

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY KUMASI,
GHANA**

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH POLICY, MANAGEMENT AND ECONOMICS



**FACTORS INFLUENCING TREATMENT OUTCOMES OF PATIENTS WITH
DIABETES AND HYPERTENSION AT THE EJISU GOVERNMENT HOSPITAL IN
EJISU, ASHANTI REGION, GHANA**

BY

JOSEPH OWUSU-ANSAH

JUNE, 2019

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BY

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**A THESIS SUBMITTED TO THE DEPARTMENT OF HEALTH POLICY,
MANAGEMENT AND ECONOMICS, SCHOOL OF PUBLIC HEALTH, COLLEGE OF
HEALTH SCIENCES IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR
THE DEGREE OF MASTER OF PUBLIC HEALTH IN HEALTH SERVICES
PLANNING AND MANAGEMENT**

JUNE, 2019

DECLARATION

I hereby declare that except for reference to other people's work, which have been duly acknowledged, this piece of work is my own composition and neither in whole nor in part has this work been presented for the award of a degree in this university or elsewhere.

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(HEAD OF DEPARTMENT)

DEDICATION

I dedicate this piece of work to God Almighty, my father (Eld. Henry Owusu-Ansah), my mother (Mrs. Diana Owusu-Ansah), my siblings (Josephine, Paulina, Demetrous and Henry Jnr) and colleague pharmacists in Ghana.



ACKNOWLEDGEMENT

This study owes its success to a number of people. I wish to express my heartfelt gratitude to my supervisor, Prof. Ellis Owusu-Dabo, for his insightful criticisms, directions and encouragement. Without his patience, this study would not have been a success.

My sincere gratitude goes to the Municipal Health Directorate of the Ejisu Municipality especially the Municipal Health Director (Mrs. Josephine Ahorsu), Municipal Pharmacist (Pharm. Adjoa Osei Amponsah) and Mr. Nana Yaw Osei (the Municipal Health Information Officer). I also sincerely want to thank Dr. Gyimah (Former Medical Director, Ejisu Hospital), Pharm Esther Asantewaa Akyereko (Head of Pharmacy, Ejisu Hospital), Mrs. Maud Abotsi (Nurse at the Diabetic Clinic) and all staff and Pharmacy-interns at the Hospital for allowing me to use their facility for the study and assisting me in my data collection.

I am very grateful to Mr. John Amissah for his immense support during the analysis of the collected data and also Miss Dorothy Osei Wireduah who proofread through my work.

DEFINITION OF TERMS

TREATMENT OUTCOME: Treatment outcome is explained to be “the consequences or results of management and procedures used in combating diseases in order to determine the efficacy, effectiveness, safety, practicability, etc., of these interventions in individual cases or series”. (Definitions.net.2019).

DIABETES: Diabetes specifically Diabetes Mellitus is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidney, and nerves (WHO, 2018).

HYPERTENSION: Hypertension can be explained as a condition in which the blood pressure of an adult is persistently equal to or higher than 140/90mmHg in a non-diabetic, or above 130/80mmHg in a diabetic, based on the average of two or more properly measured blood pressure readings (Standard Treatment Guidelines, 2010).

LIST OF ABBREVIATION AND ACRONYMS



ADA	American Diabetes Association
BMI	Body Mass Index
DCCT	Diabetes Control and Complication Trial
GDM	Gestational Diabetes
HBM	Health Belief Model
IDF	International Diabetes Federation
IDM	Insulin Dependent Diabetes Mellitus
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
NCD	Non-Communicable Diseases
NIDDM	Non-Insulin Dependent Diabetes Mellitus
RODAM	Research on Obesity and Diabetes among African Migrants
SEP	Socio Economic Position (Status)
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
WHO	World Health Organization

ABSTRACT

Diabetes and Hypertension prevalence accounts for more than two-thirds of all medical admissions in Ghana. This necessitates the exploratory factors that affect the treatment outcomes of these conditions. The aim of this study is to determine factors that influence treatment outcomes of patients with Diabetes or Hypertension at the Ejisu Government Hospital. A facility based descriptive cross-sectional study design was carried out on 423 patients, aged ≥ 18 years who visited the diabetic clinic at Ejisu Government Hospital at least once in a month and were diagnosed of Diabetes and or Hypertension a year or more ago, using a structured questionnaire. Stata 14.0 was used to analyze collected data with results presented in tables. Poisson logistic regression was used to determine the association between the demographic variables indicated in this study to determine which variables influenced treatment outcome. There were 71% of patients with their glucose score in the normal range (4.4-8.8mmol/l) on the day of interview while 6.13% patients were severely hypertensive ($\geq 160/\geq 100$ mmHg) on the day of interview. According to Morisky's adherence scale, 68.04% of patients had low adherence; 285 patients reported getting their medications all the time whereas 384 patients agreed to the belief that their medication could be managed. Patients with family history of diabetes had nearly fifty-seven percent [OR = 0.57; 95% CI = 0.32-1.00; $p=0.05$] chance of experiencing positive treatment outcomes. Also, patients with family history of hypertension, were fifty percent less likely [OR = 0.5; 95% CI = 0.31-0.98; $p=0.04$] to report positive treatment outcome. All other socio-demographic factors [age ≥ 70 {0.73; 95% CI= 0.13-1.38; $p=0.15$ }, gender {OR=0.52; 95% CI= 0.15-1.81; $p=0.30$ }, marital status {OR=1.45; 95% CI=0.86-2.45; $p=0.16$ } and employment status {OR=0.34; 95% CI=0.12-0.98;

p=0.44}} did not influence treatment outcomes for diabetes and similarly for Hypertension. Family history of patients with Diabetes and Hypertension influence treatment outcomes negatively.

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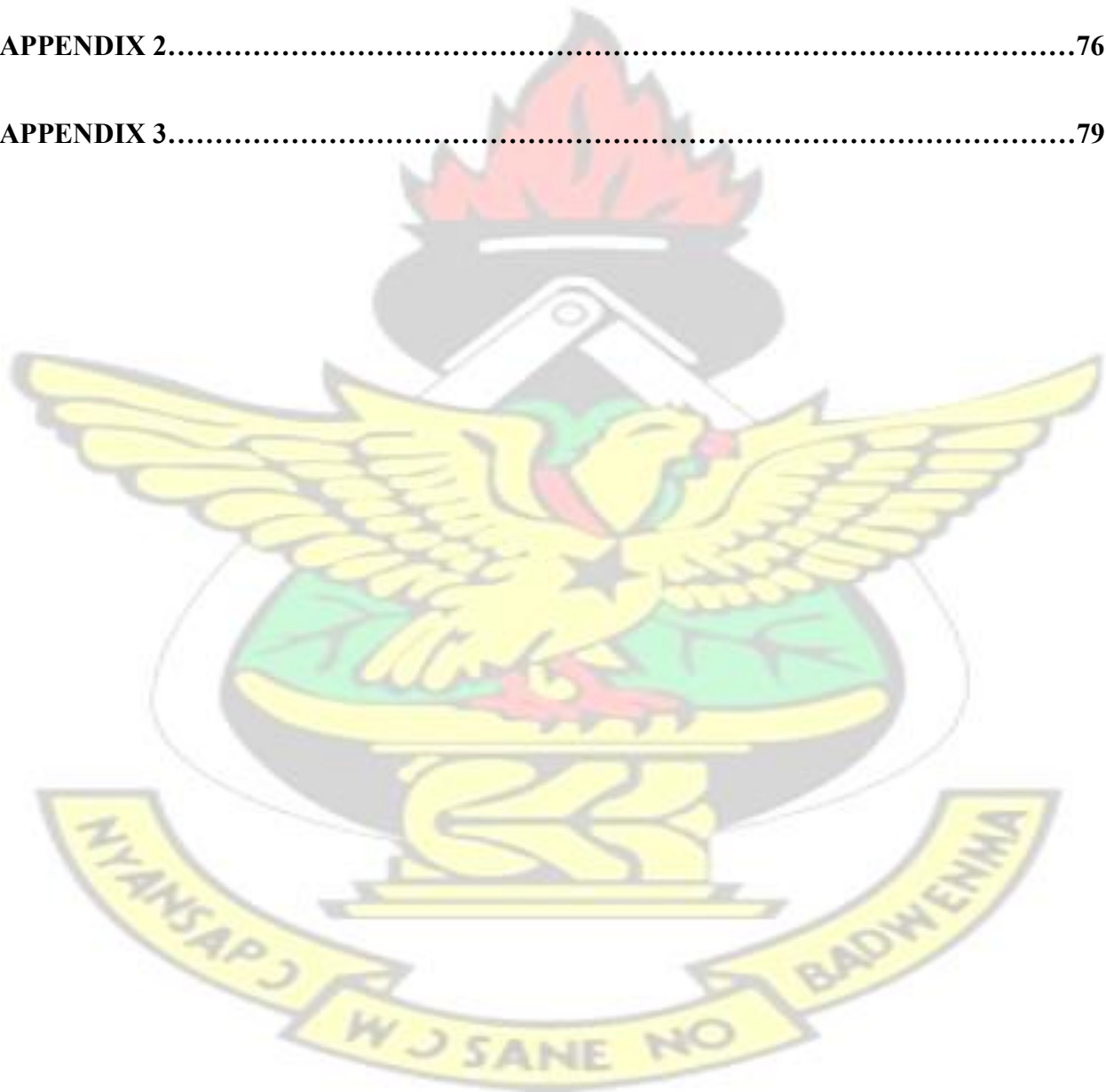
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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

In most countries worldwide, there is a major concern in the development of health systems that are responsive to Non-communicable disease (NCD) management. NCD's vary according to the particular condition diagnosed, but with premature mortality, emphasis is put on cardiovascular disease, cancer, diabetes and chronic respiratory diseases (UN General Assembly, 2011). Substantial gains achieved in economic growth, health and living standards in the past have been threatened by climate change, finance and food insecurities, crisis in NCD's, principally heart disease, diabetes and cancers (Engelgau et al., 2011). It is important therefore, to carefully consider Non-communicable disease as a peril to development of a country.

According to the World Health Organization (2018) global report on diabetes, there is an increase in the number of people with diabetes; that is from 108 million people in 1980 to 422 million people in 2014. The global prevalence of diabetes among adults above 18 years of age has increased from 4.7% in 1980 to 8.5% in 2014. Middle- and low-income countries have a higher diabetes prevalence. Diabetes, a major cause for lower limb amputation, heart attack, kidney failure, stroke, and blindness led to an estimated death of about 2.2 million people in 2012. Due to increased risks of cardiovascular and other diseases, 3.7 million deaths were attributed to high blood glucose in 2012. Alternatively, worldwide prevalence of hypertension from 1975 to 2015 was about 1.13 billion people, but in 2016, it exceeded 1.3 billion (Bloch, 2016). These rates were very high in European and Asian countries but there were high-recorded cases in Sub-Saharan Africa.

In Sub-Saharan Africa, diabetes specifically type 2, accounts for more than 90% of cases of diabetes in Sub-Saharan Africa, whereas type 1 diabetes, gestational diabetes and other forms of diabetes constitutes the remainder (Hall et al., 2011). However, over the past 40 years, People with higher measured blood pressure values have shifted from high – to low-income countries, especially in sub-Saharan Africa. The total number of adults with raised blood pressure have increased by 90% (Lehrich and Middleton, 2017).

Ghana, a sub Saharan African country, with a population of about 28 million, has an estimated adult prevalence of hypertension to be around 28%-30% in its two biggest cities (Accra and Kumasi) and its rural areas (Agyemang, 2006; Cappuccio et al., 2004; Hill et al., 2007). On the other hand, an estimated 6%-7% of prevalence of diabetes in adults in Accra from 1998-2002 and that of Kumasi being 9.5% in 2005, is noticeably higher as compared to a 1956 previous estimate of 0.4% (Amoah et al., 2002; Owiredue et al., 2008). According to the Ghana National Statistics, hypertension being the 10th commonest cause of new out-patient morbidity across all ages between 1985-2001 has moved to become the 5th commonest cause since 2002 (Bosu, 2012).

Researchers worldwide indicate that regardless of the accessibility to effective medicinal therapy, more than half of all diabetic and hypertension patients do not take any treatment and more than half of those who do so have worsening conditions (Brown et al., 2011). The World Health Organization (WHO) describes treatment outcome as influenced by many personal, medical, behavioural and societal factors. Based on the aforementioned issues, there is the need to cogitate on these eminent non-communicable conditions (Diabetes and Hypertension) by deliberating on the factors that influence their treatment outcomes and ways to improve upon its management to reduce its prevalence.

1.2 Problem Statement

Diabetes and Hypertension are of significant public health concern worldwide, and are among the most common cardiovascular disease risk factors (Damasceno et al., 2009). According to the World Health Organization (2013), recent estimates show that diabetes and hypertension affect more than one third of adults age 25 and above. This accounts for about a billion people worldwide, contributing to nearly 9.4 million deaths from cardiovascular diseases each year. It is responsible for 50% of coronary heart disease and about two-thirds of strokes (Cutler et al., 2008; Kearney et al., 2005). Furthermore, it has been projected that by the year 2030, 23 million cardiovascular deaths are estimated to be due to hypertension, to which about 85% cases will be from low resource settings and developing nations (WHO, 2013).

In Africa, the number of diagnosed diabetes cases has increased over the years from 7 million in 2000, to 15 million in 2011 (International Diabetes Federation, 2011). These increasing rates have been attributed to rapid epidemiologic conversion from an agrarian way of life to a more westernized way of life, with increasing rates of obesity, unhealthy diet, and physical inactivity (Hendriks et al., 2012). Additional factors, which include poor health service delivery, late detection of the disease and cost of medication contributes to the increased occurrence of hypertension and diabetes in Africa (Beaglehole et al., 2011).

Non-communicable diseases are estimated to account for 42% of total deaths in Ghana (WHO, 2013), with diabetes and hypertension among the major non-communicable disease prevalence in Ghana. They also account for more than two-thirds of all medical admissions and more than 50 percent of all deaths in most health facilities in Ghana (Addo et al., 2012). In the Ejisu

Municipality, one of the biggest municipalities in the second densely populated region in Ghana, Diabetes and Hypertension are ranked among the top 20 disease in the region and the top 5 noncommunicable diseases over the past 5 years (Ejisu Health Report, 2017). Even though the benefit of medications in controlling diabetes and hypertension is recounted, most patients fail to keep it under control resulting in poor treatment outcomes (Kretchy et al., 2014; Laryea, 2013). Although there is enough evidence to establish the increasing prevalence of diabetes and hypertension, there is little literature to inform health providers on the factors that influence their treatment outcomes in order to put in new measures to help reduce the disease burden and improve the health and wellbeing of patients with these conditions. It is therefore imperative that critical investigation be conducted to ascertain the factors that influence the treatment outcomes of diabetic and hypertensive patients to be able to reduce the prevalence of these conditions.

1.3 Rationale of Study

With the growing non-communicable disease burden (i.e. Diabetes and Hypertension) in Ghana, this study seeks to identify factors that influence treatment outcomes of patients with diabetes and hypertension in the Ejisu-Juaben municipality in the Ashanti Region.

The study findings would help inform health professionals and other health care givers on some of the factors that influence the management of diabetes and hypertension and how it could be abated. It also seeks to identify the perception of patients concerning diabetes and hypertension management and ways to improve upon it in order to abate the increasing burden of Diabetes and Hypertension diseases in Ghana.

1.4 Conceptual Framework

The study was guided by a framework, which sought to explain the interplay between various socio-demographic factors and other medical factors and how they influence treatment outcomes of diabetes and hypertension. There are several models that attempt to explain an individual's behavior towards treatment and one of such is the Health Believe Model. The model explains that factors such socio-demographic (age, gender, level of education) among others influence an individual's way of perceiving his/her sickness which may lead to behavior modification. The assumption is that an individual may positively adhere to medication if they perceive a positive treatment outcome and vice versa. Similarly, their perception about the side effects of taking certain medications affects their treatment compliance levels, which in the end affects the treatment outcome. In addition, Anthony et al., (2012) study on perception of hypertension treatment among patients with and without diabetes showed hypertensive patients without diabetes are more likely to adhere to treatment than those with diabetes, indicating patients without other complications adhere more to their treatment.

The study's aim was to examine the socio-demographic factors that influence treatment outcomes among diabetic and hypertensive patients in the Ejisu Government Hospital. It therefore developed a framework for such purpose. It hinted on certain socio-demographic factors like gender, familial history, age, marital status, social status, religion etc. It groups the various demographic factors into one section that details; age, sex, marital status, employment status, number of children, family history of patients, educational background etc. It also considers adherence to medication as a factor that could influence treatment outcomes of their condition. Another area where the construct focuses on is patients' access to medication and their influence on treatment outcomes of their condition. It lastly highlights on perception of patients with diabetes and hypertension and how it affects the treatment outcomes of their condition. The various factors being considered are all

related to the patient with Diabetes or Hypertension. The framework is as shown in the figure below:

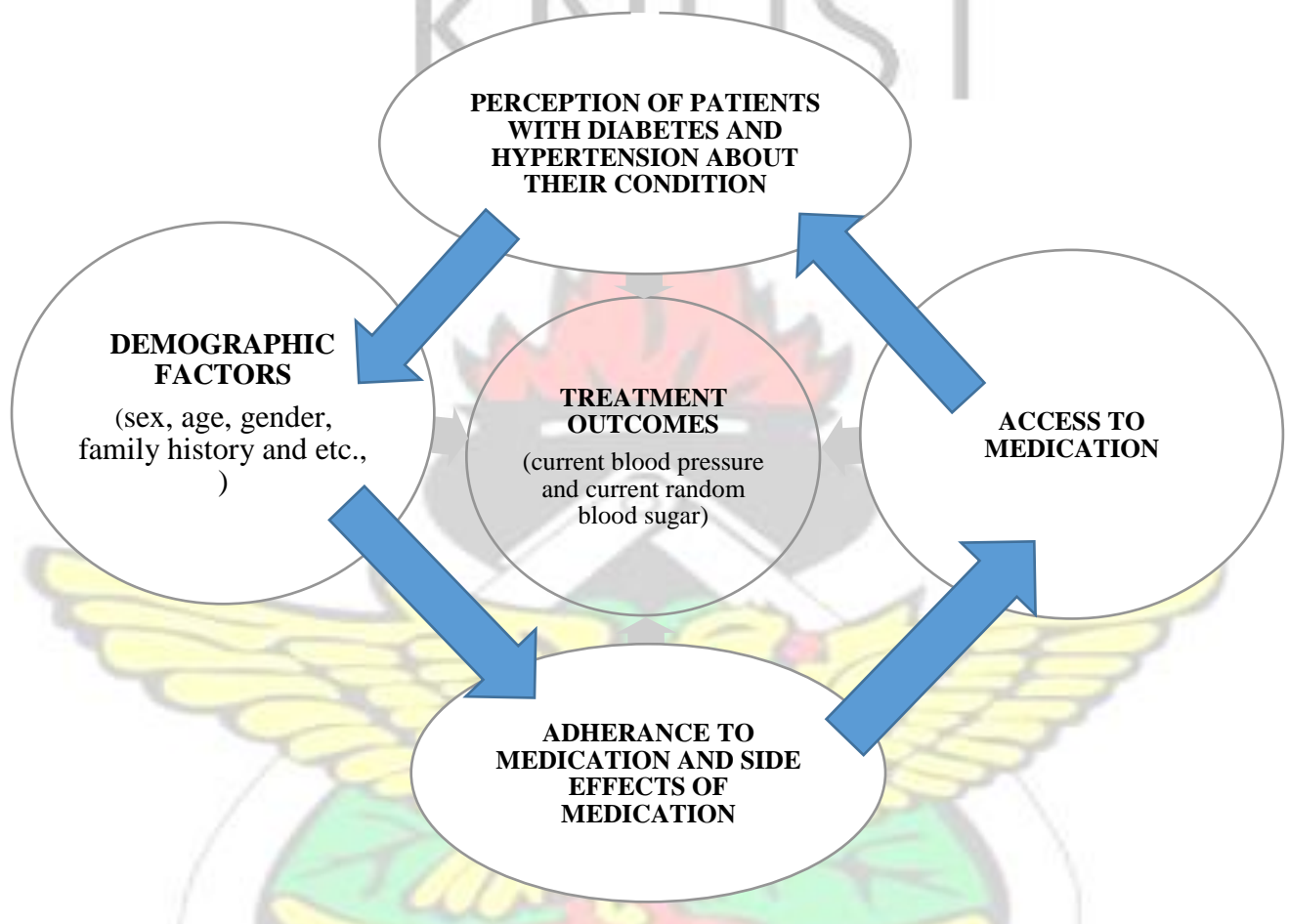


Figure 1.1: Conceptual Framework

Source- Author's Construct, 2018.

1.5 Research Questions

1. What are the socio-demographic factors that influence treatment outcomes of Diabetes and Hypertensive patients?
2. Does adherence to medication and side effects of medicines have an influence on treatment outcomes of Diabetes and Hypertensive patients?

3. How does access to medication influence treatment outcomes of Diabetes and Hypertensive patients?
4. What are the perceptions of patients with Diabetes and Hypertension concerning the treatment outcomes of their condition?

1.6 General Objective

To determine the factors influencing treatment outcomes of patients with Diabetes and Hypertension at the Ejisu Government Hospital.

1.7 Specific Objectives

1. To ascertain the socio-demographic factors that influence treatment outcomes of Diabetes and Hypertensive patients.
2. To determine the effect of adherence to medication and side effects of medicines on treatment outcomes of Diabetes and Hypertensive patients.
3. To examine the influence that access to medication has on treatment outcomes of Diabetes and Hypertensive patients.
4. To identify the perception of patients with Diabetes and Hypertension concerning the treatment outcomes of their condition.

1.8 Scope of Study

This study concentrated on factors that influence treatment outcomes of diabetes and hypertensive patients at the Ejisu Government Hospital. This includes their socio-demographic factors that influence treatment outcomes of their condition. It also includes adherence of patients to their medication, access to their medication and their influence on the treatment outcomes of their

condition, and more importantly perceptions of patients with Diabetes and Hypertension concerning their condition.

1.9 Organization of Report

Chapter one looks at the background information on the prevalence of diabetes and hypertension globally especially in sub-Saharan Africa where Ghana is located, it also focuses on problem statement, rationale of the study, conceptual framework, research questions, general and specific objectives. Chapter two deals with literature review concerning the research questions or the main study variables which are theoretical perspective of treatment outcomes, concepts and definitions diabetes and hypertension, treatment outcomes and the factors that influence treatment outcomes of diabetes and Hypertension. Chapter three focuses on methodology which deals with research method and study design, data collection technique and tool, profile of study area, study population, study variables, sample size and sampling technique, pre-testing of data collection tool, data handling, data analysis, ethical consideration and assumptions of the study. Chapter four presents the results of the study with regards to the specific objectives using tables and poisson's regression. Chapter five entails discussion of the results generated from the previous chapter citing applicable literature to validate the findings of the study and limitation. Chapter six finally outlines conclusions and enumerates recommendations made at the end of the study based on the results.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing literature on the factors influencing treatment outcomes of patients with diabetes and hypertension. It includes the concept of diabetes and hypertension and the factors

influencing treatment outcomes of these conditions. The factors are structured according to the objectives of the study.

2.2 Concepts and Definitions of Diabetes Mellitus and Hypertension.

2.2.1 Background of Diabetes Mellitus

Diabetes Mellitus is explained as a group of metabolic conditions with multiple aetiology, characterized by hyperglycemia (high blood sugar). It is caused by the inadequate production of enough insulin, or body cells not responding to insulin or both. This results in disturbances in carbohydrate, protein and fat metabolism (Alberti and Zimmet, 1998). Marking the World diabetes day in November 2017, International Diabetes Federation (IDF) estimates that the prevalence of diabetes around the world indicates 1 in 11 adults currently living with diabetes (Ogurtsova et al., 2017). Currently, there are 422 million estimated to be diagnosed with diabetes with an estimation of about 1.6 million deaths attributed to death each year. Rapidly low and middle-income countries including Ghana make up about 75% of the total diabetes prevalence (IDF, 2011).

There is an estimated increase in diabetes prevalence in Asian countries due to genetic, environmental and social factors such as industrialization and rural-urban migration (IDF, 2009). Generally, men have higher diabetes prevalence as compared to women but there are more women with diabetes, especially in the developed countries than men. A higher proportion of people with diabetes in developing countries are within the ages of 45-64 years as compared to developed countries with an age range greater than 65 years (King et al., 1998; Wild et al., 2004).

Classifying the type of diabetes to an individual normally depends on the circumstances on the time of diagnosis: where many diabetic individuals do not easily fit into a single class. There have been severally revised criteria for diagnosing diabetes over several decades but according to the

new classification of diabetes according to the World Health Organization in 1999, there are four specific types that have been identified. These are; Type 1 Diabetes, Type 2 Diabetes, Gestational Diabetes and Other specific types.

The type 1 and type 2 diabetes are the two major categories of diabetes with type 1 accounting for 5-10% of people with diabetes and type 2 accounting for 90-95% (WHO, 1999). Types 1 diabetes previously named as Insulin Dependent Diabetes Mellitus (IDM) or juvenile diabetes, results from a cellular-mediated autoimmune destruction of the β -cells of the pancreas, in people who are genetically susceptible leading to insulin deficiency (Alberti and Zimmet, 1998). Type 2 Diabetes, also known as Non-Insulin Dependent Diabetes Mellitus (NIDDM), Type II or Adult-Onset Diabetes, affects individuals who have insulin resistance with relative insulin deficiency. Type 2 diabetes mellitus consist of two identifiable defects; namely insulin resistance in peripheral tissues which is the predominant one and insulin secretory defect of the β -cell. Insulin resistance can be said to be the primary defect preceeding the derangement in insulin secretion and clinical diabetes for about 20 years (Khan, 1994; Sacks and McDonald, 1996). Gestational Diabetes Mellitus (GDM) can be explained as any degree of glucose intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy (Metzger, 1991). Other specific type of diabetes are a class of diabetes with no known aetiology. This includes those in which the underlying defect or disease process can be identified in a relative specific manner.

2.2.2 Diagnosing Diabetes

Some, but not all, diabetic patients display the classic signs and symptoms of hyperglycemia before diagnosis. This includes polydipsia (excessive thirst), polyuria (excessive urination), as well as weight loss and lack of energy despite the consumption of large amounts of food. The diagnosis

of any of the previously discussed metabolic disorders, including type 1 and 2 diabetes, requires the measurement of fasting or random plasma glucose levels and/or plasma glucose levels after an oral glucose in-take.

A different clinical criteria exists for the clinical values associated with the diagnosis of Impaired Fasting Glucose (IFG) and Impaired Glucose Tolerance (IGT), as previously presented (Kahn, 2003). This also is true for GDM in pregnant women when the fasting plasma glucose is greater than 126 mg/dL or the casual plasma glucose is greater than 200 mg/dL. In addition, a patient with characteristic symptoms of hyperglycemia or hyperglycemic crisis has a random plasma glucose of ≥ 200 mg/dL (11.1 mmol/L) (American Diabetes Association, 2018).

If a patient's plasma sugar level exceeds these thresholds, then a glucose challenge test typically is ordered on a subsequent day. This test, which does not require that the patient be fasting, involves consumption of a 50-g oral glucose load by the patient, followed by evaluation of their plasma glucose after 1 hour. A value of greater than 140 mg/dL indicates that the patient should undergo a subsequent 3-hour, 100-g oral glucose load on another day (Saljoughian, 2005). The table below indicates how blood sugar level is classified:

Table 1: Classifying Blood Glucose scores	
American Diabetes Association (2018), Random Blood Glucose scoring	
Normal	79-160 mg/dl (4.4-8.9 mmol/l)
Prediabetic	160-200 mg/dl (8.9-11.1mmol/l)
Diabetic	>200mg/dl (>11.1 mmol/l)

2.2.3 Background of Hypertension

Hypertension, also known as a high or raised blood pressure is a global public health condition in which blood vessels have consistently raised pressure (WHO, 2013). The heart carries blood to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure occurs when there is a force of blood pushing against the walls of blood vessels (arteries) as the heart pumps it. The higher the pressure, the harder work needed by the heart to pump blood (WHO, 2013).

Hypertension can be explained as a condition in which the blood pressure of an adult is persistently equal to or higher than 140/90mmHg in a non-diabetic, or above 130/80mmHg in a diabetic, based on the average of two or more properly measured blood pressure readings (Ministry of Health, 2010). Hypertension accounts for substantial morbidity and mortality globally (it accounts for at least 45% of the heart disease and 51% of deaths (Adebayo et al., 2013). It is most asymptomatic and often measured as systolic and diastolic pressure. According to American Heart Association, (2018), standard blood pressure of 120/80mmhg, indicates a systolic of 120 (when the heart beats) and a diastolic of 80 (when the heart rests).

Hypertension is grouped into primary and secondary depending on whether there is a specific underlying cause to it. They are:

Primary Hypertension: This is where no specific underlying cause is identified in majority of the people. It is very common but its pathogenesis remains elusive (Keller et al., 2003). Over 90% of all hypertension cases has no tangible cause; however, it is associated with an increased risk of morbidity or mortality due to cardiac failure, ischemic heart disease, stroke, renal failure and peripheral vascular disorders.

Secondary hypertension: This is an elevated blood pressure from an underlying, identifiable and easily seen cause. Only about 5-10% of hypertension cases are thought to result from secondary

causes of which can be due to renal disease, adrenal disorders and coarctation of the aorta or can be drug-induced (Onusko, 2003; Ramsay et al., 1999).

2.2.4 Diagnosing Hypertension

Sphygmomanometer is the device for measuring blood pressure. Diastolic and systolic blood pressure are taken and recorded in a chart. A systolic and diastolic values above 140/90mmHg respectively is diagnosed as hypertension but in diabetics above 130/80mmHg is diagnosed as hypertension. Table 2 indicates how blood pressure is classified according to JNC 7 Classification;

Table 2: Classification of Blood pressure

CLASSIFICATION OF BLOOD PRESSURE	SYSTOLIC BLOOD PRESSURE(mmHg)		DIASTOLIC PRESSURE(mmHg)	
Normal	<120	and	<80	
Normal High (Prehypertension)	120-139	or	80-89	
Stage 1 Hypertension	140-159	or	90-99	
Stage 2 Hypertension	160-180	or	≥ 100	
Stage 3 Hypertension or Emergency Hypertension	≥ 180	or	≥ 100	

2.3 Treatment Outcomes

Treatment outcome is said to be “ the consequences or results of management and procedures used in combating diseases in order to determine the efficacy, effectiveness, safety, practicability, etc., of these interventions in individual cases or series”. (Definitions.net, 2019).

The study of the outcome of clinical interventions is an important area of clinical research for a number of reasons. Some of them are to help clinicians answer the question of whether a patient is responding to the treatment they are being offered. It also helps to contribute to the quality evaluation of individual clinicians’ practice, which forms part of continuous professional development and performance review. It also helps in comparing outcomes between different user groups within the same service; for example, is the service achieving better outcomes for users with depression than those with anxiety or with white users than with those from ethnic minority groups. In addition, it helps to evaluate the extent to which measured change in a user is clinically significant – i.e. change that makes a difference to the everyday lives of users and is not just statistically significant (Sperlinger, 2002).

2.4 Factors influencing Treatment Outcomes of Diabetes and Hypertension.

Treatment Outcome of diabetes and hypertension as influenced by certain factors according to literature has been categorized into various sections. These factors include sociodemographic factors, adherence to medication, access to medication etc.

2.4.1 Sociodemographic factors

Socio-demographic factors like age, gender and marital status, social status, family history, alcohol and obesity influences treatment outcomes of patients with diabetes and hypertension. A review of how these factors influences treatment of these conditions are as below:

Age

Amoah et al., (2002), conducted a community-based prevalence study in the Greater Accra region using a random cluster sample of Ghanaians aged ≥ 25 years. The mean age for 4733 subjects involved in the study being was 44.3 ± 14.7 years, and participation rate of 75% with the crude prevalence of diabetes being 6.3%. From the study, it was found that diabetes, Impaired Fasting Glucose and Impaired Glucose Tolerance increased with age. The oldest age group (64+ years) had the highest diabetes prevalence. In addition, diabetes was more common in males than females (7.7 vs. 5.5%) ($P < 0.05$). The study found that worsening glycemic status was associated with increase in age, body mass index, systolic and diastolic blood pressure.

In a study conducted by Momin et al., (2017), to determine the socio-demographic factors affecting prevalence of hypertension among bank employees in a Surat City, India, a cross-sectional study of 1493 bank employees were carried out and analyzed using epi 6 software. There was a high prevalence among persons age 50 years and above (48.5%) out of 455 persons found to be hypertensive; of which comprised of 32.5% male as compared to 23.1% female. In addition, there was 40% prevalence among separated or divorced persons. There was significant positive association between age and prevalence of hypertension, while prevalence was higher among females above 50 years as compared to males. In addition, persons living without their partners like single, divorced/ widow/ widower had a higher prevalence of about (55%). This helped in identifying the common profile of persons susceptible to hypertension among bankers (Momin et al., 2012).

Gender

Gender, considered a risk factor that influence treatment outcomes of diabetes and hypertension is a major determinant that is often overlooked. Everett and Zajacova (2015), examined gender differences in hypertension and hypertension awareness among United State young adults with emphasis on factors that may contribute to observed disparities, carried out a study. The results from the study show that there were gender disparities among men and women in their twenties. Women were found to be far less hypertensive compared to men (12% vs. 27%). The study identified health care use, which not directly related to actual hypertension status, explains the gender differences in hypertension as a key factor that contribute to these observed differences. Gender differences in diabetes was similarly observed in a study carried out to know the gender differences in diabetes and coronary heart disease medication among patients with type 2 diabetes. Results from the study indicates that men had more angiopathic risk factors, including smoking, alcohol consumption and worse glycemic control. The study concluded that diabetic men should be thoroughly treated as compared to women (Krämer et al., 2012)

Social Economic Status

Socio-economic status can influence health outcome of diabetes or hypertension. According to a study done by Addo et al., (2017), to determine the association between Socioeconomic position (SEP) and diabetes in Ghanaians in Europe and of those in Ghana. The data used for the study were derived from the multicenter Research on Obesity and Diabetes among African Migrants (RODAM) study of Ghanaians aged 25—70 years living in some parts of Europe and in Ghana. Educational attainment and occupational class were used as indicators of SEP. The results from the study indicated a decrease in prevalence with an increasing level of education in Ghanaian men and women in Europe together with men in urban Ghana, whereas there was an increasing level of

education in men and women in rural Ghana as the prevalence increased. In conclusion, the association of diabetes and SEP differ in rural Ghana compared with urban settings in Ghana and Europe (Addo et al., 2017).

Familial History

An important risk factor in diabetes and hypertension is family history. Papazafiropoulou et al., (2009), carried out a study to assess the prevalence of family history of type 2 Diabetes in Greek patients, and to evaluate its potential effect on the patient's metabolic control and the presence of diabetic complications. The study recruited 1,473 patients with type 2 diabetes including mothers, diabetic fathers, diabetic relatives other than patients and also those with no known diabetic relatives. The prevalence of diabetes in the mother, the father and relatives other than parents, was 27.7%, 11.0% and 10.7%, respectively. There was a higher hypertension prevalence in patients with paternal diabetes (64.8 vs. 57.1%, $p < 0.05$) than patients with diabetes in the mother. Patients with familial diabetes were significantly younger ($p < 0.001$), with lower age at diabetic diagnosis ($p < 0.001$) than those without diabetic relatives. In conclusion, the study indicated an excess maternal transmission of type 2 diabetes in a sample of Greek diabetic patients. However, no different influence was seen between paternal and maternal diabetes on the clinical characteristics of diabetic patients except for LDL-cholesterol levels and presence of hypertension (Papazafiropoulou et al., 2009).

Obesity

Obesity and weight gain have mostly been associated with diabetes. Purnell et al., (1998) carried out a study to determine the effect of weight gain on lipid levels and blood pressure. 1168 subjects were enrolled in Diabetes Control and Complications Trial (DCCT) with type 1 diabetes who were

≥ 18 years at baseline. 586 and 582 subjects were randomized to receive either intensive or conventional diabetes treatment respectively with a mean follow-up period of 6.1 years. Results from the study indicate that with intensive therapy, the highest Body Mass Index (BMI) (a measure of weight adjusted for height), blood pressure, and lipid biomarkers were seen with subjects in their fourth quartile of weight gain as compared with the other weight gain quartiles. In addition, weight gain with conventional therapy resulted in smaller increase in BMI, lipids and systolic pressure. The study concluded on excessive weight gain with intensive therapy causes changes in lipid levels and blood pressure and is comparable to those seen in insulin resistance syndrome and this causes an increased risk of coronary artery disease with time (Purnell et al., 1998).

Alcohol Consumption and Smoking

People all over the world, associate Alcohol consumption and smoking as a risk factor in diabetes and hypertension. Ajani et al., (2000) conducted a prospective cohort study to examine the association between low to moderate alcohol consumption and the incidence of type 2 Diabetes Mellitus in male physicians. 20,951 participants were evaluated with a mean period of 12.1 years. 766 incident cases of type 2 diabetes were reported among the 20,951 physicians. After an adjustment for age, smoking, body mass index, physical activity and etc., the relative risk estimates for those reporting alcohol use of rarely/ never, 1 to 3 drinks per month, 1 drink per week, 2 to 4 drinks per week, 5 to 6 drinks per week, and 1 or more drinks per day were 1.00 (referent), 1.03 (0.80-1.33), 0.89 (0.70-1.14), 0.74 (0.59-0.93), 0.67 (0.51-0.89), and 0.57 (0.45-0.73), respectively (linear trend, $P < 0.001$). These data show that healthy men who are selective for light to moderate alcohol consumption have a decreased risk of type 2 Diabetes Mellitus.

A systematic review was also conducted by Willi et al., (2007) to assess the association between active smoking and incidence of type 2 diabetes. A search through MEDLINE (1966 to May 2007) and EMBASE (1980 to May 2007) databases was supported by manual searches of bibliographies of key retrieved articles, reviews of abstracts from scientific meetings, and contact with experts. Studies were included if there was a report of a risk of impaired glucose tolerance, impaired fasting glucose, or type 2 diabetes in association with smoking status at baseline. The search yielded 25 prospective cohort studies that reported 45,844 incident cases of diabetes during a follow-up study period spanning from 5 to 30 years. Of the 25 studies, 24 reported adjusted Risk Ratio's (RR) greater than 1 (range for all studies, 0.82-3.74). The pooled adjusted RR was 1.44 (95% confidence interval [CI], 1.31-1.58). Results were consistent and statistically significant in all subgroups. The risk of diabetes was greater for heavy smokers (220 cigarettes/ day; RR, 1.61; 95% CI, 1.43-1.80) than for lighter smokers (RR, 1.29; 95% CI, 1.13-1.48) and lower for former smokers (RR, 1.23; 95% CI, 1.14-1.33) compared with active smokers, consistent with a dose-response phenomenon. The study concluded on active smoking associated with an increased risk of type 2 diabetes (Willi et al., 2007).

2.4.2 Adherence to Medication

Adherence to medication, a key determinant in measuring treatment outcomes is generally defined as the extent to which patients take medications as prescribed by their health care providers (Osterberg and Blaschke, 2005). According to Krass et al., (2005) on the "Impact of Medication use and Adherence of Australian Pharmacists' Diabetes Care services," where the objective was to assess the effect of a specialized service instigated for patients with type 2 diabetes on medication use and the other medicated- related issues in community pharmacies. A study design

of a parallel group, multisite, control versus intervention, repeated measure design, used in three different regions in Australia as intervention regions, then matched with control regions as much as possible was adapted. 106 intervention patients as compared to 82 control patients with similar demographic and clinical characteristics had significant improvement in self-reported nonadherence as reflected in the total Brief Medication Questionnaire (BMQ) scores after 9 months of patients whose Pharmacist were trained using a clinical protocol. In conclusion, community pharmacists trained in reviewing medication and using protocol in conjunction with providers increased adherence in patients with type 2 diabetes, thereby reducing problems patients had in accessing their medications and advised on changes in regimen to medication that improved outcomes.

Menanga et al., (2016) studied the factors associated with successful outcomes of hypertension treatment in Cameroon. The outcome measure was controlled hypertension, which was defined as blood pressure $\leq 140/90$ mmHg. Logistic regression was used to determine factors associated with blood pressure control. Mean systolic blood pressure (SBP) was 147 mmHg and mean diastolic blood pressure (DBP) was 88 mmHg. Only 36.8% of patients had their mean blood pressure controlled (BP $\leq 140/90$ mmHg). Multivariable logistic regression analysis revealed good adherence to anti-hypertensive medications and dietary lifestyle changes to be factors independently associated with controlled hypertension.

Nemerovski et al., (2014) had an aim of studying certain factors, which affect treatment outcomes in hypertensive patients and modification of cardiovascular risk factors. Self-declared hypertensive patients met with the pharmacist for blood pressure monitoring, setting lifestyle goals, and education about medications and disease state on four occasions over a 6-month period. The results of the study showed that patients not at their set blood pressure at baseline had a significant

decrease in blood pressure and a significant increase in achievement of their blood pressure goals. Throughout the population, no significant changes were seen in the primary outcome, lifestyle goals, medication adherence or modification of cardiovascular risk factors. Patient knowledge increased.

2.4.3 Access to medication

Unavailability of Health Insurance can deprive the poor from getting access to health services and more importantly their medication. Most communities have therefore implemented mechanisms such as community-based health insurance and other targeted social health insurance to help patients get access to health, get their medications to manage their condition in order to improve health. (Frenk et al., 2006; Ranson, 2002; Wagstaff et al., 2007).

Access to medication, which includes your duration at the hospital, can help improve ones condition. Abegaz et al., (2018) measured treatment outcomes by the length of stay in the hospital. The mean length of hospital stay was 4.64(\pm 2.802) days. 79 patients (estimating 20.41%) had long hospital stay (>7 days). About 370 (95.60%) patients improved and were discharged while 17 (4.40%) patients died in the hospital. Patients who had mild DKA: AOR: 0.16 [0.03-0.78] and patients between the age of 35-44years, AOR: 0.125[0.017-0.92] had reduced hospital stay. Further, patients with DKA precipitated by infection were 4.59 times more likely to have a longer hospital stay than patients with DKA precipitated by unknown causes; AOR 4.59[1.08-19.42].

2.4.4 Patients perception on Diabetes and Hypertension treatment

Anthony et al., (2012) studied the perceptions of hypertension treatment among patients with and without diabetes, where ten focus group discussions were chosen for patients with hypertension in three age ranges, with and without diabetes. The topic guides for the groups were: (1) what can

influence your future health status? (2) How do you understand the term “raised blood pressure”? (3) How should one go about treating raised blood pressure? Results showed that people with hypertension as a risk factor for myocardial infarction or stroke and not necessary as a disease, do not either view it to be a continuous, degenerative process of damage to the vascular system, but apparently as a binary risk process, within which one can win (not become ill) or lose. This makes non-adherence to treatment a gamble with a potential positive outcome. Patients with diabetes are more susceptible to accept hypertension as a chronic illness with minor impact on their lifestyle, and less eminently than their diabetes. Most participants overemphasized the effect of being stressed as a causative factor and having the belief that the most essential treatment model is reducing the levels of stress. Many believe they “know their bodies” and are able to control their blood pressure. Patients without diabetes were most likely to adopt a treatment, which is a compromise between their physician’s suggestions and their own understanding of hypertension (Anthony et al., 2012).

Raballo et al., (2012) investigated the perceptions of diabetes care and diabetes in patients followed long-term either by group or by usual care. 120 patients were administered three open-ended questions {43 with Type1 Diabetes Mellitus (T1DM) and 77 with Type 2 Diabetes Mellitus (T2DM)} who had been randomized at least 2 years before to be followed by group care and 121 (41 T1DM and 80 T2DM) who had always been on usual care. Propositional analysis was used in analyzing the responses, by identifying the focal nuclei. Results showed that patients on group care showed a better positive attitudes, with a higher sense of empowerment and a stronger internal locus of control than those on usual care. In addition, they expressed an extended and more articulated range of concepts associated with the care received and made less use of medical

terminology ($P, 0.001$, all). Higher HbA1c was associated with negative attitudes ($P = 0.025$) and negative empowerment ($P = 0.055$).

Also a large-scale cross-sectional, registry-based study asserting on Treatment beliefs, health behaviors and their association with treatment outcome in type 2 diabetes. This was a large-scale cross-sectional, registry-based study involving a well-defined type 2 diabetes population, in the county of Funen, Denmark. Registry data were combined with a 27-item self-reported survey administered to all insulin-treated people in the registry ($n=3160$). The survey was constructed to operationalize key concepts of diabetes management, diabetes treatment beliefs, and health behaviors. In total, 1033 respondents answered the survey. From the results obtained, infrequent self-measured blood glucose was associated with a significantly higher likelihood of having a blood pressure below 130/80 mm Hg. Perceived low treatment efficacy was the only health belief associated with poorer levels of health outcome other than HbA1c (Von Arx et al., 2016). All these factors influence treatment outcomes of patients with diabetes and hypertension.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

The purpose of this study was to determine factors that influence treatment outcomes of the Noncommunicable diseases (Diabetes and Hypertension) in the Ejisu Municipality of the Ashanti Region of Ghana. The study was carried out using a cross-sectional study design by interviewing 423 patients who have been diagnosed of diabetes and or hypertension co-morbidities for at least one year. In addition, the same cross-sectional study design was carried to know the perception of patients in the management of Non-communicable diseases (Diabetes and Hypertension).

3.2 Data Collection Techniques and Tools

Primary data were collected with the use of a structured questionnaire through interviews to consented people. The questionnaire was prepared in English and rendered in Twi (the most widely spoken and understood language in the district) as expected.

The first section of the questionnaire included questions on participant's demographic characteristics. The second and third sections also consisted of factors that influence the treatment outcomes of diabetes and hypertension including the adherence to medication, side effects of the medication and access to medication. The last sector will also look at the perception of patients concerning the treatment.

3.3 Profile of Study Area

3.3.1 Population size, structure and composition

Ejisu Municipal, is one of the 7 Municipal assemblies in the Ashanti Region of Ghana, located in the South-Eastern part of the Region and shares boundaries with Kwabre, Afigya-Sekyere, Sekyere East and West to the North; Asante Akim North and South and Kumasi Metropolis to the West. According to the 2010 Population and Housing Census, the population of the Municipality is 170,471 with a growth rate of 2.7% per annum. Males constitute 68,648 (47.8%) while females represent 75,114 (52.2%). With about 72.5% of the population being rural, the sex ratio of the municipality is 91.4 as compared to the regional average of 94. The most prevalent religion in the municipality is Christianity.

3.3.2. Prevalence of Diabetes and Hypertension in the Municipal

Diabetes and Hypertension are currently among the top 20 conditions prevalent in the Municipal. With diabetes and hypertension ranked 17th and 12th respectively. In 2017, there were 854 recorded cases of diabetes and 2945 recorded cases of Hypertension. Ejisu Government Hospital, the biggest health facilities in the municipal recorded 75 new cases of diabetes and 204 new cases on hypertension in 2017 alone.

3.3.3 Health Care in the Municipal

There are 97 communities in the Municipal. For the purpose of Health Administration, the municipal is divided into five sub-municipals namely; Achiase, Bomfa, Ejisu, Juaben and OnweKwaso. The total staff strength is 721. There are thirty-six (36) health facilities with Ninety-Three

(93) outreach points. The distribution of the various types of health facilities in the municipal is described in table below:

Table 3: Health Facilities

TYPE OF FACILITIES	NUMBER-36
Hospital	9
Health Centers	4
Maternity Homes & Clinics	5
Clinics	13
Community-based Health Planning & Services (CHPS) Compound	5

3.4 Study Population

Diabetes and Hypertension patients who visited the diabetic clinic at the Ejisu-Government Hospital . They were randomly selected by yes and no ballot to see which of them have been one treatment a year or more ago. The yes was for those on treatment a year or more ago while the no was for the opposite. A sample size of Four Hundred and Twenty-three (423) patients were selected randomly with at least Hundred (100) patients selected weekly on clinic day.

The eligibility criteria for the study include adults age 18 and above, who gave an informed consent and visited the diabetic clinic at least once a month and were diagnosed of diabetes and or hypertension not less than one year ago.

The exclusion criteria was:

- Diabetes and or Hypertensive patients below 18 years.
- Diabetes and or Hypertensive patients who do not visit the diabetic clinic at least once a month.

- Diabetes and or Hypertensive patients who were of Diabetes and or Hypertension less than a year ago.

3.5 Study Variables

- Sociodemographic factors of patients diagnosed of Diabetes and Hypertension.
- Adherence to medication and side effects of the medication.
- Access to medication.
- Perception of patients with Diabetes and Hypertension concerning their treatment outcomes.

3.6 Sample Size

A sample size of 402 people was calculated by using a general proportion of 50% with 95% Confidence interval and an allowable margin of error of 5%.

Using the sample size formula:

$N = z^2 pq / d^2$ Where:

N=sample size

Z= is a constant, using 95% confidence level

From the statistical distribution table 95%= 1.96

P= estimated prevalence of adults with the characteristics under study

q= (1-p)

Using a general proportion of 50%, then

$Pq = (0.5)(1-0.5)$ d= statistically

tolerated error (0.05)

By substituting the values into the formula

$$N = (1.96)^2(0.5)(0.5) / (0.05)^2$$

$$= 0.9604 / 0.0025$$

$$= 384.16$$

N (sample size estimated) is 384

10% Non-response is 38.4

$$384.16 + 38.4 = 422.56$$

Therefore, estimated total sample size is approximately 423 respondents.

3.7 Pre-Testing of Data collection Tool

The questionnaires were pretested in August 2018 in the general Out Patient Department of the Ejisu Government Hospital to determine the reaction of 10 respondents to the questions.

3.8 Data Handling

To facilitate data collection, four (4) pharmacy staff with at least a diploma certificate in their profession were employed. These people were trained on the purpose of the study and the process of administering the questionnaire for better responds from our respondents. Data collected from the questionnaire was double-checked and cleaned before entering into an excel spreadsheet and then transferred to the statistical software (STATA).

3.9 Data Analysis

The questionnaires were organized in such a way that the responses were coded by assigning numbers to all responses. Data was coded, cleaned and double-entered and was then analyzed by using Stata statistical programme version 14. The major statistical technique used includes percentages which were transformed into graphical representations such as tables, for easy interpretation. Morisky's adherence scale, a model used in estimating non-adherence to medication, was a model adopted to analyse the adherence of patients to their medication. The study examined socio-demographic factors that influence treatment outcomes patients with diabetes and hypertension using Poisson logistic regression. For all the inferential statistical tests, a P value was set at less than or equal to 0.05 level of significance with a 95% confidence interval.

3.10 Ethical Consideration

Ethical clearance for commencement of the study was sought from the Ethical Review Committee of the Kwame Nkrumah University of Science and Technology, School of Medical Sciences (KNUST-SMS), Kumasi, Ghana. Study participants were adequately informed of the purpose, nature, procedures, risks and hazards of the study. Verbal and informed consent were obtained from them before data collection.

3.11 Assumptions

It is assumed that respondents were carefully diagnosed and put on medications for at least the past one year.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents findings and results from the study that were generated from the data obtained from patients attending to the diabetic clinic at Ejisu Government Hospital in the Ejisu Municipality of Ashanti Region. Results are organized into sections in accordance with the study objectives; examining Patients' perception on medication side effects on treatment outcomes of diabetes and hypertension, examine the socio-demographic factors that influence treatment outcomes of diabetes and hypertensive patients, access to medication and adherence to medication. The results are presented in the order of socio-demographic characteristics of patients, disease history of patients, patients' perception on medication side effects and adherence to medication, access to medication, general perception on patients with diabetes and hypertension and factors influencing their treatment outcomes.

4.2 Socio-Demographic Characteristics of Diabetic and Hypertensive Patient's presenting at the Ejisu Government Hospital

The mean age of patients was 62.39 ± 12.14 years, almost forty percent were seventy years or above with the least age group (4.04%) being 41-55years. Majority of them were female (78.49%) and a little over fifty percent (51.67%) were single. Few patients had education up to tertiary level (7.14%) and twenty-six and forty-six percent had no education and basic education respectively.

Half of them were actively employed (52.96%) and the rest unemployed (14.18%) and retired

(32.86%) respectively. Majority of the patients were Christians (91.17%) with the least being other religion (2.39%). Almost all the patients had dependent (96.69%) averaging at five as presented in the table.

Table 4.1: Socio-demographic characteristics of diabetic and hypertensive patients presenting at Ejisu Government Hospital

Characteristics	Frequency (n=637)	Percentage
Age group		
Less than 40 years	132	31.35
41-55 years	17	4.04
56-69 years	106	25.18
70 + year	166	39.43
Mean (SD)	62.39 (12.14)	
Gender		
Male	91	21.51
Female	332	78.49
Marital status		
Single	217	51.67
Married	203	48.33
Educational level		
No Formal education	113	26.90
Basic Education*	196	46.67
High School	81	19.29
Tertiary**	30	7.14
Employment status		
Employed	224	52.96
Unemployed	60	14.18
Retired	139	32.86
Religious status		
Christian	382	91.17
Muslim	27	6.44
Other religions	10	2.39
Dependents		
No	14	3.31
Yes	409	96.69

Number of dependents			
	Less than five	198	48.29
	5-9	192	46.83
	10 +	20	4.88
Mean (SD)		5 (2.41)	

* **Basic Education:** Nine-year training from primary one to completion junior high school and Middle School

** **Tertiary Education:** Includes University and Polytechnics

Source: field data, 2018

4.3 Disease History of Diabetic and Hypertensive Patients presenting at Ejisu Government Hospital

About a third of the patients had a family history of diabetes (33.42%) and fifty-seven percent also had a family history of hypertension. Almost seventy percent (69.27) were diagnosed of hypertension, while eight percent were diagnosed of diabetes. However, there were twenty-one percent who were diagnosed of both conditions and these conditions had been with the patients for an average of seven years. Most of the patients were at stage two hypertensive (56.90%) when they first presented at the hospital. There were few of them who came in as prehypertension/elevated BP (3.45%). However, on the day of interview, forty percent of the patients had their hypertension status at normal ($<120/<80\text{mmHg}$). There were few patients (6.13%) whose hypertension status were at stage two ($\geq 160/\geq 100\text{mmHg}$).

Similarly, Random Blood Sugar (RBS) level of the patients were recorded on their first visit and the day of interview. The mean RBS score for the initial day was 15.10 ± 4.81 at the initial visit, with majority (77.32%) of them in the diabetic threshold ($>200\text{mg/dl}$ ($>11.1\text{ mmol/l}$)). Few patients (5.51%) had a normal RBS score on the first visit ($79-160\text{ mg/dl}$ ($4.4-8.9\text{ mmol/l}$)). Also, on the

day of interview, majority of the patient had their RBS score were in the normal threshold with few in Prediabetic (160-200 mg/dl (8.9-11.1mmol/l) and diabetic thresholds respectively as presented in table 4.2 below.

Table 4.2: Disease history of patients presenting at Ejisu Government Hospital.

Variable	Frequency	Percentage
Family history with diabetes		
No	265	66.58
Yes	133	33.42
Family history with hypertension		
No	179	42.62
Yes	241	57.38
Condition diagnosed with		
Diabetes	37	8.75
Hypertension	293	69.27
Both	93	21.99
Mean year of condition experience (SD)		
	7.15 (6.39)	
Initial Hypertension status		
Normal	-	
Prehypertension/Elevated BP	12	3.45
Stage 1 hypertension	138	39.66
Stage 2 hypertension	198	56.90
Current Hypertension status		
Normal	151	40.27
Prehypertension/Elevated BP	99	26.40
Stage 1 hypertension	102	27.20
Stage 2 hypertension	23	6.13
Initial RBS score		
Normal	5	5.15
Prediabetic	17	17.53
Diabetic	75	77.32
Mean RBS score		
	15.10 (4.81)	
Current RBS Score		
Normal	86	71.07
Prediabetic	14	11.57
Diabetic	21	17.36

Mean RBS score

8.57(3.83)

JNC 7 Blood pressure scoring (SBP mmHg/DBP mmHg)

- ☐ Normal (phasic) <120/<80
- ☐ Prehypertension (moderate) 120-139/80-89
- ☐ Stage 1 hypertension (mild) 140-159/90-99
- ☐ Stage 2 hypertension (severe) $\geq 160/\geq 100$

American Diabetes Association Random Blood Sugar scoring

- ☐ Normal 79-160 mg/dl (4.4-8.9 mmol/l)
- ☐ Prediabetic 160-200 mg/dl (8.9-11.1 mmol/l)
- ☐ Diabetic >200mg/dl (>11.1 mmol/l)

Source: field data, 2018

4.4 Patients' Perception on Medication Side Effects and Adherence to Medication.

Results on perceived side effects and adherence to medication are presented in table 4.3 below.

Less than seven percent of the patient (6.13%) discontinued taking their medication due to perceived side effect, likewise almost five percent (4.51%) claim to have knowledge of these side effects and also eleven percent agreed to have had their source of information from health practitioners. Majority of the patients denied taking herbal preparation (91.90%) due to the perceived side effects. Some of the side effects reported were; lower abdominal pain, severe headache and drowsiness.

Using Morisky scale, adherence to medication among the patients were examined and results presented in the table below. Four set of question testing their adherence to regular uptake of the medication prescribed to them were asked. Forty-six percent of the patients agreed to always forgetting to take medication, also twenty-six person do not take their medication as and when require. Majority of the disagreed of discounted (73.87%) taking their medication when they feel better. Similarly, majority of them continues with their medication even if they feel worse (92.38). Per the scale, adherence was low among majority of the patient (68.04%), while less than seven depicted high adherences. Main reason cited for the non-adherence to the medication was

forgetfulness (81.82%). However, there were other issues like fear of side effects, feeling very sick and the feeling of being well, side effects and Fasting which recorded smaller percentages.

Table 4.3: Patients perception on medication side effects and Adherence to medication

Variable	Frequency	Percentage
Discontinue medication due to side effect		
No	383	93.13
Yes	25	6.13
Knowledge on side-effects of my medicines		
No	402	95.49
Yes	19	4.51
My Doctor/Pharmacist/Nurse told me about side effect		
No	367	88.86
Yes	46	11.14
I take herbal preparations		
No	386	91.90
Yes	34	8.10
MORISKY SCALE FOR ESTIMATING MEDICATION NON-ADHERENCE		
Do you forget to take your medication		
No	225	53.32
Yes	197	46.68
I don't take my medicines as and when required		
No	311	73.87
Yes	110	26.13
Do you sometimes stop taking your medication when you feel better		
No	382	90.52
Yes	40	9.48
Do you sometimes stop taking your medication when you feel worse		
No	388	92.38
Yes	32	7.62
Adherence to medication		
High	27	6.16
Intermediate	113	25.80
Low	298	68.04
What are the reasons for not being able to take your medication?		
Fasting	1	1.82
Feeling sick	2	3.64

Feeling well	3	5.45
Forgetfulness	45	83.64
Side effect	3	5.45
Morisky scale score		
High	0 point	
Intermediate	1-2 points	
Low	3-4 points	
<i>Source : field data, 2018</i>		

4.5 Access to Medication among Patients.

The study further examined Patients access to their medication as prescribed and the results presented below. They were asked to either agree or disagree to statements posed to them to examine how accessible their medication is to them. Most of the patients agreed that they get their medication all the time while a little over one percent strongly disagreed to the fact that they get their medication on time. Majority (86.90%) also disagreed that they run out of medication because they don't get their refills on time. Few patients strongly agreed (0.71%) that they run out of medication due to their inability to afford, while majority disagree (90.31%) to that. Similarly, few patients strongly agreed (0.71%) that they are not able to get medication that have been prescribed to purchase outside hospital, while eighty-eight percent disagrees. Majority of the patients disagreed (88.65%) to forgetting to go for refill of medication being the reason why they run out of it. Few patients also strongly agreed (0.47%) to the fact that they run out of refill due to stock out at the hospital, while most patients hold an opposite view as shown in table 4.4

Table 4.4: Access to medication among patients presenting at Ejisu Government Hospital

STATEMENT	STRONGLY AGREE (%)	AGREE (%)	NEUTRAL (%)	DISAGREE (%)	STRONGLY DISAGREE (%)
Always get my medicines all the time	77(18.25)	205(48.58)	6(1.42)	129(30.57)	5(1.18)
Refills unavailable on time	2(0.48)	36(8.57)	10(2.38)	365(86.90)	7(1.67)
Unaffordable cost of medicines	3(0.71)	21(4.96)	6(1.42)	382(90.31)	11(2.60)
Unavailability of medicines outside the hospital when told to buy them	3(0.71)	25(5.91)	10(2.36)	373(88.18)	12(2.84)
Forgetfulness in going for my refills	7(1.65)	28(6.62)	1(0.24)	375(88.65)	12(2.84)
Shortage of medicines at the hospital	2(0.47)	129(30.57)	9(2.13)	272(64.45)	10(2.37)

Source: field data, 2018

4.6 Patients General Perception on Diabetes and Hypertension Treatment Outcomes

General perception of patients on their conditions were explored. Almost sixty percent (59.81%) agreed that, their condition can be managed, however there were a little over one percent patients who disagreed (1.65%). Similarly, most (56.09%) believed that their condition can lead to death, with few strongly opposing that view (0.96%). Few patients believed that lack of exercising (5.91%) and eating of junk food (0.95%) can worsen their condition respectively. Sleeping late (61.47%) and too much stress (61.47%) were both strongly agreed by most of the patients as worsening their condition, however there few others who held a contrary view. Similarly, (60%) of the patients perceived healthy eating and regular hospital visit as best way to manage their conditions

Table 4.5: Patients perception on diabetes and hypertension treatment outcomes

STATEMENT	STRONGLY AGREE (%)	AGREE (%)	NEUTRAL (%)	DISAGREE (%)	STRONGLY DISAGREE (%)
The condition can be managed or treated.	131(30.97)	253(59.81)	32(7.57)	7(1.65)	-
The condition can lead me to death	138(32.94)	235(56.09)	30(7.16)	12(2.86)	4(0.96)
Taking fruits can properly help in the management of my condition	144(34.12)	254(60.19)	15(3.55)	9(2.13)	-
Lack of exercise can worsen my condition	135(31.91)	239(56.50)	24(5.67)	25(5.91)	-
Eating of junk foods can worsen my condition	142(33.89)	255(60.86)	18(4.30)	4(0.95)	-
Eating late at night can worsen my condition	140(33.10)	260(61.47)	18(4.30)	5(1.18)	-
Too much stress can worsen my condition	143(33.81)	260(61.47)	16 (3.78)	4(0.95)	-
The hospital is better place for the management of my condition	154(37.38)	249(60.44)	4(0.97)	5(1.21)	-

Source: field data, 2018

4.7 Factors influencing Diabetes Treatment Outcomes in Patients presenting at Ejisu Government Hospital

The study examined the socio-demographic factors and medical history that influences hypertension treatment outcomes using Poisson logistic regression. Patients with family history of diabetes had significant relationship with treatment outcomes for diabetes. They had forty-three percent [OR = 0.57; 95% CI = 0.32-1.00; p=0.05] chance of experiencing positive treatment outcomes compared with those without such history. A multivariate analysis identified family

history of diabetes as the only significant factor that influences treatment outcomes after adjusting for other covariates. Patients with family history of diabetes were fifty-seven percent less likely [OR = 0.57; 95% CI = 0.32-1.00; p=0.05] to report positive treatment outcomes of diabetes compared to the referent group. However, none of the variables (age, gender, marital status, and employment status) tested for the condition appears to have any significant association with the study outcome. These are as shown in table 4.6.1 and 4.6.2 below:

Table 4.6.1: Univariate analysis of factors influencing treatment outcomes of Diabetes.

	logistics regression	
Variables	Crude Odd ratio (OR; 95% C.I)	P-value
Age		
Less than 40 years (ref)		
41-55	1.77(0.20-15.42)	0.60
56-69	1.49(0.40-5.51)	0.54
70+ years	2.43(0.46-1.73)	0.10
Gender		
Male (ref)		
Female	0.59(0.20-1.75)	0.34
Marital status		
Single (ref)		
Married	1.29(0.49-3.37)	0.52
Employment status		
Employed	(ref)	
Unemployed	0.54(0.21-1.38)	0.20
Retired	0.43(0.11-1.72)	0.23
Family history with diabetes		
No (ref)	(ref)	
Yes	0.57(0.32-1.00)	0.05*
<i>Source: field data, 2018</i>		

Table 4.6.2: Multivariate analysis of factors influencing treatment outcomes of Diabetes.

Variables	Multivariate logistics regression	
	Adjusted Odd ratio (OR; 95% C.I)	P-value
Age		
Less than 40 years (ref)		
41-55	1.22 (0.24, 2.38)	0.48
56-69	0.92 (0.15, 1.81)	0.30
70+ years	0.73 (0.13, 1.38)	0.15
Gender		
Male (ref)		
Female	0.52 (0.15, 1.81)	0.30
Marital status		
Single (ref)		
Married	1.45 (0.86-2.45)	0.16
Employment status		
Employed (ref)		
Unemployed	1.54 (0.59, 3.99)	0.38
Retired	0.34 (0.12, 0.98)	0.44.
Family history with diabetes		
No	(ref)	
Yes	0.57(0.32-1.00)	0.05*
<i>Source: field data, 2018</i>		

4.8 Factors influencing Hypertension Treatment Outcomes in Patients presenting at Ejisu Government Hospital

Similar analysis was carried out for hypertension treatment outcomes. Socio-demographic factors such as age, gender, marital status, level of education, employment status and religion did not show any significance in the analysis. Patients with family history of hypertension had significant relationship with treatment outcomes for hypertension. Similarly, patients with family history of

hypertension had fifty percent [OR = 0.5; 95% CI = 0.31-0.98; p=0.04] reduced chance of experiencing positive treatment outcomes compared with those without such history.

Also, a multivariate analysis identified family history of diabetes as the only significant factor that influences treatment outcomes after adjusting for other covariates. Patients with family history of diabetes were fifty percent less likely [OR = 0.5; 95% CI = 0.31-0.98; p=0.04] to report positive treatment outcomes of hypertension compared to the referent group. These are as shown in table 4.7.1 and 4.7.2 below:

Table 4.7.1: Univariate analysis of factors influencing treatment outcomes of Hypertension.

	logistics regression	
Variables	Crude Odd ratio (OR; 95% C.I)	P-value
Age		
Less than 40 years (ref)		
41-55	1.97(0.52-7.54)	0.32
56-69	0.95(0.45-1.97)	0.89
70+ years	0.90(0.46-1.73)	0.74
Gender		
Male (ref)		
Female	1.33(0.64-2.73)	0.43
Marital status		
Single (ref)		
Married	1.14(0.65-1.96)	0.64
Educational level		
No Formal education		
Basic Education*	0.93(0.50-1.71)	0.83
High School	0.64(0.28-1.41)	0.26
Tertiary**	0.21(0.01-2.32)	0.20
Employment status		
Employed (ref)		
Unemployed	0.79(0.46-1.35)	0.40
Retired	0.68(0.32-1.44)	0.32

Religious status		
Christian (ref)		
Muslim	1.36(0.48-3.58)	0.56
Other religions	2.63(0.59-11.76)	0.20
Family history with Hypertension		
No (ref)		
Yes	0.5(0.31-0.98)	0.04*
<i>Source field data. 2018</i>		

Table 4.7.2: Multivariate analysis of factors influencing treatment outcomes of Hypertension.

	Multivariate logistics regression	
Variables	Adjusted Odd ratio (OR; 95% C.I)	P-value
Age		
Less than 40 years (ref)		
41-55	1.90 (0.60-8.99)	0.66
56-69	0.56 (0.16-1.64)	0.70
70+ years	0.94 (0.37-2.41)	0.60
Gender		
Male (ref)		
Female	1.92 (0.88-4.20)	0.10
Marital status		
Single (ref)		
Married	1.10 (0.65-1.90)	0.54
Educational level		
No Formal education (ref)		
Basic Education*	0.94 (0.37-2.41)	0.90
High School	0.48 (0.19-1.18)	0.10
Tertiary**	0.45 (0.17-1.19)	0.11
Employment status		
Employed (ref)		
Unemployed	0.71(0.21-2.36)	0.57
Retired	0.53(0.18-1.61)	0.26
Religious status		
Christian (ref)		
Muslim	1.41(0.46-4.46)	0.55

Other religions	3.41(1.39-8.52)	0.65
Family history with Hypertension		
No (ref)		
Yes	0.55(0.31-0.98)	0.04*

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This chapter presents the discussion of results generated from the collected data for this study. An investigation of the treatment outcomes of both diabetic and hypertension patients presented at Ejisu Government Hospital. The discussion in this section was organized in accordance with the study objectives. The study identified family history to be a major influencing factor towards the treatment outcomes of patients. Factors like adherence to medication, access to medication and perception of patients with Diabetes and Hypertension are all involved in treatment outcomes of these conditions.

5.2 Demographic Characteristics of the study sample.

The study achieved a response rate of 99%, as against the anticipated ninety percent rate. This makes the generalization of the finding to other population with similar characteristics acceptable. The age distribution of the respondents ranged between forty to above seventy years old, with the majority being above seventy years. The gender distribution was dominated by female. The ratio of gender distribution was consistent with reports from several studies conducted elsewhere (Addo, Amoah, & Kwadwo, 2006; Buabeng, Matowe, & Plange-Rhule, 2004; Everett and Zajacova, 2015). The issue of this gender disparity could be explained by the higher numbers of women who

are usually burdened with both diabetes and hypertension in most settings (Ado et al., 2006). A little over the twenty-six percent had no formal education and most had at least basic education. This distribution reflects the district demographics of having majority of them with basic level training and less than twenty percent with no education, rest of the educational level among patients (Ghana Statistical Service, 2014). Literacy level has been reported to be one of the predictors of treatment outcomes for both diabetes and hypertension. For instance Addo et al., (2006) reported that educated people had three fold improved hypertension status compared to those with no education. Even though our study did not show any significant association of hypertension outcome with patient's educational level, it was consistent with treatment outcome. Experiencing a positive treatment outcome kept increasing as education level also increases. More than half of the studied population were still actively in some form of occupation that earns them income, while a little over thirty-two percent have also retire from active services, only few were unemployed. Similarly, employed persons who had access to some form of income had bad outcomes as reported by Addo et al., (2006) even though such relationship was statistically significant, however there the same trend was experienced in this study. Religious distribution in the district is Christian dominated one and this was reflected in the characteristics of patient recorded for this study.

5.3 Disease history of diabetic and hypertensive patients presenting at Ejisu Government Hospital.

Disease history of an individual and that of his family members are important factors that play a major role in studying disease aetiology. Therefore, in quest to establish the factors which influence treatment outcomes of hypertension, the study examined the disease history of the patients reported at the clinic. About fifty-seven percent had family relatives who suffered from hypertension and a

third had relatives who suffered from diabetes. Almost fifty-seven percent of the patients were mildly hypertensive ($\geq 160/\geq 100$ mmHg) i.e. 56.90% on the day of diagnosis, with none presenting a normal blood pressure level. These figures dropped significantly on the day of interview, forty-percent of the respondents had normal blood pressure level ($< 120/< 80$ mmHg), while those who were pre-hypertensive (120-139/80-89mmHg) and moderately hypertensive represented twenty-six and twenty-seven percent respectively. The figures for the mildly hypertensive patients had dropped to a little over six percent an indication that, there had been improvement in the hypertension management. This implied that hypertensive status of the patients was being controlled in a way. Similar trend was experienced in the glucose score of patients on the day of diagnosis and the day of interview. The mean scores of the patients had improved almost 100 percent. This means that majority of the patient were within diabetic threshold on the day of diagnosis and gradually an improvement was experienced representing about fifty-four percent reduction as shown in table 4.2.

5.4 Perception on medication side effects and adherence to medication.

The study explored some of the perceived side effects of medication from the patients view. Adherence to instruction on prescription and medication has been reported to be influenced by various factors. It is believed that the individual's perception about the side effect derived from taking a particular medicine influences their treatment behavior and over-all treatment outcome of hypertension (WHO, 2003). Six percent of the patients believed that there was side effect to taking of the medication prescribed to them and therefore discontinued uptake, even though majority held a different belief. In addition, a little over five percent of them claim to have knowledge on side effects of the medication they take. When asked about their source of knowledge, eight percent

claim their sources where from practitioner like nurses, doctors and pharmacist. These perception causes most patients to avoid their medication, This finding corroborate with a report from Horne et al., (2013) that once a patients perception on medication side effect is negative one, it causes a behavior change in adherence to his/her medication (Horne, Weinman, Barber, Elliott, & Morgan, 2013). In the typical Ghanaian communities, most of the use of herbal preparation is widely accepted and is believed to be devoid of any side effects, so people who have chronic conditions and diabetes usually resort to these remedies as the best way of managing them instead of resorting to orthodox medication. Our study revealed that a number of patients up to eight percent take herbal preparation due to the reason stated above.

Medication adherence among patients were examined using the famous Morisky scale. Based on the four set of questions as required by the scale, majority of the patients (68.04%) were in the low adherence grade. Only 6% scored a High adherence grade. Adherence level recorded in this study is very low compared to the global figure which estimates non-adherence to be in the range of 30-50% (Schroeder, Fahey, & Ebrahim, 2004). This indicator could lead to a high number of uncontrolled hypertension and diabetes among the study sample. This means treatment outcomes among patients may be affected negatively since there is a direct connection between management of conditions and their treatment outcomes as reported in by Ross et al., (2004) in their study of patient's compliance in hypertension treatment.

The reasons for the low adherence level recorded in the current study were given by the majority as due to forgetfulness. Other reasons were given as the fear of side effects, feeling unwell when they took the medication and fasting for religious purposes. These reasons were put forward by the patients in the study, similarly finding from studies elsewhere also reported same as the reason was put up as barriers to medication uptake (Grégoire et al., 2001; Krousel-Wood, Muntner, Islam,

Morisky, & Webber, 2009).

5.5 Access to medication among patients presenting at Ejisu Government Hospital.

The study found out that issue of medication access was less of a challenge to the patients when they visited the hospital. Less than a percentage of them agreed to the fact that they sometimes do not go for their medication on time due to reasons ranging from cost of medication, stock-out at facility, and forgetting to go for refill as shown in table 4.4. From this finding, there is a clear indication that patients do not have problem in getting their medication refilled for them whenever they so desire, but ironically per Morisky scale adherence to medication was low. This means that the reasons reported to be discouraging patients from medication uptake need to be given much attention if we wish to record quality treatment outcomes among this population group.

5.6 Patients general knowledge on Diabetes and Hypertension treatment outcomes.

Diabetes and Hypertension are conditions, which the public holds several perception and opinions. It has however been argued by Lay epidemiologist that a successful implementation of intervention to influence health condition rely greatly on people's perception and understanding about such conditions and its risk factors associated. Therefore, this study sort to investigate some of these perceptions by patients presenting at the Ejisu Hospital in order to come up with suggestion that will support future interventions.

Majority of the patients believed that both diabetes and hypertension are conditions that could be managed however, same number were also optimistic that it could lead to their death if uncontrolled. Also, majority of respondents were aware that, lifestyle modification such as healthy eating, good eating habits and exercising regularly could improve their conditions. Similar trends were reported by Spencer, Phillips, & Ogedegbe, (2005) in their study of knowledge, beliefs and

attitudes on hypertension in western region of Ghana. Their study reported that knowledge on hypertension risk factors was relatively high as about 73% of the people were aware that lack of exercise, uncontrolled eating habits and other lifestyles could increase an individual's susceptibility to the condition. In addition, fifty-eight percent believed the condition could be cured. The level of knowledge on diabetes and hypertension appears to be relatively high in this study. This possibly explains why prevalence of these conditions reduced greatly after starting treatment as presented in table 4.2.

Ross et al., (2004) concluded in their study that some aspects of illness perception and knowledge improves compliance and outcome of such illness. The degree of importance attached to management of a patient's condition is affected by how serious or mildly they perceive such a condition. Once the patients become knowledgeable about their condition, they are likely to look for ways to improve their condition and are likely to follow treatment instructions and comply accurately.

All the respondents with the exception of a little over 4% percent believe that hypertension is caused by stress (table 4.5). This finding corroborate with similar studies which cites stress and worries to be connected to both hypertension (Marshall, Wolfe, & McKevitt, 2012). It is believed that pressures from work, finances and family issues are major causes of high blood pressure that triggers hypertension, when an individual endures such a condition for longer periods.

5.6.1 Factors influencing diabetes treatment outcomes in patients presenting at Ejisu Government Hospital.

Even though it has been widely published in other studies in various part of Ghana that sociodemographic factors such age, sex, marital status, education and medical history such as glucose level, blood pressure, are major risk factors to diabetes treatment outcomes (Amoah, Owusu, & Adjei, 2002; Danquah et al., 2012). None of these factors stated in this study demonstrated any significant association with the study outcome except patients with family history of diabetes. Patients with relatives who have diabetes were fifty-seven times less likely to show good treatment outcomes compared to those without family history of the condition after adjusting for all covariates. Similarly finding have been reported elsewhere (Forman, Stampfer, & Curhan, 2009). Diabetes and hypertension are seen to have some linkage therefore, it is not surprising to record such finding has been confirmed in other studies elsewhere. This supports Papazafiropoulou et al., (2009) studies that patients with family history of diabetes are more likely to have the condition than those without such history.

People who have families with history of certain conditions are likely to inherit some lifestyles, cultures and behavior from them voluntarily or involuntarily without noticing. This explains why certain people develop condition due to their association with their families and ethnicity.

5.6.2 Factors influencing hypertension treatment outcomes in patients presenting at Ejisu Government Hospital.

Hypertension is a condition that has been reported to be influenced by several factors including socio-demographic characteristics and patient's medical histories among others. This study examined the influence of these factors on the treatment outcomes of diabetes and hypertension.

Both univariate and multiple variable logistic regression was performed to identify the factors that predict the outcome.

The study revealed significant association between family history and treatment outcomes of hypertension. Other socio-demographic factors were not statistically significant in the study. Socio-demographic factors such as age, gender, education, marital status among others have been reported by experts to have some degree of influence on hypertension outcomes (Forman et al., 2009; Kannel, 1989; Messerli et al., 2007), however, none of these factors were significant determinant in the present study. This variation could be explained by difference in the study settings, population involved among others.

5.7 Limitations of Study

This study is based on factors that influence treatment outcomes of Diabetes and Hypertension comorbid conditions only and does not include other non-communicable diseases. This limits the influence that other non-communicable disease like asthma could have on the treatment outcomes of these conditions when patients with such conditions present other co-morbid conditions. In addition, the response to the questionnaires by the patients were influenced by the manner the researcher interrogates the patients, especially in relation to the language being used (twi). This altered most to the responses given as none of the sociodemographic factors significantly influenced treatment outcomes of diabetes patients. In addition, patients may not notice the side effects of their medicine and the specific medicine causing that effect or reaction and turn not to take their medication as required and these accounted for the low level of adherence in the study.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

6.1.1. Introduction

This chapter presents the conclusion from the findings of the study in accordance with the objectives for the study. Also, recommendations were made based on the findings obtained from the study to the various stakeholders concerned in order for them to address the problem at hand and also improve treatment outcomes for both diabetes and hypertension in the Ejisu municipality.

6.1.2 Diabetes and Hypertension patients on day of diagnosis and on day of interview

Seventy-seven (77%) percent of the patients presented with diabetic status ($>11.1\text{mmol/l}$), while 17% of them had their glucose score at the Prediabetic state ($8.9\text{-}11.1\text{mmol/l}$) when first diagnosed of their condition. On the otherhand, on the day of interview, a little over seventeen percent presented with diabetic status, while majority (71%) had improved to the normal range ($4.4\text{-}8.9\text{mmol/l}$) of the glucose score according to American Diabetes Association classification of glucose score.

Fifty-six percent (56.90%) of Hypertensive patients were mildly-hypertensive ($140\text{-}159/90\text{-}99\text{mmHg}$) when first diagnosed, while thirty-nine percent were also moderately Hypertensive ($120\text{-}139/80\text{-}89\text{mmol/l}$). However, on the day of interview their condition had improved significantly. Most of the patients were in the phasic state ($<120/<80\text{mmHg}$) of Hypertension, while a little over 6.13% were mildly hypertensive according to the JNC7 classification.

6.1.3 Socio-demographic characteristics on Treatment Outcomes

Gender, Marital status, Employment status and Religious affiliation did not significantly influence treatment outcomes of patients with diabetes and hypertension. On the other hand, increasing age, a higher determinant for diabetes and hypertension, though did not influence treatment outcomes, it was related with poor treatment outcome as old age affects health outcome of patients with such conditions.

A positive treatment outcome for patients with hypertension is influenced by higher Educational status. Treatment outcomes of these patients improved with their level of literacy as Patients with Tertiary educational status had a better health outcome as compared to those with High school status and Basic Educational status.

6.1.4 Adherence to medication and medication side effects on Treatment outcomes

Patients who recorded low adherence grade was 68.04% as compared to the global figure, which estimates non-adherence in the range of 30-50%. This explains a higher level of uncontrolled hypertension among the study sample, which ultimately affects treatment outcome negatively. The reasons for low level of adherence given in the study includes; forgetfulness which they attributed to being busy with work and religious activities predominantly; fasting. Fear of side effects, feeling unwell when they took the medication and feeling better after some months of taking the medication were also some of the reasons given.

6.1.5 Access to medication on treatment outcomes of Patients with Diabetes and Hypertension

Access to medication was not a major challenge for patients with diabetes and hypertension as most of their medication were insured. Though few patients admitted to the fact that, they

sometimes do not go for their refills. A small number admitted to the cost of medication, which they are asked to buy outside the hospital as when the hospital runs out-of-stock, and the distance to a Pharmacy as a reason for their difficulty in getting access to their medication.

With adherence being low and access to medication not being a challenge, which could directly affect treatment outcomes, much attention should be given to patient counselling to improve treatment outcomes.

6.1.6 Perception of Patients on treatment outcomes of Diabetes and Hypertension

Treatment outcomes have often been associated with Patients' perception, beliefs and behavioral characteristics. Most Patients were of a positive belief that their condition could be managed and that they would recover faster if they take their medication as prescribed. Majority of these patients were well aware of lifestyle modifications such as eating less junk food, regular exercises, reducing stress and halting late night eating as a factor to improve their health outcome. These explains that once patients become aware and informed of their condition they find ways to improve their health outcome and well-being.

6.1.7 Factors influencing Diabetes and Hypertension treatment outcomes in patients presenting at Ejisu Government Hospital.

Significant association between family history and treatment outcomes was noted as the other socio-demographic factors didn't show any significant influence. Patients with relatives having diabetes and hypertension were 57 and 50 times less likely to show good treatment outcomes as compared with those without family history of condition.

Although some socio-demographic factors such as age, gender, education and marital status have been reported to have some degree of influence on diabetes outcome, none were significant determinant which could be explained in the study settings and population involved. On the other hand, a similar reason could be given for hypertensive patients where no significant association was observed for the demographic factors stated above.

6.2 RECOMMENDATIONS

Based on the finding from the study, it was important for the researcher to make the following recommendation to help improve treatment outcomes in patients with Diabetes and Hypertension in the Municipal and the country at large. Recommendations enlisted are:

1. To help better treatment outcomes, patient counselling by health professionals especially Pharmacist should be taken with all seriousness to help patients adhere to their medication.
2. Also extensive research should be done to know the genetics of family history in affecting treatment outcomes of patients with diabetes and hypertension in order to help improve upon these outcomes.
3. Ministry of Health and Ghana Education Service should also help organize more sensitization programmes for Health Workers on the factors that influences treatment outcomes of diabetic and hypertensive patients in order for them to know some of the reasons for the prevalence of these conditions in the country and find ways to reduce it.
4. Health Education Programmes should regularly be organized both for patients in the Hospital with such conditions and also for the district at large to create more awareness on

the knowledge and beliefs the people have concerning the management of these conditions to help reduce its prevalence.

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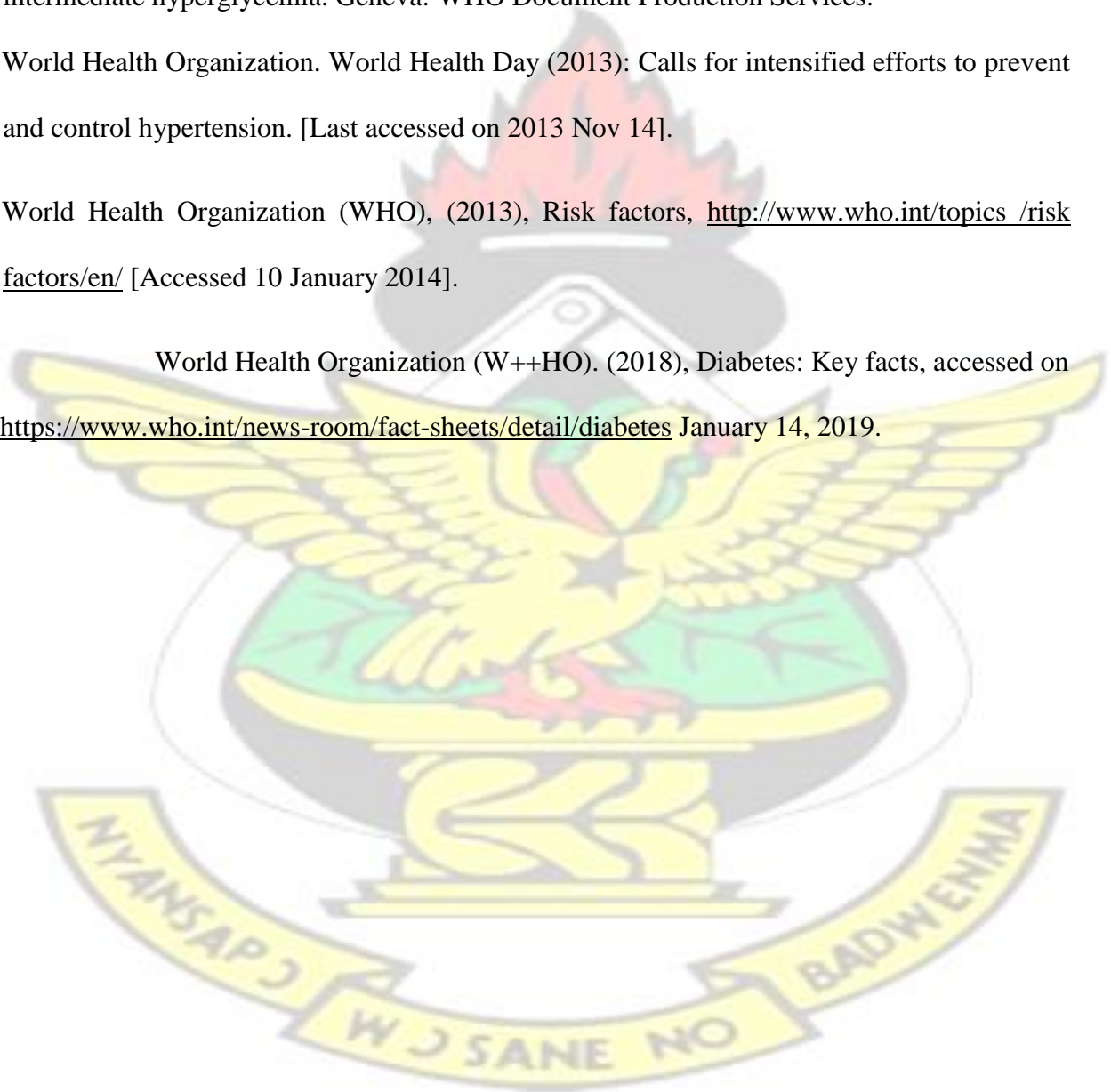
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APPENDICES

APPENDIX 1

QUESTIONNAIRE

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

**FACTORS INFLUENCING TREATMENT OUTCOMES OF PATIENTS WITH DIABETES
AND HYPERTENSION AT THE EJISU GOVERNMENT HOSPITAL IN EJISU, ASHANTI
REGION, GHANA.**

This questionnaire is about a research on factors that influence treatment outcomes of patients with Diabetes and Hypertension in the Ejisu Government Hospital. They are grouped into **FOUR** sections. Please tick where appropriate and fill in the space where necessary. You are not obliged to answer all questions and have permission to decline but your full participation in this survey will be very much appreciated.

Please **NOTE** that any information provided for this study would be treated as confidential.

Thank you.

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SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PATIENT

<p>1. Sex of respondent</p> <p>Male <input type="checkbox"/></p> <p>Female <input type="checkbox"/></p>	<p>7. Do you have any Family History of Diabetes?</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Yes</p> <p>No</p>
<p>2. Age of respondent</p> <p><input type="text"/></p>	<p>8. Do you have any Family History of Hypertension?</p> <p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>3. Marital Status</p> <p>a. Single</p> <p>b. Married</p> <p>c. Divorced</p> <p>d. Widow</p> <p>e. Separated</p> <p>f. Cohabiting</p> <p>g. Others (Specify)</p> <p>.....</p>	<p>9. (i) What is your level of education?</p> <p>a. Basic</p> <p>b. Secondary</p> <p>c. Tertiary</p> <p>d. None</p> <p>e. Others (Specify)</p> <p>.....</p> <p>(ii) Job status</p> <p>a. retired</p> <p>b. self-employed</p> <p>c. employed</p> <p>d. unemployed</p>

<p>4. Do you have children?</p> <p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p> <p>5. If Yes, How many?</p> <p>.....</p>	<p>10. Religious affiliation</p> <p>a. Christian</p> <p>b. Muslim</p> <p>c. Traditionalist</p> <p>d. Others (Specify)</p> <p>.....</p>
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<p>6. Which condition have you been diagnosed of? a. Diabetes b. Hypertension c. Both a and b</p> <p>13. How long has it been since you were diagnosed of the condition?</p> <p>.....</p>	<p>11. How high was your BP when first diagnosed? (For Hypertensive Patients)</p> <p>12. What is your present “average” BP reading?</p> <p>.....</p> <p>14. What was your RBS when first diagnosed? (For Diabetic patient)</p> <p>.....</p> <p>15. What is your RBS currently?</p>
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SECTION B: ADHERENCE TO MEDICATION AND SIDE-EFFECTS OF THE MEDICINES

Please indicate (by ticking in the box) the extent to which you agree or disagree with each statement.

Please note there are no right or wrong answers.

STATEMENT	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
16. I sometimes forget to take my medication					
17. I don't take my medicines as and when required					
18. When I feel better, I sometimes stop taking my medication					
19. Sometimes, when I feel worse, I stop taking my medication					
20. I stopped taking my medication because I often experienced sideeffects					

21. What are some of the side effects experienced when taking your medication? a. Headache c. Sexual dysfunction e. Allergic reaction b. Dry Mouth d. G.I.T Disturbances f. Others (Specify).....					
22. I sometimes don't take my medicines because of my knowledge on sideeffects of my medicines					
23. My Doctor, Pharmacist or Nurse always tell me about the side-effects of my medication					
24. I don't take my medicines because I take herbal preparations					

25. What are the reasons for not being able to take your medication?

- a. Forgetfulness d. Feeling well g. Don't believe in the treatment
 b. Financial e. Feeling sick h. Others (Specify)
 c. Side effects f. Too busy

SECTION C: ACCESS TO MEDICATION

STATEMENT	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
26. I always get all my medicines all the time					
27. I run out of medicines because I don't get refills on time					
28. I run out of medicines because I can't afford the cost of medicines					
29. When I am told to buy my medicines outside the hospital I don't always get them					
30. I run out of medicines because I sometimes forget in going for my refills					
31. I run out of medicines because the hospital / department runs out of stock					

32. What are the reasons that makes it difficult for you to get all your medication?

.....

**SECTION D : PERCEPTION OF PATIENTS IN RELATION TO THE TREATMENT
 OUTCOME OF DIABETES AND HYPERTENSION**

STATEMENT	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
33. I know my condition can be managed or treated.					
34. I know my condition can lead me to death					
35. I know that taking fruits can properly help in the management of my condition					
36. I know that lack of exercise can worsen my condition					
37. I know that eating of junk foods can worsen my condition					
38. I know that eating late at night can worsen my condition					
39. I know that too much stress can worsen my condition					
40. I know the hospital is better place for the management of my condition					

<p>41. What is (are) the name(s) of the medication(s) for your condition of Diabetes? Please list</p> <p>.....</p> <p>.....</p>
<p>42. What is (are) the name(s) of the medication(s) for your condition of Hypertension? Please list</p> <p>.....</p> <p>.....</p>

NB: Questions 16-19 = Morisky’s 4-item questionnaire

APPENDIX 2

Participant Information Leaflet and Consent Form

Title of Research:

FACTORS INFLUENCING TREATMENT OUTCOMES OF PATIENTS WITH DIABETES AND HYPERTENSION IN THE EJISU GOVERNMENT HOSPITAL, ASHANTI REGION, GHANA.

Name(s) and affiliation(s) of researcher(s):

This study is being conducted by Mr. Joseph Owusu-Ansah and Supervised by Prof. Ellis Owusu-Dabo of the School of Public Health, Department of Health Policy, Management & Economics of the Kwame Nkrumah University of Science and Technology in partial fulfilment of MPH Health Services Planning and Management.

Purpose(s) of research: The purpose of this research is to address some of the factors that influence the treatment outcomes of patients with Diabetes and Hypertension in the Ejisu Government Hospital, in the Ashanti Region of Ghana.

Procedure of the research: Primary data would be collected with the help of a structured questionnaire and administered to consented people during data collection. The questionnaire would be prepared in English and rendered in Twi (the most widely spoken and understood language in the district) as expected.

Diabetes and Hypertension patients who visits the Diabetic clinic at the Ejisu-Government Hospital will be randomly selected. Selected patients should be diagnosed patients who have been on treatment medication for at least one year. About Four Hundred (400) patients would be selected randomly with Hundred (100) patients selected weekly on clinic day.

An eligibility criteria for the study includes adults age 18 and above, who would be given an informed consent, and who visits the diabetic clinic at least once a month and have been diagnosed of Diabetes and or Hypertension not less than two years ago

Risk(s): This study will not expose you to any risk. It will not add any additional risk to your normal treatment.

Benefit(s): It is an expectation that this study will help to determine the factors that influence the treatment outcome of patients with Diabetes and Hypertension at the Ejisu Government Hospital, in the Ashanti Region of Ghana.

Confidentiality: All information collected in this study will be given code numbers. No name will be recorded. Data collected cannot be linked to you in anyway. No name or identifier will be used in any publication or reports from this study.

Voluntariness: Taking part in this study should be out of your own free will. You are not under any obligation to. This research is entirely voluntary.

Alternatives to participation: If you choose not to participate, this will not affect your treatment in the Diabetic clinic in the Ejisu Government hospital in any way.

Withdrawal from the research: You may choose to exit from the research at any stage without having to explain yourself. You may also choose not to answer any question you find uncomfortable or private. This will not affect the kind of treatment that will be given to you.

Consequence of Withdrawal: There will be no consequence, loss of benefit or care of any kind to you if you choose to withdraw from the study.

Costs/Compensation: There are no direct benefits or compensation by participating in the study. However, by your participation, you will be making available, valuable information which may help evaluate some of the factors that influence treatment outcome of Diabetic and Hypertension in the Ashanti Region and if possibly, the country as a whole.

Contact(s): If you have any question concerning this study, please do not hesitate to contact the Principal investigator, Mr. Joseph Owusu- Ansah on 0541880453/ 0206794503.

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APPENDIX 3



KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES



SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Ref: CHRPE/AP/567/18

3rd October, 2018.

Mr. Joseph Owusu-Ansah
Department Health Policy,
Management & Economics
School of Public Health
KNUST – KUMASI.

Dear Sir,

LETTER OF APPROVAL

Protocol Title: *“Factors Influencing Treatments Outcomes of Patients with Diabetes and Hypertension in Ejisu Government Hospital in the Ashanti Region of Ghana.”*

Proposed Site: *Diabetic Clinic, Ejisu Government Hospital.*

Sponsor: *Principal Investigator.*

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 20th September, 2018 from the Ejisu Government Hospital (study site) indicating approval for the conduct of the study at the Hospital.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 3rd October, 2018 to 2nd October, 2019 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,


Rev. Prof. John Appiah-Poku.
Honorary Secretary
FOR: CHAIRMAN

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