ENSIGN COLLEGE OF PUBLIC HEALTH – KPONG

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THE FEASIBILITY OF INTRODUCING SCREENING FOR NON-COMMUNICABLE DISEASES INTO PHARMACY SHOPS IN THREE (3) MUNICIPALITIES IN SOUTH-EASTERN GHANA

BY

AKUTEY RICHARD

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DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research unless otherwise stated and that no part of it has been presented for another degree in this College or elsewhere.

Name: Richard Akutey

Signature:…… Date:…….....

Supervisors' Declaration

I hereby declare that the preparation and presentation of this dissertation was supervised in accordance with guidelines on supervision of dissertation laid down by the Ensign College of Public Health

Name: Dr. Frank Baiden

Signature: …… Date:…….....

ABSTRACT

Background: The epidemiological transition with increasing prevalence of chronic non-communicable diseases (NCDs) is well established in many sub-Saharan African countries including Ghana. The introduction of screening for NCDs into pharmacy shops in Ghana is a recent development and remains largely informal.

Aim: The aim of this research is to assess the feasibility of introducing screening for non-communicable diseases into pharmacy shops in three (3) Municipalities of south-eastern Ghana aged 18 years and above.

Method: Three hundred and thirty (183 males and 137 females) clients of six pharmacy shops were surveyed. Information on Age, Sex, Marital status, Occupation, Level of education, income level, Religion, Ethnicity, knowledge about NCDs (hypertension, diabetes, obesity) and willingness to be screened in pharmacy shops was collected using questionnaires, and analyzed using Stata software (version 14.1).

Result/discussion: Clients have knowledge about NCDs risk factors (family history (27%), overweight (75%), smoking (82%), and excessive salt intake (92%)). 98.5% of clients agreed to be screened and 52.0% accepted to receive health promotion messages from pharmacy shops. About 30% of the respondents were concerned that promotional messages sent using mobile health resource could invade their privacy.

Conclusion: The introduction of screening for non-communicable diseases into pharmacy shops is acceptable to clients. This approach if formalised could expand access to NCD screening and early detection in Ghana. A similar study among clients of licensed chemical sellers is recommended.

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DEDICATION

To my father, Mr. Stephen N. Akutey

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CHAPTER ONE

INTRODUCTION

1.0 Background of the study

The epidemiological transition with increasing prevalence of chronic non-communicable diseases (NCDs) is already underway in sub-Saharan Africa (Damasceno et al, 2009; Addo et al, 2007; Agyemang et al, 2005; Pereira et al, 2009; Wamala et al, 2009; Maher et al, 2011; Walker et al, 2010; World Health Organization, 2009; Bosu, 2012) including Ghana (Agyemang et al, 2005; Bosu, 2012). The commonest NCDs experienced during this early stage of the epidemiological transition are hypertension (Maher et al, 2011; World Health Organization, 2009) and cerebral vascular accidents (strokes) with strokes in sub-Saharan Africa mainly attributable to uncontrolled hypertension (Walker et al, 2010; World Health Organization, 2009).

Hypertension is the leading risk factor for death worldwide and is beginning to be recognized as a significant public health problem in developing countries (WHO, 2009). In 2004, 12.8% of global deaths and 12.1% of deaths in low and middle income countries were attributed to hypertension (WHO, 2009). Furthermore, hypertension is a significant risk factor in CVD which is the world's number one killer (WHO, 2009). In 2004, 30% of global deaths could be attributed to CVD and a striking 82% of these deaths occurred in low to middle income countries (WHO, 2009). If current trends are allowed to continue, the World Health Organization predicts that 23.6 million people will die of cardiovascular diseases by 2030 (WHO, 2009). In the low income countries in sub-Saharan Africa; hypertension is increasing and affecting young people less than

50 years, many of whom die prematurely (Walker et al, 2010; World Health Organization, 2009). Ghana in West Africa has already seen significant increase in the prevalence of hypertension.

In Ghana, Chronic non-communicable diseases (NCDs) have caused significant illness and death for many years. Yet, until recently, they have been neglected and not considered a health priority (Bosu, 2012). In a survey in 1950 among 255 persons aged 0-75 years (95% of them less than 50 years) in Kwansakrom, a village 60 miles from Accra, 14 (5.5%) were found to have cardiovascular disease with an organic cardiac murmur or a diastolic blood pressure of more than 100 mmHg (Colbourne et al, 1950). Over the period from 1960 to 1968, strokes accounted for 6-10% of deaths in adult patient and approximately 8% of medical admissions at the Korle Bu Teaching Hospital (KBTH), Accra (Haddock, 1970). Between 1990 and 1993, the proportions increased to 17% and 11% respectively (Nyame et al, 1994). The first major community-based systematic study of cardiovascular diseases was undertaken in Mamprobi, Accra in 1974-1976 by the University of Ghana Medical School with support from the World Health Organization (WHO). The study found that 25% of urban population aged 15-64 years had abnormal cardiovascular (CVD) finding (Ikeme et al, 1978). Thirteen percent of respondents had raised blood pressure ≥160/95 mmHg and 3.4% had rheumatic heart disease. In a five year follow up survey from 1975, CVDs accounted for 48% of the adult deaths in this community (Pobee, 1993; 2006). By 2003, an epidemic of chronic disease risk factor among women in Accra had emerged with 35% of them being obese, 40% hypertensive and 23% hypercholesterolaemic (Hill et al, 2007). Comparable results from a 2005 study in the Ashanti region, located in central Ghana, determined

the prevalence of hypertension to be 33.4% in urban areas and 27.0% in rural areas (Agyemang, 2006). In Accra, Kumasi and rural areas, the estimated adult prevalence of hypertension is 28%- 40% (Hill et al, 2007; Agyemang et al, 2006; Amoah, 2006; Cappuccio, 2004; Agyemang, 2006). Nationally, hypertension has moved from being the ninth to tenth commonest cause of new outpatient morbidity in all ages in 1985-2001 to become the fifth since 2002. Stroke and hypertension have regularly been among the leading causes of deaths in hospitals in Ghana for more than 20 years. This drastic increase in the prevalence of hypertension indicates a need for further review of the condition in Ghana

Also, the estimated 6%-7% adult prevalence of diabetes in Accra in 1998-2002 (Amoah et al, 2002; Hill et al, 2007) and 9.5% in Kumasi in 2005 (Owiredu et al, 2008), is markedly higher than previous estimates of 0.4% in 1956 (Dodu, 1958). Consistent with the reported increases in chronic NCDs, obesity levels have been increasing (Hill et al, 2007; Ghana Statistical Service, 2009; Martorell et al, 2000) and fruit and vegetable consumption is among the lowest in Africa (Hall et al, 2009).

1.1.Problem statement

In the face of the high and increasing burden of chronic NCDs in Ghana, this research attempts to pilot the feasibility of introducing screening for non-communicable diseases into pharmacies in three (3) Municipalities of south-eastern Ghana. Ultimately, the data that would be collected from this study would help to develop public health interventions that can be deployed in the study region, Ghana, Africa, and whole wide

world to increase education about NCDs, the modifiable risk factors, and ways to prevent future morbidity and mortality.

1.2. Significance of the study

This research has many important applications some of which include:

1. It would give the true picture about the burden of NCDs in the three (3) Municipalities of south-eastern Ghana.
2. It would be used to make inference about the burden of NCDs in Ghana.
3. It would be used by policy makers to make public health interventions. For instance, advising pharmacies to start offering NCDs screening services.
4. It would also provide information about NCDs to the public and ways of preventing them at the early stages.
5. It would also help to reduce pressure on the health facilities.
6. It would help to reduce the pressure on the health workers.

1.3. OBJECTIVES

1.3.1. Overall Objectives

To assess the feasibility of introducing screening for non-communicable diseases into pharmacies in three (3) Municipalities of south-eastern Ghana

1.3.2. Specific Aims

1. To assess knowledge of clients about NCDs (hypertension, diabetes and obesity) and the related risk factors

2. To assess how screening for NCDs in pharmacies may be acceptable to clients of these facilities

3. To explore the factors that influence acceptability

4. To explore clients acceptability of the use of m-health resources in follow-up after screening at the facility

1.4 . Hypothesis

The introduction of screening for non-communicable diseases into pharmacy shops will be acceptable to clients.

CHAPTER TWO

LITERTURE REVIEW

2.1. DEFINITION AND INTRODUCTION OF NON-COMMUNICABLE DISEASES

Non-communicable disease (NCD) is a medical condition or disease that is non-infectious or non-transmissible. NCDs can refer to chronic diseases which last for long periods of time and progress slowly are the major cause of adult mortality and morbidity worldwide (WHO, 2005a). Sometimes, NCDs result in rapid deaths such as seen in certain diseases such as autoimmune diseases, heart diseases, stroke, cancers, diabetes, chronic kidney disease, osteoporosis, Alzheimer's disease, cataracts, and others. While sometimes (incorrectly) referred to as synonymous with "chronic diseases", NCDs are distinguished only by their non-infectious cause, not necessarily by their duration. Some viral diseases are chronic diseases of long duration, such as HIV/AIDS and hepatitis C, are caused by infections. Chronic diseases require chronic care management as do all diseases that are slow to develop and of long duration. NCDs are the leading cause of death globally. About half were under age 70 and half were women. Risk factors such as a person's background, lifestyle and environment increase the likelihood of certain NCDs. Every year, at least 5 million people die because of tobacco use and about 2.8 million die from being overweight. High cholesterol accounts for roughly 2.6 million deaths and 7.5 million die because of high blood pressure (WHO, 2011b).

2.2. **KEY DISEASES OF NON-COMMUNICABLE DISEASES**

Cardiovascular disease (**CVD**) is a class of diseases that involve the heart or blood vessels. Cardiovascular disease includes coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack). Other CVDs are stroke, hypertensive heart disease, rheumatic heart disease, cardiomyopathy, heart arrhythmia, congenital heart disease, valvular heart disease, carditis, aortic aneurysms, peripheral artery disease, and venous thrombosis. The underlying mechanisms vary depending on the disease in question. Coronary artery disease, stroke, and peripheral artery disease involve atherosclerosis. This may be caused by high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, and excessive alcohol consumption, among others. High blood pressure results in 13% of CVD deaths, while tobacco results in 9%, diabetes 6%, lack of exercise 6% and obesity 5%. Rheumatic heart disease may follow untreated strep throat *(*Mendis et al., 2011; Gaziano et al., 2010). Cardiovascular diseases are the leading cause of death globally. This is true in all areas of the world except Africa. Together they resulted in 17.3 million deaths (31.5%) in 2013 up from 12.3 million (25.8%) in 1990. Deaths, at a given age, from CVD are more common and have been increasing in much of the developing world, while rates have declined in most of the developed world since the 1970s (Fuster et al., 2010; Moran et al., 2014) Coronary artery disease and stroke account for 80% of CVD deaths in males and 75% of CVD deaths in females (Mendis et al., 2011). Most cardiovascular disease affects older adults. In the United States 11% of people between 20 and 40 have CVD, while 37% between 40 and 60, 71% of people between 60 and 80, and 85% of people over 80 have CVD (Go et al., 2013) The average age of death from coronary

artery disease in the developed world is around 80 while it is around 68 in the developing world (Fuster et al., 2010). Disease onset is typically seven to ten years earlier in men as compared to women (Mendis et al., 2011).

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. Not all tumors are cancerous; benign tumors do not spread to other parts of the body. Possible signs and symptoms include: a new lump, abnormal bleeding, a prolonged cough, unexplained weight loss, and a change in bowel movements among others. While these symptoms may indicate cancer, they may also occur due to other issues. There are over 100 different known cancers that affect humans (WHO, 2014). Tobacco use is the cause of about 22% of cancer deaths. Another 10% is due to obesity, a poor diet, lack of physical activity, and consumption of alcohol. Other factors include certain infections, exposure to ionizing radiation, and environmental pollutants. In the developing world nearly 20% of cancers are due to infections such as hepatitis B, hepatitis C, and human papillomavirus (HPV) (WHO, 2014; NCI, 2012; Anand et al., 2008). These factors act, at least partly, by changing the genes of a cell. Typically many such genetic changes are required before cancer develops. Approximately 5–10% of cancers are due to genetic defects inherited from a person's parents. Cancer can be detected by certain signs and symptoms or screening tests. It is then typically further investigated by medical imaging and confirmed by biopsy humans (WHO, 2014; American Cancer Society, 2013). In 2012 about 14.1 million new cases of cancer occurred globally (not including skin cancer other than melanoma). It caused about 8.2 million deaths or 14.6% of all human deaths. The most common types of cancer in males are lung cancer, prostate cancer, colorectal

cancer, and stomach cancer, and in females, the most common types are breast cancer, colorectal cancer, lung cancer, and cervical cancer (WHO, 2014). If skin cancer other than melanoma were included in total new cancers each year it would account for around 40% of cases (Dubas & Ingraffea, 2013; Cakir et al, 2012). In children, acute lymphoblastic leukaemia and brain tumors are most common except in Africa where non-Hodgkin lymphoma occurs more often. In 2012, about 165,000 children under 15 years of age were diagnosed with cancer. The risk of cancer increases significantly with age and many cancers occur more commonly in developed countries (WHO, 2014). Rates are increasing as more people live to an old age and as lifestyle changes occur in the developing world (Jemal et al., 2011). The financial costs of cancer have been estimated at $1.16 trillion US dollars per year as of 2010 (WHO, 2014).

Diabetes mellitus (**DM**), commonly referred to as **diabetes**, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include cardiovascular disease, stroke, chronic kidney failure, foot ulcers, and damage to the eyes (WHO, 2013; Kitabchi et al, 2009). Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.[5] There are three main types of diabetes mellitus: Type 1 DM results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown. Type 2 DM begins with insulin resistance, a condition in which cells

fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non-insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight and not enough exercise. Gestational diabetes, is the third main form and occurs when pregnant women without a previous history of diabetes develop high blood-sugar levels (RSSDI, 2012; WHO, 2013). As of 2015, an estimated 415 million people have diabetes worldwide. With type 2 DM making up about 90% of the cases. This represents 8.3% of the adult population, with equal rates in both women and men. From 2012 to 2015, diabetes is estimated to have resulted in 1.5 to 5.0 million deaths each year. Diabetes at least doubles a person's risk of death (Shi, 2014; Vos, 2012; WHO, 2013). The number of people with diabetes is expected to rise to 592 million by 2035. The global economic cost of diabetes in 2014 was estimated to be $612 billion USD (IDF, 2013).

Chronic respiratory conditions and COPD are respiratory conditions affect the airways, including the lungs as well as the passages that transfer air from the mouth and nose into the lungs. They can be long lasting (chronic) or short term (acute) and can cause ill health, disability and death. Chronic respiratory conditions can be grouped together in a variety of ways. One common grouping is obstructive lung diseases (diseases affecting the flow of air in and out of the lungs), such as asthma, chronic obstructive pulmonary disease and bronchiectasis, versus other respiratory conditions, such as chronic sinusitis and occupational lung disease (ABS, 2012).

According to the Australian Health Survey, an estimated 6.3 million Australians suffered from a chronic respiratory condition in 2011–12 (ABS, 2012). Respiratory conditions are believed to be the most commonly managed problems in general practice. Data from the Bettering the Evaluation and Care of Health survey of general practitioners suggest that respiratory conditions were managed in approximately 1 in 5 encounters from 2004–05 to 2013–14 (Britt et al., 2014).

In 2012, there were 12,465 deaths where the underlying cause was a respiratory condition (acute or chronic) (ABS, 2015). Chronic obstructive pulmonary disease (COPD) is a leading cause of death in Australia and internationally, and asthma deaths rates in Australia are high in comparison with many other countries (AIHW: Poulos et al., 2014).

Chronic kidney disease (CKD), also known as **chronic renal disease**, is progressive loss in kidney function over a period of months or years. The symptoms of worsening kidney function are not specific, and might include feeling generally unwell and experiencing a reduced appetite. Often, chronic kidney disease is diagnosed as a result of screening of people known to be at risk of kidney problems, such as those with high blood pressure or diabetes and those with a blood relative with CKD. This disease may also be identified when it leads to one of its recognized complications, such as cardiovascular disease, anemia, pericarditis or renal osteodystrophy (the latter included in the novel term CKD-MBD) (National Kidney Foundation, 2002; KDIGO, 2009). CKD is a long-term form of kidney disease; thus, it is differentiated from acute kidney disease (acute kidney injury) in that the reduction in kidney function must be present for

over 3 months. CKD is an internationally recognized public health problem affecting 5–10% of the world population (Eknoyan et al., 2004; Martínez-Castelao et al., 2014).

Chronic kidney disease is identified by a blood test for creatinine, which is a breakdown product of muscle metabolism. Higher levels of creatinine indicate a lower glomerular filtration rate and as a result a decreased capability of the kidneys to excrete waste products. Creatinine levels may be normal in the early stages of CKD, and the condition is discovered if urinalysis (testing of a urine sample) shows the kidney is allowing the loss of protein or red blood cells into the urine. To fully investigate the underlying cause of kidney damage, various forms of medical imaging, blood tests, and sometimes a kidney biopsy (removing a small sample of kidney tissue) are employed to find out if a reversible cause for the kidney malfunction is present (National Kidney Foundation, 2002).

Previous professional guidelines classified the severity of CKD in five stages, with stage 1 being the mildest and usually causing few symptoms and stage 5 being a severe illness with poor life expectancy if untreated. Stage 5 CKD is often called end-stage kidney disease, end-stage renal disease, or end-stage kidney failure, and is largely synonymous with the now outdated terms chronic renal failure or chronic kidney failure; and usually means the patient requires renal replacement therapy, which may involve a form of dialysis, but ideally constitutes a kidney transplant. Recent international guidelines reclassified CKD based on cause, glomerular filtration rate category (G1, G2, G3a, G3b, G4 and G5), and albuminuria category (A1, A2, A3) (KDIGO, 2012).

Screening of at-risk people is important because treatments exist that delay the progression of CKD (Plantinga et al., 2010). If an underlying cause of CKD, such as vasculitis, or obstructive nephropathy (blockage to the drainage system of the kidneys) is found, it may be treated directly to slow the damage. In more advanced stages, treatments may be required for anemia and kidney bone disease [also called renal osteodystrophy, secondary hyperparathyroidism or chronic kidney disease - mineral bone disorder (CKD-MBD)]. Chronic kidney disease resulted in 956,000 deaths in 2013 up from 409,000 deaths in 1990 (GDB et al., 2014).

2.3. **RISK FACTORS OF NON-COMMUNICABLE DISEASES**

There are several risk factors for non-communicable diseases. Risk factors such as a person's background; lifestyle and environment are known to increase the likelihood of certain non-communicable diseases. They include age, gender, genetics, exposure to air pollution (Kelly et al., 2010; Mendis et al., 2011), and behaviors such as smoking, unhealthy diet and physical inactivity which can lead to hypertension and obesity, in turn leading to increased risk of many NCDs (Frinks et al., 2012). While the individual contribution of each risk factor varies between different communities or ethnic groups the overall contribution of these risk factors is very consistent. Some of these risk factors, such as age, gender or family history, are immutable; however, many important non-communicable risk factors are modifiable by lifestyle change, social change, drug treatment and prevention of hypertension, hyperlipidemia, and diabetes (Yusuf et al., 2004). The WHO's World Health Report 2002 identified five important risk factors for non-communicable disease in the top ten leading risks to health. These are raised blood

pressure, raised cholesterol, tobacco use, alcohol consumption, and overweight. The other factors associated with higher risk of NCDs include a person's economic and social conditions, also known as the "[social determinants of health]".It has been estimated that if the primary risk factors were eliminated, 80% of the cases of heart disease, stroke and type 2 diabetes and 40% of cancers could be prevented. Interventions targeting the main risk factors could have a significant impact on reducing the burden of disease worldwide. Efforts focused on better diet and increased physical activity have been shown to control the prevalence of NCDs (Frinks et al., 2012; Micha et al, 2012)

2.4. **EFFECTS OF NON-COMMUNICABLE DISEASES**

Previously, chronic NCDs were considered a problem limited mostly to high income countries, while infectious diseases seemed to affect low income countries. The burden of disease attributed to NCDs has been estimated at 85% in industrialized nations, 70% in middle income nations, and nearly 50% in countries with the lowest national incomes (WHO, 2005). In 2008, chronic NCDs accounted for more than 60% (over 35 million) of the 57 million deaths worldwide. Given the global population distribution, almost 80% of deaths due to chronic NCDs worldwide now occur in low and middle income countries, while only 20% occur in higher income countries (WHO, 2011b).

National economies are reportedly suffering significant losses because of premature deaths or inability to work resulting from heart disease, stroke and diabetes. For instance, China is expected to lose roughly $558 billion in national income between 2005 and 2015 due to early deaths. In 2005, heart disease, stroke and diabetes caused an

estimated loss in international dollars of national income of 9 billion in India and 3 billion in Brazil (WHO, 2005).

The burden of chronic NCDs including mental health conditions is felt in workplaces around the world, notably due to elevated levels of absenteeism, or absence from work because of illness, and presenteeism, or productivity lost from staff coming to work and performing below normal standards due to poor health. For example, the United Kingdom experienced a loss of about 175 million days in 2006 to absence from illness among a working population of 37.7 million people. The estimated cost of absences due to illness was over 20 billion pounds in the same year. The cost due to presenteeism is likely even larger, although methods of analyzing the economic impacts of presenteeism are still being developed. Methods for analyzing the distinct workplace impacts of NCDs versus other types of health conditions are also still being developed (Cooper & Dewe, 2008)

2.5. **PREVENTION AND CONTROL OF NON-COMMUNICABLE DISEASES**

Most NCDs are considered preventable because they are caused by modifiable risk factors.

Greater number of deaths could be prevented by avoiding risk factors including: tobacco, overweight or obesity, an insufficient diet, physical inactivity, alcohol, sexually transmitted infections, and air pollution (WHO, 2005a).

For instance, it is estimated that 90% of CVD is preventable (McGill et al., 2008). Prevention of atherosclerosis is by decreasing risk factors through: healthy eating, exercise, avoidance of tobacco smoke and limiting alcohol intake. Treating high blood

pressure and diabetes is also beneficial (*Mendis et al., 2011*). Treating people who have strep throat with antibiotics can decrease the risk of rheumatic heart disease (Spinks et al., 2013). The effect of the use of aspirin in people who are otherwise healthy is of unclear benefit (Sutcliffe et al., 2013). The United States Preventive Services Task Force recommends against its use for prevention in women less than 55 and men less than 45 years old; however, in those who are older it is recommends in some individuals (US Preventive Services Task Force, 2009). Treatment of those who have CVD improves outcomes (*Mendis et al., 2011)*.

Also, Greater than 30% of cancer deaths could be prevented by avoiding risk factors including: tobacco, overweight or obesity, an insufficient diet, physical inactivity, alcohol, sexually transmitted infections, and air pollution (WHO, 2014). Many cancers can be prevented by not smoking, maintaining a healthy weight, not drinking too much alcohol, eating plenty of vegetables, fruits and whole grains, being vaccinated against certain infectious diseases, not eating too much processed and red meat, and avoiding too much exposure to sunlight (Kushi et al., 2012; Parkin et al., 2011). Early detection through screening is useful for cervical and colorectal cancer (WHO, 2014). The benefits of screening in breast cancer are controversial (WHO, 2014; Gøtzsche & Jørgensen, 2013). Cancer is often treated with some combination of radiation therapy, surgery, chemotherapy, and targeted therapy. Pain and symptom management are an important part of care. Palliative care is particularly important in those with advanced disease. The chance of survival depends on the type of cancer and extent of disease at the start of treatment. In children under 15 at diagnosis the five-year survival rate in the

developed world is on average 80%. For cancer in the United States the average five-year survival rate is 66% (WHO, 2014).

Furthermore, Prevention and treatment involve a healthy diet, physical exercise, maintaining a normal body weight, and avoiding use of tobacco. Control of blood pressure and maintaining proper foot care are important for people with the disease. Type 1 DM must be managed with insulin injections. Type 2 DM may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar (Rippe et al., 2010). Weight loss surgery in those with obesity is sometimes an effective measure in those with type 2 DM (Picot et al., 2009). Type 2 diabetes can also be prevented by a person being a normal body weight, physical exercise, and following a healthful diet. Dietary changes known to be effective in helping to prevent diabetes include a diet rich in whole grains and fiber, and choosing good fats, such as polyunsaturated fats found in nuts, vegetable oils, and fish. Limiting sugary beverages and eating less red meat and other sources of saturated fat can also help in the prevention of diabetes. Active smoking is also associated with an increased risk of diabetes, so smoking cessation can be an important preventive measure as well (Willi et al., 2007). Gestational diabetes usually resolves after the birth of the baby (Cash, 2014).

It has been estimated that if the primary risk factors were eliminated, 80% of the cases of heart disease, stroke and type 2 diabetes and 40% of cancers could be prevented. Interventions targeting the main risk factors could have a significant impact on reducing the burden of disease worldwide. Efforts focused on better diet and increased physical activity has been shown to control the prevalence of NCDs (WHO, 2005a).

CHAPTER THREE

MATERIALS AND METHODS

3.0. STUDY AREA

The Yilo Krobo, Lower Manya Krobo, and Asuogyaman Districts are one of the twenty-six Districts in the Eastern Region of Ghana. They are located in the south eastern part of the Ghana and lie between latitude 6.05S and 6.30N and longitude 0008E and 0.20W.

The Yilo Krobo, Lower Manya Krobo, and Asuogyaman Districts cover land areas of 805, 1,476 and 1,507 square kilometers with population sizes of 95,462, 99,019 and 106,545 respectively.

3.1. SAMPLING TECHNIQUE

No formal sample size estimation was applied in this study. All clients (age 18 years and above) to the selected pharmacy shops over the six (6) week period from 1st February to 7th march, 2016 were approached and interviewed.

Six pharmacy shops were conveniently-selected for this study: one (1) at Atimpoku, one (1) at Agormanya, one (1) at Atua, and three (3) at Somanya. With the use of questionnaires the following information were obtained from participants who agreed to participate in the study: Age, Sex, Marital status, Occupation, Level of education, income level, Religion, Ethnicity, knowledge about NCDs (hypertension, diabetes, obesity) and willingness to be screened any time they visit these pharmacy shops.

3.2. DATA ANALYSIS STRATEGIES

The data collected was analyzed using Stata software (version 14.1). The Statistical significance was determined at $P < 0.05$. The analysis was largely descriptive. Although logistic regression to determine predictors of acceptability was planned, this was not feasible because of the overwhelming number of respondents who consider the practice acceptable.

CHAPTER FOUR

RESULTS

A total of 330 participants took part in the study over a six-week period from 1st February to 7th march, 2016. They were made of 58% males and 42% females. The youngest and oldest participants interviewed were 18yrs and 85yrs respectively. The median, mean and standard deviation ages were 34 years (interquartile range of 27-43years), 36 years, and 10years respectively. The majority of participants were Christians (90%). The rest were Muslims and traditionalists (10%). Most of the participants were married (45%), followed by single (40%), and Divorced, separated or widowed (15%). The level of education of the participants showed some have no education (16%), JHS (25%), SHS and middle form or A-level (27%), and post-secondary or vocational (polytechnic), graduate and post-graduate level (32%). The place of residence of the participants showed that, some were within 30 minutes (56%), between 30-60 minutes (31%), and more than 60 minutes (13%) from the pharmacy shops. With the ethnicity, Ga-adangbes formed 50%, whiles Akans, Ewes, Moshi-Dagbanis and others formed 50%. The occupational status of the participants showed that unemployed (19%), informal occupation (58%), and formal occupation (23%). Also the median, mean and standard deviation of the income level of the participants were GH 800 Cedis (interquartile range of GH 500-1000 Cedis), GH 897Cedis, and GH 949 Cedis respectively.

Table 4.1 Demographic characteristics of respondents

Variables		Number	Percentage
Age			
	18-30 Years	133	40.30
	31-50 Years	158	47.88
	51-85years	39	11.82
Sex			
	Female	134	42.27
	Male	183	57.73
Religion			
	Christians	292	89.85
	Muslims & Traditionalists	33	10.15
Marital Status			
	Married	148	44.85
	Single	134	40.60
	Divorced, Separated, & Widowed	48	14.55
Level Of Education			
	None	54	16.36
	Jhs	82	24.85
	Shs & Middle Form/A-Level	89	26.97
	Post-Secondary/Vocational, Graduate Degree, & Post-Graduate Level	105	31.81
Ethnicity			
	Ga-Adangbes	160	49.54
	Ewes, Akans, Moshi-Dagbani, & Others	163	50.46
Place Of Residence			
	Within 30 Minutes	181	55.52
	Between 30-60 Minutes	102	31.39
	More Than 60 Minutes	43	13.19
Occupational Status			
	Unemployed	51	18.82
	Informal Occupation	156	57.56
	Formal Occupation	64	23.63
Income Level			
	Decline	212	64.24
	Less Than Gh 500 Cedis	42	12.73
	Between Gh 500-1000 Cedis	48	14.55
	More Than Gh 1000 Cedis	28	8.48

The result showed that, majority of the participants was aware that overweight (75%), smoking (82%), and excessive salt intake (92%) were risk factors of hypertension and diabetes. Awareness of family history as a risk factor was somehow low (27%). A high proportion of respondents did not consider family history as a risk factor for hypertension and diabetes (73%). This was shown in figure 4.1 below.

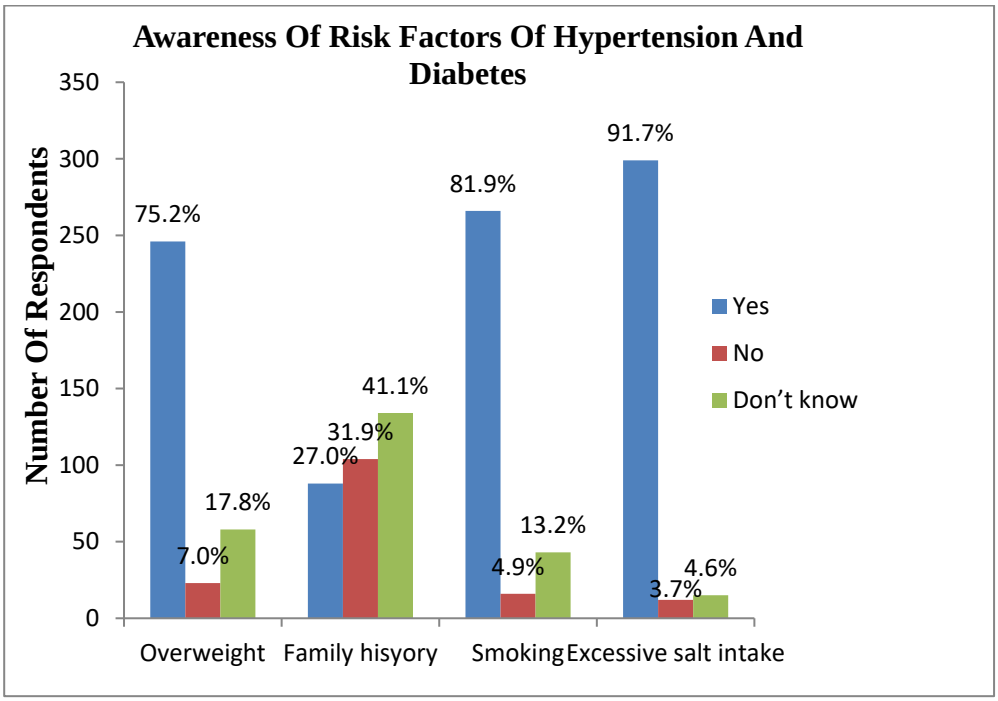

Figure 4.1 A bar chart showing the clients awareness of the risk factors of Hypertension and Diabetes.

Only 35.4% of the respondents were aware of their current weight at the time of the interview (Figure 4.2).

Figure 4.2 showed the client knowledge of his or her weight. It showed that majority of the participants (64.6%) did not know their weight.

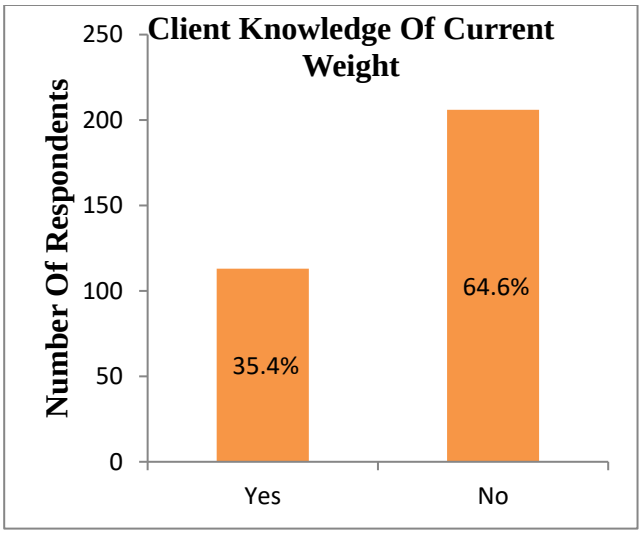

Figure 4.2 A bar chart showing the client knowledge of current weight

Many (44.1%) respondents however indicated they did not remember the last time they had a weight check. Among those who remember, 34.2% had done so between 1-6 months ago, 4.5% between 6-12 months, and 17.2% about a year ago (Figure 4.3).

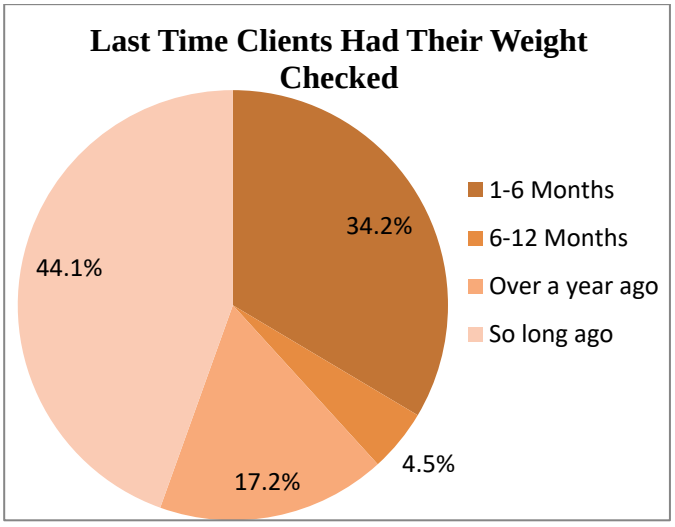

Figure 4.3 A pie chart showing the last time clients had their weight checked.

Figure 4.4 showed that majority of the clients (79%) did not know their BP level.

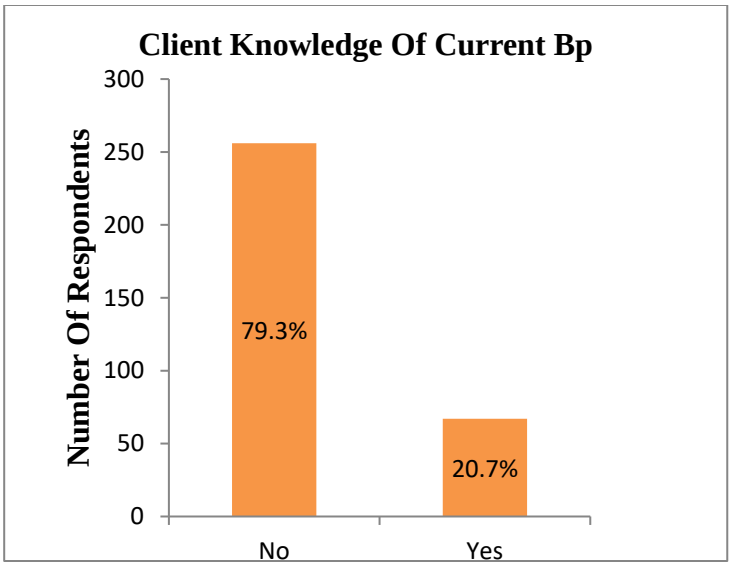

Figure 4.4 A bar chart showing the clients knowledge of current BP

Furthermore, figure 4.5 also showed the last time the clients had their BP checked as: so long ago (64.0%), over a year ago (7.2%), 6-12 months (3.3%), and 1-6 months (25.5%).

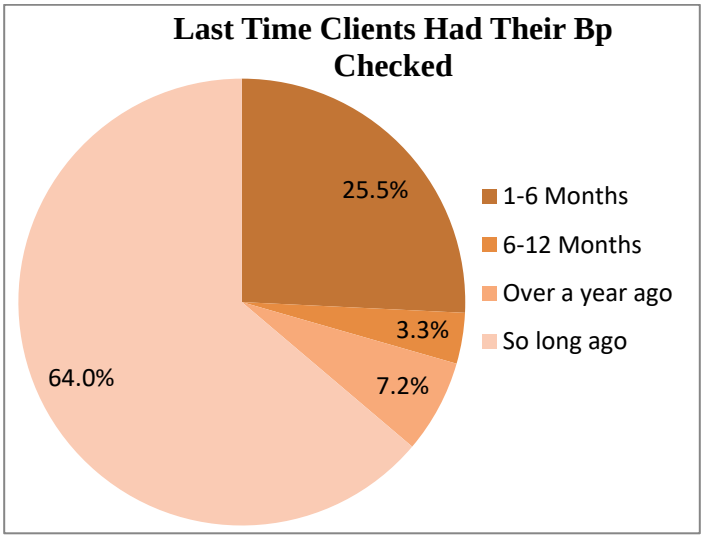

Figure 4.5 A pie chart showing the last time clients had their BP checked

About a third (35.7%) of the clients who were hypertensive had not had their BP check for over a year. Similarly 21.4% of clients who were aware that they had a family history of hypertension did not know their Bp status and 42.9% of those who did not know whether there was a family history of hypertension or not and had not checked their Bp at the time of interview status (Table 4.2).

Table 4.2 The association between clients status of hyper tension, the last time they had their BP checked, and family history of hypertension.

	Client hypertension status		
	Hypertensive	Not hypertensive	Don't know
Last time blood pressure was checked			
Within past 6months	19 (55.9%)	44 (24.4%)	21 (19.1%)
Between 6-12 months ago	3 (8.8%)	6 (3.3%)	3 (2.7%)
Over a year ago	3(8.8%)	18 (10.0%)	1(0.9%)
So long ago, it is forgotten	9 (26.5%)	112 (62.2%)	85 (77.3%)
Client has family history of hypertension			
Yes	17 (50.0%)	41 (22.9%)	24 (21.4%)
No	7 (20.6%)	94 (52.5%)	40 (35.7%)
Don't know	10 (29.4%)	44(24.6%)	48 (42.9%)

About a quarter (24.8%) and 14.1% respectively of clients interviewed had family histories of hypertension and diabetes (Figure 4.6).

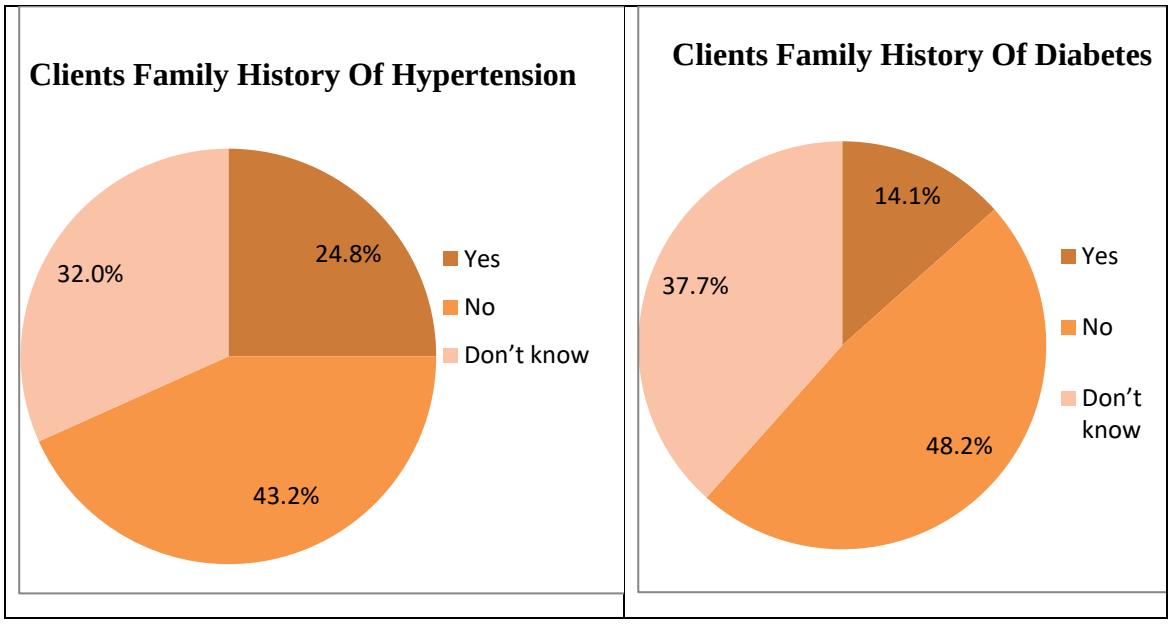

Figure 4.6 Pie charts showing clients family history of Hypertension and Diabetes

Figure 4.7 showed clients agreement to be screened for hypertension and diabetes at the pharmacy shops. Majority of the clients (98.5%) agreed to be screened for hypertension and diabetes at the pharmacy shops.

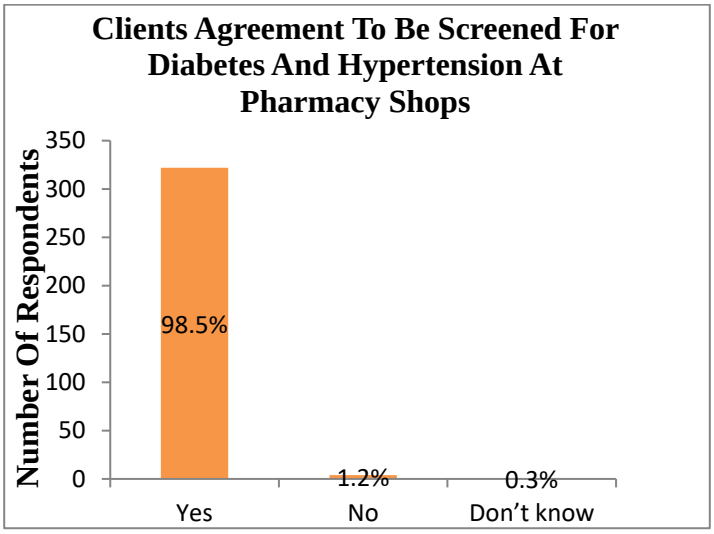

Figure 4.7 Pie chart showing clients agreement to be screened for hypertension and diabetes at the pharmacy shops

Majority of the clients (56.7%) wanted screening for hypertension and diabetes to be done for free at pharmacy shops. For clients who wanted to pay, 77%, 21% and 2% suggested one Ghana cedis or less, between 1-2 Ghana cedis, and between 2-5 Ghana cedis respectively to be paid for the cost of screening (Figure 4.8).

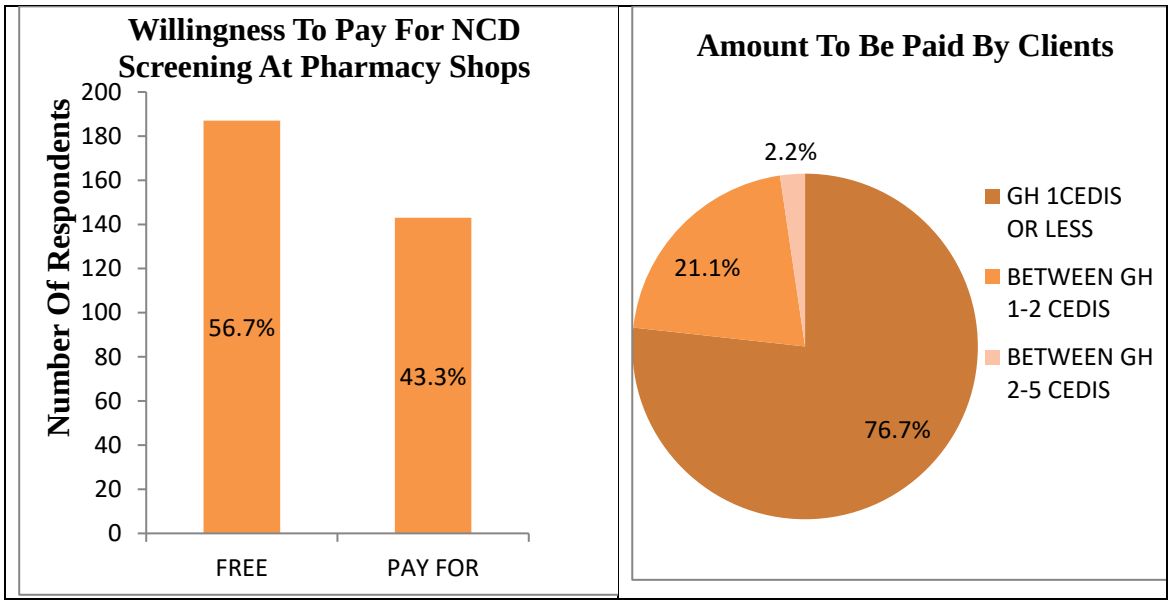

Figure 4.8 Pie charts showing client responds to pay or not for screening and amount to be paid

Majority of the clients (52.0%) agreed to receive health promotion messages from pharmacy shops. For privacy issues, 60.9% of the clients considered receiving health promotion messages from pharmacy shops as non-invasion of their privacy (Figure 4.9).

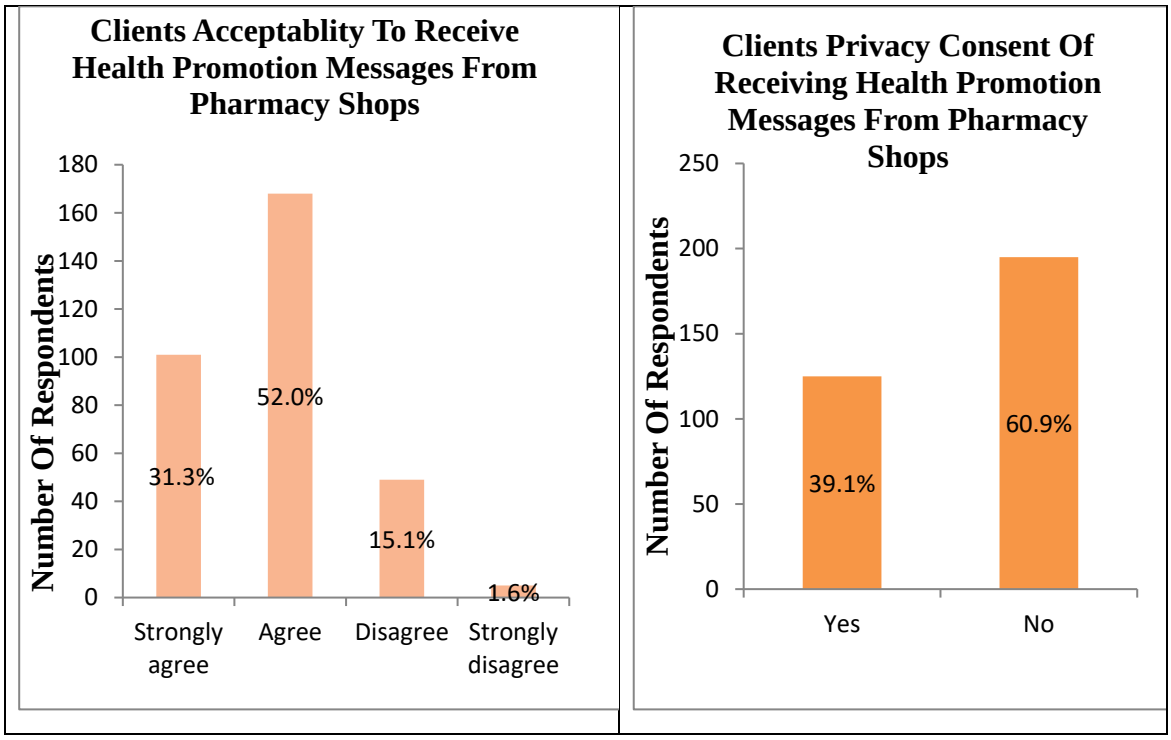

Figure 4.9 Bar charts showing clients acceptability and privacy consent to receive health promotion messages from pharmacy shops

The majority of clients (83.3%) indicated a willingness to receive health promotion text messages sent by phone from the pharmacy shops. However 40.5% regards such messages as potentially their privacy (Table 4.3).

Table 4.3 The association between clients acceptability and privacy consent to receive health promotion messages from pharmacy shops

1. **Clients Privacy Consent Of Receiving Health Promotion Messages From Pharmacy Shops**		**Client Acceptability To Receive Health Promotion Messages From Pharmacy Shops**	
		Agree	Disagree
		269 (83.3%)	54 (16.7%)
Yes	125 (39.1%)	107 (40.5%)	18 (34.0%)
No	195 (60.9%)	159 (59.5%)	36 (66.0%)

Table 4.4 showed the association between demographic characteristics and client's acceptability and privacy consent to receive health promotion messages from pharmacy shops. It revealed that there was a strong association between demographic characteristics such as age, sex, religion, marital status, and level of education and client's acceptability to receive health promotion messages from pharmacy shops with p-values 0.00, 0.01, 0.03, 0.01, and 0.00 respectively. Also, there was a strong association between demographic characteristics such as marital status, level of education, and income level and clients privacy consent to receive health promotion messages from pharmacy shops with p-values of 0.00, 0.00, and 0.03 respectively

Table 4.4 The association between Demographic characteristics and clients acceptability and privacy consent to receive health promotion messages from pharmacy shops

	Client Acceptability To Receive Health Promotion Messages From Pharmacy Shops		**P-Value**	**Clients Privacy Consent Of Receiving Health Promotion Messages From Pharmacy Shops**		**P-Value**
	Agree	Disagree		Yes	No	
Variables						
Age			0.00			0.17
18-30 Years	123(45.7%)	8(14.8%)		58(46.4%)	70(35.9%)	
31-50 Years	113(42.0%)	40(74.1%)		54(43.2%)	102(52.3%)	
51-85years	33 (12.3%)	6 (11.1%)		13(10.4%)	23 (11.8%)	

Sex			0.01			0.37
Female	115(44.9%)	14(25.9%)		54(45.4%)	76 (40.2%)	
Male	141(55.1%)	40(74.1%)		65(54.6%)	113(59.8%)	
Religion			0.03			0.70
Christians	234(88.0%)	51(98.1%)		110(88.7%)	172(90.1%)	
Muslims & Traditionalists	31 (12.0%)	2 (1.9%)		14 (11.3%)	19 (9.9%)	
Marital Status			0.01			0.00
Married	116(43.1%)	28(51.8%)		43 (34.4%)	99 (50.8%)	
Single	119(44.2%)	13(24.1%)		65 (52.0%)	65 (33.3%)	
Divorced, Separated, & Widowed	34 (12.7%)	13(24.1%)		17 (13.6%)	31 (15.9%)	
Level Of Education			0.00			0.00
None	40 (14.9%)	13(24.1%)		17 (13.6%)	37 (19.0%)	
Jhs	58 (21.6%)	23(42.5%)		21 (16.8%)	60 (30.8%)	
Shs & Middle Form/A-Level	82 (30.5%)	5 (9.3%)		49 (39.2%)	34 (17.4%)	
Post-Secondary/Vocational, Graduate Degree, & Post-Graduate Level	89 (33.0%)	13(24.1%)		38 (30.4%)	64 (32.8%)	
Ethnicity			0.96			0.41
Ga-Adangbes	130(49.6%)	27(50.0%)		64 (52.5%)	91 (47.6%)	
Ewes, Akans, Moshi-Dagbani, & Others	132(50.4%)	27(50.0%)		58 (47.5%)	100(52.4%)	
Place Of Residence			0.08			0.56
Within 30 Minutes	155(58.3%)	23(43.4%)		72 (58.0%)	102(53.1%)	
Between 30-60 Minutes	75 (28.2%)	23(43.4%)		38 (30.7%)	61 (31.8)	
More Than 60 Minutes	36 (13.5%)	7(13.2%)		14 (11.3%)	29 (15.1)	

Occupational Status			0.12			0.54
Unemployed	47 (21.1%)	3 (7.3%)		20 (19.2%)	29 (18.4%)	
Informal Occupation	124(55.6%)	27(65.9%)		56 (53.9%)	95 (60.1%)	
Formal Occupation	52 (23.3%)	11(26.8%)		28 (26.9%)	34 (21.5%)	
Income Level			0.25			0.03
Decline	166(61.7%)	41(75.9%)		90 (72.0%)	114(58.5%)	
Less Than Gh 500 Cedis	38 (14.1%)	4(7.4%)		10 (8.0%)	32 (16.4%)	
Between Gh 500-1000 Cedis	40 (14.9)	6 (11.0%)		13 (10.4%)	33 (16.9%)	
More Than Gh 1000 Cedis	25 (9.3)	3 (5.7%)		12 (9.6%)	16 (8.2%)	

CHAPTER FIVE

DISCUSSION

There are several risk factors for non-communicable diseases. Risk factors such as a person's background; lifestyle and environment are known to increase the likelihood of certain non-communicable diseases. They include age, gender, genetics, exposure to air pollution (Kelly et al., 2010; Mendis et al., 2011), and behaviors such as smoking, unhealthy diet and physical inactivity which can lead to hypertension and obesity, in turn leading to increased risk of many NCDs (Frinks et al., 2012). This was confirmed by figure 4.1 when the knowledge of the clients was tested, with the results revealing that except family history (27%), majority of the participants were aware that overweight (75%), smoking (82%), and excessive salt intake (92%) were risk factors of hypertension and diabetes. however, in spite of the clients awareness of risk factors of hypertension and diabetes, figure 4.2 and 4.4 showed that majority of the clients (65% and 79%) did not know their weight and BP level respectively. Figure 4.3 and 4.5 also revealed that majority of the clients (44% and 64%) did not know their weight and BP level respectively for so long ago. This result can be used to explain previous works indicating that epidemiological transition with increasing prevalence of chronic non-communicable diseases (NCDs) is already underway in sub-Saharan Africa (Damasceno et al, 2009; Addo et al, 2007; Agyemang et al, 2005; Pereira et al, 2009; Wamala et al, 2009; Maher et al, 2011; Walker et al, 2010; World Health Organization, 2009; Bosu, 2012) including Ghana (Agyemang et al, 2005; Bosu, 2012). This is a serious public health concern because there are a lot of people out there that do not go for regular check up to know their status of BMI and hypertension.

Furthermore, when association between client's status of hyper tension and the last time they had their BP checked was done by Table 4.2, it gave a significant p-value of 0.00. It revealed that 35% of the clients were hypertensive but did not check their BP over a year ago. Table 4.2 showed the association between client's status of hyper tension and their family history. From the result, 21% of clients were aware that there was family history of hypertension yet they did not know their status. Also, 43% of them did not know whether there was a family history of hypertension or not and they too did not border to check their status of hypertension. Figure 4.6 showed clients family history of Hypertension and Diabetes. It revealed that 25% and 14% of the clients have family history of hypertension and diabetes respectively. This result can be used to explain former works revealing that, in the low income countries hypertension is increasingly affecting young people less than 50 years, many of whom die prematurely as compared to the developed countries (Walker et al, 2010; World Health Organization, 2009). In 2004, 30% of global deaths could be attributed to CVD and a striking 82% of these deaths occurred in low to middle income countries (WHO, 2009), which Ghana could be of no exception. Also, when the clients were asked about their acceptability to be screened for hypertension and diabetes whenever they visit these pharmacy shops, figure 4.7 showed that majority of them (98.5%) agreed to be screened. In addition to the above, when the clients were asked whether they would pay or not for the screening, Figure 4.8 showed that majority of them (56.7%) wanted it to be done for free. For clients who wanted to pay, 77%, 21% and 2% of them suggested GH 1 cedis and below, between GH 1-2 cedis, and between GH 2-5cedis respectively to be paid for the cost of screening.

Lastly, results from 2005 study in the Ashanti region, located in central Ghana, determined the prevalence of hypertension to be 33.4% in urban areas and 27.0% in rural areas (Agyemang, 2006). In Accra, Kumasi and rural areas, the estimated adult prevalence of hypertension is 28%- 40% (Hill et al, 2007; Agyemang et al, 2006; Amoah, 2006; Cappuccio, 2004; Agyemang, 2006). Nationally, hypertension has moved from being the ninth to tenth commonest cause of new outpatient morbidity in all ages in 1985-2001 to become the fifth since 2002. Stroke and hypertension have regularly been among the leading causes of deaths in hospitals in Ghana for more than 20 years. This drastic increase in the prevalence of hypertension indicates a need for further review of the condition in Ghana, and can be done by including mobile health. Mobile text messages have been used to improve health outcomes in a wide range of contexts because of their low cost and convenience (Krishna et al, 2009). For instance, text messages have been used in health programmes for smoking cessation (Chen et al, 2012), disease management (Holtz & Lauckner, 2012) and weight reduction (Stephens & Allen, 2013) and to improve adherence to medication (Horvath et al, 2012) and attendance at health-care appointments (Car et al, 2012). In general, text messages seem to be effective for communicating information in a health-care context and have been well accepted by users (Yeager & Menachemi, 2011). Research also indicates that text messages could serve as a powerful tool for behaviour change (Cole-Lewis & Kershaw, 2010), both in developed and developing countries (Déglise et al, 2012). This has been revealed in this study when client's acceptability and privacy consent to receive health promotion messages from pharmacy shops were done by figure 4.9. It revealed that majority of the clients (52.0%) agreed to receive health promotion messages from

pharmacy shops. For privacy issues, 60.9% of the clients considered receiving health promotion messages from pharmacy shops as non-invasion of their privacy. However, when the association between client's acceptability and privacy consent to receive health promotion messages from pharmacy shops was done by Table 4.3, it revealed that majority of the clients (83.3%) agree to receive health promotion messages from pharmacy shops but 40.5% of them consider it as invasion of their privacy. This means that although most of the clients agree to receive health promotion messages from pharmacy shops, however about half of them have issues with it as invasion of their privacy. Also, when the association between demographic characteristics and client's acceptability and privacy consent to receive health promotion messages from pharmacy shops was done by Table 4.4, it revealed that there was a strong association between demographic characteristics such as age, sex, religion, marital status, and level of education and client's acceptability to receive health promotion messages from pharmacy shops with p-values of 0.00, 0.01, 0.03, 0.01, and 0.00 respectively. Also, there was a strong association between demographic characteristics such as marital status, level of education, and income level and clients privacy consent to receive health promotion messages from pharmacy shops with p-values of 0.00, 0.00, and 0.03 respectively. Hence, user guidelines need to be established for mobile-Health programs to help manage privacy and security issues especially considering mobile phones are often shared among family and community members (Srinath et al, 2005).

CHAPTER SIX

CONCLUSION, LIMITATION, AND RECOMMENDATION

6.1 CONCLUSION

The acceptability of introducing screening for non-communicable diseases into pharmacies was conducted in three (3) municipalities of south-eastern Ghana. Three hundred and thirty (330) participants were used for the study (58%) males and (42%) females with ages starting from eighteen (18) years and above. Except family history (27%) majority of the participants were aware that overweight (75%), smoking (82%), and excessive salt intake (92%) were risk factors of hypertension and diabetes. Majority of the clients (65% and 79%) did not know their weight and BP level respectively, and majority of them (44% and 64%) did know not their weight and BP level respectively for so long ago. Association between client's status of hypertension and the last time they had their BP checked gave a significant p-value of 0.00 with 35% of the clients being hypertensive but did not check their BP over a year ago. Association between client's status of hypertension and their family history showed that 21% of clients were aware that there was family history of hypertension yet they did not know their status. Also, 43% of them did not know whether there was a family history of hypertension or not and they too did not border to check their status of hypertension. Family history of Hypertension and Diabetes revealed that 25% and 14% of the clients have family history of hypertension and diabetes respectively. Client's acceptability to be screened for hypertension and diabetes whenever they visit these pharmacy shops revealed that, majority of them (98.5%) agreed to be screened with 56.7% wanting screening to be

done for free. For clients who wanted to pay, 77%, 21% and 2% of them suggested GH 1 cedis and below, between GH 1-2 cedis, and between GH 2-5cedis respectively to be paid for the cost of screening.

Furthermore, client's acceptability and privacy consent to receive health promotion messages from pharmacy shops revealed that majority of the clients (52.0%) agreed to receive health promotion messages from pharmacy shops. For privacy issues, 60.9% of the clients considered receiving health promotion messages from pharmacy shops as non-invasion of their privacy. However, association between client's acceptability and privacy consent to receive health promotion messages from pharmacy shops revealed that majority of the clients (83.3%) agree to receive health promotion messages from pharmacy shops but 40.5% of them consider it as invasion of their privacy. Also, association between demographic characteristics and client's acceptability and privacy consent to receive health promotion messages from pharmacy shops revealed that there was a strong association between demographic characteristics such as age, sex, religion, marital status, and level of education and client's acceptability to receive health promotion messages from pharmacy shops with p-values of 0.00, 0.01, 0.03, 0.01, and 0.00 respectively. Also, there was a strong association between demographic characteristics such as marital status, level of education, and income level and clients privacy consent to receive health promotion messages from pharmacy shops with p-values of 0.00, 0.00, and 0.03 respectively.

6.2 LIMITATION

The participants of this study were clients that come to buy drugs from these pharmacy shops; hence it was very difficult to obtain information from them. This was because almost all the clients were in hurry to go back from where they were coming from after buying whatever drug they were in for. This made them not to have time for any interrogations or questions. Either the client coming to buy the drug was sick him or herself or being sent by somebody seriously sick. Also, some clients went to the extent of asking for further explanation and lot of questions, after which a decision would be made of not being interested.

5.3 RECOMMENDATION

Ghana is a developing country with an increasing prevalence of chronic non-communicable diseases (NCDs), hence I recommend that:

1. Pharmacy shops should be encouraged to offer screening services for non-communicable diseases.
2. Public awareness of various risk factors of non-communicable diseases should be increased.
3. There must be increased public education to encourage people to go for regular check-ups at these pharmacy shops.
4. This study should be conducted at the licensed chemical shops which are many and much closer to the people.

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APPENDIX 1

PILOTING THE FEASIBILITY OF INTRODUCING SCREENING FOR NON-COMMUNICABLE DISEASES INTO PHARMACY SHOPS IN THREE (3) MUNICIPALITIES IN SOUTH-EASTERN GHANA

SECTION A: SOCIODEMOGRAPHIC AND ECONOMIC BACKGROUND OF CLIENTS

A1. Age: ____ ____ yrs **A2.** Sex: ☐ Male ☐ Female

A3. Religion: ☐ 1. Christian ☐ 2. Muslim ☐ 3. Traditionalist ☐ 4. Other

A4. Marital status: ☐ 1. Married ☐ 2. Single ☐ 3. Divorced ☐ 4. Widowed ☐ 5. Separated
☐ 6. Other: _____

A5. Level of education

☐ 1. None ☐ 2. JHS ☐ 3. SHS ☐ 4. Middle form/A-level ☐ 5.Post-secondary vocational (Polytechnic)
☐ 6. Graduate degree ☐ 7. Post-graduate level

A6. Ethnicity

☐ 1. Ga-Adangbe ☐ 2. Akan ☐ 3. Ewe 4. Moshi-Dagbani 5. Other: _____

A7. Place of residence: How far is your home from this shop?

☐ 1. Within 15mins walking distance ☐ 2. Between 15-30m walking distance ☐ 3. Between 30-60 walking distance
☐ 4. More an 1hr walking distance ☐ 5. Travelling distance (Not walkable distance)

A8. Occupation: What is your current occupational status?

☐ 1. Unemployed ☐ 2. Petty trader ☐ 3. Farmer ☐ 4. Driver ☐ 5.Business(wo)man
☐ 6. Other:_____

A9. Income level: About how much do you earn (profit) in a month? 1. _____GHC

☐ 2. Decline to answer

SECTION B: NCD RISK FACTORS AND ACCEPTABILITY OF SCREENING

B1. Can you tell me three things that can put you at risk of getting hypertension or diabetes? [RECORD SPONTANEOUS ANSWER ONLY)

a. _____
b. _____
c. _____

B2. Do you think the following can increase your risk of developing hypertension or diabetes?

a. Overweight: (___) – 1 – Yes , (___) – 2 – No, (___) – 3 – Don't know
b. Parent(s) or close relative has it: (___) – 1 – Yes , (___) – 2 – No, (___) – 3 – Don't know
c. Smoking: (___) – 1 – Yes , (___) – 2 – No, (___) – 3 – Don't know
d. Excessive salt intake: (___) – 1 – Yes , (___) – 2 – No, (___) – 3 – Don't know

B3. Do you know how much your weigh? ☐ 1. Yes ☐ 2. No. If yes, what is it? ____ ___ kg

B4. How long ago did you last check your weight?

☐ 1. Within 1m ago	☐ 2. Between 1-3m ago	☐ 3. Between 3-6m ago
☐ 4. Between 6-12m ago	☐ 5. Over a year ago	☐ 6. Can't remember

B5. Do you know your usual BP level? ☐ 1. Yes ☐ 2. No. If yes, what is it? ___ __ /__ __ mmHg

B6. How long ago did you last check your BP?

☐ 1. Within 1m ago ☐ 2. Between 1-3m ago ☐ 3. Between 3-6m ago
☐ 4. Between 6-12m ago ☐ 5. Over a year ago ☐ 6. Can't remember

B7. Would you agree to have your BP checked for you whenever you visit this or other such shop?

☐ 1. Yes ☐ 2. No ☐ 3. Don't know

B8. Would you agree to have your urine checked for sugar whenever you visit this or other such shop?

☐ 1. Yes ☐ 2. No ☐ 3. Don't know

B9. About how much should a BP check here cost for you to consider it affordable?

☐ 1. Won't pay for it. Should be free ☐ 2. GHC_____.__ ___p

B10. About how much should a urine check here cost for you to consider it affordable?

☐ 1. Won't pay for it. Should be free ☐ 2. GHC_____.__ ___p

B11. Do you know whether you have hypertension? ☐ 1. Yes ☐ 2. No ☐ 3. Don't know

B11a. If 'Yes', then for how long have you been diagnosed?
.....

B12. Does anyone in your family have hypertension? ☐ 1. Yes ☐ 2. No ☐ 3. Don't know

B12a. If 'Yes', who? ☐ 1. Father ☐ 2. Mother ☐ 3. Sibling ☐ 4. Other, specify: _____

B13. Does anyone in your family have diabetes? ☐ 1. Yes ☐ 2. No ☐ 3. Don't know

B13a. If 'Yes', who? ☐ 1. Father ☐ 2. Mother ☐ 3. Sibling ☐ 4. Other, specify:___ _____

B14. Do you smoke cigarette? ☐ 1. Yes ☐ 2. No ☐ 3. Decline to answer

B15. Have you smoke cigarette in the past? ☐ 1. Yes ☐ 2. No ☐ 3. Decline to answer

SECTION C: POTENTIAL FOR M-HEALTH IN FOLLOW-UP

C1.Which of the following do you have use or have access to

Mobile phone	☐Yes	☐ No
Text message	☐Yes	☐ No
E-mail	☐Yes	☐ No
Facebook	☐Yes	☐ No
WhatsApp	☐Yes	☐ No

C2.Would you agree to receive health promotion messages from this licensed chemical shop or pharmacy on nutrition, hypertension or diabetes?

☐ 1. Strongly agree ☐ 2. Agree
☐ 3. Disagree ☐ 3. Strongly disagree

C3.Would you consider receiving health promotion messages from this licensed chemical shop or pharmacy on nutrition, hypertension or diabetes an invasion of your privacy?

☐ 1. Yes ☐ 2. No

Any reason for your answer:

_____

C4.By what means would you like to receive health promotion messages from this licensed chemical shop or pharmacy on nutrition, hypertension or diabetes?

☐ 1.Phone call ☐ 4.Facebook
☐ 2.Text message ☐ 5.WhatsApp
☐ 3.E-mail ☐ 6.Other:_____

C5.At what interval would you like to receive these health promotion and educational tips?

☐ 1.Daily ☐ 4.Monthly
☐ 2.One week ☐ 5.Other:_____
☐ 3.Two weeks ☐