, these made up the direct costs for the study and the total indirect costs were estimated as loss of productivity by the hypertensive respondent. The three stages of hypertension were identified in this study, these are; pre-hypertension, hypertension at stage 1 and stage two; data on cost of treatment and management was collected from these three stages. The respective estimated total direct costs for each stage were RM1612.38, RM1741.85 and RM2718.21. Total indirect costs for the study were RM8078.7, RM6654.52 and RM7511.41 for pre-hypertensives, stage 1 and stage 2 respectively (Alefian et al., 2009).

In Nigeria, a cross-sectional study on the cost of treating hypertension was done in South Eastern part of the country, 250 hypertensive participants were recruited for this survey,

results from the study revealed that about half of the hypertensive patients recruited were spending a tenth or more of their income on health care related expenses in treating hypertension; it also was found that the mean cost of hypertension treatment was significantly higher for those who had comorbidities, higher BP at diagnosis and those on 3 or 4 drug regimens (Ilesanmi, Ige, & Adebisi, 2012).

Still in West Africa, a survey by Buabeng & Plange-Rhule (2004) emphasised the high cost of medications as a main cause of non-compliance with hypertension medication in Ghana. In their study, they referred to non-compliance as patients not taking hypertensive drugs according to the daily dosages advised by their physicians, but rather taking the drugs in a about three time in a week or less. Due to the cost of the drugs, regular treatment in effect will be affected and the prevalence of hypertension also stays high among Ghanaians.

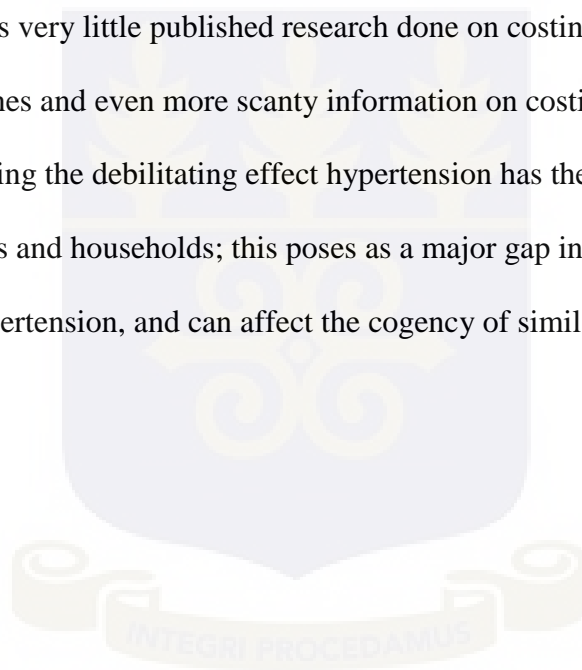
In spite of the high medical and economic burden in developing countries, cardiovascular diseases have not been accorded the needed priority globally (Perkovic et al., 2007). And the fact is; the cost of treatment is so key to the control of hypertension that Ibrahim et al. (2012) recommended a hypertension management strategy, the need for developing countries to provide free or subsidised drugs and a cost-effective drug distribution system, among others.

2.8. Conclusion

In summary, hypertension is heavily prevalent in developing countries, Kearney et al., (2005) predicted an even further rise in the prevalence of the disease especially on developing countries. The toll on mortality from hypertension has been recorded to be very high in both developed and developing countries, but the later has a higher percentage of deaths from high blood pressure. This is largely because hypertensive

patients in developed countries have been found to effectively manage the chronic condition due to the improved health system structures available in such countries. The damming effect of chronic diseases like hypertension costs various developed countries like the United States, South Korea among others millions of dollars annually to help prevent and manage the disease. In an attempt to reduce cost and at the same time more effectively manage hypertension, many a people use CAM in treating the disease; the use of CAM in treating non-communicable diseases have been widely embraced by many countries, whether developing or developed.

Unfortunately there is very little published research done on costing hypertension using conventional medicines and even more scanty information on costing of hypertension using CAM considering the debilitating effect hypertension has the finances and over all well-being of patients and households; this poses as a major gap in literature when it comes to costing hypertension, and can affect the cogency of similar future studies.



CHAPTER THREE

METHODS

3.1. Study Area

The study took place at the Ledzokuku - Krowor Municipal Assembly (LEKMA) Hospital, which is located within the Greater Accra Region of south-eastern Ghana near the coast. As at 2010, the population was estimated at about 261,571 (LEKMA, 2010). The LEKMA municipality has eight government owned health facilities; there is 1 municipal hospital (LEKMA Hospital), 1 Health Center, 1 Poly Clinic 3 Research Centres and 2 CHPS Zones.

The hospital unlike many other hospitals has a Complementary and Alternative Medicines (CAM) unit where patients who prefer treating ailments using CAM or herbal medicines attend and patronize health services from this unit. The unit is like a miniature clinic within the bigger hospital (LEKMA), there are two consulting rooms and a unique; separate pharmacy, where only CAMs are dispensed. The bigger hospital on the other hand, also has its own dispensary for conventional medicines.

Annually, the hospital treats an average of about 7000 hypertensive patients for the conventional medicines unit; the annual average for hypertensive clients using CAM is between 600 to 700 patients.

3.2. Study Design

This was a cross-sectional study on cost of treatment. It compared the differences in cost incurred by hypertensive patients when treating the condition using conventional medicines, or treating it using the CAM approach. Figure 2 (page 23) gives a graphical overview of the design of the study; the quantitative nature of the study, the participant's informed consent was sought for each interview. One experienced field worker was recruited and trained to help with the quantitative data collection. The research tool was pretested, and data was entered into SPSS after successful completion of questionnaires. At the end of the data collection period, the data gathered was analysed using SPSS and excel.

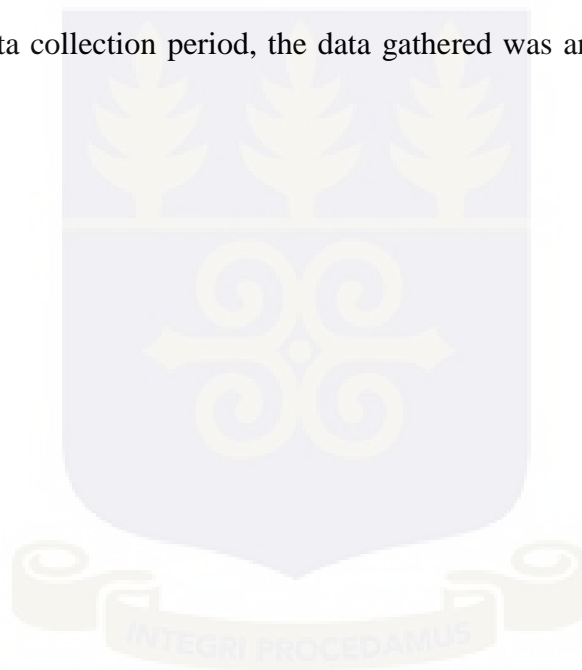
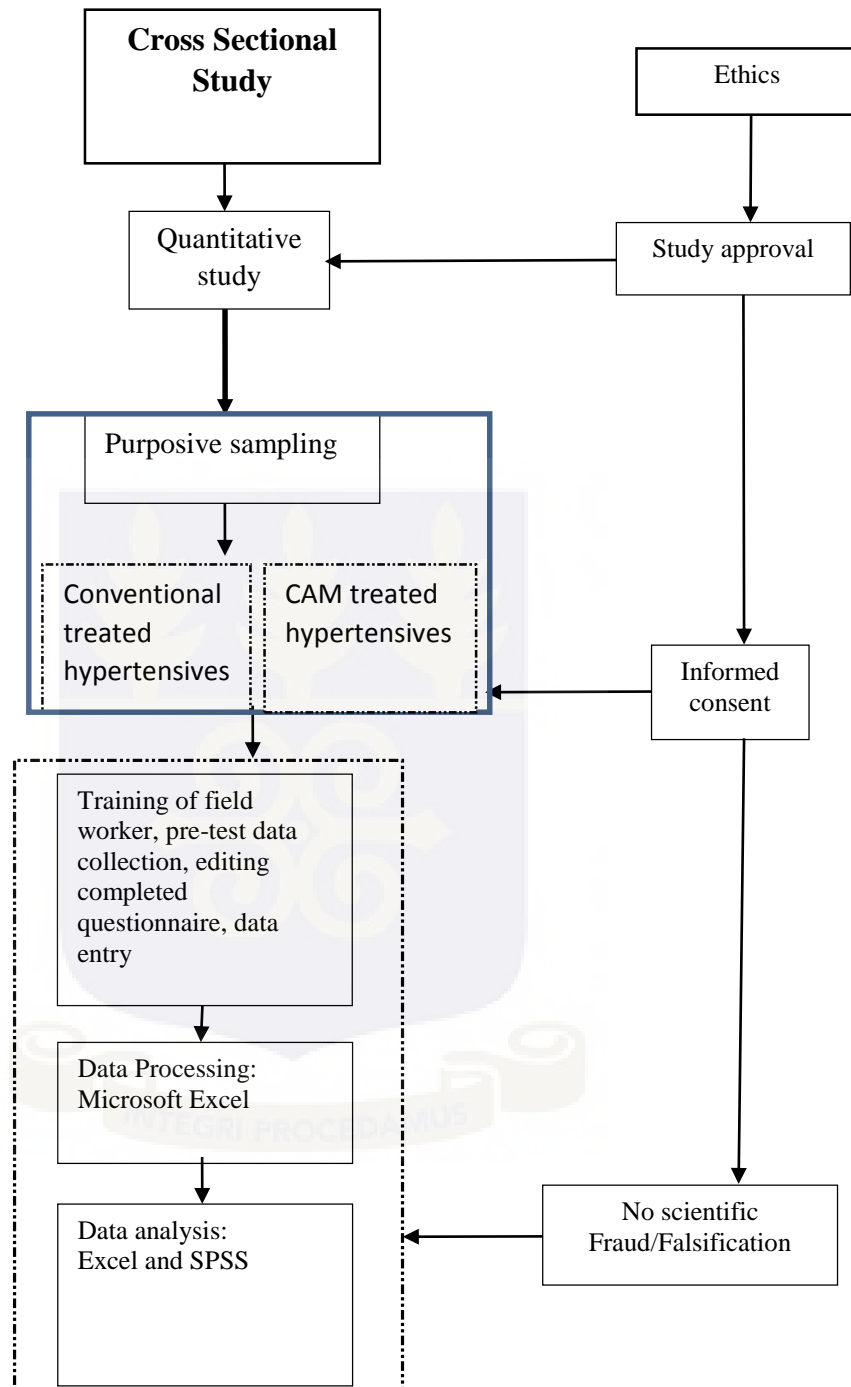


Figure 2. Study design of comparative cost.



3.3. Study Variable

The independent variables identified for the study were direct costs and indirect costs for both Conventional Medicines and CAM in treating hypertension. Here, direct costs included medical costs and nonmedical costs, whereas indirect costs for the study constituted waiting time, travel time and loss of productivity.

There were two outcome variables, shown in table 1; one for Conventional Medicines and another CAM in treating hypertension. The outcome variable was the summation of total direct and indirect cost in treating hypertension using Conventional Medicines and CAM.

Table 1. Explanatory/ Independent Variables for CAM & Conventional Medicines

Cost Type	Cost Variable	Cost Description
Direct Cost	Medical	<ol style="list-style-type: none"> 1. Cost of consultation 2. Cost of laboratory test 3. Cost of treatment 4. Cost of medication
	Non-Medical	<ol style="list-style-type: none"> 1. Travel cost 2. Special diet/food supplement 3. Other cost
Indirect Cost	Productivity loss	<ol style="list-style-type: none"> 1. Work hours lost excluding travel and waiting time
	Travel time	Travel hours spent to and from the facility
	Waiting time	Hours spent waiting at the facility

Dependent / Outcome Variable

- Total Cost of Conventional Hypertension Treatment.
- Total Cost of CAM Treatment.

3.4. Study population

The study population were hypertensive patients of the hospital that received treatment at the Conventional Medicines Unit or the Complementary and Alternatives Medicines Unit at the LEKMA hospital, in June 2017.

3.5. Sampling

The participants for the study were selected using the purposive sampling approach, this method of sampling was done because the hypertensive clients as well as diabetic clients attending the hospital had a common unit, so it was found out from each participant whether they came for hypertension treatment or for other treatment. Also, the hospital had two days assigned for hypertensives and diabetics to come for check-ups, as a result, these days were the busiest in the hypertensive and diabetic unit. The sample size calculated for CAM was $n=68$, that of Conventional medicines was also $n=68$ as well.

3.6. Sample Size

From a study done on cost of treating hypertension among patients attending a General Hospital at Igbo-Ora, a semi urban community in Oyo state; South West Nigeria, it was found out that the mean total cost of treatment was ₦1440±560 (\$9.6±3.7) (Ilesanmi, Ige & Adebisi, 2012).

The sampling based on this literature was chosen as it was one of the few facility based hypertensive surveys on cost in lower middle income countries.

Based on this study's outcome; the sample size was calculated as follows:

$$n = \left[\frac{z_{\alpha/2} \sigma}{E} \right]^2$$

Where: n = sample size: Critical z-value (1.96), Standard deviation of cost of hypertension treatment was estimated to \$4 from Ilesanmi, Ige, & Adebisi, (2012) standard deviation cost of \$3.7. The margin of error, E: was estimated to be (\$1).

$$n = 62$$

Adjusting for 10% non-response rate was calculated as $62 \times 0.1 = 6$

Therefore, Total sample size (N) = sample size (n) + 10% non-response

$$\text{Total sample size (N)} = 62 + 6 = \mathbf{68}$$

Since the conventional treatments cost was compared to the CAM cost of treatment, the total sample size N for both units was multiplied by 2 i.e. $68 \times 2 = 136$

Therefore the total sample size determined for both Conventional Medicines (N=68) and CAM (N=68) units for this study was 136.

3.7. Quality Control

Training of fieldworker

An experienced field worker was trained prior to the beginning of the data collection. The training focused on ensuring that the field worker understood the objectives of the study, building understanding on the survey tools and interpretation, and the ability to perform the survey tasks. Simulated practices were made to build consensus and consistency on study tool understanding and interpretation. The field worker was also briefed on confidentiality, informed consent and voluntary participation, risks and benefits involved in the study.

3.7.1. Data Collection Stage

Through interviews, the data collected for both types of treatment summed up to 85 hypertensive respondents, with a 94% response rate.

Data on socio-demographics, direct and indirect cost incurred during the data collection period and or within the last 30 days for both Conventional medicines and CAM treatment of hypertension were collected using a structured close ended questionnaire.

Direct Costs included direct medical costs (Cost of consultation, laboratory tests, cost of treatment and cost of medication) and direct nonmedical costs (travel cost, special diet cost and other costs). Indirect costs constituted; loss of productivity days, travel time and waiting time.

Data collection tools and techniques.

Quantitative data was collected using a closed ended questionnaire, respondents were interviewed face-to-face using the questionnaire, and their responses were recorded on each respective tool.

3.7.2 Editing Completed Questionnaire

Completed questionnaires were given unique numbers so as to easily put them in order and thereby making them easily traceable. Completed questionnaires were gone through again before leaving the facility to ensure quality of completion.

3.8. Data Entry and Analysis

Data on cost from completed questionnaires were entered into IBM SPSS Statistics 20. The data collection tools were numbered uniquely in order to show the type of treatment (CAM or Conventional medicines) and the number of each tool.

Direct medical cost, direct non-medical cost and indirect cost incurred by hypertensive patients who attend the LEKMA hospital during the data collection period was estimated for both the conventional medicines treatment and the CAM treatment. Demographic information of respondents such as age, sex, level of education and employment status were also recorded.

Data on direct cost was categorized into direct medical cost and direct nonmedical cost from the perspective of the health service.

Direct Medical Cost: This was estimated by summing up all cost incurred by respondents on medical services due to hypertension during the data collection period and the last 30 days from that period. This included cost of consultation, laboratory tests, cost of treatment and cost of medication. With the cost of consultation, patients who were covered by the National Health Insurance Scheme did not pay for consultation, as it was covered by the scheme. Most of the hypertensive medication were also largely covered by the National Health Insurance Scheme; patients on certain hypertensive drugs had to make some co-payment in order to obtain such drugs, however, not all patients were under the National Health Insurance Scheme, as about 25% of participants were not on health insurance. Here the total cost of medication included co-payment and full payment of pharmaceuticals. However, all the medicines dispensed at the CAM unit of the hospital were not covered by the National Health Insurance, hence hypertensive patients patronizing CAM services paid for all their medications in full.

Table 2. Shows the cost estimation approach for direct medical cost borne by respondents for both CAM and Conventional treatment of hypertension for this study.

Direct Nonmedical Cost: This was estimated by summing up nonmedical cost such as travel cost, special diet/ food supplement cost (recommended by physician or nutritionist)

and other direct nonmedical cost. Table 2 shows the cost estimation approach for direct nonmedical cost for both CAM and Conventional treatment of hypertension for the study.

Table 2: Estimation of direct medical and nonmedical costs for CAM and Conventional treatment

Cost Type	Cost Estimation Approach
Consultation	Cost of consultation in the last 30 days was summed; this excluded respondents who were covered by the National Health Insurance Scheme
Laboratory test	Summation of lab tests respondents had made in the last 30 days from the study period
Treatment	Summation of cost of treatment received by hypertensive in the last 30 days from the study.
Medicines	Summation of medicines prescribed for the respondents in the last 30 days, this included patients covered on health insurance, as some drugs required co-payment.
Total direct medical cost	Summation of total costs of consultation, laboratory tests, treatment and medications for hypertension during the study period and in the last 30 days from the period.
<i>Direct nonmedical cost</i>	
Travel	Summation of travel cost to and from the facility hypertensive respondents incur.
Special Diet/ food supplement	Summation of cost of recommended diet/ food supplement by nutritionists or physician for hypertensive respondents.
Others	Summation of all other cost incurred by hypertensive respondents
Total direct nonmedical cost	Summation of travel cost, special diet cost, and other cost incurred by hypertensive respondents.

Total direct cost (CAM & Conventional treatment): This was a summation of estimated direct medical and nonmedical cost incurred as a result treating hypertension.

Indirect cost: This was estimated based on Human Capital Approach (Income Approach).

It was based on the minimum wage in Ghana which is GHS 8.8 per day, and the average

working time for people is 8 hours, therefore, GHS 8.8 was divided by 8 hours to arrive at GHS 1.1 per hour. This was an estimate of output or productivity loss based on total work hours lost.

Table 3 shows Estimation approach for indirect cost of treating hypertension using CAM and Conventional medicines.

Table 3: Estimation of Indirect Cost for CAM and Conventional treatment.

Cost Category	Estimated Approach
Loss of productive days	Lost productive days were converted into lost productive hours where each day was divided by 8 hours. Summation of total number of work hours lost, was valued by multiplying hours by GHS 1.1 per hour (excludes travel and waiting time)
Waiting time	Was estimated by multiplying total hours by the hourly minimum wage of GHS 1.1 per hour
Travel time	Travel time in minutes were converted to hours by dividing it by 60 in order to be able to value it. Total travel time was multiplied by the minimum wage per hour GHS 1.1 in order to value the travel time.
Total indirect cost	Summation of all valued loss of productive days, travel time and waiting time.

The Total Costs for the two treatment approaches were compared; that is the Conventional Medicines and the CAM.

3.9 Sensitivity Analysis

This was done to test the robustness of the estimated costs; a one-way (1-way) and multi-way (M-way) sensitivity analysis (SA) was done by varying salient cost components; laboratory costs and wage (wage rate of 1.1/hour). These components were chosen because of the presence of uncertainty accompanying them; cost of laboratory tests was

selected as there was a possibility of the respondents running the tests at different facilities where the charges might vary, making its cost estimates uncertain. The analysis was done by increasing the two cost components 3%, 5% and 7%. The percentages relied on an academic research done on household cost of seeking diabetic healthcare in Ghana (Kumi-Ampofo, 2014).

3.10. Ethical Considerations

Ethical clearance

Ethical approval was sought from the Ghana Health Service Ethics Review Committee of the Research and Development Division, Accra (Ethical Approval – ID No: GHS-ERC: 145/02/17). Permission from the LEKMA hospital, Greater Accra Regional Health Directorate, Ledzokuku Krowo (LEKMA) Municipal Health Directorate was obtained, before commencement of data collection at the facility.

Before each interview took place, prospective volunteers were fully informed about the purpose and nature of the research before they decided or agreed to take part of the interview process, this was confirmed by getting their signature or mark on the consent forms that were provided. There were no costs incurred or risks involved nor benefits awarded in taking part of the research; all prospective participants were informed. Participants were also assured of privacy and confidentiality, where their names were not taken keeping their anonymity, this was done to protect their identity.

Prospective participants were informed that participation in the study was voluntary and they could withdraw from the study at any time without attracting any penalty or quality of care from the hospital, participants were not forced to take part of the study.

Data collected for the study have been kept confidential and was used for the purpose indicated for the study. The data files have been password protected and hard copies are being kept secure under lock and key in a filing cabinet. The information will be accessible only to the PI and the supervisor of the study.

3.11 Limitations of the Study

The sample size (68) for hypertensive patients who had their treatment from the CAM unit of the hospital was not met, this was due to the low turn up of patients for CAM treatment even for general ailment, it was found out that there has been a gradual decline in the number of patients that attend the CAM unit; there were two days in a week (Tuesdays and Thursdays) where Chinese specialists come to the facility to treat patients (including hypertensive ones), and these days are relatively more busy than other days within the week for the CAM unit. Currently the estimated daily turn up for hypertension treatment is between 0 – 3 patients per day, and the annual number of hypertensive patients treated at the CAM unit is between 600- 700. Upon further enquiry at the unit, it was found out that most patients who attend the CAM unit request for herbal drugs that do not have their generic names identified and therefore were not approved by the Food and Drugs Authority, hence were not dispensed at the CAM unit's pharmacy; so they consequently go to unlicensed herbal medicine sellers for such medications. Time was therefore a limiting factor, as the duration for the data collection period was inadequate in reaching the sample size for CAM hypertensive patients as the daily client turn up rate was very low.

Also, little or no published studies have been done on the cost of the treatment of hypertension using CAM. This thus limits the study's generalisation of the findings when it comes to the total cost of treating hypertension under CAM.



CHAPTER FOUR

RESULTS

This chapter represents the results of the study, and it has been sub sectioned respectively as; background characteristics of study participants; the direct cost of treating hypertension using CAM, the direct cost of treating hypertension using Conventional Medicines; the indirect cost of treating hypertension using CAM, the indirect cost of treating hypertension using Conventional Medicines; and the total cost of treating hypertension comparing the two methods of treatment, that is, CAM and Conventional Medicines.

4.1 Background characteristics of study respondents

The response rate for the CAM hypertensive clients was 15%, and that of Conventional Medicines was about 100%.

Table 4 shows the socio-demographic characteristics of the participants for both CAM and Conventional medicines treatment of hypertension. The mean age for both CAM and Conventional medicines was 65 years (95% CI: 0-76.28), 92.8% of whom were more than 50 years old. Majority of the respondents for both methods of treatment were females 75.3% (64) compared to the percentage of males of only 24%. Furthermore, a greater percentage of the patients had at least attained middle school education 38.3% (33), roughly 20% (17) had no formal education and only about 12% had tertiary education. It was also found out that most respondents for both types of hypertension treatment are single 60% (51), as against 40% of participants who were either married or cohabiting. When it comes to the employment status of the patients for both CAM and Conventional treatment of hypertension, it was found out that majority of the participants were unemployed 68.2% (58) as against only 30.6% of patients that were working. Most of the

patients reported the reason for being unemployed as a result of being unable to work due to hypertension 40% (34), about 26% of the patients were too old to work and 19% of the patients mentioned they were on retirement, and only 2.4% were housewives.

The reason for the distinction between being “too old to work” and “retirement” is that, 15.3% of the patients mentioned that they were self-employed, which means that they could continue working even after the legal retirement age of 60 years. About 16.5% of the patients were either government workers or worked in the private sector. From the findings, it shows that the mean income for the patients was GHS 306.82 (95% CI: 0-686.97). About 57.6% of the participants did not have any dependents, whereas 28% had between 2 to 3 dependents supported financially by the hypertensive patients. About 25% of the patients were not on the National Health Insurance Scheme.

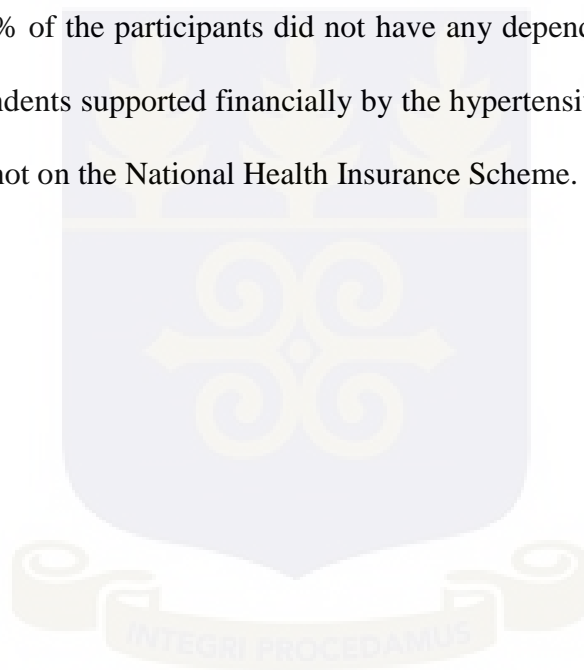


Table 4: Socio-demographic characteristics of study patients (CAM & Conventional)

Characteristics	CAM	Conventional
	N (%)	N (%)
Sex		
Male	3 (30)	18 (24)
Female	7 (70)	57 (76)
Age		
<50	0	7 (9.3)
>50	10 (100)	68 (90.7)
Marital status		
Married/Cohabiting	3 (30)	31 (41.3)
Single	7 (70)	44 (58.7)
Education		
No Formal Education	2 (20)	15 (20)
Primary Education	1 (10)	11 (14.7)
Middle/JSS	5 (50)	28 (37.3)
Vocational/SSS	1 (10)	12 (16)
Tertiary	1 (10)	9 (12)
Employment status		
Unemployed	6 (60)	53 (70.3)
Employed	4 (40)	22 (29.7)
Income		
<500	4 (40)	50 (66.7)
>500	6 (60)	25 (33.3)
Average Income	470	285.07
Patients on Health Insurance	6 (60)	58 (77.0)

4.2 Direct Cost of CAM

Here, the direct cost was sub-divided into direct medical cost and direct nonmedical costs of treating hypertension using CAM.

4.2.1 Direct Cost (CAM)

Direct Medical Cost: Table 5 shows the distribution of the direct medical cost of treating hypertension with CAM. Laboratory tests constituted the most, it summed up to GHS 780.00 (31%) when it came to direct medical cost; medications for treatment using CAM also made just about the same contribution of GHS 752.00 (30%) to the sum of direct medical cost for treating hypertension using CAM. The respective mean cost for laboratory test and medications were GHS 78 (95% CI: 29.06-126.94) and GHS 75.20 (95% CI: 63.61-86.79). The subtotal for direct cost of treating hypertension here was GHS 2,242 and it had a mean cost of GHS 224.20 (95% CI: 154.40-294); and this contributed about 89% of the total direct cost for treating hypertension using CAM.

Direct Nonmedical Cost: This was sub-categorized into three parts, namely; travel cost, Special diet/ food supplement cost and any other cost not directly linked to medication. The breakdown of the cost is also shown in the direct non-medical cost section of table 5. Here it was found that the travel cost was GHS 126.00 and it reported a mean cost of GHS 12.60 (95% CI: 5.42-19.78); and the cost of special diet was GHS 145.00, and had a mean of GHS 14.50 (95% CI: 0-39.72). The travel cost and special diets cost respectively contributed 5% and about 6% of the total direct cost of treating hypertension using CAM which was GHS 2,513.00 (USD 750.45), and had a mean cost of GHS 251.30 (95% CI: 172.45-330.15).

Table 5: Direct Cost of treating hypertension using Complementary and Alternative Medicines

Direct Cost (CAM)	Cost (GHS)	Average (95% CI)	Cost profile (%)
<i>Direct medical cost</i>			
Consultation	160.00	16.00 (0-36.66)	6.4
Laboratory test	780.00	78.00 (29.06-126.94)	31.0
Treatment	550.00	55.00 (20.28-89.72)	21.9
Medicine	752.00	75.20 (63.61-86.79)	30.0
<i>Sub-total</i>	2,242.00	224.20 (154.40-294)	89.2
<i>Direct non-medical cost</i>			
Travel	126.00	12.60 (5.42-19.78)	5.0
Special diet	145.00	14.50 (0-39.72)	5.8
<i>Sub-total</i>	271.00	27.10 (1.91-52.29)	10.8
Total Direct Cost	2,513.00	251.30 (172.45-330.15)	100.0

4.3 Direct Cost of Treating Hypertension using Conventional Medicines

Direct cost here was also sub-divided into direct medical cost and direct nonmedical costs of treating hypertension.

4.3.1 Direct Cost

Direct Medical Cost: Cost here was also made up of summing up the subsequent costs; consultation, laboratory test, treatment and medication. Table 6 shows the spreading of

the direct medical cost of Conventional Medicines treatment of hypertension. Similar to the CAM treatment of hypertension, the cost laboratory tests here was also the highest contributor GHS 13,830 (58.2%) to the total direct cost, it has a mean cost of GHS 184.40 (95% CI: 0-377.21). The second highest component of the direct medical cost (GHS 7,104) was treatment; it had a mean cost of GHS 94.72 (95% CI: 0-370) and constituted about 30% of the total direct cost for treating hypertension using Conventional Medicines. Unlike the CAM treatment of hypertension, cost of medications here constituted only 1.7% of total direct cost of Conventional Medicines used in treating hypertension as against that of CAM which was 30% of its total direct cost. The difference in the cost medications' percentage between the two methods of treatment is largely due to the fact that drugs on conventional or orthodox treatment of hypertension are usually subsidized or fully covered by the National Health Insurance, whereas the drugs for CAM are not covered by the National Health Insurance Scheme.

Direct Nonmedical Cost: The cost here was grouped into three sections, namely; travel cost, Special diet/ food supplement cost and any other cost not directly linked to medication. The itemization of the cost is presented in the direct non-medical cost section of table 6, where travel cost was the highest direct nonmedical cost (GHS 1,287); it had a mean cost of GHS 17.16 (95% CI: 5.02-29.30) and contributed 5.4% of the total direct cost. Special diet/ food supplement cost was about GHS 276.00 with a mean of GHS 3.68 (95% CI: 0-17.56). Total direct nonmedical cost was GHS 1,703.00 and had a mean cost of GHS 22.71 (95% CI: 0-45.59); it constitutes only 7.2% of the total direct cost of conventional treatment of hypertension; similar to the direct nonmedical cost of CAM treatment which was also just about 10% of the total direct cost of treating hypertension using CAM. The total direct cost for the conventional medicines treatment of hypertension was GHS 23,767.00 (USD 5,395.11), its mean cost was GHS 316.89 (95% CI: 0-717.33).

Table 6: Direct cost of Conventional Medicines treatment of Hypertension

Direct Cost	Cost (GHS)	Average (95% CI)	Cost profile (%)
<i>Direct medical cost</i>			
Consultation	720.00	9.60 (0-29.15)	3.0
Laboratory test	13,830.00	184.40 (0-377.21)	58.2
Treatment	7,104.00	94.72 (0-370)	29.9
Medicine	410.00	5.47(0-13.70)	1.7
<i>Sub-total</i>	22,064.00	294.17 (0-691.55)	92.8
<i>Direct non-medical cost</i>			
Travel	1,287.00	17.16 (5.02-29.30)	5.4
Special diet	276.00	3.68 (0-17.56)	1.2
Other	140.00	1.87 (0-10.68)	0.6
<i>Sub-total</i>	1,703.00	22.71 (0-45.59)	7.2
Total Direct Cost	23,767.00	316.89 (0-717.33)	100.0

4.4 Indirect Cost of Treating Hypertension Using CAM

The human capital approach was used to value the productive hours lost as a result of hypertension; Indirect cost distribution for CAM is represented in Table 7. The valued travel time for patients using CAM was GHS 8.89.00, had a mean cost of GHS 0.89 (95% CI: 0.68-1.10). Valued waiting time was had a mean cost of GHS 2.33 (95% CI: 0-24.81). The valued days absent from work was GHS 187.78, and its mean cost was GHS 13.77 (95% CI: 0-28.41); it represent about 76% of the total indirect cost for hypertension treatment with CAM. The total indirect cost for CAM after summing up the three cost components was GHS 137.78 (USD 31.30), with a mean cost of GHS 33.25 (95% CI: 0-101.01).

Table 7: Indirect Cost of Hypertension Treatment with CAM

Indirect Cost	Cost (GHS)	Average (95% CI)	Cost profile (%)
Valued Travel Time	8.89	0.89 (0.68-1.10)	6.4
Valued Wait Time	23.28	2.33 (1.65-3.00)	16.9
Valued Absent Days	105.60	10.56 (0-24.81)	76.6
Total Indirect Cost	137.78	13.77 (0-28.41)	100.0

4.5 Indirect Cost of Treating Hypertension Using Conventional Medicines

The human capital approach was used to price the productive hours lost as a result of hypertension. The distribution of indirect cost for conventional medicines treatment is represented in Table 8. As represented in the table, the valued travel time was GHS 76.82, and its corresponding mean was GHS 1.02 (95% CI: 0.576-1.47); this was very close to that of CAM treatment, where its mean cost for valued travel time was GHS 0.89 (95% CI: 0.68-1.10). The valued waiting time for conventional medicines was GHS 357.50, and its mean cost was GHS 4.70 (95% CI: 2.92-6.48). With a cost profile similar to that of CAM treatment of hypertension (76.6%); the cost profile for valued absent days for conventional treatment of hypertension covered the greatest part of the total indirect cost at 82.6%, the estimated valued absent days here was GHS 2,059.20; and its means cost was GHS 27.46 (95% CI: 0-95.20). The total valued indirect cost of treating hypertension using conventional medication summed up to GHS 2,493.52 (USD 566.03); with a mean cost of GHS 33.25 (95% CI: 0-101.01).

Table 8: Indirect Cost of Treating Hypertension with Conventional Medicines.

Indirect Cost	Cost (GHS)	Average (95% CI)	Cost profile (%)
Valued Travel Time	76.82	1.02 (0.576-1.47)	3.1
Valued Wait Time	357.50	4.70 (2.92-6.48)	14.3
Valued Absent Days	2,059.20	27.46 (0-95.20)	82.6
Total Indirect Cost	2,493.52	33.25 (0-101.01)	100.0

4.6 Total Costs of Treating Hypertension; CAM vs. Conventional Medicines

The total cost distribution for CAM and Conventional Medicines treatment of hypertension is all shown in Table 10. The means for the total direct medical costs for both methods of treatment were similar; CAM had GHS 224.20 (95% CI: 154.40-294) as its mean cost, and that of Conventional Medicines was GHS 294.17 (95% CI: 0-691.55). The two methods of treatment had also about the same cost profile for total direct medical costs at 84% of their respective total costs. The mean expenses of the direct nonmedical costs for CAM and Conventional Medicines was GHS 27.10 (95% CI: 1.91-52.29) and GHS 22.71 (95% CI: 0-45.59) respectively; CAM had a comparatively slightly higher mean price because its special diets/food supplement average expense was GHS 14.50 (95% CI: 0-39.72) while that of Conventional Medicines was only GHS 3.68 (95% CI: 0-17.56). Total direct cost for CAM was GHS 2,513.00 with a mean expense of GHS 251.30 (95% CI: 172.45-330.15), and that of Conventional Medicines was GHS 23,767.00, its average cost was GHS 316.89 (95% CI: 0-717.33). The total cost profile for the direct costs for CAM and Conventional treatment of hypertension was about 95% and 90% respectively; which are very much similar. The mean indirect cost for Conventional

Medicines; GHS 33.25 (95% CI: 0-101.01) was higher than that of CAM, which was GHS 13.77 (95% CI: 0-28.41). The total valued indirect costs for the two however were GHS 2,493.52 and GHS 137.78 respectively. CAM treatment of hypertension had a total cost of GHS 2,650.77 (USD 602)², and the total cost for Conventional Medicines was GHS 26,260.52 (USD 5,961); and their respective average costs were GHS 265.08 (95% CI: 185.16-336.00) and GHS 350.14 (95% CI: 0-776.59).



² The cedi to dollar conversion rate was at GHS 1 to USD 0.227 in July 2017

Figure 3. Percentage distribution in total cost of treating hypertension (CAM)

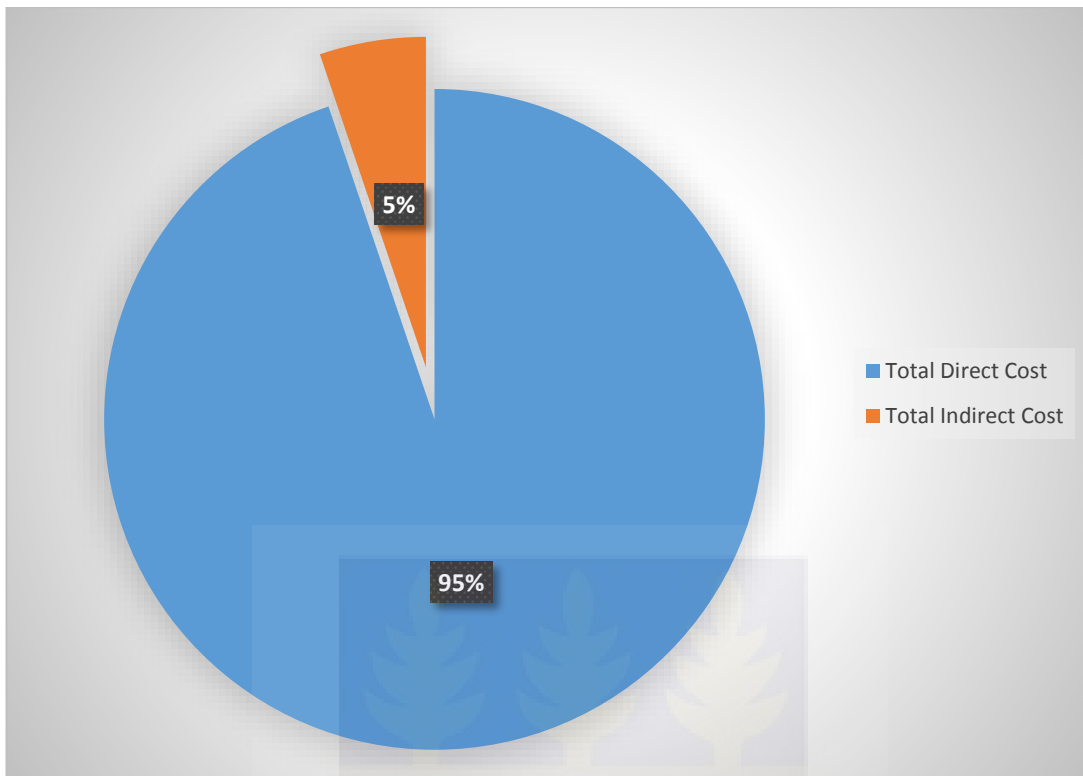
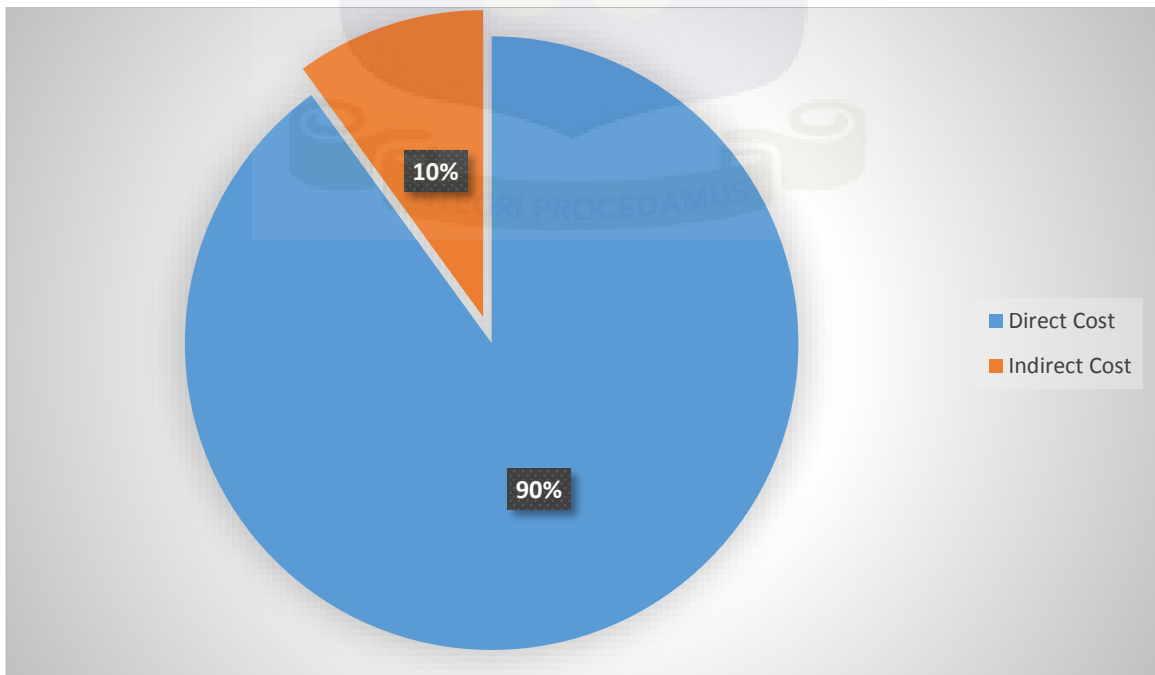


Figure 4. Percentage distribution in total cost of treating hypertension (Conventional Med.)



4.7 Sensitivity Analyses

Table 9 shows the one-way sensitivity analysis conducted by varying the cost of laboratory tests by 3%, 5% and 7%; there was a respective percentage increase of 1.5, 2.5 and 3.5 in the total cost of treatment for the two methods for hypertension treatment in this study. The same percentage variation analysis was conducted on wage rate, and this resulted in a percentage increase by 0.3, 0.5, and 0.6. Now, looking at the percentage change in proportions of cost by varying laboratory costs by 3%, 5%, and 7%; we find that it resulted in a corresponding percentage increase in the direct cost by 0.1, 0.2, and 0.3. On the contrary, the respective indirect cost for laboratory expenses fell by 0.1%, 0.2% and 0.3%. The same level of variation applied to the wage rate resulted in the direct cost falling by 0.2%, 0.4% and 0.6%; whereas that its corresponding indirect cost had a percentage increase by 0.2, 0.4 and 0.6. That notwithstanding, there was a simultaneous variation (3%, 5% and 7%) in both laboratory expenses and wage rate; this resulted in a respective percentage fall in the direct cost by 0.1, 0.2, and 0.2, and a divergent corresponding percentage increment in its indirect cost by 0.1, 0.2 and 0.2. Nonetheless, there was a percentage increase in the total cost of treatment by 1.8, 3.0 and 4.2 respectively. The results of the sensitivity analysis on table 10 showed that the study's cost estimate were sensitive to changes in laboratory expense and wage rate.

Table 9: Sensitivity analysis of total cost of hypertension treatment (CAM + Conventional)

Scenario	Cost component	Percentage change in parameter (%)	Total cost		Percentage change in total cost (%)	Proportion of total cost		Percentage change in proportions of cost (%)	
			GHS	USD		Direct	Indirect	Direct	Indirect
Base scenario		0	28,911.29	6,631.03	0.0	90.9	9.1	0	0
Variation (One-way Sensitivity Analysis)	Laboratory	3	29,349.59	6,731.56	1.5	91.0	9.0	0.1	-0.1
		5	29,641.79	6,798.58	2.5	91.1	8.9	0.2	-0.2
		7	29,933.99	6,865.59	3.5	91.2	8.8	0.3	-0.3
Variation (One-way Sensitivity Analysis)	Wage rate	3	28,990.23	6,649.14	0.3	90.7	9.3	-0.2	0.2
		5	29,042.85	6,661.21	0.5	90.5	9.5	-0.4	0.4
		7	29,095.48	6,673.28	0.6	90.3	9.7	-0.6	0.6
Multi-variation (Multi-way Sensitivity Analysis)	Laboratory and Wage rate	3	29,428.53	6,749.66	1.8	90.8	9.2	-0.1	0.1
		5	29,773.35	6,828.75	3.0	90.7	9.3	-0.2	0.2
		7	30,118.18	6,907.84	4.2	90.7	9.3	-0.2	0.2

CHAPTER FIVE

DISCUSSION

The discussions of the study are presented in this section. The structure of this chapter is based on the objectives of the study; the key findings of the research are summarized and discussed while being linked with published studies on the cost of treating hypertension.

The mean age for the population was 65 years (85), with a bulk of the patients being more than 50 years old, similarly, the mean age found in a study conducted by Ilesanmi, Ige, & Adebisi, (2017) in Nigeria was 61 ± 11.2 years, and more than half of the study population were over 60 years old. A greater percentage of the respondents for this study (38%) had attained at least middle school education. About 68% of the respondents were unemployed, most of the unwaged patients (40%) reported being unable to work due to hypertension, the findings also showed that even though most of them (57.6%) did not have financial dependents, the mean income for the patients was GHS 306.82 (USD 70).

5.1 Direct Cost of Hypertension Treatment using CAM.

The direct medical cost for CAM had a mean of GHS 224.20 (154.40-294), and represented roughly 85% percent of the total cost profile of hypertension treatment with CAM, total direct non-medical cost had a mean of GHS 27.10 (1.91-52.29), and was just about 10% of the total cost profile. The direct cost profile of laboratory tests and medications were very close, as it constituted a high percentage of direct cost for CAM treatment at 31% and 30% respectively. Direct nonmedical costs however made up only about 10% of the total cost of GHS 2,650.77 (USD 602.00), this cost profile of the direct nonmedical cost was a little similar to a study done on hypertension in China by Le, Zhankun, Jun, & Keying, (2012), where the total direct nonmedical cost formed only 2.2%

of the total cost of treatment. The total direct cost for CAM hypertension treatment was GHS 2,513.00 with a mean cost of GHS 251.30 (95% CI: 172.45-330.15); this was about 95% of the total cost profile for CAM, similar to a study by Elliott, (2003) in his article focusing on the economic impact of hypertension which also found the total direct cost outweighing the total indirect cost of the study.

5.2 Direct Cost of Hypertension Treatment using Conventional Medicines.

Direct cost here had a mean of GHS 316.89 (95% CI: 0-717.33) made up about 90% of the total cost of hypertension treatment for Conventional Medicines, this cost profile is similar to findings in other literature on the cost of treating hypertension; another study by Elliott, (2003) on the cost of treating hypertension had the total direct cost of treatment constituting about 74% of the total cost of treatment for the study. In another study done by Le et al., (2012), it was found that the total direct cost was 53.4% of the total cost of illness for the study, and it included other cost such and indirect costs and intangible costs, furthermore, the direct medical cost found by Le et al., (2012) made up a good 51.2% of the total cost of the study. However, in this study, the direct medical cost alone constituted about 84% of the total cost of the study; with a mean cost of GHS 294.17 (95% CI: 0-691.55). The cost of laboratory tests for the conventional medicines treatment constituted a bulky 52% of the total cost of treatment for the study, and had a mean cost of GHS 184.4 (95% CI: 0-377.21). The total direct cost for conventional medicines for hypertension was GHS 23,767.00 (USD 6,583.50).

5.3 Indirect Cost of Hypertension Treatment with CAM.

The total indirect cost for CAM treatment of hypertension for this study was GHS 137.78 (USD 31.30), and its mean cost was GHS 13.77 (95% CI: 0-28.41), and the cost profile was only about 5% of the total cost profile; as with most studies on the direct and indirect cost of hypertension treatment, the indirect cost most often constitutes the least to the total cost of treatment. For instance; the total indirect cost in a study conducted by Le et al., (2012) on the cost of treating hypertension in a rural part of China made up only about 3% of the total cost of the study. The days absent from work formed the largest cost component (4%) of the indirect cost for CAM, and it had a mean of GHS 10.56 (95% CI: 0-24.81).

5.4 Indirect Cost of Hypertension Treatment with Conventional Medicines.

The total indirect cost for the Conventional Medicines treatment was GHS 2,493.52 (USD 566.03). The average indirect cost for Conventional medicines; GHS 33.25 (95% CI: 0-101.01) was in comparison, more than twice of that of CAM which was GHS 13.77 (95% CI: 0-28.41), suggesting that the indirect cost of treating hypertension using CAM is significantly less than using Conventional Medicines.

Here, indirect cost constituted only about 9% of the total cost of hypertension treatment with conventional medications. Even though some literature support this result; like studies done by Le et al., (2012) and Elliott, (2003), a similar study on the cost of hypertension treatment in Malaysia had a contradictory finding, as the indirect costs for the treatment of three stages of hypertension (pre-hypertension, stage 1 and stage 2) were all higher than the estimated direct costs of the study (Alefán, Ibrahim, Razak, & Ayub,

2009). A sub-component of the indirect cost for this study; days absent from work constituted the highest (9.5%) to the total indirect cost.

5.5 Total cost of CAM and Conventional Medicines in Treating Hypertension.

According to the findings of this study, the CAM treatment of hypertension had a total cost of GHS 2,650.77 (USD 602), and the total cost for Conventional Medicines summed up to GHS 26,260.52 (USD 5,961). Their respective average costs were GHS 265.08 (95% CI: 185.16-336.00) and GHS 350.14 (95% CI: 0-776.59); the difference (GHS 85.06) in the mean total costs show that the cost of treatment of hypertension using Conventional Medicines is higher than treating hypertension using CAM.

In comparing the averages for the total direct medical costs for CAM and Conventional Medicines treatment, it was found that they were similar; as CAM had a mean cost of GHS 224.20 (95% CI: 154.40-294), while that of Conventional Medicines was GHS 294.17 (95% CI: 0-691.55). Both treatment methods also had roughly the same cost profile for their respective total direct medical costs at about 84% of their individual total costs. Similarly, the mean expenses for the direct nonmedical costs for CAM and Conventional Medicines was GHS 27.10 (95% CI: 1.91-52.29) and GHS 22.71 (95% CI: 0-45.59) respectively, which was also very close; the average expense for CAM was slightly higher because its special diets/food supplement average expense was higher than that of Conventional Medicines, this could be as a result of the assistive use of food supplement to treat hypertension for CAM. According to the findings, the direct costs of CAM and Conventional medicines treatment of hypertension were about 95% and 90% of their respective cost profiles; which are very much similar. The mean indirect cost for Conventional medicines; GHS 33.25 (95% CI: 0-101.01) was higher than that of CAM,

which was GHS 13.77 (95% CI: 0-28.41). It was also found that under the indirect costs, the valued days absent from work for CAM and Conventional medicines both constituted the largest part of their respective total indirect costs.



CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the significance and implication of the study are summarized, it also includes recommendations to inform programs and policies that are targeted at reducing the cost burden patients incur due to hypertension.

6.1 Conclusion

According to the results of this study, the treatment or management of hypertension is comparatively less expensive when the CAM method is patronized, this is because the mean of the total cost of the treatment of hypertension using Conventional medications was more expensive than that of CAM, there was also a noticeable difference in the averages of the total indirect costs between the two methods of treatment, as the mean indirect cost for CAM was about two times less than the mean indirect cost for Conventional medications. Also, another conspicuous component of the total costs were the cost of laboratory tests, which falls under the direct cost category; the costs of laboratory tests for especially Conventional Medicines was very high, covering about half of its total cost profile, making it very expensive for all patients to pay for the service.

6.2 Recommendations

This study makes the following recommendations:

Ghana Health Service and Stakeholders

There should be an intervention that reduces the direct medical cost incurred by hypertensive patients, as direct medical cost cover a huge percentage of total treatment

cost of hypertension. In this case, the Ministry of Health could ensure that certain high cost components of direct medical costs like cost of laboratory tests for hypertensive patients should be covered by the National Health Insurance Scheme, so all their hypertensive subscribers benefit from that cover.

Further Research

More research on costing the treatment of hypertension should be carried out in Ghana. Due to the fact that the average cost derived from this CAM study was from a small sample, which questions its validity



REFERENCES

- Addo, J., Agyemang, C., Smeeth, L.de-Graft, Aikins, Adusei, A., & Ogedegbe, O. (2012). A review of population-based studies on hypertension in Ghana. *Ghana medical journal*, *46*(2), 4-11.
- Addo, J., Smeeth, L., & Leon, D. A. (2007). Prevalence, detection, management, and control of hypertension in Ghanaian civil servants. *Ethnicity & disease*, *18*(4), 505-511.
- Agyemang, C., Bruijnzeels, M. a, & Owusu-Dabo, E. (2006). Factors associated with hypertension awareness, treatment, and control in Ghana, West Africa. *Journal of Human Hypertension*, *20*(1), 67–71. <https://doi.org/10.1038/sj.jhh.1001923>
- Akinyemi, J. O., Bamgboye, E. A., & Ayeni, O. (2013). New trends in under-five mortality determinants and their effects on child survival in Nigeria: A review of childhood mortality data from 1990-2008. *Etude de la Population Africaine*, *27*(1).
- Alefan, Q., Ibrahim, M. I. M., Razak, T. A., & Ayub, A. (2009). cost of treating hypertension in malaysia, *2*(1), 1–5.
- Atibila, F. (2015). *Assessment of risk factors for hypertension in Dormaa Municipality (Ghana)* (Doctoral dissertation). Kwame Nkrumah University of Science and Technology.
- Beevers, D. G., Robertson, J. I. S., Lip, G., & Hall, J. (2007). A short history of the study of hypertension. *Comprehensive Hypertension*, 3-20.
- Berto, P., Degli Esposti, E., Ruffo, P., Buda, S., Degli Esposti, L., Sturani, A., & Lopatriello, S. (2002). The pandora project: cost of hypertension from a general practitioner database. *Blood Pressure*, *11*(3), 151–6. <https://doi.org/http://dx.doi.org/10.1080/080370502760050386>

- Bosu, W. K. (2010). Epidemic of hypertension in Ghana: a systematic review. *BMC Public Health*, 10(1), 1.
- Buabeng, K. O., Matowe, L., & Plange-Rhule, J. (2004). Unaffordable drug prices: The major cause of non-compliance with hypertension medication in Ghana. *Journal of Pharmacy and Pharmaceutical Sciences*, 7(3), 350–352.
- Chodick, G., Porath, A., Alapi, H., Sella, T., Flash, S., Wood, F., & Shalev, V. (2010). The direct medical cost of cardiovascular diseases, hypertension, diabetes, cancer, pregnancy and female infertility in a large HMO in Israel. *Health Policy*, 95(2–3), 271–276. <https://doi.org/10.1016/j.healthpol.2009.12.007>
- Dans, A., Ng, N., Varghese, C., Tai, E. S., Firestone, R., & Bonita, R. (2011). The rise of chronic non-communicable diseases in southeast Asia: time for action. *The Lancet*, 377(9766), 680-689.
- Daskalopoulou, S. S., Khan, N. A., Quinn, R. R., Ruzicka, M., McKay, D. W., Hackam, D. G., . . . Padwal, R. S. (2012). The 2012 Canadian hypertension education program recommendations for the management of hypertension: blood pressure measurement, diagnosis, assessment of risk, and therapy. *Canadian Journal of Cardiology*, 28(3), 270-287.
- de Wet, H., Ramulondi, M., & Ngcobo, Z. N. (2016). The use of indigenous medicine for the treatment of hypertension by a rural community in northern Maputaland, South Africa. *South African Journal of Botany*, 103, 78–88. <https://doi.org/10.1016/j.sajb.2015.08.011>
- Department of Health. (2005). Self care: a real choice-self care support: a practical option.
- Elliott, W. J. (2003). The Economic Impact of Hypertension, V(III), 3–13.

- Fezeu, L., Kengne, A. P., Balkau, B., Awah, P. K., & Mbanya, J.-C. (2010). Ten-year change in blood pressure levels and prevalence of hypertension in urban and rural Cameroon. *Journal of epidemiology and community health*, 64(4), 360-365.
- Gaziano TA, Bitton A, Anand S, Weinstein MC. The global cost of nonoptimal blood pressure. *J Hypertens* 2009; 27(7):1472-1477.
- Goka, F. (2007). Trend analysis of diseases reported at outpatient departments: A case study of the Greater Accra region (Doctoral dissertation, University of Cape Coast).
- Hutchings, A., Scott, A.H., Lewis, G., Cunningham, A., 1996. Zulu Medicinal Plants: An Inventory. University of Natal Press, Pietermaritzburg, South Africa.
- Ibrahim M. Mohsen et al. (2012). Hypertension in developing countries. *The Lancet*, Volume 380, Issue 9841, 611 – 619
- Ilesanmi, O. S., Ige, O. K., & Adebisi, A. O. (2017). The managed hypertensive : the costs of blood pressure control in a Nigerian town Abstract Background, 1–7.
- Israel Central Bureau of Statistics. Statistical Abstract of Israel 2008. Jerusalem: Central Bureau of Statistics; 2008. Report no. 59.
- Jaddou H. Y., Batieha A. M., Khader Y. S., Kanaan A. H., El-Khateeb M. S., and Ajlouni K. M., “Hypertension Prevalence, Awareness, Treatment and Control, and Associated Factors: Results from a National Survey, Jordan,” *International Journal of Hypertension*, vol. 2011, Article ID 828797, 8 pages, 2011.
doi:10.4061/2011/828797

- Kumi-Ampofo, (2014). Household cost of seeking diabetic healthcare in the tano north district of the brong ahafo region gift, 1–75.
- Lawes CM, Vander Hoorn S., Rodgers A. Global burden of blood-pressure-related disease, 2001. *The Lancet* 2008; 371(9623):1513-1518.
- Le, C., Zhankun, S., Jun, D., & Keying, Z. (2012). The economic burden of hypertension in rural south-west China, *17*(12), 1544–1551. <https://doi.org/10.1111/j.1365-3156.2012.03087.x>
- Ledzokuku Krowor Municipal Assembly. (2010). *Demographics*. Retrieved from LEKMA: <http://lekmagh.org/about-lekma/232/demographics/>
- Louw G, Duvenhage A. The Traditional Health Practitioners Act No. 22 (2007) of South Africa: Its history, resolutions and implementations in perspective (Part 1: History). *AMJ* 2016;9(10):396–401. <http://dx.doi.org/10.4066/AMJ.2016.2715>
- Marshall, S., Edidin, D., & Arena, V. (2016). From the Journals. *African Journal of Diabetes Medicine Vol, 24*(1).
- McKeown, R. E. (2009). The Epidemiologic Transition: Changing Patterns of Mortality and Population Dynamics. *American Journal of Lifestyle Medicine*,3(1 Suppl), 19S–26S. <http://doi.org/10.1177/1559827609335350>
- Ministry of Health. Palestinian Health Information Centre, Health status in Palestine 2011; May 2012.
- National Center for Chronic Disease Prevention and Health Promotion. Chronic Disease Prevention and Health Promotion; 2008.

- Nulu, S., Aronow, W. S., & Frishman, W. H. (2016). Hypertension in Sub-Saharan Africa: A Contextual View of Patterns of Disease, Best Management, and Systems Issues. *Cardiology in review*, 24(1), 30-40.
- Olayemi, O. (2015). *Management of Hypertension by Patients Attending The Korle-Bu Polyclinic*. (Thesis MPh). University of Ghana.
- Omran, A. R. (2001). The epidemiologic transition. A theory of the Epidemiology of population change. 1971. *Bulletin of the World Health Organization*, 79(2), 161–170
- Rosamond, W., Flegal, K., Friday, G., Furie, K., Go, A., Greenlund, K., ... Hong, Y. (2007). *Heart disease and stroke statistics - 2007 Update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation* (Vol. 115). <https://doi.org/10.1161/CIRCULATIONAHA.106.179918>
- Rosendaal, N. T. A., Hendriks, M. E., Verhagen, M. D., Bolarinwa, O. A., Sanya, E. O., Kolo, P. M., ... Gomez, G. B. (2016). Costs and Cost-Effectiveness of Hypertension Screening and Treatment in Adults with Hypertension in Rural Nigeria in the Context of a Health Insurance Program. *PloS One*, 11(6), e0157925. <https://doi.org/10.1371/journal.pone.0157925>
- The Henry J. Kaiser Family Foundation. Health Care Costs— A Primer. Menlo Park, CA: The Henry J. Kaiser Family Foundation; May2012.
- United Nations (2015, September 15). Sustainable Development Goals Explained: Good Health and Well-being [Video file]. Retrieved from <https://www.youtube.com/watch?v=Fzz3Rr8fd2Q>
- United Nations. (n.d.). *Sustainable Development Goals*. Retrieved from United Nations: <http://www.un.org/sustainabledevelopment/health/>

United States National Library of Medicine (2016). *Hypertension (High Blood Pressure)*.

Retrieved from PubMed Health:

<https://www.ncbi.nlm.nih.gov/pubmedhealth/PMHT0024199/>

United States National Library of Medicine. (2016, October 5). *High blood pressure*.

Retrieved from Medline Plus: <https://medlineplus.gov/ency/article/000468.htm>

Vasan RS, Beiser A, Seshadri S, Larson MG, Kannel WB, D'Agostino RB et al. Residual

Lifetime Risk for Developing Hypertension in Middle-aged Women and Men.

JAMA 2002; 287(8):1003-1010.

Yel, Ç. (2014). The Presentation of Complementary and Alternative Medicine (CAM) in

the Turkish Press. *Procedia - Social and Behavioral Sciences*, 152, 995–1000.

<https://doi.org/10.1016/j.sbspro.2014.09.356>

Wang, C.-C., Kennedy, J., & Wu, C.-H. (2015). Alternative Therapies as a Substitute for

Costly Prescription Medications: Results from the 2011 National Health Interview

Survey. *Clinical Therapeutics*, 37(5), 1022–30.

<https://doi.org/10.1016/j.clinthera.2015.01.014>

WHO (2013, April). *Nigerians wake up to high blood pressure*. Retrieved November 7,

2016, from Bulletin of the World Health Organisation:

<http://www.who.int/bulletin/volumes/91/4/13-020413/en/>

World Bank (2016). Retrieved from The World Bank:

<http://www.worldbank.org/en/search?q=ghana+middle+income>

World Health Organisation. (2013). *A global brief on Hypertension: Silent killer, global*

public health crisis. Geneva: WHO Press.

World Health Organisation (2014). *The Top 10 Causes of Death*. Retrieved from WHO

Media Center: <http://www.who.int/mediacentre/factsheets/fs310/en/>

World Health Organisation. (2016). *Sustainable development and healthy environment*.

Retrieved from WHO in South-East Asia:

http://www.searo.who.int/about/administration_structure/sde/en/

World Heart Federation. (2015). Cardiovascular disease risk factors - Hypertension |

World Heart Federation. Retrieved from [http://www.world-heart-](http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/hypertension/)

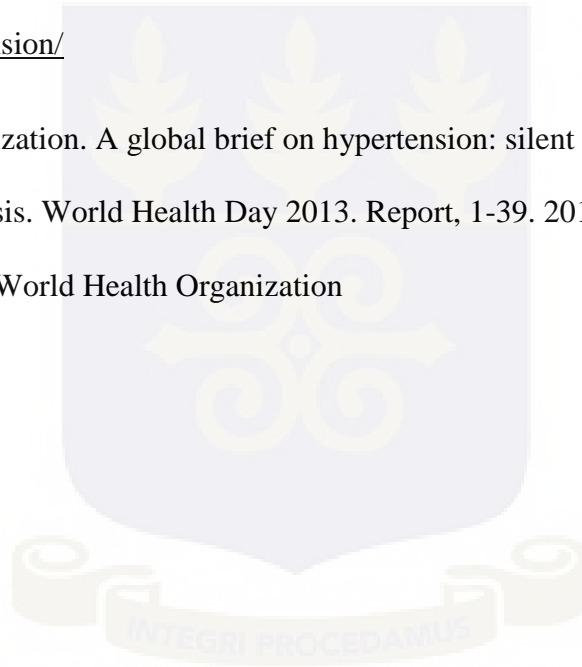
[federation.org/cardiovascular-health/cardiovascular-disease-risk-](http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/hypertension/)

[factors/hypertension/](http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors/hypertension/)

World Health Organization. A global brief on hypertension: silent killer, global public

health crisis. World Health Day 2013. Report, 1-39. 2013. Geneva,

Switzerland, World Health Organization



APPENDICES

Appendix I – Respondent Information Sheet

General Information

Title of Research: A Comparative Study of the Cost of Complementary/Alternative Medicine (CAM) and Conventional Treatment of Hypertension at the Ledzokuku Krowor Municipal Assembly (LEKMA) hospital.

This study is being conducted by Mr. Jude Ekow Crentsil, a graduate student at the University of Ghana, School of Public Health, as part of the requirement in pursuing an MPH programme.

The main objective of the study is to collate and compare the cost hypertensive patients incur in treating the condition using conventional medicines and CAMs. A structured close ended questionnaire covering all the objectives of the study will be used for the data collection. A total of 136 participants will be interviewed for this study, this number will comprise patients that use Conventional medicines treatment for hypertension and hypertensive patients that use CAM. The interview will take approximately 30 minutes to complete.

Participants will gain a better insight into the cost of managing disease, the control measure to take and ways of improving the quality of managing the disease. It will also inform policy makers on better and more effective ways of developing safety interventions and preventive educational campaigns in addition to the body of knowledge on cost hypertension management in Ghana.

The identity of participants will not be disclosed as every questionnaire will be given unique code numbers instead of names, data collected therefore will not be linked in any way to a participant.

Participation in this study is voluntary, quality of health service offered to respondent will not be affected if a participant refuses to take part or even decide not to go on with an interview that has already started. A participant also may also decide not to answer any question that makes him or her uncomfortable.

Before Taking Consent

Do you have any questions you will like to ask about the study? Yes/No

If yes, please indicate the questions below

.....
.....\

If you have any further questions concerning the conduct of this study, please do not hesitate to contact the following;

Mr. Jude Ekow Crentsil on 0273723758

Hannah Frimpong

GHS-ERC Administrator

Numbers: Office; +233302681109, Mobile; 0243 235 225

Email- Hannah.Frimpong@ghsmaail.org

Nana Abena Kwaa

Assistant GHS-ERC Administrator

Number; Mobile – 0244 712 919

Email – nanatuesdaykad@yahoo.com



Appendix II: Consent Form

Statement of person obtaining informed consent:

I have read the information given above, and I understand. I have been given a chance to ask questions concerning this study and questions have been answered to my satisfaction. I now voluntarily agree to participate in this study knowing that I have the right to withdraw at any time without it affecting my current or future use of health care services.

Signature/Thumb Print: Date:

Contact Detail:

I, the undersigned, have explained this consent to the respondent in English/Twi/Ga and he or she understands the purpose of the study, procedures to be followed as well as the risks and benefits of the study. The participant has fully agreed to participate in the study.

Signature of Interviewer: Date:

.....

Contact Detail:

Appendix III – Questionnaire

ID No.				
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Questionnaire

Topic: A Comparative Study of the Cost of Complementary/Alternative Medicine (CAM) and Conventional Treatment of Hypertension at the Ledzokuku Krowor Municipal Assembly (LEKMA) hospital.

Dear respondent,

This is a research carried to assess and compare the total costs patients incur in treating and managing hypertension using either conventional medicines or CAMs at the LEKMA hospital. You are assured that the responses/answers you give will be strictly confidential, and your name will not be mentioned in my response. Thank you.

Ques. No.	Questions	Response
Section 1	Socio-demographic Information <i>I will start by asking a few questions about your socio demographic characteristics</i>	
1	Type of hypertensive patient 1. Conventional Medicine 2. CAM	<input type="text"/>
2	Sex (Do not ask) 1. Male	<input type="text"/>

	2. Female	
3	What is your age at last birthday?	
4	<p>What is the highest level of school you attended?</p> <ol style="list-style-type: none"> 1. No formal education 2. Primary 3. JSS/JHS/ Middle 4. SSS/SHS/Vocational/Technical 5. Tertiary 	<input type="text"/>
5	<p>What is your current marital status?</p> <ol style="list-style-type: none"> 1. Married/ Co-habiting 2. Single 	<input type="text"/>
6	<p>What is your employment status?</p> <ol style="list-style-type: none"> 1. Unemployed 2. Employed <p><i>If unemployed go to Qn 7</i></p>	<input type="text"/>
7	<p>If employed, what is your occupation, that is, what kind of work do you mainly do?</p> <ol style="list-style-type: none"> 1. Self employed 2. Civil Servant 3. Private Sector Worker 	<input type="text"/>
8	<p>If unemployed, reason for not being employed?</p> <ol style="list-style-type: none"> 1. Student 2. Housewife 3. Retired 4. Unable due to hypertension 	<input type="text"/>

	5. Other (specify)	
9	What is your average monthly income (from all sources)?
10	How many people are supported on this income?
Section 2	Health Status and Treatment Information <i>Now I will ask questions concerning your medical condition (Hypertension)</i>	
11	What is your current blood pressure level?
12	How long have you been diagnosed with hypertension
13	Have you been diagnosed with any co-morbidities? 1. Yes 2. No	<input type="checkbox"/>
14	Do you skip hypertension treatment because of:	
	a) Cost 1.Yes 2. No	<input type="checkbox"/>
	b) Work 1.Yes 2. No	<input type="checkbox"/>
	c) Distance to hospital 1.Yes 2. No	<input type="checkbox"/>
	d) Nobody to accompany you to the hospital 1. Yes 2. No	<input type="checkbox"/>
	e) Lengthy time spent at hospital 1.Yes 2. No	<input type="checkbox"/>
	f) Other, please specify 1.Yes 2. No	<input type="checkbox"/>

15	<p>Who pays for your hypertension treatment</p> <ol style="list-style-type: none"> 1. Self 2. Spouse 3. Parent 4. Brother/ sister 5. Son/ Daughter 6. Employer 7. National Health Insurance 8. Private health insurance 9. Other (specify) 	<input type="checkbox"/>								
Section 3	<p>Direct Cost Information</p> <p><i>In this section I will ask questions concerning costs you incurred on your way to the facility, at the facility, and leaving the facility.</i></p>									
16	<p>Direct medical cost information</p> <p>How much money (GHS) did you spend for:</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">a) Consultation</td> <td style="width: 20%;"></td> </tr> <tr> <td>b) Lab tests</td> <td></td> </tr> </table>	a) Consultation		b) Lab tests		<table border="1" style="width: 100%;"> <tr> <td style="width: 80%;"></td> <td style="width: 20%;"></td> </tr> <tr> <td></td> <td></td> </tr> </table>				
a) Consultation										
b) Lab tests										

	c) Treatment		
	d) Medicines: Which drugs were given for hypertension treatment?		
	i) Dosage:		
	ii) Dosage:		
	iii) Dosage:		
	iv) Dosage:		
17	Direct non-medical cost information How much money (GHS) did you spend for....? a) Travel cost b) Special diet / supplements cost c) Other cost		
Section 4	Indirect Cost Information <i>Now I will ask questions about time spent away from work due to the hypertension.</i>		
22	How many days have you absented yourself from work (if applicable) in the last month because of diabetes (i.e treatment/ recovery) excluding travel and waiting time?	
23	How many minutes have you spent waiting at the facility?		
24	How many minutes did you spend travelling to and from LEKMA hospital?	
25	Does anyone accompany you to the Hospital 1. Yes 2. No		<input type="checkbox"/>

26	What is his or her employment status? 1. Unemployed 2. Employed	<input type="checkbox"/>
27	Any other information on expenses incurred due to hypertension?

