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OUT-OF-POCKET EXPENDITURE AND FINANCIAL COPING STRATEGIES FOR MANAGEMENT OF DIABETES AT GA SOUTH MUNICIPAL HOSPITAL

BY

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DECLARATION

I, Nii Ankonu Annorbah-Sarpei, hereby declare that this study is a result of my independent work. References to other works have been duly acknowledged. I further declare that this study has not been submitted for award of any degree in this institution and other universities elsewhere.

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(STUDENT)

SIGNATURE: ……..

DATE: ……..

PROF. MOSES AIKINS

(SUPERVISOR)

SIGNATURE: …….

DATE: …….

DEDICATION

I dedicate this work to my wife, Naa Adokarley Pappoe whose tolerance, kind heartedness and support was instrumental in helping me to have the peace of mind required to complete this work. I also dedicate this to my mum, Naa Koshie whose love for me continues unabated.

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Special thanks to Naa Tsotsoo, who gave me the opportunity to further my education. I am forever grateful! I am also thankful to Sweet Mama May, my siblings, my colleagues at work especially Michael and my classmates at SPH whose drive and encouragement made it possible to finish this work.

My sincerest gratitude goes to my supervisor, Prof. Moses Aikins whose calm demeanour, patience, tolerance and helpful criticism was instrumental in helping me finish this work. There are certainly few like you.

Last but not least I wish to thank my father who though no longer here continues to inspire me. Dad, like I have always said, you are always the man I want to be like

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LIST OF ABBREVIATIONS

BOD	-	Burden of Disease
CDC	-	Centre for Disease Control
COI	-	Cost of Illness
CVD	-	Cardiovascular Disease
DALY	-	Disability-Adjusted Life Years
DM	-	Diabetes Mellitus
DME	-	Diabetic Macular Edema
DN	-	Diabetic Nephropathy
DPN	-	Diabetic Polyneuropathy
DR	-	Diabetes Retinopathy
GDP	-	Gross Domestic Product
GDM	-	Gestational Diabetes Mellitus
GFR	-	Glomerular Filtration Rate
GHS	-	Ghana Health Service
HCA	-	Human Capital Approach
IDF	-	International Diabetes Federation
LMIC	-	Low-and Middle-Income Country
MoH	-	Ministry of Health
NCD	-	Non-Communicable Disease
NHIS	-	National Health insurance Scheme
OOPE	-	Out-of-Pocket Expenditure
OOPP	-	Out-of-Pocket payment

OOPS	-	Out-of-pocket Spending
PDR	-	Proliferative Diabetes Retinopathy
PHC	-	Primary Health Care
QALY	-	Quality-Adjusted Life Year
QoL	-	Quality of Life
RHNP	-	Regenerative Health and Nutrition Programme
UHC	-	Universal Health Coverage
VTDR	-	Vision Threatening Diabetes Retinopathy
WHO	-	World Health Organisation
WTP	-	Willingness to Pay

ABSTRACT

Background: In 2017, there were 425 million people living with diabetes globally, while in Ghana, the number of adults with diabetes was 518,400. The International Diabetes Federation revealed that patients with diabetes have health expenses of 673 billion USD annually. In Ghana, financial and non-financial cost associated with diabetes accounts for over two-thirds of household's income.

Objective: The objective of this study was to determine out-of-pocket payments and financial coping strategies for management of diabetics at Ga South Municipal Hospital.

Method: The study design was cross sectional using quantitative data collected from Ga South Municipal Hospital. The cost-of-illness and human capital approach were used to determine the direct, indirect and intangible costs. Financial coping strategies adopted by diabetics was also determined. A total of 120 adult diabetics were interviewed during the study.

Results and Findings: The total monthly direct cost for diabetes constituted about 90% of the total cost profile of diabetes treatment among diabetics in Ga South Municipal Hospital. More than half of respondents listed self-financing as one of their treatment sources. Treatment costs for diabetes continues to rise with the cost of medication, a major driving factor.

Conclusion and Recommendations: Many patients with diabetes continue to make out of pockets payments to support treatment for diabetes. The cost data of the study – direct, indirect and intangible costs could be used by public health promoters and educators as a funding advocacy tool to support diabetes prevention and promotion activities.

CHAPTER ONE

INTRODUCTION

1.1 Background to the problem

Across the world today, accessing quality health services is a major constraint for many people with studies indicating annually, about 150 million people experience catastrophic healthcare expenditure. Of this number about 100 million people live in low and middle income countries are annually pushed into poverty or death as many continue to live the rest of their lives with health threatening conditions because of the cost of health care services (Mbogo and McGill 2017). This predicament mostly affects vulnerable groups such as pregnant women, children and young people who are usually at the forefront of disadvantages when accessing health services.

Indeed, while previously, communicable diseases were the cause of most deaths, an ever rise in the number of persons with non-communicable diseases (NCDs) continues to be major challenge globally. In 2018, the World Health Organisation (WHO) reported that NCDs are "chronic diseases that tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors" (WHO, 2018). The WHO states that the main types include cardiovascular diseases like stroke and heart attacks, diabetes, asthma, chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, pneumonia and cancers disproportionately affects individuals in low-and middle-income countries.

Diabetes is said to contribute to the high prevalence of global deaths occurring worldwide. In 2016, the WHO reported that of the 56.9 million global deaths occurring worldwide, 40.5 million, or 71%, were due to NCDs such as diabetes. The WHO further pointed out that diabetes is the fifth leading cause of all deaths. In 2017, there were 425 million people living with diabetes with more than 16 million located in Africa (IDF, 2017). Interestingly, more than 31 million of these deaths took place in developing countries and in these countries, approximately 46% of such deaths happened before the affected turned 70 years. In 2016, 1.6 million deaths was attributed to diabetes alone.

With the world experiencing an upsurge in the rise of chronic non-communicable diseases in comparison with communicable disease, people across the globe are faced with ever increasing expenditure in health care while countries are faced with a new burden of increasing their investment in the health sector to mitigate the risk and threat of citizens being forced into poverty because of demand on out-of-pocket payments (OOPP) for health care services.

In a 2010 publication, the World Health Organisation (WHO) stated that OOPP is a component of the health financing across countries in the world that rely on co-payments and patient payments to mobilize financial resources. The WHO adds that out-of-pocket payments (OOPP) are expenses made by persons to health service providers at the point of use. In estimating out-of-pocket payments (OOPP) for national health accounts, the WHO revealed that OOPP are "typically the largest or second-largest source of health care financing in many developing countries, as well as the largest source of error in estimates of national health spending" (WHO, 2018:6).

Interestingly, studies indicate that the cost of treatment for non-communicable diseases (NCDs) such as diabetes remains high both for the individual and the family. The United Nations, for instance estimates that in addition to the social and psychological burdens of chronic diseases, the increasing loss to the world's economy would be USD47 trillion in 2030 if nothing is done about the situation (Brown, 2017). Legetic, Medici, Hernández-Avila, Alleyne and Hennis (2016) in an earlier study revealed that economically, the total losses to NCDs such as diabetes among low-and middle-income countries (LMICs) will be above USD7 trillion between the years 2011–2025. They emphasized that such yearly loss is about 4% of these countries' yearly economic output. Elucidating further, they stated that on an individual level, the cumulative losses per year averages about USD25 in low-income countries and USD50 in lower-middle-income countries.

In a study of out-of-pocket payments, Li, Barker, Shrestha, Zhang, Duru, Pearson-Clarke and Gregg (2014) found that "trends in high OOP burden among people who are poor or near-poor were similar to those observed in people with public insurance" (p.8). They additionally found that "trends in high OOP burden among people with high incomes were similar to those observed in people with private insurance" (p.8).

1.2 Problem Statement

Ghana currently has a high incidence of NCDs. Statistics from the WHO (2016) indicated that Ghana is sixth among countries in Africa with Diabetes. With an estimated total adult population of 14,586,000, state that the total cases of diabetes in adults in Ghana is about 518,400 (IDF, 2017). As a result of the high incidence of diabetes, there is an upsurge in individual, societal and

national costs associated with treatment for health conditions for diabetes and related health conditions.

A study by Kumi-Ampofo (2015) revealed that financial and non-financial cost associated with diabetes accounts for over two- thirds of household's income. In an earlier study, de-Graft Aikins, Addo, Ofei, Bosu and Agyemang (2012) revealed that,

The prevalence of major chronic non-communicable diseases and their risk factors has increased over time and contributes significantly to the (sic) Ghana's disease burden. Conditions like hypertension, stroke and diabetes affect young and old, urban and rural, and wealthy and poor communities. The high cost of care drives the poor further into poverty (p.1)

The National Health Insurance Scheme (NHIS) policy has been implemented in Ghana since 2003 as a strategy to ensure and protect residents of Ghana from experiencing catastrophic and unaffordable health cost when accessing health services. Importantly, the NHIS provides under its listed benefits package, curative and treatment services for diabetes, nonetheless, like many other diseases covered under the scheme, there have been reported cases of clients making out-of-pocket payments for services and medication listed under the NHIS benefits packaged. For instance, a study by Aryeetey Nonvignon, Amissah, Buckle & Aikins (2016) on whether the health insurance protects against out of pocket and catastrophic expenditures, revealed cases of persons with NHIS making out-of-pocket payments (OOPP) for services. Similarly, Awoonor-Williams, Tindana, Dalinjong, Nartey, Akazili (2016) in another study revealed that, "despite the contribution of the NHIS to PHC services, the quantitative data suggests that many clients are

still paying out of pocket for basic health services such as treatment and diagnosis for HIV, Malaria and Pneumonia" (p.7).

Given these findings, this study sought to determine OOPP for diabetics and financial coping strategies adopted by diabetics in management of diabetes at Ga South Municipal hospital. The study specifically sought to determine the direct medical and non-medical components of out-of-pocket payments, indirect costs such as lost wages due to diabetes, productivity lost or time lost for seeking treatment and how these influence the health seeking behaviour of male and female adult diabetics. Additionally, the study sought to determine intangible costs associated with accessing health services which included physical and psychological pains, stress, etc. Last but not least, the study also sought to determine the financial coping strategies adopted by diabetics to reduce the burden or challenge of OOPP.

1.3 Objectives

The Study objectives were categorized into general and specific objectives.

1.3.1 General Objectives

The general objective of this research was to determine out-of-pocket-payments and costs for diabetics as well as the financial coping strategies adopted by them to address these demands.

1.3.2 Specific Objectives

The specific objectives were:

i. To determine the direct cost (medical and non-medical costs) incurred by diabetics when seeking treatment

ii. To determine the indirect costs incurred by diabetics when accessing treatment services

iii. To determine the intangible costs of treatment for diabetes

iv. To determine the financial coping strategies adopted by diabetics when seeking treatment for diabetes.

1.4 Research Questions

Research questions explored under the study were;

a. What constitutes direct cost for diabetics accessing diabetic services?

b. What are the indirect costs incurred by diabetics when accessing diabetes services?

c. What are the intangible costs of diabetes treatment?

d. What are the financial coping strategies adopted by diabetics when seeking treatment?

1.5 Significance of Study

The study on out-of-pocket expenditure and financial coping strategies of diabetics at Ga South Municipal Hospital was necessitated by two reasons, the first being; despite the Ministry of Health, 2012 developing a four years strategy for the managing, preventing and controlling chronic non-communicable diseases in Ghana (Ministry of Health, 2012), few studies have been undertaken in recent times to understand the economic impact of diabetes on the poor who are more vulnerable and increasingly at risk of poverty as a result of the costs to health services and lost productivity which can nearly match or sometimes exceed the direct costs. In fact, in spite of the high prevalence of diabetes, studies on its financial burden in Ghana remains inadequate. Currently, most cost-of-illness studies of diabetes have been carried out in Western countries and

interestingly, most studies in Europe and North America report strong association between the cost of diabetes and its severity. This study was therefore an opportunity to understand how the direct (medical and non-medical) and indirect costs of health care influences the health seeking behaviour of diabetics.

The second reason necessitating this study was to understand the financial coping strategies adopted by diabetics. A study found that "benefit packages structured to derive greater fiscal contribution from the health plan membership result in suboptimal use of diabetes preventive services and may thus lead to poorer clinical outcomes, greater future costs" (Karter, Stevens, Herman, Ettner, Marrero, Safford, Engelgau, Curb *et al.*, 2011). Given that premium contributions or payments by individuals is less than 5% of the total source of revenue for the NHIS, this research provides an opportunity to ascertain whether Ghana's NHIS reduces OOPE thereby ensuring optimal use of diabetes treatment services and better clinical outcomes for diabetics.

1.6 Conceptual Framework: Out-of-Pocket and Financial Coping Strategies of Diabetics at Ga South Municipal Hospital

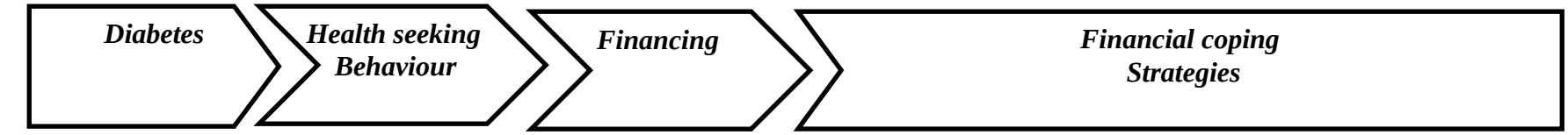
Many diabetics suffer from certain conditions as a result of their diabetic conditions. These includes morbidities and complications such as foot ulcers, skin conditions visual impairment, neuropathy, nephropathy etc. which places a lot of financial pressure on them and their families. Figure 1 shows the theoretical relationship between diabetes and associated out-of-pocket payments it poses to people living with the disease. The framework is based on the Cost of Illness (COI) method. As shown in Figure 1, the COI approach was used to determine treatment costs which includes payments for treatment, care and management of complications from

diabetes Expenses incurred in treating diabetes have been categorised into direct cost (medical and non-medical, indirect cost.

Specifically, direct costs constituted medical and non-medical costs. Medical cost included expenditure consultation, prescribed drugs and medicines while non-medical direct cost included cost of visits to the health facilities in the form of transportation and travel expenses and expenditure on food and communication. Indirect costs included assessment of work hours lost due to inability to work, lost productivity and income. Intangible cost assessed were psychological and physical pain, depression, anxiety, stress and social isolation etc. The sum of all of these costs constituted out of pocket payments for diabetes.

Figure 1 shows the financial coping strategies adopted by diabetics. This includes the formal and informal mechanisms of coping with the cost of treatment and management of diabetes. This was categorized into cost prevention and cost management strategies and includes strategies such as reliance on pensions, taking less medication than prescribed, selling of assets, workfare, transfers and monetary gifts from friends and family among others. In summary, Figure 1 indicated how the cost-of-illness and human capital approaches were be employed to determine the direct, indirect, intangible costs and financial coping strategy adopted by diabetics when accessing treatment for diabetes.

Figure 1: Conceptual framework of Out-of-Pocket Payment and Financial Coping Strategies of Diabetics



Out-of-Pocket Payments for and Financial Coping Strategies of Diabetics → Diabetics → **Type of Out-of-Pocket Payment:**
- *Medical*
- *Non-medical*

Type of Out-of-Pocket Payment:
- *Indirect costs*
- *Intangible cost*

Informal mechanisms	***Individual:*** • Sale of assets • Financial gifts from friends and family • Reallocating spending from consumption and investment • Taking less medications than prescribed	***Group based:*** • Transfers from networks of mutual support
Formal mechanisms	***Market based:*** • Sale of financial assets • Reliance on pensions • Taking less medications than prescribed • Working extra hours	***Publicly provided:*** • Social assistance • Workfare

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter examined diabetes as a non-communicable disease, out-of-pocket expenditure in the treatment of diabetes, the economic burden of diabetes both globally and in Ghana and the financial coping strategies adopted by diabetics when accessing services to treat and manage their diabetic conditions. The purpose was to provide comprehensive information on the burden of out-of-pocket payment in diabetics as they sought treatment for diabetes. This chapter thus focused on diabetes and its related comorbidities and complications, out-of-pocket payments, direct cost, indirect cost, intangible cost associated with the disease as well as financial coping strategies documented in scientific literature. Literature reviewed was thus not only specific to Ghana but also other countries in Europe, Asia, the Americas and some African countries.

2.2. Epidemiology of Diabetes

Today's health system is burdened by an ever increasing disease burden which is predominantly non-communicable. Diabetes mellitus (DM) which is often referred to as diabetes is a chronic non-communicable disease which can be debilitating and deadly. Diabetes has been recognized as a distinct disease for over 2000 years (King and Rubin, 2003; Das and Shah, 2011), however, it was not until 1935 that Hinsworth established that there were two district types of diabetes (Ali, 2013). Diabetes usually occurs because of metabolic disorders in the body's system resulting in high blood sugar levels over a prolonged period. Diabetes also occurs whenever the pancreas fails to produce sufficient insulin, or when the body is unable to effectively use the insulin it produces. Studies reveal that when left untreated, diabetes can become severe and lead

to serious complications requiring emergency care, such as a diabetic coma (Mayoclinic, 2019). Mayoclinic states that "in the long term, persistent hyperglycaemia, even if not severe, can lead to complications affecting your eyes, kidneys, nerves and heart". Zhang, Zhang, Brown, Vistisen, Sicree, Shaw & Nichols (2010) also reported that "diabetes leads to both premature death and complications such as blindness, amputations, renal disease, and cardiovascular diseases" (p.294).

Types of Diabetes

Studies reveal that Type 1 diabetes, Type 2 diabetes, and Gestational Diabetes are the three major types of diabetes; with the first two, considered deadly. The International Diabetes Federation (2019) states that Type 1 diabetes is caused by an auto-immune reaction where the body's defence system attacks the cells that produce insulin leading to the body producing no or very little insulin. Elaborating, the IDF states that the disease can affect people of all ages, but usually develops in children or young adults (International Diabetes Federation, 2019).

The IDF also states that Type 2 diabetes previously called non-insulin dependent diabetes or adult-onset diabetes accounts for at least 90% of all cases of diabetes. The Federation explains that diagnosis of type 2 diabetes happens at any age and can be unnoticed for years till a complication appears or a routine blood test is done. The third type of diabetes known as Gestational diabetes mellitus (GDM) is a form of diabetes usually occurring in pregnancy as a result of high blood glucose levels. The IDF states that it develops in one in 25 pregnancies worldwide and is associated with complications to both mother and baby and usually disappears

after pregnancy although women with GDM and their children are at an increased risk of developing type 2 diabetes later in their life (International Diabetes Federation, 2019).

Prevalence of Diabetes

The prevalence of diabetes is increasing around the world and in every country. Elucidating, Forouhi and Wareham (2018) indicate that the rising disease burden of diabetes mellitus globally is a major public health priority, placing unsustainable demands on individuals, their careers, health systems and society. The estimates showed that there was a global prevalence of 425 million people with diabetes in 2017. This is expected to rise to 629 million by 2045. This is fuelled by the global rise in the prevalence of obesity and unhealthy behaviours including poor diets and physical inactivity; these are in turn promoted by wider societal determinants, including changes in nutrition in a global context (p.22).

Other factors influencing the prevalence of diabetes includes education, employment status, and household income. For instance, Borrell, Dallo and White (2006) stated that education attainment is related to the prevalence of diabetes among adult population in the U.S. They espoused that respondents with tertiary education were less likely to have diabetes compared to those with basis education. Similarly, Steele, Schöttker, Marshall, Kouvonen, O'Doherty, Mons, Saum et al. (2017) also assert that an individual's educational status is linked to their risk of type 2 diabetes.

Regarding employment, Rautio, Varanka-Ruuska, Vaaramo, Palaniswamy, Nedelec, Miettunen, Karppinen et al. (2017), revealed that unemployment is associated with diabetes and the unemployed compared to the employed are more predisposed to diabetes. On household income,

Bird, Lemstra, Rogers and Moraros (2015) state that the prevalence of diabetes is strongly related to household income. Rabi, Edwards, Southern, Svenson, Sargious, Norton, Larsen et al. (2006) also affirmed that income level is associated diabetes.

With regards to family history of diabetics, a study by Wagner, Thorand, Osterhoff, Müller, Böhm, Meisinger, Bernd K. et.al (2013) showed that most people with diabetes have a family history of the disease. Similarly, findings by Geetha, Gopalakrishnan and Umadevi (2017) affirmed this in their study of diabetes and family history of the disease.

In Ghana, the IDF indicated that there were 518.400 cases of diabetes in 2017 with the prevalence of diabetes in adults estimated to be 3.6% out of a total adult population of 14,586,000. The Ghana Health Service [GHS] (2017) reports that between 2009 and 2016, the number of cases reported for diabetes has risen from 96,856 out of a total number of 15,360,765 in 2009 to 154,790 in 2016 out of a total number of 22,365,777 outpatient morbidity cases.

Global Mortality – Diabetes

Like other NCDs, Diabetes is reported to contribute to the global deaths occurring worldwide. In 2016, the WHO reported that of the 56.9 million global deaths occurring worldwide, 40.5 million, or 71%, were due to NCDs. The WHO further pointed out that diabetes which is the fifth leading cause of all deaths killed 1.6 million people in 2016. In Ghana, the Ghana Health Service data (2017) indicates that diabetes is among the top ten (10) causes of hospital admissions and deaths in regional and district hospitals in all ten regions of Ghana excluding two Teaching Hospitals. The data reveals that there were 311 diabetes related deaths out of 8,978 people

admitted to these facilities. In a 2017 publication, the Daily Graphic reported 5,000 diabetes related deaths in 2015, while approximately 8,300 people died from diabetes in 2013 (Daily Graphic, November 14 , 2017).

2.3. Complications of Diabetes

Quaye, Amporful, Akweongo and Aikins (2009) state that "complications resulting from late diagnosis and late presentation, lack of access to essential medication and services, and poor management of diabetes have created a heavy socio-economic burden for Africa" (p.49). In a study on complications of diabetes, Papatheodorou, Banach, Bekiari, Rizzo and Edmonds (2017) indicate that complications in diabetes are common among patients with type 1 or type 2 diabetes and are also are responsible for significant morbidity and mortality. They reveal that complications of diabetes are divided into two, namely; microvascular and macrovascular, with the former reported to have a much higher prevalence than the latter. Expanding on these, Papatheodorou specify that "microvascular complications include neuropathy, nephropathy, and retinopathy, while macrovascular complications consist of cardiovascular disease, stroke, and peripheral artery disease (p.1).

2.3.1. Microvascular Complications of Diabetes

Microvascular Complications of Diabetes are said to involve small vessels. Fowler (2008) shares that microvascular complications of diabetes include diabetic retinopathy, diabetic neuropathy and diabetic nephropathy. Abebe, Berhane and Worku, (2014) also stated that when patients perceive the treatment expenditure to be a financial burden, compliance with treatment guidelines are threatened. The result is low adherence to medication which exposes diabetics to an increased chance of developing co-morbid conditions such as hypertension.

Diabetic Retinopathy

Ting, Cheung and Wong (2016) reveal that "diabetes retinopathy (DR) is a leading cause of vision loss in middle-aged and elderly people globally." Citing the International Diabetes Federation, Ting *et al.* (2016) reveal that "with the increasing number of people with diabetes, the number of DR and vision-threatening DR (VTDR), which includes severe non-proliferative DR, proliferative DR (PDR) and diabetic macular edema (DME), has been estimated to rise to 191.0 million and 56.3 million, respectively by 2030" (p.260). Lee, Wong and Sabanayagam (2015) also stated that one third of about 285 million persons with diabetes mellitus worldwide have diabetes mellitus.

Diabetic Nephropathy

Chang and Tang (2015) also state that "diabetic nephropathy (DN) is estimated to affect one-third of individuals with DM and is associated with considerable cardiovascular morbidity and mortality" (p.359). Described as a peripheral nerve disorder caused by diabetes or poor blood sugar control, symptoms of diabetic nephropathy include numbness, pain, or tingling in the feet or lower legs.

Diabetic Neuropathy

Diabetic nephropathy is a diagnosis that refers to specific pathologic structural and functional changes seen in the kidneys of health clients with diabetes. According to Umanath and Lewis (2018) diabetic kidney disease occurs in patients with diabetes mellitus (DM) and reduced kidney function that can be from many diverse causes, including hypertensive nephrosclerosis and unresolved acute kidney failure. Juster-Switlyk and Smith (2016) also indicate that diabetic

polyneuropathy (DPN) is a leading cause for disability due to foot ulceration and amputation, gait disturbance, and fall-related injury. Additionally, Rehman, Khan and Hamayun (2005) indicate that diabetic nephropathy occurs in about one third of individuals with diabetes mellitus and is a clinical syndrome characterized by persistent albuminuria, a relentless decline in Glomerular filtration rate (GFR), raised arterial blood pressure and increased relative mortality for cardiovascular diseases (p.25).

2.3.2. Macrovascular Complications of Diabetes

Macrovascular disease are diseases of any large (macro) blood vessels in the body including in the coronary arteries, the aorta, and the sizable arteries in the brain and in the limbs usually occurring when a person has had diabetes for an extended period of time. According to Cade (2008), macrovascular complications of diabetes include cardiovascular disease (CVD), cerebrovascular and peripheral artery disease. Cade (2008) states that cardiovascular disease is the leading cause of mortality among persons with type 2 diabetes. Hyperglycaemia which occurs when people with diabetes have too much sugar in their bloodstream is purported to damage blood vessels through a process called “atherosclerosis”, or clogging of arteries resulting in decrease in the flow of blood which can cause heart attack, or damage to the brain, stroke or reduction in the healing of infections.

2.4. Global Economic Burden of Diabetes

With the upsurge in NCDs particularly, diabetes globally, the capacity of developing countries to attain universal health coverage (UHC) is threatened. Ghana like many developing countries is economically burdened in its efforts to prevent, manage and mitigate the impact of NCDS such as diabetes. Indeed, there is an increasing demand on governments to increase health investments

particularly at the primary level to address NCDs such as diabetes and in Ghana's case; the the Regenerative Health and Nutrition Programme (RHNP) in 2006 and the National Policy for the Prevention and Control of Chronic Non-Communicable Diseases (2012) has been developed by Ghana's Ministry of Health.

Arnold, Beran, Haghparast-Bidgoli, Batura, Akkazieva, Abdraimova and Skordis-Worrall (2016) state that "the economic burden of illness commonly includes the direct costs of treatment, drugs, transport and fees and informal payments, and the indirect costs of a reduction in their ability to generate income." The WHO (2015) reveal that the substantial cost associated with diabetes remains a major public health issue for countries globally as a result of the economic burden it places on diabetics in particular and the society at large. The WHO adds that as the global number of persons with diabetes continues to grow, the proportion of national health care budgets spent on the disease is ever-increasing.

Adding their voice to the discourse, de-Graft Aikins, Kushitor, Koram, Gyamfi and Ogedegbe (2014) elucidate that, many countries are faced with both the challenge of chronic and infectious diseases. "This dual burden weakens health systems that are already compromised" (p.1). Explaining further, they state that add that while the growing burden of NCDs puts constraints on a few and poorly distributed human resource for health, "the impact of NCDs on communities is great [as] NCDs affect adults in their most productive age, affect poor communities disproportionately, push individuals and households further into poverty and present long-term psycho-social challenges" (p.1).

Gillani, Aziz, Masood, Saqib, Yang, Chang, Ibrahim and Fang (2018) quoting 2017 reports from the IDF reveal that "patients with diabetes have health expenses of 673 billion USD per annum" (p.1). Zhang *et al.* (2010) remarked that many countries are currently spending a large proportion of their health budgets on diabetes care. They state that Saudi Arabia for example spends 21 per cent of its budget on diabetes care. Similarly, others like Sri Lanka and Malaysia, the United States of America (U.S.A) spend 16 per cent, while Mexico and Pakistan respectively spend 15 and 12 per cent of their annual budget on diabetes care. Highlighting the global cost of diabetes, Zhang *et al.* (2010) further remark that "diabetes is also costly to health care systems [as] people with diabetes have more outpatient visits, use more medications, have a higher probability of being hospitalized, and are more likely to require emergency and long-term care than people without the disease" (p.294).

The World Bank (2006) indicates that "the economic cost of diabetes and its complications is unaffordable by most sub-Saharan Africans. Their incomes are insufficient to purchase anti-diabetic drugs, insulin and other supplies for management of their illness" (p.280). In Sub-Saharan Africa, data from also revealed that South Africa, Kenya, Zimbabwe, Nigeria and Ghana respectively were the top five countries with the most expensive cost of diabetes care (IDF, 2003). In Ghana, de-Graft Aikins reveals that,

Treating chronic disease … is expensive. Without health insurance, managing a condition such as diabetes can cost more than the average individual earns... The economic impact of chronic diseases for individuals has a knock on impact on their family livelihood and relations, as well as their long-term treatment choices. A rural urban study of diabetes experiences showed that many

poor rural men and women with diabetes often relied on financial support from their immediate and distant family members" (p.156).

Quaye *et al.* (2015) reported that Korle Bu Teaching Hospital statistics and patients' accounts revealed that "the cost of managing one case of diabetes ranged between Ghana Cedi (GHS) 167 and GHS 392 in 2001 to between GHS 1200 and GHS 7200 in 2007" (p.50).

2.5. Cost of Illness

The Centre for Disease Control (CDC) states that the cost of illness analysis which is also referred to as economic impact analysis is used to measure the burden of disease or illness. They explain that "mortality, morbidity, life expectancy, quality of life, quality-adjusted life expectancy, disability-adjusted life expectancy, healthy-days equivalent, and activities of daily living are all measures of disease burden related to health outcomes" (p.3).

Quaye *et al.* (2015) reveal that "cost of illness studies have rarely been conducted in Ghana" (p.50) however, Gillani *et al.* (2018), state that the "cost-of-illness (COI) studies are fundamental in the evaluation of economic losses to society and individuals owing to [the] disease diabetes" (p.50). They add that that several COI studies aimed specifically at "diabetes mellitus are of great importance and are widely conducted around the world" (p.2). Re-echoing the importance of COI, Tharkar, Devarajan, Kumpatla and Viswanathan (2010) emphasize that the cost of illness approach is an important evaluation mechanism in health care and measures through comparisons, the economic burdens of diseases to countries. They state that studies on COI can make it easy for health decision makers to organise and prioritize health interventions and policies.

Studies reveal that in estimating the cost of illness, all costs associated with treatment of the illness are summed up. These include OOPP for service costs. Particularly, the direct medical and non-medical cost, the indirect cost and the intangible cost spent in the treatment of diabetes are assessed. Direct costs are said to include laboratory cost, drug cost for diabetes and diabetes complications, specialist cost for diabetes care, emergency/ambulance cost related to diabetes services, diabetes-related hospitalization cost, and surgical cost etc. while indirect cost refers to all expenses incurred as a result of stopping work or reducing work output because of sickness or death as a result of a particular health condition.

Jo (2014) also states that known as the burden of disease (BOD), cost of illness is also defined as encompassing different facets of a health condition's "impact on the health outcomes in a country, specific regions, communities, and even individuals" (p.327). He explains that "the category of COI can range from the incidence or prevalence of disease to its effect on longevity, morbidity along with the decrease in health status and quality of life (QoL), and financial aspects including direct and indirect expenditures that result from premature death, disability or injury due to corresponding disease and/ or its comorbidities" (P.327). Additionally, Jo (2014) adds that "COI studies traditionally stratify costs into three categories direct, indirect, and intangible costs" (p.327). Elucidating further Jo (2014) indicates that there are several approaches to cost of illness studies. These include, prevalence versus incidence-based approaches, prospective versus retrospective approaches, top-down versus bottom-up verses econometric approaches.

2.6. Direct Cost of Diabetes Disease

Direct costs according to Jo (2014) are expenses experienced by individual patients, families, societies, health system and also involves of health and non-health care costs. Health care costs

also known as medical expenses include expenditures for diagnosis, treatment, and rehabilitation and others while non-medical expenses include expenses related to transportation, household expenditures, communication, property losses, and other related expenses. Kirch (2008) states that in health economics, the term direct cost relates to all expenses due to resource use that are totally attributable to the use of a health care intervention or illness. Kirch also explains that direct costs can be split into direct medical costs and direct non-medical costs. Clarifying, he states that direct medical costs include the cost of a defined intervention and all follow-up costs for other medication and health care interventions in ambulatory, inpatient, and nursing care. He also notes that that that all specialist and general practitioner care, including emergency care, as well as rehabilitation and physiotherapy can be categorised under direct medical costs. Direct non-medical costs, Kirch further explains includes transportation costs and additional paid caregiver time.

Boccuzzi (2003) on the other hand also indicates that the quantifiable costs associated with human disease and illnesses are typically categorized into two unique components, including direct and indirect costs. He notes that direct costs "represent the costs associated with medical resource utilization, which include the consumption of in-patient, out-patient, and pharmaceutical services within the health care delivery system" (P.63) Direct cost can be classified as medical and non-medical expenses and includes cost of medical products and services such as medicines and drugs, referral charges, consultation, diagnostic tests, hospitalization etc. while non-medical direct costs include transportation expenses accrued from visiting health facilities, communication expenses, feeding and others such as communication. Yesudi, Grepstad, Visintin and Ferrario (2014) in a study reviewing the costs of diabetes mellitus

in India found that medication was the largest proportion of costs with this burden directly felt by the poor and urban populations. Citing Seuring, Archangelidi and Suhrcke (2015), Walker, Garbe and Wright (2017) indicate that the economic costs of diabetes in relation to levels of national GDP found direct costs to be generally higher than indirect costs, with these direct costs strongly linked with a country's gross domestic capital (GDP).

2.6.1. Direct costs of diabetes disease to individuals and their families

The WHO (2015) explains that direct costs of diabetes disease to individuals and their families comprises medical care, drugs, insulin and other supplies. The organization explains that additionally, in some countries, patients also have to deal with other personal costs including increased payments for health, life and automobile insurance. The WHO further states that with specific reference to the health care sector, direct costs comprise hospital services, physician services, laboratory tests and the daily management of diabetes by use of products such as insulin, syringes, oral hypoglycaemic agents and blood-testing equipment. The organization also explains that direct cost of diabetes ranges from relatively low-expense items, such as primary level care consultations to very high cost items, including long hospitalization for treatment of complications. Davari, Boroumand, Amini, Aslani, and Hosseini (2016) in a study estimating the direct cost of diabetes stated that "direct medical costs of diabetes are 2–3 times higher than nondiabetic people" (p.4). Shuyu *et al.* (2015) in a study on direct medical cost of type 2 diabetes in Singapore also found that the mean or average annual direct medical cost was USD2,034, of which 61% was accounted for by inpatient services, 35% by outpatient services and 4% by accident and emergency services.

On the direct cost to individuals, Kanavos, van den Aardweg and Schurer (2012) revealed that the total direct cost burden of people with diabetes in five European countries, specifically, France, Germany, Italy, Spain, and the UK, was €90 billion. Kanavos *et al.* (2012) state that,

Per patient, direct costs are more comparable across countries, with some variation (€1,708 (Spain) to €5,899 (Germany) in 2010), suggesting a key driver behind total diabetes costs is prevalence. Inpatient care represents the greatest component of direct costs (33-49%), followed by outpatient (18-36%) and pharmaceuticals (diabetes plus non-diabetes) (20-32%). Expenditure on insulin and oral anti-diabetic medicines ranges between 6.2% and 10.5% of total direct cost. A significant majority of inpatient direct costs account for treatment of diabetes related complications, affecting approximately 18.3 million diabetic patients each year across the five study countries (p.1).

Bermudez-Tamayo, Besançon, Johri, Assa, Brown, and Ramaiya (2017) also state that the average annual direct cost of diabetes treatment for diabetes mellitus patients in Mali was estimated USD365.48 (USD318.48-USD412.48). Domeikienė, Vaivadaitė, Ivanauskienė and Padaiga (2014) revealed that the mean or average annual type 2 diabetes mellitus direct healthcare costs per patient accounted to EUR 955.73 (USD1077.16).

In Ghana, the medical cost of diabetes care is high for all income groups in Ghana. De-Graft Aikins (2005) however, states that poor individuals in rural and urban areas are the most vulnerable groups as they often tend to experience chronic financial insecurities due to diabetes. Amissah and Dunyah (2016) also revealed that,

The annual mean or average direct medical cost for outpatient care for a person with DM was 1,491.45 Ghana Cedis (USD390.43) on oral anti-diabetics paid by the National Health Insurance

Scheme, out of which medications consisted the biggest component of direct medical cost (42.7%), followed by cost of glucose strips (16.6%). Also, on the average a person with diabetes spend out-of pocket of 188.29 GHS (USD49.29) per year in private pharmacies for diabetes medications. Also, the period of treatment for diabetes had a strong relationship with the increment of cost and the mean annual direct medical cost was higher in females than males (USD 362.98 vs USD332.58)…the mean direct non-medical cost was GHS 110.93 (USD 29.04), out of which transportation accounted for the largest proportion (52.3%)" (p.1089).

2.6.2. Direct Cost of Diabetes to National Economies

The direct cost of diabetes to national economies was also found to be very high across different countries. For instance, the WHO (2015) quoted that Brazil's expenditure for diabetes was USD 3.9 billion while that was Argentina was USD 0.8 billion and Mexico USD 2.0 billion. According to the WHO (2015) diabetes share of direct health care costs is between 2.5% and 15% of yearly health care budgets. Kanavos *et al.* (2012) reported that estimated direct annual cost was €5.45billion for Spain and €43.2billion for Germany in 2010. Likewise, Henriksson, Agardh, Berne, Bolinder, Lönnqvist, Stenström, Ostenson and Jönsson (2000) state that Sweden's direct medical cost of drugs on a yearly basis for patients on the average accounts for 27% of the total direct cost of treatment for the disease. Amon and Aikins (2017) in a study on the economic burden of type 2 diabetes mellitus complications among patients in the Eastern Region of Ghana revealed that the estimated total monthly management cost of complicated type 2 diabetes was USD9,980.62, with direct healthcare management cost constituting about 94% of this total cost.

2.7. Indirect Cost of Diabetes

Illness as a result of diabetes can result or lead to productivity loss as a result of time loss to illness or time spent seeking treatment. This often results in absence from the work and subsequently, losses for both the employee and employer. Indirect costs are however also experienced when friends and family spend time taking care of their friends and relatives with diabetics. Tesler, Fischer, Leukert and Vaterlaus (2011) state that,

On the contrary, indirect costs describe opportunity costs with no effect on the consumption of resources, and has no bearing on direct expenditure. They include productivity losses as a result of sickness or early death. In the work environment, productivity losses is a result of absence from work because of sickness as well as constrained performance capacity. In sum, indirect costs are related to work and relaxation losses. It also includes time of relatives and friends time lost as they take care of patients without any charges (p.10).

Boccuzzi (2003) states that indirect costs refers to all expenses obtained as a result of stopping or reducing productivity because of illness and death related to a disease. Explaining further, Boccuzzi indicates that indirect costs often comprises losses related to work, staff replacement, and productivity losses due to sickness illness with such losses valued from an individual, society or employer outlooks (p.63).

Jo (2014) states that the 'indirect' sometimes refers to losses related to productivity as a result of illness and death, faced by the patients, their families, the society at large and the employer. To estimate indirect costs, both Jo (2014) and Tesler *et al.* (2011) state that either of these approaches - the human capital approach, the friction cost approach and the willingness to pay approach are used. Other approaches to measure indirect cost according to Tesler *et al.* (2011)

include the average national income or individual salary with the former also distinguished by age and gender. Teslar *et al.* (2011) state that though difficult to measure the indirect costs of informal care, the opportunity cost and the replacement cost approaches can be used. Png, Yoong, Phan and Wee (2016) state that indirect cost losses related to the total economic losses is more than direct medical cost losses. They state that direct medical costs constitute 42% of losses while indirect productivity-related losses constitutes 65% of the total economic costs per working-age patients in Singapore. Magliano, Martin, Owen, Zomer and Liew (2018) also add that productivity losses occurs because of absenteeism (absence from work due to illness) as well as presenteeism (reduced efficiency while at work).

2.8. Intangible cost of diabetes

Intangible costs of diabetes are said to relate to reduction in the quality of life as a result of psychological and physical pain, discomfort, anxiety, stress and other quality of life attributes. Amon and Aikins (2017) states that intangible cost assesses the incalculable burden – usually physical and psychological pain and suffering - associated with the diabetes disease. They also add that Intangible costs of health care includes social isolation, anxiety, stress, depression, stigmatization, self-esteem and others. In an earlier study, de-Graft Aikins (2005) states that intangible costs refer to the inability of an individual to undertake daily routine care such as self-care - which is likely to create psychological constraint thereby leading to social isolation. Tesler *et al.* (2011) while acknowledging that intangible costs are difficult to capture, however, state that they "nevertheless represent a real loss of benefit for those affected, so they cannot be neglected" (p.2). They further explain,

The intangible costs are losses of benefit that arise due to an illness but which have no direct impact on the consumption of resources. These include physical and mental impairments such as suffering, pain or (in general) the resultant loss of quality of life. As the term itself suggests, intangible costs are difficult to record in monetary form, because they do not entail any effects on resources that can be assessed in terms of value (p.12).

Intangible costs can be categorized into two types, first intangible costs to the individual and secondly to the society. Intangible cost to the individual includes pain and suffering, stress or anxiety, loss of quality of life and loss of time while intangible costs to the society like pain, anxiety, inconvenience, loss of quality of life due to absence/premature death, absenteeism, depression or loss of a member of the community. Egede and Ellis (2010) state that the prevalence of depression among diabetics vary by lower and higher income countries. Amon and Aikins (2017) citing Strine *et al.* 2005 state that "high risk of complications such as retinopathy (eyes damage), nephropathy (kidneys damage), and neuropathy (nervous system damage), hearing impairment, Alzheima and CVD burden a person suffering from diabetes with emotional, physical and psychological pains. Common symptoms of diabetes neuropathy are pain in extremities" (p.21). Brinkhues, Dukers-Muijrers, Hoebe, van der Kallen, Dagnelie, Koster, Henry et al. (2017) also state that adults who were frequently ostracised and received less support had new and previously diagnosed diabetes mellitus. Adding on, Park, Katon and Wolf (2013) reveal that there is a great relationship between diabetes and depression. Last but not least, Papaspurou, Laschou, Partsiopoulou, Fradelos, Kleisiaris, Kalota, Neroliatsiou and Papathanasiou (2017) in their study of fear among diabetics revealed that high levels of fear exist

among diabetics. These fears, they stated are relate to their fear of death and its impact on their family.

Kirigia, Sambo, Sambo and Barry (2009) indicate that the intangible cost suffered by diabetics contributes significantly to the overall cost burden of diabetes. Given the difficulty in measuring intangible costs due to the fact that they are not include any effect on resources that can be measured in types of values, intangible is usually undertaken from a perspective of loss of benefit. In measuring the loss of benefit, the concept of willingness to pay (WTP) is normally used to assess the value of benefit. Teslar *et al.* (2011) explain that the fundamental hypothesis this perception is that the benefit from the 'good' is the value attributed to it by the people who use or consume it" with the amount for a specific good varying from each person to another. Elucidating, they remark that "as an approximation in order to determine the intangible costs, a so-called QALY (Quality Adjusted Life Years) approach is used in some studies. A QALY is a measurement for assessing the value of a year of life depending on the state of health" (p.19).

2.9. Financial Coping Strategies

Lazarus and Folkman (1984) as cited in Porta (2009) define coping as the "cognitive and behavioral efforts" an individual adopts to address stress. Coping strategies can be split into two types. It includes the attempt to play an active role in dealing with the problem or an attempt to avoid the problem. Problem-focused strategies are adopted by people to address the cause of the problem and thereby overcome the stress. People who often adopt this strategy indicate that by making plans, they are to deal with problem, they end up feel better than when they do nothing.

Grey (2015) states that in a number of studies, coping has been identified to be related with various metabolic or disease outcomes, as measured by glycosylated haemoglobin, functional status, symptom severity, body mass index, or body weight. Coping has also been noted to affect psychosocial outcomes, such as psychological adjustment, depression, and quality of life.

Arnold, Beran, Haghparast-Bidgoli, Batura, Akkazieva, Abdraimova and Skordis-Worrall (2016) revealed that in coping with the economic burden of diabetes and other ill health conditions, some strategies adopted include reliance on pensions, and financial gifts from friends, selling of household assets, reallocating spending from consumption and investment, working extra hours and/or selling of personal assets. Kruk, Goldmann and Galea (2009) also add that another coping strategy adopted is the borrowing of loans from money lenders. Arnold *et al.* (2016) state that "diabetes patients cope with the economic burden by using social welfare support" (p.1). McIntyre, Thiede, Dahlgren and Whitehead (2006) reveal that selling household assets, reallocating spending from consumption and investment, borrowing money or working extra hours are some of the financial coping strategies adopted by households to meet the financial costs of ill health. Aye, Wyss, Abdualimova and Saidaliev (2011) revealed that coping strategies are often categorised into two types; detrimental strategies and non-detrimental strategies. Detrimental strategies include selling of livelihood assets and borrowing of money while non-detrimental strategies includes dependence on savings or income, social networks or labour substitution or. Arnold *et al.* (2016) adds that "detrimental coping strategies draw on the households' ability to generate future income or leave the household indebted and thus at higher risk of economic vulnerability and poverty in the long run" (p.2).

Leive and Xu (2008) and Nguyen, Khuat, Ma, Pham, Khuat and Ruger (2012) both indicate that households with lower income and higher health expenditure are more likely to use detrimental coping strategies. In Ghana, one of the financial coping strategies adopted by diabetics is payment of health insurance premiums. Despite this, there is evident of patients making out of pocket payments.

2.10. Conclusion

Literature reviewed highlighted the epidemiology of diabetes, complications, the economic burden as well as the cost of illness approach to diabetes. The literature examined the global regional and national economic burden of diabetes and its relationship of pocket payments for diabetes from a perspective of cost of illness approach. Specifically, the direct, indirect, intangible costs and financial coping strategies adopted by persons with diabetes were also reviewed. The review did highlight that while there have been a few studies on the economic burden of diabetes in Ghana, studies on out of pocket payments for clients assessing services at any of the eight (8) diabetes support centres in Ghana do not exist. This study therefore focuses on estimating the direct, indirect, intangible costs and the financial coping strategies adopted by diabetics assessing services at the Ga South Municipal hospital which is one of the eight diabetes support centres currently in operation in Ghana.

CHAPTER THREE

METHODS

3.1 Introduction

This chapter sets out the methods and procedures used to undertake the study. These procedures were designed to meet the research objectives and to address data collection problems eminent in a research of this nature in Ghana. The method highlighted the general procedures used including settings and contexts under which the study was undertaken. It also indicated ethical considerations which will observed.

3.2 Study Area

This study took place at Ga South Municipal Hospital in the Greater Accra Region of Ghana located between Malam and Oblongo. The Ga South Municipal is among 29 districts in the Greater Accra Region. According to the Ghana Statistical Services (2019), the population of the municipality as at 2019 stands at 521,162 with inter-censal growth rate of 3.4% according to the 2000 National Population and Housing Census. The 2010 Population and Housing Census, however, reported a population of 411,377 with 201,222 males and 210,155 females respectively.

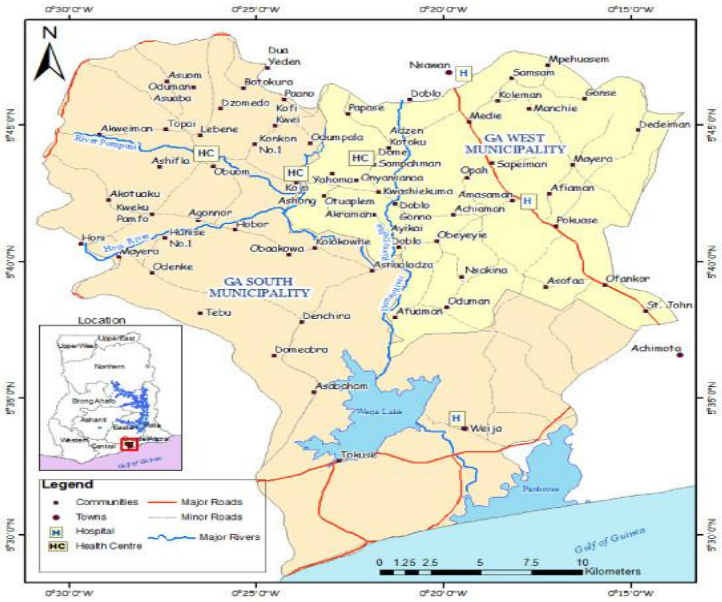
Ga South Municipal hospital was selected because it is the only and main public hospital in the Weija/Gbawe Municipality municipal which has a population of 510,145 people. Ga South Municipal hospital began as a leprosarium in the 1940's and was later known as the Communicable Disease Hospital because it provided services for chicken pox, small pox and cholera. The facility serves as the main referral facility for all public health facilities in the

municipal. The 2018 annual report of the facility indicates that almost all health services are run in the hospital with 384 dedicated personnel. Out-patient Department (OPD) attendance for 2019 was 109,206 patients with daily attendance estimated at 299 people. The facility was also chosen because it is among the eight (8) diabetes support facilities currently operating in five regions of Ghana. Ga South Municipal hospital operates 24 hours, 7 days every week.

The diabetes support centre is however opened thrice a week and serves as the only diabetes centre in the municipality. It operates thrice a week - Monday, Tuesday and Thursday. The daily attendance is between 35-45 patients while weekly average attendance is a population of 120-140 patients. The 2017 annual attendance at the diabetes support centre was 3,693 patients while that of 2018 was 4,013 patients. The facility operates from 7am – 4pm on these days. In 2018, diabetes was ranked seventh among causes of admission in the facility with 151 cases. Diabetes mellitus was also reported as the fifth underlying cause of death in the same year with 7 deaths.

Payment for health services is done through insurance which includes possession of a valid national health insurance card or a private insurance scheme recognised by the health facility. For those without an insurance, out-of-pocket-payment is the option. Majority of patients accessing health services at the facility are registered and active members of the National Health Insurance Scheme. Figure two (2) shows the map of Ga South Municipal and Ga South Municipal Hospital.

Figure 2: Map of the Ga South-municipality showing the location of Ga South Municipal Hospital



Source: Online Data, Ghana Districts Map, 2019 (Ga South Municipal Hospital, marked as 'H' beside Weija is situated between Mallam and Oblogo community which are both close to Weija township)

3.3 Study Population

This included adult males and females who accessed diabetes services at the Ga South Municipal Hospital during the period under review.

3.4 Study Design

This study was a cross sectional study supported quantitative data collected from the field. The cost-of-illness approach was applied to determine the direct cost- medical and non-medical – while the human capital approach was used to determine indirect costs, intangible costs as well as financial coping strategies adopted by diabetics when accessing diabetes services in Ghana South Municipal Hospital.

3.5 Sample Size

The Cochran formula for the continuous outcome:

$$n = \frac{Z_{\alpha/2}^2 * \delta^2}{\mathcal{E}^2}$$

Where $Z_{\alpha/2}$ for a 95% confidence level is 1.96, δ is the standard deviation from previous studies and $\mathcal{E}$ is a margin of error of GHS15. From a previous studies by Kumi-Ampofo (2015), the mean or average cost of seeking diabetic health care was GHS 146.70 (USD 58.64) with a standard deviation of GHS 79.78 monthly per diabetic patient. Hence the study estimates it sample size as

$$n = \left(\frac{1.96 * 79.78}{15}\right)^2 = 108.67 \approx 109$$

Adding a 10% to the adjust for non-response a final sample size of

$$n = 1.10 * 109 = 120$$

Hence a total of 120 diabetic patients would be recruited into the study.

Inclusion criteria: All male and female adult patients with diabetes willing to be part of the study and who also access health services at the Ga South Municipal Hospital.

Exclusion criteria: Diabetics who did not want to participate in the interview either because they are too ill or unwilling or diabetics who did not time to participate in the study

3.6 Sampling Procedures

Working with three research assistants, the Principal Investigator identified and recruited participants to be interviewed. During the study duration, a sample size of at least 120 was reached. The sampling method employed was systematic sampling. The sample frame included

both male and female adults who access services at the Ga South Municipal Hospital Diabetes Support Centre. Sampling was carried out on Mondays, Tuesdays and Wednesdays since the facility opens/functions only on these days. The sampling was done in over 12 diabetic clinic days. On each day, sampling started at 7am and end at 4pm. Approximately 10 diabetic patients were interviewed on each day of the assessment. Given the estimated daily attendance number at the diabetic support centre, it was assumed that on every day of the data collection activity, the number of patients present was 40. To thus obtain the sample interval, an interval of four (4) was used to recruit patient to be interviewed. Using this figure, the number of persons to be interviewed on each day was 10. The first person to be interviewed was obtained via a simple random sample of one (1) out of the four (4) numbers and any subsequent interviewee was drawn by adding the calculated interval of four (4) to recruit every fourth patient. The same procedure was repeated again till the final interviewee was identified. The Principal Investigator ensured that informed consent was sought from every participant before questionnaires were administered.

3.7 Study Variables

The outcome variable for this study was out-of-pocket payments while variables studied for effect included direct costs, indirect costs, intangible costs and financial coping strategies adopted by patients. The study variable in Table 1 indicates the various variables to be studied in this research.

Table 1: Study Variables

Type of Cost	Type of Cost	Variable
Direct cost	Medical	1. Cost of Consultation 2. Cost of prescription for drugs and medicines 3. Cost of diagnostic tests 4. Cost of treatment
	Non-Medical	1. Transportation cost 2. Cost of food 3. Travel cost 4. Cost of communication 5. Other expenses
Indirect cost	Productivity losses	1. Hours lost due to inability to work 2. Waiting time in health facility
Intangible cost	Psychological costs	1. Physical pain 2. Psychological pain 3. Anxiety 4. Social isolation 5. Depression 6. Stress 7. Stigmatization 8. Self-esteem
Financial coping strategy	Coping strategies	1. Selling of personal and financial assets 2. Transfers from networks of mutual support 3. Reliance on pensions 4. Taking less medications than prescribed 5. Working extra hours

3.8 Quality Control

Mechanisms were put in place to safeguard and ensure data accuracy and quality thereby minimising bias. These measures included training of research assistants, pretesting of

questionnaire, editing of completed questions and data entry. Research assistants were monitored on a daily basis while completed data was validated and entered on a daily basis. Additionally, the data set was cleaned before analysis of data was conducted. Completed questionnaires were kept under lock and key to prevent unlawful use and authorised people from having access to the data. Finally, questionnaires from the field will be discarded six months after the findings of the study are published.

Training was done before commencement of data collection activities as part of strategies to be adopted by the Principal Investigator to ensure data accuracy and quality. The training was done to ensure that research assistants understood the study objectives, the survey tool to be used and to accurately translate and explain questions both in English and the local language. There was a practice session for the research assistants which included explanation of the questionnaires and ethical issues of confidentiality and privacy as well as how to seek informed consent from participants. The survey tool was pre-tested and edited for finalisation. During the data collection process, the Principal Investigator supervised the research assistants as well as crosschecked the data collected for accuracy and consistency and to clean errors.

3 ***Training of Field Workers*** – Three (3) research assistants were recruited to help code and enter the information obtained into Microsoft excel (version 2016). These individuals were recruited from the University of Ghana, Department of Statistics and Actuarial Science. Effort was made to ensure that research assistants speak fluent English and at least two (2) of these three local languages – Ga, Twi and Ewe languages. They were trained on how to administer the questionnaire, obtain consent from participating patients and how to handle

information collected from the field. They were supervised on a daily basis throughout the process.

4 ***Pretesting*** – The questionnaire was pretested before it is finally administered to participants. Pretesting was conducted on diabetics assessing diabetes services at the Ga South Municipal Hospital, nonetheless, this sample was not added to the sample for the main study. The benefit of carrying out pre-testing of the questionnaire was to enable the interviewers to understand how participants respond to the questionnaire and to enable proper organisation of appropriate answers for questions that were asked by some members of the study population.

5 ***Questionnaire*** – The study questionnaire was reviewed after it is pretested. Errors and inconsistencies in the questionnaire were edited and corrected before start of the study.

6 ***Data Entry and Processing*** – Information collected from the Ga South Municipal Hospital was screened thoroughly, validated, serialized and coded within 24 hours before data is entered into Microsoft Excel 2016 version. Study participants' Likert scale responses to intangible costs associated with diabetes were also entered into Epi Info Version 10. To prevent data entry errors, the completed questionnaires were coded, double entered and cleaned. Detected discrepancies were also be resolved by consulting the original completed questionnaires.

3.9 Data Analysis

Sociodemographic information was extracted, with their corresponding proportion counted and tabulated by use of Microsoft Excel 2016 version. This included age, marital status, sex and educational level. All costs including direct medical cost, direct non-medical cost and indirect cost incurred by patients with diabetes were estimated using Microsoft Excel version 2016 and STATA version 15. The total direct cost was estimated by adding the total direct medical cost and total direct non-medical cost. The Indirect cost was also calculated by multiplying lost hours

for productivity. Total cost was estimated by summing up all direct and indirect cost. Costs data was presented in total aggregates, averages, median and percentage share of cost profile. The Likert scale responses to intangible costs associated with diabetes was analysed using a composite intangible score which was obtained through summation of the responses in each domain and multiplying them by the number of questions. The results was presented in charts, graphs and figures.

3.9.1 Direct Costs Estimation

Specifically, direct medical costs is represented by Table 2 and includes all OOPE made for consultation, diagnostic tests, treatments and medicines and drugs. Direct non-medical costs represented by Table 3 relates to OOPE spent on travel, food and miscellaneous such as communication during the process of accessing health services. To estimate direct costs, all direct costs incurred by diabetic patients for medical and non-medical cost in a month was summed and divided by the total number of participants that incurred this cost. This provided information on the average OOPP of diabetic care at Ga South Municipal hospital.

Table 2: Direct Medical Costs Estimates

Type of Cost	**Costs Estimation Approach**
Consultation	Sum of OOPE for consultation and registration of diabetics during period under study
Diagnostics	Sum of OOPE for diagnostic tests requested for diabetics during study duration
Treatment	Sum of OOPE for treatment services provided to diabetics during study duration
Medicines and Drugs	Sum of OOPE for medicines and drugs prescribed for diabetics and purchased during study duration
Total medical cost	Sum of OOPE for all consultation, diagnostics, treatment and medicines and drugs for diabetics during study duration

Table 3: Direct Non-medical Costs Estimates

Type of Cost	Cost Estimation Approach
Travel	Sum of every travel cost incurred by diabetics when undertaking return travelling from the homes to Ga South Municipal Hospital
Food	Sum of all feeding expenses incurred by diabetics while accessing diabetes services at Ga South Municipal Hospital
Miscellaneous	Sum of every other diabetes related expenses such as communication incurred when accessing services at Ga South Municipal Hospital
Total direct non-medical costs	Sum of all travel, feeding and miscellaneous expenses incurred by diabetic respondents at Ga South Municipal Hospital

3.9.2 Indirect Cost Estimation

The indirect cost was estimated based on the Human Capital Approach (HCA) or Income Approach). Productivity losses was estimated using the daily minimum wage of GHS 10.65. Hours lost at work to patient (employed) – is the addition of all work hours/days lost by patient who were employed during the period of illness and treatment. Productivity loss due to waiting time is the sum of all hours spent waiting to be seen by a medical doctor or a health provider. Table 4 indicates the estimation approach for indirect cost of diabetes in this study. The total indirect cost refers to the overall losses of the patient. Those not working at the time of data collection were excluded from the measurement.

Table 4: Indirect Cost Estimations

Type of Cost	Cost Estimation Approach
Productivity hours lost at work	Summation of total number of lost work hours by employed diabetics
Productivity loss due to waiting time in health	Summation of total number of hours lost due to waiting time to be seen by a medical doctor or a health provider at Ga South Municipal Hospital
Total indirect costs	Sum of productivity hours and waiting time lost to be attended to by a health provider at Ga South Municipal Hospital

3.9.3 Intangible Costs Estimation

The analysis of the intangible cost was descriptive using 5-point Likert scale. Diabetic patients' physical and psychological behaviour was assessed. The responses were counted and expressed in frequencies, percentages, graphs and charts. The scale to be used had five points, [1] Not at all, [2] A little, [3] Moderate, [4] Quite a bit and [5] Extremely to measure the intangible elements of pain, fear, stress, depression, irritation, self-confidence and self-esteem. The scores for each domain of the intangible costs was used to describe that domain. The summation of the scores of each domain was added and re-classified. This was then used to determine the effect of intangible cost on patients with diabetes.

Table 5: Composite Intangible Cost

No	Domain	Dimension	Score Range
1.	Pain	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	2-10
2.	Fear	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	3-15
3.	Depression	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	3-15
4.	Stress	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	3-15
5.	Self Confidence/Self Esteem	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	2-10
6.	Social Isolation	1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	1-5
	Total		70
	Range		14 – 70

1 Scores estimated from 2 questions by 5 responses = 10
2 Scores estimated from 3 questions by 5 responses = 15
3 Scores estimated from 3 questions by 5 responses = 15
4 Scores estimated from 3 question by 5 responses = 15
5 Score estimated from 2 questions by 5 responses = 10
6 Score estimated from 1 question by 5 responses = 5

3.9.4 Composite Intangible score

The composite intangible score was obtained through summation of the responses in each domain and multiplying them by the number of questions. The total score was then aggregated and classified into three dimensions, Low, Moderate and High intangible cost with their corresponding ranges of 14-32, 33-51 and 52-70 respectively using the descriptive tertile statistics approach as indicated in Table 6.

Table 6: Composite intangible score ranges

No	Dimension	Range
1.	Low	14 – 32
2.	Moderate	33 –51
3.	High	52 – 70

3.9.5 Determination of Financial Coping strategies of Diabetics

Per the conceptual framework, the financial coping strategies are categorized into two groups - informal mechanisms and formal mechanisms. Informal mechanisms are also divided into Individual and Group-Based categories while formal mechanisms are split into Market based and Publicly provided categories. This study will determine the financial coping strategy mostly adopted by participants. The proportion of each category will be determined. These categories will then be ranked from mostly used to least used based on the choice of respondents.

Table 7: Financial Coping Strategies

Groups	Categories	
Informal mechanisms	***Individuals*** • Sale of assets • Financial gifts from friends and family • Reallocating spending from consumption and investment • Taking less medications than prescribed	***Group-based:*** • Transfers from networks of mutual support
Formal mechanisms	***Market based:*** • Sale of financial assets • Loans from financial institutions • Reliance on pensions, • Working extra hours	***Publicly provided:*** • Free public health care • Social assistance • Workfare

3.10 Sensitivity Analysis

To determine the robustness of the cost estimates, sensitivity analysis was undertaken on cost components which lack certainty and also by varying costs of medications and wages. This was be done by taking into account the time values associated with costs of diabetes care and by adjusting the cost of medication and wages by 3%. 5% and 7%. Wage rate and medicine cost was varied because of uncertainty surrounding them. The result are presented in the summary Table 11.

3.11 Ethical Consideration

The study focused on Out-of-Pocket Expenditure and Financial Coping Strategies of Diabetics at Ga South Municipal Hospital. The Ghana Health Service Ethical Review Committee on Research Involving Human Subjects Ethical clearance provided ethical approval. Permission to carry out the research was obtained from the Greater Accra Regional Health Directorate and the Ga South Municipal Health Directorate as well as the Medical Superintendent of the Ga South Hospital.

3.11.1 Description of Subjects in the Study

Participants of this study were adult male and females with diabetes and who sought treatment for diabetes at the Diabetes Support Centre in Ga South Municipal Hospital.

3.11.2 Risk/Benefits

This research posed minimal risk to the population under study who were required to answer questions from the survey tool. The study highlighted through estimations, monthly out-of-pocket payments spent by diabetics and the financial coping strategies they adopted to address this need. The information was not only relevant information for patients with diabetes but also academicians and policy and decision makers such as the NHIA.

3.11.3 Privacy and Confidentiality

The Principal Investigator ensured that the interview was conducted in a secure place free from interaction of other ongoing activities. Preferably the client exit interviews were conducted at the facility after clients have accessed health care. The participation to these interviews was

voluntary. Participants were informed of their right to stop and opt out of the interview at any point during the process.

3.11.4 Informed Consent and Consenting Process

Consent of participants was obtained before data is collected. An information sheet was read out to participants or respondents. In this sheet, the potential benefit of the study to participants and the country were outlined. The rationale for the study, related benefits and rights of respondents and the processes for involvement were explained to all respondents before start of interview prior to the interview. Informed consent was received from all respondents after they were assured of confidentiality. Consent was obtained through thumb printing or signing of a consent form.

3.11.5 Anonymity and Confidentiality

Information from respondents was kept confidential with a code number given to each respondent. Names and identities of interviewees were not needed for the study. The name of interviewees did not appear in the study report. Interview process was used to obtain information from interviewees and the Principal Investigator ensured that they are not exposed to any form of risks. Compensations in the form of monetary gifts was not offered to participants. Information collected from respondents was solely used during this study.

3.11.6 Data Storage and Usage

All files, papers and data obtained from to the study were locked in a cabinet and on computers protected by passwords. Electronic data files were stored on an external drive with a secured password with access limited to only the Principal Investigator and Supervisor. Research

assistants did not have access to these documents except when granted permission by either the Principal Investigator and/or Supervisor Data files will be kept for six after which they will be destroyed. This research was fully self-funded.

3.11.7 Compensation and Declaration of Conflict of Interest

No monetary compensation was offered to participants except for by word of appreciation. The Principal Investigator had no conflict of interest in this research.

3.11.8 Funding for the Study

The Principal Investigator self-funded this study.

3.12 Assumption

The assumption made for this study is that the national minimum wage of the country is reflective of the average income earned per day by the respondent. The 2018 national minimum wage of GHS10.65 is thus assumed to reflect the daily average wage earned by each participants.

3.13 Limitation of the Study

The main limitation of this study relates to the scale and scope of the study as it is limited to just one out of eight diabetes support centre currently operational in the country. Perhaps, this study if undertaken in more than one diabetes support centre would have provided grounds to generalise results on national basis. Nonetheless, the results of the study remain valuable in helping to understand out of pocket payments and financial coping mechanisms of diabetics in urban and peri-urban Accra as the costs components of diabetes and coping strategies continues to remain an under-researched area both in Ghana and in other developing countries. Generally,

interpretation and generalization of the study findings results to a wider context must be done with caution.

Again, the reliance of the national minimum wage to determine the indirect cost could have introduced bias in estimating the total cost contribution given that income differs across the different economic sectors of Ghana. Further, respondents were asked to provide expenditure information regarding the cost elements of the study during the data collection phase. This could have resulted in instances of recall bias. Also, the exclusion of persons deemed too ill to participate in the study might have resulted in some selection bias which could have affected the cost components of the study.

Other study limitations included:

1) Recall bias – There was likely to be recall bias by participants who may not accurately remember out-of-pocket payments and financial coping strategies they have adopted in dealing with their diabetic conditions.
2) Sample size – small sample size was likely to have an effect on the external validity of the study.
3) The relatively short period for data collection influenced the number of people who were invited to participate.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the study results. The results of the study are segmented into sections including: background characteristics of study patients, health status of study patients; cost of direct treatment of diabetes; indirect cost of treatment of diabetes; intangible cost associated with diabetes; total treatment cost of diabetes by socioeconomic status and the financial coping strategies adopted by adults with diabetes.

4.2 Socio-demographic characteristic of participants

Table 8 provides the socio-demographic characteristics of study participants. The response rate of the study was 100%. Majority of the participants were females (53.3%). The mean age of respondents was approximately 52.8 years with most of them in the age group 50-59 years (30.3%) and 6.7% of the respondents were above 69 years. Majority of the respondents (56.7%) were married or living together or cohabitating. About 20% of respondents had no formal education while 14.3% had tertiary level of education. Seventy-four percent (89) of the respondents were Christians. About 33% of respondents were unemployed and 17.5% were public sector employees. About 15.8% (19) of respondents received no monthly income and 40.8% (49) of them received less than GHS1,000.00 (USD183.93) monthly income. More than a third of them had a family history of diabetes (38.8%).

Table 8: Demographic characteristic of study participants

Variables	Number	Percentage (%)
Sex		
Male	56	46.7
Female	64	53.3
Age groups (Years)		
30-39	12	10.1
40-49	35	29.4
50-59	36	30.3
60-69	28	23.5
>69+	8	6.7
Age: mean (SD)	52.8 (10.2)	
Marital status		
Single	12	10.0
Married/Living together/cohabitation	68	56.7
Divorced/Separated	21	17.5
Widowed	19	15.8
Level of education		
No Education	24	20.2
Primary	14	11.8
JSS/JHS/Middle School	18	15.1
SSS/SHS	34	28.6
Vocational	12	10.1
Tertiary	17	14.3
Religion		
Muslim	28	23.3
Christian	89	74.2
Other	3	2.5
Employment status		
Unemployed	40	33.3
Private Sector Employee	23	19.2
Public Sector Employee	21	17.5
Self-Employed	36	30.0
Average monthly Income (GHS)		
No income	19	15.8
<1000	49	40.8
1000-1999	33	27.5
≥2000	19	15.8
Family history of diabetes		
None	74	61.7
Family history	46	38.3
Total	120	100.0

SD: standard deviation.

4.3 Diagnosis, treatment and co-morbidity of Study diabetes

Figure 3 shows the distribution of the number of years since the diabetic patients were diagnosed or put on treatment. About 37% of respondents were diagnosed 5-9 years ago and 9.2% more than 19 years ago. Forty-five percent of respondents had been on treatment between 5-9 years and 5.8% for more than 19 years.

Figure 3: Distribution of diabetic patients' years after diagnosis and on treatment

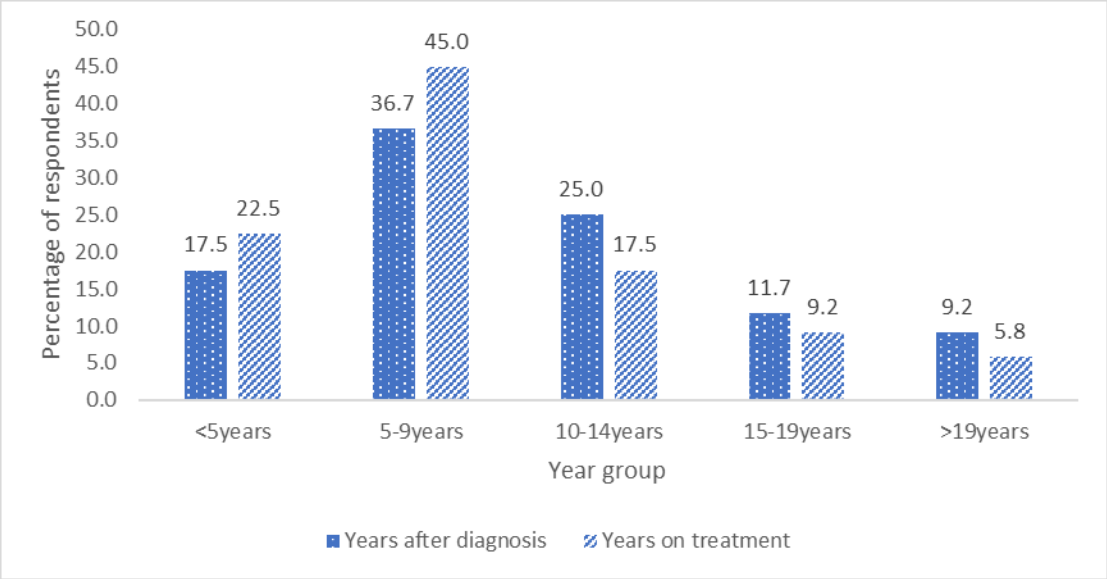
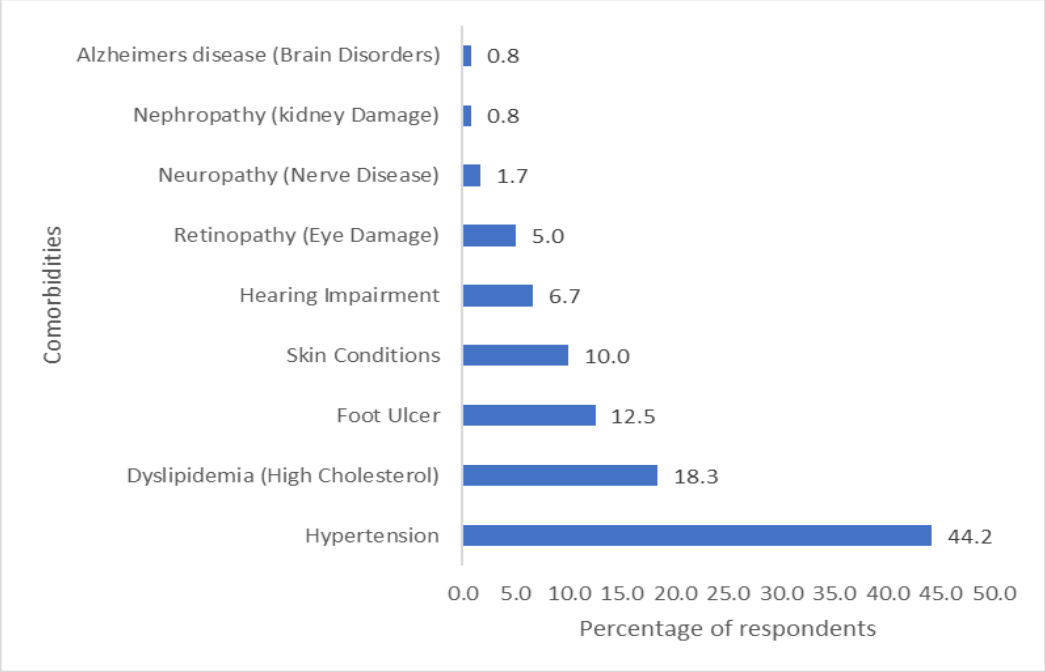


Figure 4 shows the prevalence of co-morbidity among diabetic patients. All respondents had a co-morbidities with most of the study participants (44.2%) reporting being hypertensive. Very few (0.8%) had Alzheimer's disease (brain disorder) or Nephropathy (Kidney damage).

Figure 4: Prevalence of co-morbidity among diabetic patients



4.4 Direct cost incurred by diabetics when seeking treatment

Table 9 provides details of the direct costs of diabetics. The direct cost were put into two categories namely direct medical cost and direct non-medical cost. The direct medical cost was made up of consultation cost, treatment cost, laboratory test cost, folder cost and medication cost while the direct non-medical cost consisted of transport cost, food and drinks costs, accommodation and other expenses.

4.4.1 Direct medical cost

In Table 9, the total direct medical cost was GHS13,856.00 (USD2,614.34) with mean or average cost estimated at GHS115.47 (USD 21.79) and median cost approximately GHS110.00 (USD 20.75). Under the direct medical costs 50% of respondents' expenditure was on medication with the least cost reported on folder (1%).

4.4.2. Direct non-medical cost

In Table 9, under direct non-medical cost, the total direct non-medical cost was GHS6,101.00 (USD1,151.13) with mean or average cost of GHS50.48 (USD9.52) and median cost of GHS43.50 (USD8.21). Under the direct non-medical cost items, about 20% of total cost was on transport while less than 1% of cost was on accommodation.

4.4.3. Total direct (medical and non-medical) cost of diabetes treatment

From Table 9, the total direct cost (medical and non-medical) is GHS19,957.00 (USD3,765.47) with mean or average cost of GHS166.31(USD31.38) per diabetic patient and median of GHS158.50 (USD29.91) constituting about 90% of total direct cost of diabetes treatment among diabetics.

4.5. Indirect costs incurred by diabetics

Table 9 provides the indirect cost of diabetes treatment among diabetes. The total indirect costs was GHS2,117.97 (USD399.61) with mean or average cost of GHS17.65(3.33) and median of GHS13.09 (USD2.47) representing 9.6% of costs of diabetes treatment. The total indirect cost per patient on work absenteeism was GHS1,256.70 (USD237.11) with mean or average cost of GHS13.51 (±21.25) and median GHS10.65 (USD2.01) representing 5.7% of indirect cost.

4.6. Total Cost of Treatment for Diabetes

Table 9 which provides the details of the cost of diabetes among diabetics reveals that the total direct (medical and non-medical) and indirect cost was GHS22,074.97 (USD4,165.09) with mean or average cost of GHS183.96 (USD34.71) per diabetic patient and median of GHS180.72 (USD34.09).

Table 9: Cost of treatment among diabetic patients

Cost items	Total	Mean	SD	Median	Minimum	Maximum	Cost Profile (%)
	GHS	GHS	GHS	GHS	GHS	GHS	%
Direct Cost (Medical)							
Consultation	952.00	8.00	0.00	8.00	8.00	8.00	4.3
Laboratory test	15,79.00	13.27	4.83	13.00	5.00	45.00	7.2
Folder	230.00	1.93	0.36	2.00	0.00	2.00	1.0
Medication	11,095.00	93.24	24.44	90.00	47.00	170.00	50.3
Total Medical Direct	13,856.00	115.47	28.15	110.00	0.00	195.00	62.8
Direct cost (Non-medical)							
Transport cost	4,498.00	37.48	25.07	40.00	0.00	150.00	20.4
Food and drinks	1,052.00	8.77	9.25	9.00	0.00	48.00	4.8
Communication	196.00	1.63	5.02	0.00	0.00	50.00	0.9
Accommodation	50.00	0.42	4.56	0.00	0.00	50.00	0.2
Other expenses	305.00	2.54	22.87	0.00	0.00	250.00	1.4
Total Non-medical Direct	6,101.00	50.84	39.31	43.50	0.00	317.00	27.7
Total Direct	19,957.00	166.31	52.04	158.50	0.00	447.00	90.4
Indirect cost							
Work Absenteeism	1,256.70	13.51	15.32	10.65	0.00	74.55	5.7
Travel time cost	316.84	2.69	2.75	1.78	0.67	16.64	1.4
Clinic waiting cost	363.83	3.11	1.37	2.66	0.02	7.99	1.7
Patient total indirect	1,937.37	16.14	15.39	10.21	0.00	79.88	8.8
Other persons cost	180.61	4.88	4.46	3.99	0.00	15.98	0.8
Total Indirect	2,117.97	17.65	16.35	13.09	0.00	79.88	9.6
Total Cost	22,074.97	183.96	55.28	180.72	10.65	460.93	100.0

USD1.00 equivalent to GHS5.3 (Bank of Ghana interbank exchange rate, 5th July, 2019)

4.7. Household Treatment cost by financial situation and patient physical health condition

Table 10 shows the average household treatment cost by reported financial situation and physical health condition of diabetic patient. For patients who reported to be from household with comfortable financial situation, the mean or average total cost of diabetes treatment per patient was GHS189.44 (USD35.74) with a mean or average direct cost of GHS172.37 (USD32.52) while for those from households with uncomfortable financial situation, the mean or average total cost of diabetes cost was GHS173.78 (USD32.79) with mean or average indirect cost of diabetes GHS18.73 (USD3.53).

The total mean or average cost of diabetes treatment for patients with poor physical health condition was GHS196.38 (USD37.05) with the mean or average direct cost of GHS177.50 (USD33.49) compared to the total mean or average cost of GHS 171.30 (USD32.32) with the mean or average direct cost of GHS154.49 (USD29.15) for those with good physical health condition.

Table 10: Average household treatment cost by reported financial situation and patient physical health condition

Cost item	Household financial situation				Physical health condition					
	Comfortable (n=78)		Uncomfortable (n=42)		Poor (n=20)		Fair (n=53)		Good (n=47)	
	Mean (GHS)	SD (GHS)	Mean (GHS)	SD (GHS)	Mean (GHS)	SD (GHS)	Mean (GHS)	SD (GHS)	Mean (GHS)	SD (GHS)
Direct cost	172.37	52.36	155.05	50.13	177.50	55.45	172.57	56.85	154.49	42.90
Indirect cost	17.07	15.46	18.73	18.04	18.88	21.90	17.92	13.89	16.82	16.56
Total cost	**189.44**	**55.89**	**173.78**	**53.30**	**196.38**	**62.50**	**190.49**	**56.32**	**171.30**	**49.26**

USD1.00 equivalent to GHS5.3 (Bank of Ghana interbank exchange rate, 5th July, 2019)

4.8. Sensitivity analysis of cost of treatment for diabetic patients

Table 11 provides details of sensitivity analysis of cost of treatment for diabetic patients. For robustness of the cost estimate for treatment of diabetes, the one-way and multi-way sensitivity analysis of cost was done. One-way and multi-way sensitivity analysis (SA) were done by varying relevant costs components. Cost of medication and hourly wage incurred in treating diabetes were varied by 3%, 5% and 7% to estimate the cost of treating diabetes. Medication and wage were selected due to high volatility around them.

As expected an increase in the medication leads to an increase in total cost of treatment. From Table 11, a 3% increase in medication leads to a 1.5% increase in total cost. The direct cost as a percentage of the total cost increases by 1.0% (thus from 90.4% to 90.5%) and the indirect cost component decreased by 0.1% (thus from 9.6% to 9.5%).

When the cost of wages is increases by 3%, the total cost of treatment increases by 0.3%. The direct cost component of the total cost decreases by 0.3% (from 90.4% to 90.5%) and the indirect cost component increases by 0.3% (thus from 9.6% to 9.9%). Also similar trends shows when the cost of medication or wages are increase by 5% and 7%. When the cost of both medication and wage increases by 3%, the total cost of treating diabetes increases by 1.8%, The percentage of direct cost component reduces by 0.1% (thus from 90.4% to 90.3%) and the indirect cost component of the total cost increases by 0.1% (thus from 9.6% to 9.7%).

Table 11: Sensitivity analysis of the cost of diabetic treatment

Scenario	Cost component	Change in parameter	Total cost	Change in total cost	% of total cost		% change in cost	
					Direct	Indirect	Direct	Indirect
		%	GHS	%	%	%	%	%
Best scenario	Baseline	0	22,074.97	0.0	90.4	9.6	0.00	0.00
One way sensitivity	Medication	3	22,407.82	1.5	90.5	9.5	0.1	-0.1
		5	22,629.72	2.5	90.6	9.4	0.2	-0.2
		7	22,851.62	3.5	90.7	9.3	0.3	-0.3
One way Sensitivity	Wage	3	22,138.51	0.3	90.2	9.9	-0.3	0.3
		5	22,180.87	0.5	90.0	10.0	-0.4	0.4
		7	22,223.23	0.7	89.8	10.2	-0.6	0.6
Multi-way sensitivity	Medication & Wage	3	22,471.36	1.8	90.3	9.7	-0.1	0.1
		5	22,735.62	3.0	90.2	9.8	-0.2	0.2
		7	22,999.88	4.2	90.2	9.9	-0.3	0.3

USD1.00 equivalent to GHS5.3 (Bank of Ghana interbank exchange rate, 5th July, 2019)
*The cost of medication and wage rate was independently and concurrently varied by *3%, 5% and 7%* increment.
**The national minimum wage per day of *GHS10.65* as at July, 2019 was used to value productivity days and time lost to patients

4.9. Intangible costs of treatment for diabetes

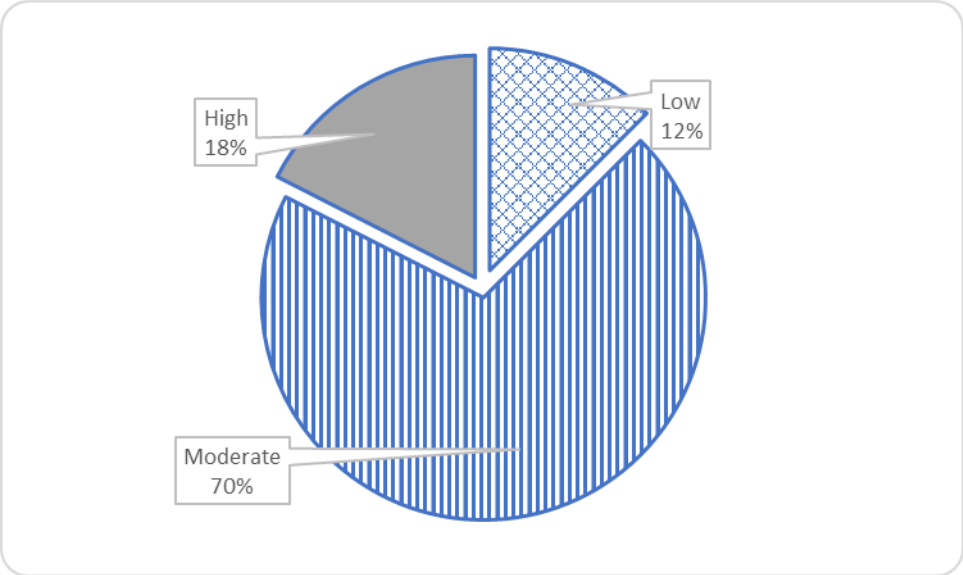
Treating diabetes leads to numerous intangible cost to the patient. Figure 5 shows the level of intangible cost incur by diabetic patients.

4.9.1. Intangible costs

Figure 5 indicates intangible costs of treatment for diabetics. Among study participants, 70% reported moderate intangible cost while 18% reported high intangible cost and 12% reported low intangible cost. With specific reference to social isolation, about two-thirds of respondents reported low levels of social isolation while 13.3% reported high level of social isolation. For self-confidence and esteem, 41.7% of respondents both reported moderate levels of self-confidence while 16.7% had high level of low self-confidence and esteem.

Fifty-five percent of respondents reported moderate stress levels while 25% reported high stress level. Fifteen percent of respondents reported high level of depression and anxiety while 40% reported low levels of depression and anxiety about their diabetic situation. Regarding fear, 47.5% of respondents had high levels of fear with 6% of respondents reporting little to no fear about their diabetic situation. Eighteen percent of respondents reported high level of pain as a result of diabetes while 40% reported low or no pain from their diabetic condition.

Figure 5: Intangible cost among diabetic patients

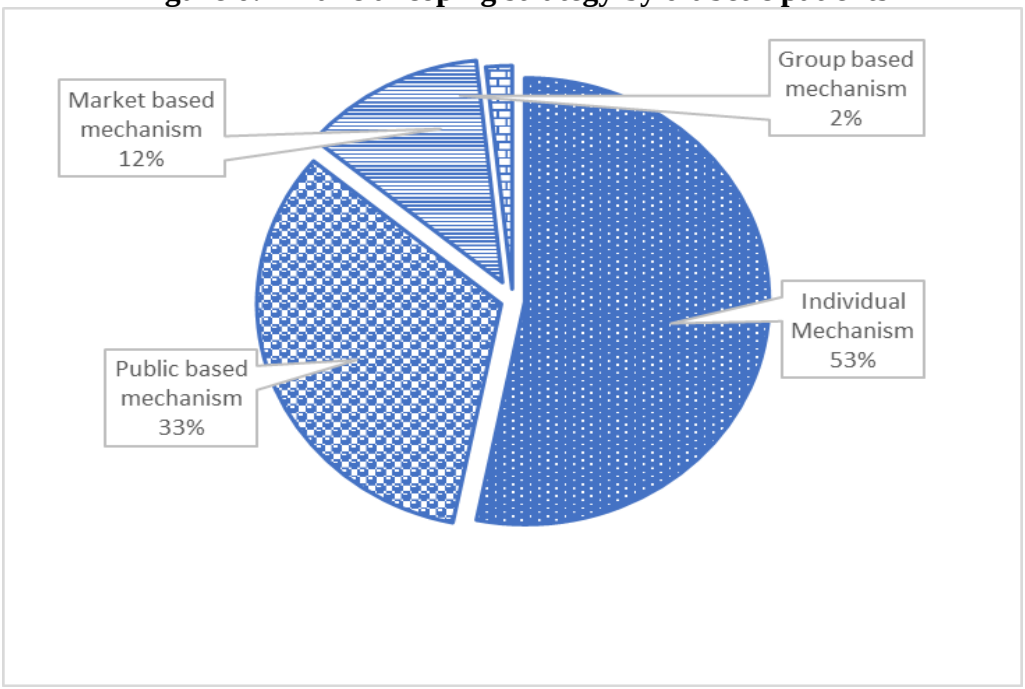


4.10. Financial coping strategies adopted by diabetic patients

Figure 6 provides details on the financial coping strategies adopted by diabetic patients. While almost all diabetic patients under the study listed NHIS as their main source of funds for treatment of diabetes, 55.8% still reported self-financing treatment cost. None of the diabetic patients reported being supported by private insurance while only 2.5% of them had financial support from friends, parents or remittances.

Fifty-three percent of respondents (64) reported individual mechanisms as part of their financial coping mechanisms with 28.4% of them reportedly taking less medication than prescribed while less than 1% of respondents sold their assets. Regarding public based mechanism, one third of respondents reported the NHIS as their financial coping mechanism while 12% of respondents adopted market based mechanisms as their financial coping strategy. Of these, 9.6% of reported working extra hours to support the cost of diabetes treatment.

Figure 6: Financial coping strategy by diabetic patients



CHAPTER FIVE

DISCUSSIONS

5.1. Introduction

Findings of the study are discussed in this. It provides a summary of relevant outcomes as they relate to the objectives of the study and related published literature on the cost of diabetes treatment. It provides an overview of the direct and indirect cost of diabetes, the intangible cost of diabetes as well as the financial coping strategies adopted by diabetics when seeking treatment for diabetes. The discussions also focuses on the socio-demographic characteristics of diabetics and their financial situation of diabetics at the household level.

5.2. Background characteristics

For this study, One hundred and twenty respondents were interviewed of which 53.3% (64) of respondents were females while 46.7% (56) were males. Respondents were aged between 30 and 69 years and above with an estimated mean age of 52.8 years. Approximately, 40% of the respondents were below the mean age while 30% were at the retirement age of 6o years and above. The study revealed that approximately, 83% of respondents were aged between 40-69 years. This confirms global statistics and studies by the Centres for Disease Control and Prevention (2017) in countries like the United States of America which revealed that adults aged 45-64 years were the most diagnosed age group for diabetes.

The study also revealed that majority of the respondents were married, living together or cohabitating (56.7%), with 10% identified as single, 17.5% divorced or separated and 15.8% widowed. In comparison with findings from Cornelis *et al.* (2014), which indicated that diabetes

was as less common among married compared to unmarried, widowed or divorced subjects, this finding showed that diabetes was more common among married, living together or cohabitating partners than among single, divorced or separated and widowed respondents.

About 20.2% of respondents had no formal education while 14.3% had received tertiary education. The study further revealed that 28.6% had received senior high school education. This is indicative of a trend in the level of education and the prevalence of diabetes. A study conducted by Borrell *et al.* (2006) revealed the educational attainment was associated with the prevalence of diabetes in the US adult population. Respondents with less than a high school diploma were almost twice as likely to report having diabetes as those with at least a bachelor's degree. Similarly, Steele *et al.* (2017) assert that the risk of type 2 diabetes increased as the educational level of participants decreased. They further purport that highly educated individuals were more likely to consume fruits and vegetables daily. They further espoused that individuals within higher levels of education were also less likely to be current smokers since smoking and high levels of sugar consumption have been identified as some of the underlying causes or risk factors associated with diabetes.

About 33% (40) of respondents were unemployed while 17.5% (21) and 19.2% (23) of respondents were public and private sector employees respectively. This finding aligns with the findings of Rautio *et al*. (2017), which revealed that unemployment is a risk factor for pre-diabetes and type 2 diabetes. It also confirms Rautio *et al.* (2017) study which states that the unemployed compared to the employed had a higher risk for pre-diabetes.

Further, the study revealed that about 15.8% (19) of respondents received no monthly income and 40.8% (49) of them received less than GHS1, 000.00 (USD183.93) monthly income. Analysis of this finding shows a correlation between income levels and diabetes and supports results of a study by Bird *et al.* (2015) which shows the prevalence of diabetes to be inversely and strongly related to household income. Bird *et al.* (2015) reveal that 9.0 % of those who had a household income of USD29,999 per year or less had diabetes, when compared to 4.3 % of those who made between USD30,000 and USD79,999, and only 2.7 % of those who made more than USD80,000.

This means that the effect of income and employment clearly has a significant implications on the prevalence of diabetes. This further confirms earlier studies by Rabi *et al.* (2006) which revealed that low income is associated with a higher prevalence of diabetes. In the present study, more than a third of respondents had a family history of diabetes (38.8%).The results show that an association between family history and diabetes. A study by Wagner *et.al* (2013) involving 8,000 participants has shown that people with a family history of diabetes see their risk of pre-diabetes increase by 26%. Family history is an important risk factor in pre-diabetes and diabetes. In a study undertaken by Geetha *et al.* (2017) revealed that nearly 68.8% of type 2 diabetes patients had a family history of diabetes. Furthermore, 25.1% of them had a diabetic mother and 15.3% had a diabetic father. This shows that persons with a positive family history of diabetes is more prone to the onset of the disease as evidenced in the present study.

Additionally, an analysis of the time difference between diagnosis and treatment showed that there were substantial delays in the initiation of treatment. For instance, while 25% of respondents had been diagnosed with diabetes between 10-14 years ago, only 17.5% of them had

been on treatment within the same time frame. Similar trends could also be observed for those diagnosed 15-19 years ago and above. Interestingly, while about 37% of respondents were diagnosed 5-9 years ago, 45% of respondents had been on treatment over the same number of years thus confirming the delay between diagnosis and treatment of diabetes. The findings confirm a study by Fraser *et al.* (2010) which further reveals that that delay in diagnosis of diabetes cannot be attributed to patient non-adherence as a result of missing appointments or blood tests, however to the contrary, there were multiple opportunities when a diagnosis could have been made but was not made, suggesting provider factors (clinical inertia) as the cause of delay.

Regarding the prevalence of co-morbidity among diabetic patients, the findings revealed that the most frequent co-morbid condition among diabetes was hypertension which was recorded among 44.2% of diabetics. The findings were similar to that of Pati and Schellevis (2017) which revealed that the most frequent co-morbid conditions for patients with diabetes was hypertension (62%).

5.3. Direct cost of diabetes

The total monthly direct cost (medical and non-medical) for diabetes was estimated at GHS19,957.00 (USD3,765.47) with mean or average cost of GHS166.31(USD31.38) per diabetic patient and median of GHS158.50 (USD29.91) which constituted about 90% of the total cost profile of diabetes treatment among diabetics. The findings confirm studies by Seurin and Suhrcke (2015) which revealed that across the globe, the direct costs of diabetes management was more than the indirect costs. It however contradicts findings by Png *et al.* (2016) which

states 42% direct medical costs and 65 % indirect productivity-related losses as total economic costs per working-age patient in Singapore.

With an average total cost of treatment for diabetes estimated at GHS183.96 (USD34.71), the direct cost of diabetes treatment was estimated at GHS166.31 (USD31.38) per diabetic patient and indirect cost estimated at an average of GHS17.65 (USD3.33). The total direct medical cost contributes a significant proportion of cost profile (62.8%) to the total direct cost profile compared to the direct non-medical cost (27.7%). This supports findings by Amon and Aikins (2017) which reports low direct non-medical cost (10%) and quiet substantial direct medical cost (89.3%) contribution to the total direct cost profile among diabetes patients. The findings from this study however fails to shows a significant increase in the average monthly direct cost of diabetes treatment GHS166.31 (USD31.38) when compared to the study by Amon and Aikins (2017) which revealed an average monthly cost of GHS163.51 (USD30.85) for treatment of complicated diabetes.

Findings from this study are however in sharp contrast to study results obtained by Domeikienė *et al* (2014) which revealed that the mean or average type 2 diabetes mellitus direct healthcare costs per patient accounted to EUR 955.73 (USD1077.16). This difference can probably be ascribed to contextual differences.

Similar to the study undertaken by Amon and Aikins (2017), medication was identified as the most costly direct medical cost item as it accounts for 50% of the total cost (direct and indirect) related to diabetes treatment. Estimates of high percentage share of direct cost over total

treatment cost can thus be attributed to the effect of cost of prescribed medications for diabetes treatment and its related comorbidities. There are serious implications to this as the World Bank (2006) indicates that the economic cost of diabetes and its complications remains unaffordable for most sub-Saharan Africans since their incomes remain insufficient to purchase anti-diabetic drugs, insulin and other supplies. Despite this, the real cost of medications for diabetes is probably undervalued as majority of the respondents are NHIS subscribers and diabetes treatment is listed as one of the benefits packages of the NHIS. This suggests that further studies need to be undertaken to determine the real cost of medication if patients were to fully comply with prescription for diabetes treatment.

For diabetic patients from households with comfortable financial situation, the average monthly cost of treatment for diabetes, GHS172.37 (USD32.52) in comparison with the average monthly cost of diabetes treatment from households with uncomfortable financial situation GHS155.05 (USD29.26) is relatively not significant, however, while this study did not seek to understand why there was disparity in cost among these groups, one can stipulate that low adherence to medication could have accounted for this disparity. This is in line with findings from this study which revealed that one of the coping mechanisms adopted by diabetic patients is the taking of less medication than prescribed. This also confirms findings by Abebe *et al.* (2014) which showed a significant association between poor socio-economic status and low-adherence and adds that if patients perceive the cost of therapy to be a financial burden, compliance with therapy will be threatened resulting in low adherence to medication.

5.4. Indirect Cost of Diabetes

In this study, indirect cost of diabetes refers to the loss of productivity as a result of work absenteeism and time spent seeking treatment which includes travel time and clinic waiting costs. In addition to these losses by patients, loss from accompanying relative or friend was considered an important element of indirect cost. It is important to state that due to the possibility of people withholding accurate information about their income due to socio-cultural factors, Ghana's minimum wage of July 2019 (GHS10.65) was used to estimate indirect cost of employed diabetic patients.

According to Magliano *et al.* (2018) productivity loss occurs because of absenteeism (absence from work due to illness) as well as presenteeism (reduced efficiency while at work). The study findings reveals that the total monthly indirect cost per patient is GHS2,117.97 (USD399.61) with an average cost of GHS17.65 (USD3.33) which when compared to the total direct costs of treatment for diabetes revealed that, the total indirect cost was approximately 10% of the total cost of diabetes treatment. This percentage constitutes the time spent travelling to and from the health centre, time spent with the health personnel, and the cost of patient's absence from work which comes to GHS1, 256.70 (USD237.11) and the losses incurred by accompanying relatives. This findings affirm earlier studies by Seurin and Suhrcke (2015) which states that direct costs of diabetes management are generally higher than indirect costs globally.

Further analysis of the findings reveal that among indirect costs items, work absenteeism constituted more than 50% of the total indirect cost. With approximately 70% of respondents aged between 30-59 years and about 56% of respondents with an average monthly income less

than GHS1,000.00 (USD188.68), the impact of productivity loss among the working-age population is significant. The findings are similar to studies by Png *et al.* (2016) which revealed that the total cost of diabetes treatment among diabetics in Singapore is projected to rise to USD7,791 (USD5,741-USD12,756) in 2050 with the share of indirect costs rising to 65 % among working population with diabetes. It also affirms studies by Bermudez-Tamayo *et al.* (2017) which showed that costs relating to the loss of productivity are exacerbated in Sub-Saharan Africa because the working-age adults account for a high proportion of the diabetes mellitus burden.

While in this study, the indirect cost constituted approximately 10% of the total cost of diabetes treatment, the indirect cost of diabetes is likely to rise with an increase in diabetes prevalence among the working population. It is very likely that such an increase will likely have an effect on the national economy by manifesting itself in losses in the Gross Domestic Product (GDP), lost income earnings, and general government revenues. This is evidenced in a study by Toroj and Mela (2017) of the indirect cost of diabetes among diabetics in Poland which showed that in the years 2012, 2013 and 2014 the indirect cost of diabetes among a growing diabetes population amounted to USD1.85 billion, USD1.94 billion and USD2.00 billion USD respectively.

5.5. Intangible Cost

Intangible costs relates to costs that reduce the quality of life and these costs or burden include but are not limited to pain, anxiety and stress. Estimating the intangible cost of diabetes to the individual or society is daunting since this value is incalculable in financial terms. Nonetheless, Kirigia, Sambo, Sambo and Barry (2009) indicate that the intangible cost suffered by diabetics

contributes significantly to the overall cost burden of diabetes. As already stated in earlier sections of this study, intangible cost included the physical and psychological pain, depression, anxiety, stress, social isolation, stigmatization and self-esteem associated with diabetes.

An examination of the intangible cost of diabetes in this study revealed that 70% of respondents reported moderate intangible cost, while 18% and 12% reported high and low intangible costs respectively. Particularly, the study findings revealed low levels of experience regarding social isolation among two-thirds of respondents. This contradicts findings by Brinkhues et al. (2017) which revealed that men and women who were more socially isolated, and who received less emotional and practical support, more frequently had newly and previously diagnosed type 2 diabetes. This difference can plausibly be ascribed to contextual differences given that social support networks are stronger in Ghana and Africa than elsewhere.

Regarding self-confidence or self-esteem, 41.7% of respondents each reported low and moderate levels of self-confidence while 16.7% of respondents reported high levels of low self-esteem. The study findings are similar to findings by Park et al. (2013) which shows an association between diabetes and depression. It further confirms earlier studies by Egede and Ellis (2010) and Harris (2003) which both reveal that low levels of self-esteem have been associated with diabetes and its management.

Similar to other intangible cost mentioned, most respondents revealed that they experienced low to moderate levels of stress, depression, and pain. Interestingly though, approximately 48% of respondents and 45.8% of respondents expressed high and moderate levels of fear respectively.

These findings are similar to findings by Papaspurou et al. (2017) which revealed high levels of fear among diabetics. These fears were found to relate to their lives and impact on their family.

5.6. Financial Coping Strategies Adopted by Diabetics

Given the growing financial burden of diabetes treatment, many diabetics and their families, adopt several financial coping mechanisms to alleviate this cost. Arnold *et al.* (2016) revealed that in coping with the economic burden of diabetes and other ill health conditions, some strategies adopted by diabetics and their families include reliance on pensions, and financial gifts from friends, selling of household assets, reallocating spending from consumption and investment, working extra hours and/or selling of personal assets.

Findings from this study revealed that while almost all diabetic patients had the NHIS as their source of funds for diabetes treatment, more than half (55.8%) of respondents listed self-financing as one of their treatment sources given credence to findings by Amon and Aikins (2017) which reveals that shared health care cost payment by patient and National Health Insurance Scheme (NHIS) is the most dominant payment mechanism (77.1%) of diabetics.

Also, the findings revealed that 53% of respondents (64) adopted individual coping mechanisms as part of their financial coping mechanisms. These included sale of assets, financial gifts from friends and family, reallocation of spending from consumption and taking less medications than prescribed. It affirms findings by McIntyre *et al.* (2006) which states that selling household assets and reallocating spending from consumption and investment are some of the financial coping strategies adopted by households to meet the financial costs of ill health. Regarding

public based mechanisms, the findings revealed that 33% of respondents (118) solely depend on the NHIS as their only financial coping mechanism while 12% of respondents adopt market based mechanisms which includes sale of financial assets, reliance on pensions and working extra hours. These findings are similar to study findings by Aye *et. al.* (2011) which reveals that selling of livelihood assets, labour substitution are some of the financial coping mechanisms adopted by diabetics. The findings also revealed that an insignificant number of respondents (2%) adopt group-based mechanisms such as transfers from networks of mutual support as their financial coping mechanisms.

Interestingly, further analysis of the individual financial coping mechanisms as diabetics revealed that 28.4% of respondents take less medication than prescribed for diabetes treatment to avoid catastrophic expenses. The findings are similar to findings by Awodele and Osuolale (2015) which reveal that non- adherence to medications is because patients cannot afford most of their medications. The implication is more episodes of sickness and death among diabetics.

With relation to the conceptual framework, findings of this study show a strong association between the health seeking behaviour of diabetics, the cost components of diabetes and the financial coping strategies adopted by diabetics in dealing or managing their diabetes condition. The study successfully determined out-of-pocket payments and financial coping strategies of diabetics at Ga South Municipal Hospital thus the conceptual framework can be said to be suitable and a valuable theoretical basis in determining the results of this study.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter provides a summary of the importance of the study and what the findings imply. It and also states recommendations for policies and programmes that aim to improve the current management of diabetes in order to reduce out-of-pocket payments associated with the treatment of the disease.

6.2 Conclusion

The total monthly direct cost (medical and non-medical) for diabetes constituted about 90% of the total cost profile of diabetes treatment. Regarding indirect cost, the total indirect cost was approximately 10% of the total cost of diabetes treatment. This percentage constituted time spent travelling to and from the health facility, time spent with the health personnel as well as the cost of patient's absence from work. This implies that the direct costs of diabetes management is more than the indirect costs with the total direct medical cost contributing a significant proportion of cost profile of diabetes management.

Further, treatment costs for diabetes continues to rise with the cost of medication, a major driving factor for diabetics. Compounding this is the productivity related losses as a result of absenteeism incurred by diabetic patients with low incomes. Fear remains a major intangible burden for diabetic patients with concern for family and life of paramount interest while experiences of pain are low to moderate among diabetic patients. Last but not least many diabetics continue to make out of pockets payments to support treatment for diabetes and this can

push them into poverty and further exacerbate the development of co-morbid conditions such as hypertension.

In sum, the economic cost of diabetes management and its complications remains unaffordable for most people as income levels remains insufficient to purchase anti-diabetic drugs, insulin and other supplies over a period.

6.3 Recommendations

The recommendations are:

1. Given the rising cost of medication and the fact that diabetics continue to make out of pocket payments to support treatment for their diabetic conditions, it is imperative for policy and decision makers to conduct studies to determine the real cost of medication. The findings should be used to review the current cost of diabetes treatment under the NHIS in order to ensure that the full medical cost of diabetes treatment is bore by the Scheme. This will reduce the risk to diabetics being exposed to catastrophic health expenditure that will likely result in poverty.

2. Fear is a major intangible cost associated with the diabetes. The implication is that persons with this condition will continue to be psychologically affected as long as they live. To mitigate this situation, effort must be made by government and health providers to establish counselling units within diabetes support centres as well as integrate psychosocial screening and educational counselling programmes for diabetics.

3. The study findings are relevant for planning relating to financing of diabetes, for instance, for an insurance scheme and can be used to identify the cost of managing diabetes in primary hospital settings in Ghana.

4. The cost data of the study – direct, indirect and intangible costs could be used by public health promoters and educators as a funding advocacy tool to support diabetes prevention and promotion activities.

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APPENDICES

School of Public Health| College of Health Sciences University of Ghana

Appendix I: Information Sheet

Introduction

Health is a fundamental human right to be enjoyed by all, irrespective of their circumstances (WHO, 1995). The Ghana Ministry of Health, Ghana Health Service and National Health Insurance Authority have introduced the National Health Insurance Scheme as a policy to ensure financial risk protection for all in Ghana accessing health care services. Despite this several studies indicate that people across the world and in Ghana continue to make out-of-pocket payments for health services. This study is thus interested in determining out-of-pocket expenditure and financial coping strategies of diabetics at Ga South Municipal hospital. Specifically, the study will determine the direct, indirect and intangible costs and financial coping strategies adopted by diabetics. The study is necessary as the findings will be shared with policy makers to enable them fully understand the total cost of seeking treatment for diabetes as well as the economic burden of the disease on national health care expenditure, the society and individual.

Type of Research Intervention

This research will involve the participation of diabetic patients in the in an interview that will take about one hour.

Participant Selection and Right to Withdraw

You are being invited to take part in this research as a patient of Ga South Municipal Hospital. We feel that your experience as a patient at this facility can contribute much to our understanding and knowledge of out-of-pocket payment and financial coping strategies adopted by diabetics in Ghana. Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate this will have no bearing on the service you receive at this facility. You may change your mind later and withdraw at any time, even if you agreed earlier.

Procedures

During the interview, I will sit down with you in a comfortable place. No one else but the interviewer will be present unless you would like someone else to be there. The information recorded is confidential, and no one else except the researchers you have met today, will access to the information documented during your interview. The entire interview will be tape-recorded, but no-one will be identified by name on the tape. The tape will be kept in sealed files. The information recorded is confidential, and no one else except the researchers you have met today will have access to the tapes.

Risks

I foresee no risk in this study but you may share some personal or confidential information by chance. You do not have to answer any question or take part in the discussion/interview if you feel the question(s) are too personal or if talking about them makes you uncomfortable.

Confidentiality

The information that we collect from this research project will be kept private. Any information about you will have a number on it instead of your name. It will not be shared with or given to anyone outside of the research team. We also ask that you and others in the group do not to talk to people outside the group about what was said in the group.

Any further questions on this study can be directed to:

1) Annorbah-Sarpei Nii Ankonu (Principal Investigator)

Tel: +233-24-474-6569

nasarpei@gmail.com

2) Prof. Moses Aikins (Supervisor)

School of Public Health,

University of Ghana, Legon Campus

3) Madam Hannah Frimpong,

Administrator at the Ghana Health Service Ethical Review Committee Office:

Telephone 0507041223

Email address: Hannah.Frimpong@ghsmail.org

School of Public Health| College of Health Sciences University of Ghana

Appendix II: Participant's Consent form

I have read the foregoing information, have had it read to me or translated into a language I understand. I have also had the opportunity to ask questions about it and all these questions have been answered to my full satisfaction. I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it. I further understand that I may freely stop being part of this study at any time without having to explain myself. I have also received a copy of the information leaflet and consent form to keep for myself. I consent voluntarily to be a participant in this study.

Print Name of Participant_____

Thumb Print/Signature of Participant _____

Date _____ (Day/Month/Year)

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the background and proceedings of the present study. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this informed consent form has been provided to the participant.

Print Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____ Day/month/year

STATEMENT OF WITNESS (where applicable)

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to the participant in the language he/she understood (….*name of language*)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name:……

Signature……. OR Thumb Print ……..... OR Mark (please specify)……..

Date:……

Appendix III: Questionnaire

Topic: Out-of-Pocket Expenditure and Financial Coping Strategies for Management of Diabetes at Ga South Municipal Hospital

Dear Respondent,

This research on diabetes is being undertaken in Ga South Municipal hospital in the Greater Accra Region. I will appreciate your participation and time in providing questions to the questions I will ask. I assure you again that all answers you provide will be strictly kept confidential and your name will not be mentioned in my final report. Thank you.

SECTION A: SOCIO-DEMOGRAPHY STATUS

No.	Questions	Responses
Section 1	**Socio-demographic Information**	
1.	Respondent ID No:	……..
2.	Sex: 1) Male 2) Female	……
3.	What is your age in years (i.e. age as at last birthday)?	[ ] years
4.	What is your current marital status? 1. Single 2. Married/Living together/cohabitation 3. Divorced/Separated 4. Widowed 5. Never Married	[ ]
5.	What is your highest level of education attained? 1. No Education 2. Primary 3. JSS/JHS/Middle School 4. SSS/SHS 5. Vocational 6. Tertiary	[ ]
6.	What Religion do you practice? 1. Muslim 2. Traditionalist 3. Christian 4. Other	[ ]
7.	What is your employment status? 1. Unemployed 2. Private Sector Employee 3. Public Sector Employee 4. Self-Employed	[ ]

	If unemployed, skip to Q 12	
8.	If Employed, what is your occupation? 1. Health 2. Education 3. Civil Service 4. Security Services 4. Business/ Petty trading 5. Banking 6. If Other, Please Specify……..	[ ]
9.	If employed, are you still working despite your illness? 1. Yes 2. No	[ ]
10.	How much is your average monthly income (renumeration and money from other sources?	[ ]
11.	How many people do you support on this income?	[ ]
12.	If unemployed, what is your reason for not being employed? 1) Student 2) Housewife 3) Retired 4) Unable due to diabetes 5) Other (please specify) …….	[ ]
Section 2	**Health Status and Treatment Information**	
13.	Do you have a valid NHIS card? 1. Yes 2. No	[ ]
14.	When were you diagnosed with diabetes?	……. years
15.	Do you have a family history of diabetes? 1. Yes 2. No If No, skip to Q17	[ ]
16.	If yes to 16 above, please specify …….	
17.	Have you been diagnosed with any of the following comorbidities/complication due to diabetes? a) Hypertension b) Dyslipidemia (High Cholesterol) c) Retinopathy (Eye Damage) d) Neuropathy (Nerve Disease) e) Nephropathy (kidney Damage) f) Foot Ulcer g) Skin Conditions h) Hearing Impairment i) Alzheimer's disease (Brain Disorders)	……
18.	For how long have you been on treatment?	…….. years ……. months

19.	What is your current fasting blood glucose/sugar level?	……. mmol/L
20.	What condition did you receive treatment for today? 01. Hypertension 02. Eye 03. Nerve 04. Kidney 05. High cholesterol 06. Foot Ulcer 07. Skin conditions 08. Hearing impairment 09. Depression 10. Other (please specify)..……	
21.	Do you skip diabetes treatment because of: a) Cost b) Work c) Distance to hospital d) Nobody to accompany you to hospital e) Lengthy time spent at hospital f) Other, please specify _____	 |___| |___| |___| |___| |___|
22.	What is the source of funding for your treatment? (tick as many as applicable) 1. Self 2. National Health Insurance Scheme 3. Pension 4. Remittances 5. Spouse 6. Parent 7. Friend 8. Brother/sister 9. Son/Daughter 10. Employer 11. Private Health Insurance 12. Other (please specify) 13. Donations/Gifts	 [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]
23.	How would you classify your household's financial situation these days? [1] Very comfortable [2] Comfortable [3] Poor [4] Extremely poor	 [ ]
24.	How do you rate your current physical health? [1] Very Poor [2] Poor [3] Fair [4] Good [5] Excellent	 [ ]
Section 3	**Direct Costs of Diabetes**	
25.	***Direct medical cost information*** How much money (GHS) do you spend on: (a) Consultation?	 [ ]

	(b) Lab tests? (c) Treatment? (d) Folder? (e) Medicines: Which drugs were given for diabetes and other co-morbidities/complications? Total medicine cost	[ ] [ ] [ ] [ ] [ ]
26.	***Direct non-medical cost information*** How much money do you spend on? (GHS) (i) Transportation and travel expenses (ii) Food and drinks expenses (iii)Communication expenses (iv)Lodging/accommodation expenses (v) Others (specify) expenses	 [ ] [ ] [ ] [ ] [ ]
Section 3	**Indirect Cost**	
27.	In the last month, how many days did you absent yourself from work because of because of diabetes (i.e. treatment, recovery)?	…… days
28.	On the average in a month, how many days do you absent yourself from work because of your illness? How many minutes did you spend travelling to and from the diabetic clinic?	……days
29.	How many minutes or hours do you spend travelling to and from this diabetic support centre every month?	……Mins/Hours
30.	How long do you usually wait before been attended to by a doctor?	
31.	How many minutes did you spend at the diabetic clinic …….	……. minutes/hr
32.	Do you have anyone accompanying you during each visit to this diabetic support centre? If No, skip to Q 37 1. Yes 2. No	……..
33.	On the average, how many people accompany you during each visit?	[ ]
34.	Is he/she/they gainfully employed? 1. Yes 2. No	[ ]
35.	On the average, how many minutes/hours do he/she/they spend travelling together with you to this diabetes support centre each month?	[ ]
36.	On the average, how many minutes hours in a day does your household member spend taking care of you?	[ ]
Section 4	**Intangible Cost**	
	Pain (Physical and Psychological)	
37.	I feel pain in my feet or lower legs because of my diabetic condition? 1. Not at all	[ ]

	2. A little 3. Moderate 4. Quite a bit 5. Extremely	
38.	I always feel uneasy when I have to administer injectable insulin 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
	Fear	
39.	I usually fear I will die from this disease 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
40.	I always fear of what will become of my children and partner when I die 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
41.	I am afraid my children will inherit my condition 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
	Depression/Anxiety	
42.	I often feel depressed because I have diabetes 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
43.	I am side-lined at work and/or at social events because of my diabetic condition and that makes me moody and sad? 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
44.	I am unable to enjoy my hobbies as I did prior to being	

	diagnosed with diabetes? 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
	Stress	
45.	I have sleepless nights because of diabetic condition? 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
46.	I am stressed out by because of my condition 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
47.	I worry or get stressed because I have become a financial burden to my family 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
	Self Confidence/Self Esteem	
48.	I have low self-confidence because of diabetic condition 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
49.	I have low self-esteem because of my diabetic condition? 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]
	Social Isolation	
50.	I avoid people because of my diabetic condition 1. Not at all 2. A little 3. Moderate 4. Quite a bit 5. Extremely	[ ]

Section 5	**Financial Coping Strategies**	
	Which of these financial coping strategies do you adopt to cope with the cost of diabetes	
	Informal Mechanisms	
51.	***Individual*** (Tick if applicable) • Sale of assets [ ] • Financial gifts from friends and family [ ] • Reallocating spending from consumption and investment [ ] • Taking less medications than prescribed [ ]	
52.	***Group based*** (Tick if Applicable) • Transfers from networks of mutual support [ ]	
	Formal Mechanisms	
53.	***Market based*** (Tick if applicable • Sale of financial assets [ ] • Reliance on pensions [ ] • Taking less medications than prescribed [ ] • Working extra hours [ ]	
54.	***Publicly provided:*** • Free public health care [ ] • Social assistance [ ] • Workfare [ ]	

Thank you for your time!