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EXPERIENCES OF LIVING WITH DIABETES AND THE INFLUENCE OF DIABETES COMPLICATIONS AND SELF-CARE ON PSYCHOLOGICAL OUTCOMES

BY

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DECLARATION

I, Abigail Esinam Adade, hereby declare that this thesis is the final product and a true reflection of an investigation under the supervision of Dr. Margaret Amankwah-Poku and Dr. Angela Anarfi Gyasi-Gyamerah both of the Department of Psychology, University of Ghana. All references have been cited and acknowledged accordingly.

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DEDICATION

I dedicate this work to God and my dearest family.

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Abstract

Self-care activities are critical in managing diabetes and lead to better recovery responses. However, adherences to these activities are poor among patients. This results in improper disease management, increases in diabetes complications, and consequently poor psychological health. This study examines the lived experiences and the influence of diabetes self-care activities and complications on psychological outcomes (depression, diabetes distress, and quality of life) among patients with type 2 diabetes. Multivariate Analysis of Variance, Multiple regression, and Linear regression were used to analyze the quantitative data obtained whereas thematic analysis was employed for the examination of the qualitative data. Results from the quantitative study revealed that no significant differences exist in the distress and depression levels between patients with two or more diabetes complications and those with no diabetes complications. Also, there were no observed differences in self-care activities between patients with two or more, and those with no diabetes complications. Furthermore, quality of life was significantly predicted by exercise but not medication. Interestingly, diabetes duration neither predicted depression, diabetes distress nor quality of life. Findings from the qualitative study, it was revealed that most patients experienced negative emotions when diagnosed with diabetes. Some challenges to effective diabetes management were identified to be distance to health care facilities, the use of herbal drugs, and the fear of medication side effects. Despite support and coping tools, patients still experienced some form of distress due to complications and death from these complications. Limitations of the study and their implications for future research are discussed.

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List of Abbreviations

WHO: World Health Organization

IDF: International Diabetes Federation

ADA: American Diabetes Association

CDC: Center for Disease Control

HbA1c: Glycated hemoglobin

BMI: Body Mass Index

QoL: Quality of Life

DSM: Diagnostic Statistical Manual

Chapter One

Introduction

Background of the Study

Diabetes is a metabolic disease characterized by increased levels of blood glucose (World Health Organization; WHO, 2020). It is associated with the body's inability to effectively metabolize glucose as a result of defects in insulin secretion or improper insulin action (Torpy, Lynm & Glass, 2011). Improper insulin secretion builds up glucose in the blood instead of getting to the cells. This glucose gets stored up in the bloodstream making blood sugar levels high, leading to diabetes (Chester et al., 2019). People living with diabetes experience symptoms such as polyphagia (excessive hunger), polydipsia (frequent thirst), polyuria (frequent urination), fatigue, erectile dysfunction, and blurred vision (Pot et al., 2019).

Generally, there are three (3) main types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes (WHO, 2020). Type 1 diabetes, also known as autoimmune diabetes, is characterized by insulin deficiency due to the loss of unique insulin production cells found in the pancreas called pancreatic beta cells (Kahonovitz, Sluss, & Russell, 2017). The causes of the loss of these beta-cells are not fully understood, however, genetics and environmental triggers such as toxins have been suspected (International Diabetes Federation; IDF, 2019). Type 1 diabetes represents approximately 10% of diabetic cases (IDF, 2019). Chiang et al. (2018) indicate that this type of diabetes normally occurs in children, adolescents, and young adults.

Type 2 diabetes, on the other hand, results from beta-cell dysfunction and insulin resistance (Saisho, 2015). Compared to type 1 diabetes, this type of diabetes is more prevalent and accounts for about 90% of diabetes diagnoses worldwide (IDF, 2019). According to the Centre for Disease Control (CDC,2020), it most often develops in people over age 45 but now

children, adolescents, and young adults are also developing it. Risk factors for developing type 2 diabetes include aging, reduced physical activities, family history of diabetes, prior history of gestational diabetes, obesity, and race. Although CDC (2020) showed that African American, Asian Americans, Latinos American are more susceptible to developing this type of diabetes (CDC, 2020), studies such as Gudjinu & Sarfo (2017) indicates that type 2 diabetes is on the rise in Ghana. This may be attributed to the changing lifestyles of Ghanaians including an increase in the consumption of high caloric foods and reduced exercise (Quartey, 2012).

The third type of diabetes, Gestational Diabetes, refers to any degree of glucose intolerance first noticed during pregnancy (IDF, 2016). It occurs in about 2 - 5% of pregnancies and often disappears after birth (Kampmann, Madsen, Skajaa, Iversen, Moeller & Oversen, 2015). Obesity is noted to be a risk factor for developing gestational diabetes (Zhu et al. 2019). This type of diabetes exposes both the mother and baby to risks such as neonatal hypoglycaemia and maternal hyperglycaemia. Further, both mother and baby are at increased risk for developing type 2 diabetes following delivery (Zhu & Zhang, 2016).

The prevalence of diabetes over the years has been high and has reached endemic proportions worldwide over the years (Korsah, 2015). According to the International Diabetes Federation (IDF, 2019), about 463 million people worldwide are affected by diabetes, and this figure is projected to reach about 700 million in 2045. Further, it was estimated that 232 million people have undiagnosed diabetes and 374 million people were at a high risk of developing diabetes. In Africa, an estimated 9.4 million adults aged 20-79 years were living with diabetes as of 2019, representing a regional prevalence of 3.9% (IDF, 2019). The region has the highest proportion of undiagnosed diabetes, with over 60% of adults currently living with diabetes and unaware of their condition (IDF, 2019). Even though IDF does not state the number of people

suffering from the various types of diabetes in Ghana, it estimates that the country has about 518,400 people living with diabetes.

The high prevalence of diabetes affects every sector of a country's economy, most especially the health and the economic sectors (WHO, 2016). The International Diabetes Federation, for instance, estimates that as of 2019, 4.2 million diabetes-related deaths and disabilities were recorded globally (IDF, 2019). In addition to this is the high expenditure imposed on health systems, governments, and individuals who are compelled to bear the cost involved in diabetes treatment (Zhang et al., 2010). This corroborates IDF's (2019) findings as the global health expenditure of diabetes amounted to 760 billion dollars. Similarly, the cost of diabetes in Africa has been overwhelming with a scarcity of economic and healthcare resources, as diabetes competes with other infectious and chronic diseases for these resources (Mutyambizi, Pavlova, Chola, Hongora & Groot, 2018).

Since diabetes has debilitating effects on both the individual and the country as a whole, various treatment therapies are laid down in managing it. These include medication, psychosocial care, education/counselling, continuous monitoring of biochemical markers, and the consistent and sustained performance of self-care activities (Alrahbi, 2014). Diabetes self-care activities, which are the focus of the present study, are the day-to-day actions an individual performs to control and reduce the impact of the disease on his/her health and well-being. They are paramount in keeping the disease under control (Ghosh & Roy, 2016). These self-care behaviours involve dietary restrictions, frequent blood glucose monitoring, foot care, recording insulin injections, regularity in eating and sleeping to match the peaks and action of the injected insulin, and having a source of sugar readily available for episodes of hypoglycemia and regular exercise (Abrahim, 2011).

Regular exercise is one of the key self-care activities that aid diabetes treatment. According to the Centre for Disease Control (CDC, 2020), individuals diagnosed with diabetes are required to participate in at least 30 minutes of moderate-intensity physical exercises, five or more times a week. The WHO (2016) defines moderate-intensity physical exercise as one that involves a reasonable amount of energy as well as increases heart rate. This includes aerobic exercises such as walking, swimming, cycling, and jogging. According to Sheri et al (2016), physical exercises help control diabetes by contributing to weight loss, improving blood glucose, and decreasing insulin resistance and glycated haemoglobin (HbA1c) levels.

Aside from physical exercise, diabetes can also be controlled by improving patients' dietary knowledge and adherence to dietary procedures (Sami, Ansari, Butt & Hamid, 2017). A diabetes diet requires eating moderate amounts of healthiest foods and sticking to consistent meal times. It is a healthy-eating plan that typically contains the right nutrients and is low in calories (vegetables, fruits, whole grains) and it is based on eating three meals at regular times per day (Yasmin et al., 2020). Maintaining healthy meal plans helps in controlling glucose levels, managing weight, controlling high blood fats as well as high blood pressure (Yasmin et al., 2020). The body creates a detrimental increase in blood sugar levels when people living with diabetes eat extra fats and calories and when this persists, it may lead to long-term complications including heart diseases and kidney damage (Eckert, 2012).

In addition to exercise and diet, majority of patients with diabetes need pharmacological agents to manage the disease. These medications are in the form of insulin peptides or oral anti-diabetic agents such as metformin, meglitinides, and sulfonylureas (Wallai & Molitch, 2014; IDF, 2016). These medications help to lower the production of glucose in the liver as well as improve the body's sensitivity to insulin (Ngugi, Njagi & Kibiti, 2012). Individuals with diabetes are required to adhere to strict blood glucose monitoring and maintaining a glycated

haemoglobin (HbA1c) level of less than 7% (American Diabetes Association [ADA], 2018). The ADA recommends the maintenance of good foot care by regularly examining both feet, soles, and toes, keeping the feet dry, and reporting any swelling, wound, or discoloration to a health facility.

A consistent engagement in these self-care activities correlates positively with improved quality of life and well-being, lowered glycated haemoglobin levels, and reduction in diabetes complications (Shrivasta, Shrivasta & Ramasmay, 2013). For instance, a study by Lin et al., (2017) showed a significant reduction in depression and an improvement in the quality of life among patients with type 2 diabetes as their exercise rates increased. Also, the American Diabetes Association (2017) revealed that in both type 1 and type 2 diabetes, exercises improve cardiovascular fitness, insulin resistance, glycaemic control, blood circulation, and lipid levels. Furthermore, diet, self-management of blood glucose levels, and medication adherence have been positively associated with quality of life and improved well-being (Babazadeh et al.,2017; Zhao et al., 2019).

Although self-care activities yield positive outcomes, unfortunately, some patients adhere poorly to these activities. For example, Stephani, Opoku & Beran, (2018) reported poor diabetes self-management among Sub-Saharan Africans; specifically, blood glucose monitoring, physical activity, and risk reduction behaviours were inadequate. A study involving 416 Ethiopian patients with diabetes reported a 71.6% prevalence rate of poor self-care activities (Abate, Tareke & Tirfie, 2018). Mogre, Abanga, Johnson, Tzelepis, and Paul (2017) also reported lower adherence rates to diet, foot care, and self-monitoring of blood glucose among Ghanaians with type 2 diabetes in Tamale.

The non-adherence rates of self-care activities may be influenced by various factors. Among these are illness perception, diabetes knowledge (Nuworza et al., 2017), negative

emotions (Amankwah-Poku, 2020), difficulty in changing old habits (Hushie 2019), lack of motivation to exercise, busy schedule, lack of glucometers, lack of family support, financial difficulties and the use of herbal drugs (Mogre et al., 2019). Patients with comorbid conditions also tend to display poor adherence to self-care activities compared to those suffering from just diabetes (Quek et al. 2019). These factors all serve as barriers to self-care practices.

Notwithstanding the fact that performing self-care activities may be a daunting task (Winchester, Williams, Wolfman & Egede, 2016), negligence to adhere to these activities can have an immensely detrimental effect on the health of a patient (Groof, Golden & Wagner, 2016). For instance, poor glycaemic control was recorded among patients who were non-adherent to their medication, exercise, and diet (Sekhar et al. 2013). Also, DiBonaventura et al. (2014) revealed a 21% increase in HbA1c levels as a result of non-adherence among patients with diabetes on insulin. Poor dietary practices and physical activities lead to changes in energy and excess fat which promote weight gain and insulin resistance (Al-Hayek et al., 2012). Insulin resistance can cause obesity and also, induce an imbalance in glucose metabolism, and cause hyperglycaemia (Ormazabal et al., 2018). Prolonged hyperglycaemia and poor glycaemic control lead to potentially life-threatening diabetes complications (Elnour, 2018).

Diabetes complications can be broadly categorized into two; microvascular or macrovascular. Microvascular complications include retinopathy, neuropathy, and nephropathy whilst macrovascular complications include coronary artery disease, peripheral artery disease, and cerebrovascular disease (Mauricio, Alonso & Gratacos, 2020). These complications are common among patients with poorly controlled glycaemic levels. Yaghoubi (2019) reported an 80.3% prevalence of at least one type of diabetes-related complication among people with diabetes in Canada with the most frequently reported complications being high blood pressure (54.65%), cataracts (29.52%), and poor circulation (21.68%).

In Ghana, Annani-Akollor et al. (2019) reported the prevalence of macrovascular (31.8%) and microvascular (35.3%) complications among patients at the Komfo Anokye Teaching Hospital, as well as the prevalence of neuropathy (20.8%), nephropathy (12.5%), retinopathy (6.5%), sexual dysfunction (3.8%), diabetic ketoacidosis (2.0%), and hypoglycemia (0.8%). These diabetes complications are significant causes of increased morbidity and mortality rates (Papathotheodorou, et al., 2017) and can be a cost to patients, employers, and society at large as patients absent themselves from the workplace and ultimately go on early retirement (Meetoo, 2014). Additionally, the quality of life and well-being of patients with diabetes worsens as diabetes complications develop (Triskelion et al., 2017).

Quality of life (QoL) is described as a "broad-ranging concept affected in a complex way by an individual's psychological state, personal beliefs, social relationships and their relationship to salient features of the environment (Skevington, 1999). Quality of life incorporates the mental state, level of an individual's autonomy, public activity, and individual convictions (Goh, Rusli, & Khalid, 2015). It comprises four components, namely; physical, psychological, environmental, and social components. The physical dimension incorporates an individual's daily activities, functional capacity, energy, pain, sleep, and mobility. The second component which is the psychological dimension incorporates an individual's positive attitudes, mentality self-image, negative thoughts, self-esteem, mentality, learning ability, religion, and memory concentration. The social dimension refers to an individual's relationship with others, sexual activities, and social support. Lastly, the environmental dimension incorporates an individual's financial resources, recreation, safety, health, and social services, living physical environment, opportunities to acquire new skills and knowledge. Worse quality of life was reported across all the dimensions of quality of life listed above among patients with more complications (Venkataraman et al. 2012; Peyrot et al., 2017). Tadros, Kontodimopoulos,

Feretis, Kabanarou, and Peto (2011) also reported a poorer quality of life among patients with diabetic retinopathy and maculopathy.

Also, diabetes complications can lead to distress and depression in patients with diabetes (Jacob & Kostev 2015). Diabetes-related distress refers to the burden related to the physiological and behavioural outcomes resulting from the knowledge of living with diabetes and its complications (Aljuaid, Almutairi, Assiri, Almalki, & Alswat, 2018). It can also result from external issues such as family and societal health care services. Studies indicate that, about 40% of people with diabetes experience diabetes distress at some point (Abrahim, 2011; Stephani, Opoku, & Beran, 2018). Depression, on the other hand, is a mood disorder that affects a person's thoughts, feelings, and behaviour (Diagnostic Statistical Manual; DSM-V, 2013). Depression among patients with diabetes is caused by biological factors such as the hyperactivity of hypothalamic-pituitary adrenalin and lack of physical activities leading to obesity and increased insulin resistance (Rustad, Musselman & Nemeroff, 2011). Research indicates that the prevalence of depression among patients with diabetes is twice higher than the normal population (Kreider, 2017).

One of the factors associated with depression and distress in patients with diabetes is the duration with which they have lived with the disease. Diabetes duration has been reported to be positively associated with both depression and diabetes distress among people with type 2 diabetes (Nanayakkara et al. 2018). Islam, Karim, Habib, and Yesmin (2017) reported a positive association between a longer duration of diabetes (above 10 years) and diabetes distress. Similarly, Baek, Tanenbaum, and Gonzalez (2014) revealed a significantly positive correlation between diabetes duration, depression, and distress.

Due to the distress, depression, demanding self-care practices and other complications that characterize diabetes, living with it can be burdensome. This disease also burdens an

individual's or family's expenses. Furthermore, it affects an individual's work and social life thus requires coping for a better outcome (Amon & Aikins, 2019). "Coping refers to the cognitive and behavioural efforts to modulate internal and external specific demands appraised as exceeding personal resources" (Endler & Parker, 1990; Lazarus & Folkman 1984). Evidence suggests that coping strategies such as social and financial support promotes positive psychological outcomes and help alleviate the psychological distress associated with living with diabetes (Miller & Dimatteo, 2013). In addition to this, Gupta (2014) reported religiosity and spirituality as instrumental sources of coping in diabetes management.

In summary, diabetes is a chronic disease that requires self-management. However, poor self-care has been recorded among patients with diabetes making them susceptible to developing diabetes complications. These diabetes complications, in turn, increase the risk of having diabetes distress and depression whilst causing a reduction in quality of life. Thus, the present study assessed the lived experiences, diabetes complications, diabetes self-care, and psychological outcomes among patients living with type 2 diabetes using a mixed approach.

Problem Statement

Diabetes mellitus has been on the increase in developing countries and Ghana is no exception (IDF, 2017). This increase may be due to the current changes and patterns of the lifestyle of Ghanaians (Owusu et al., 2016). Living with type 2 diabetes necessitates lifestyle changes such as diet adherence and blood glucose monitoring, which are referred to as self-care activities. In the management of diabetes, self–care activities are crucial because they have been shown to produce positive health outcomes such as improved quality of life and subjective well-being (Aljuiad et al., 2013). In as much as these practices are effective in producing positive outcomes, adherence to these activities in Ghana is low (Kretchi et al., 2020; Mogre et al., 2017). Lack of glucometers, difficulties changing old habits, illness perception among others have been identified as barriers to self-care. These tend to have an impact on self-care, which has been identified as an important factor influencing glycemic control and, as a result, diabetes complications.

Complications of diabetes range from acute to chronic and a large number of people with diabetes experienced at least one complication (Yaghoubi, 2019). Diabetes complications are significant causes of increased morbidity and mortality rates and an increase in economic burden. (Raghavan et al., 2019). People suffering from diabetes complications are vulnerable not only to its debilitating physical health effects, such as foot ulcers and amputations but also to its debilitating psychological effects (Islam, Karim, Habib & Yesmin, 2013). Diabetes complications, such as angina, stroke, and retinopathy, are likely to reduce patients' well-being and quality of life significantly. This may have an impact on patients' ability to function independently (Debono & Cachia,2007).

Studies assessing the psychological distress of patients living with type 2 diabetes predominantly in Western countries have emerged due to the increased health challenges associated with diabetes (Bigna, et al., 2018). However, in Sub-Saharan Africa, far less has

been done on the psychological outcomes and health implications despite the endemic proportion of the populace with the disease. Assessing the psychological outcomes and health implications is imperative given the psychosocial challenges and health complications associated with the disease.

Current literature assessing the lived experiences, diabetes complications and psychological outcomes in Ghana is limited and, in most cases, has adopted only qualitative or quantitative methods. This does not permit an in-depth understanding of the phenomenon. Scholars are yet to eclectically understand the lived experiences and the influence of self-care and diabetes complications on psychosocial challenges such as distress, depression and quality of life in Ghana using the mixed method. Since previous studies did not help to vividly explain the life experiences, management of diabetes and the impact of diabetes complications and self-care on psychological outcomes, the existing management of diabetes is not very direct and effective. As a result, creating a problem in the quest to improve quality of life and reduce diabetes distress and depression among persons with type 2 diabetes. The study can thus add value by providing more in-depth knowledge by utilizing the mixed-method design to understand the lived experiences and psychological outcomes among patients with type 2 diabetes in Ghana.

Aim and Objectives of the Study

This study assesses in general, the lived experiences and the extent to which diabetes complications and self-care activities influence the psychological health of people with type 2 diabetes. The specific objectives of this study are to:

1. Assess the relationship between diabetes complications and psychological factors (depression, diabetes distress, and quality of life).
2. Assess the relationship between self-care activities and quality of life.

3. Assess the relationship between diabetes duration, psychological distress (depression and diabetes distress), and quality of life.
4. Explore the experiences of people with type 2 diabetes.
5. Find out the challenges of self-care management among people with type 2 diabetes.
6. Explore the management and coping strategies of people living with type 2 diabetes.
7. Explore the emotional responses of people living with type 2 diabetes about diabetes complications.

Relevance of the Study

The knowledge generated from this study will sensitize patients with diabetes on the impact of self-care practices and diabetes complications on their quality of life. Based on the findings of the study, healthcare practitioners can come up with appropriate measures and design interventions to improve adherence to diabetes self-care practices and reduce the rate of diabetes complications to improve psychological health. Furthermore, the findings of the present study will help address the paucity of literature, stimulate concerns and promote a platform for addressing the psychological outcomes associated with diabetes and its predictive factors (diabetes complication and self-care activities) in the Ghanaian context.

Chapter Two

Literature Review

This chapter summarizes the theoretical background of the study, a review of relevant literature, and presents the rationale and hypotheses/research questions for the study.

Theoretical Framework

The Health Belief Model (Rosenstock, 1966) and the Self-Regulation Model (SRM; Leventhal & Cameron, 1987) served as theoretical foundations for this study.

The Health Belief Model. The Health Belief Model (HBM; Rosenstock, 1966) is a psychological framework that classifies health behaviour. As posited by the HBM, an individual will take a health-conscious action if such is believed to help avoid a negative health-related condition, has a positive health outcome, and that such recommended health action when taken is without any perceived obstacles and minimal if any (Rosenstock, 1966). The HBM was explained in terms of five concepts signifying perceived vulnerability or susceptibility, perceived weakness or severity, perceived barriers or benefits, perceived self-efficacy, and cues to action—which result from within the individual or from his external environment (Rosenstock, 1966).

Perceived vulnerability or susceptibility depicts an individual's appraisal of the risk of acquiring a disease. It is the degree to which an individual believes that they are at risk of contracting a specific illness, discomfort, or disease. Perceived weakness or severity depicts a person's view of the seriousness of an illness and how he or she might interact with the illness socially, medically, and its other likely outcomes. Perceived barriers or costs refer to the impairments or the likely cost involved in exhibiting healthy behaviors. The barriers serve as impediments in exhibiting recommended health actions whilst perceived benefits deal with an individual's assessment of the positive consequences of adopting healthy behaviors. Self-efficacy on the other hand refers to the extent to which a person has the confidence to

successfully carry out a recommended health action. Lastly, cues to actions depict the factors that activate the decision-making process of engaging in a recommended health action. These cues could be internal (wheezing, body pains) or external (illness of a family member, the media) to the individual.

Relating the HBM to the present study, perceived susceptibility can be linked to the perception people with diabetes have of their vulnerability to the disease and its associated complications. If they perceive developing complications as a result of the disease, then their perceptions of diabetes complications are likely to influence them to adhere to better self-care practices (Adejoh, 2014). Secondly, people's perceived weakness or severity in this study will be how serious and threatening they recognize diabetes complications are and are convinced that self-care practices will lead to better treatment outcomes. Thirdly, perceived barriers or perceived benefits can be related to the perceived cost or benefit of engaging in self-care management to control glycemic levels and prevent complications. For instance, if people with diabetes perceive oral drugs, test strips or insulin pumps to be expensive but beneficial to their treatment to prevent complications, they are more likely to commit their resources to these. However, if they think the cost of treatment is too expensive and will not be of many benefits to them, then they are less likely to commit resources to that end. In like manner, individuals will weigh the costs and benefits of exercising and maintaining a healthy diet before engaging in such activities.

Fourthly, an individual's perceived self-efficacy is his/her level of confidence to successfully carry out self-care behaviors. The level of self-efficacy will determine the extent to which a person will persist in maintaining self-care behaviors even when he/she encounters barriers. For example, if perceived self-efficacy is high, then individuals will maintain self-care behaviors to control the detrimental consequences associated with it. On the other hand, if they perceive themselves as incapable of maintaining self-care behaviors then they are less

likely to engage in effective treatment, which will increase their chances of developing complications or increase complications. Harrison, Mullen, and Green (2012) indicated that patients with diabetes engage in healthy behaviors when they perceive that they have control of the disease and that they can successfully engage in that healthy behavior. Lastly, cues to actions will be the internal (low or high sugar levels) or external (reminders from family members to adhere to self-care practices) cues that motivate individuals with diabetes to maintain self-care practices. For instance, numbness and tingly feeling in a person's fingers which are signs of neuropathy (internal cues), and seeing other patients with diabetes during clinical visits with amputations (external cues) may prompt individuals to be more adherent to prevent or delay diabetes complications.

Self-Regulation Model. The Self-Regulation Model (SRM) postulates that an individual's set of cognitive representations and emotional representations determines his/her health behaviour. This model postulates that in response to an illness, individuals will form both cognitive and emotional representations, which are processed independently of each other (Leventhal, Nerenz, & Steele, 1984). Cognitive representations guide an individual's behavior concerning managing an illness. These representations are formed based on five distinct beliefs canopied under illness perception (Leventhal, Meyer, & Nerenz, 1980). Illness perception comprises these five interrelated beliefs namely; identity (label and symptoms associated with the illness), timeline (duration of illness), cause (source of illness), consequences (effects of illness on life domains), and control (the extent to which the illness is amenable to treatment or cure).

The first belief which is identity refers to beliefs regarding the disease label and the symptoms associated with it. For instance, by depending on symptoms such as frequent urinating and thirst as well as past experiences, an individual might label his or her condition as diabetes. The second belief, cause, refer to beliefs about potential reasons for the illness. These causal factors may include heredity, environmental factors, or the way of life. Perceptions based on

an individual's personal experiences and the opinions of others might influence interpretations about the cause of the disease. Thirdly, timeline/course beliefs are predictive beliefs concerning the duration of illness with its symptoms increasing or decreasing cyclically. This dimension includes views about the uncertainty and unpredictability of an illness. The Consequences belief is the fourth and concerns the apparent physical, social, mental, and economic outcomes of an illness. Lastly, curability or controllability has to do with what an individual does to cure or control the condition. It takes into account the perception of individual control (trust in self-management) and treatment viability.

This theory is related to the present study in that, it implies that people living with diabetes first assess the disease and its associated warning signs. By doing this, a lot of questions come into mind including what is diabetes, what side effects are associated with it, and what might be wrong? The diabetes patient then unravels the underlying reasons for the illness; heredity, environmental factors, or the way of life. This is where the patient finds out about the real causes of the diseases and the timeline the disease will linger. The patient then asks what can be done to control or cure the disorder. Hence, if the patient perceives the illness to last long, then there will be higher psychological effects (depression or distress). Furthermore, the patient will also assess all the treatment regimens to see which of them is appropriate for controlling the disease. For instance, the patient will start eating a healthy diet and on time, engaging in exercises, complying with medication, etc. As such, if he or she notices a reduction in his or her levels of complications and psychological distress, then he or she is more likely to adhere to these regimens.

Review of Related Studies

Several studies have been conducted on diabetes, its challenges, complications, self-care activities, and psychological outcomes. This section reviews some of such studies.

The lived experiences, management, and barriers of self-care management

The lived experiences of people with diabetes have attracted numerous studies. Mwila, Bwembya, and Jacob (2020) conducted a qualitative study in Lusaka to explore the lived experiences of older people with type 2 diabetes mellitus. Twenty-eight (28) participants were sampled and interviewed through the purposive sampling technique. The data obtained was analyzed using Atlas. ti 7. The outcome of the investigation revealed that persons with diabetes experienced mental challenges such as depression, stress, and frustration as well as physical illnesses such as fatigue, headache, and lower limb numbness. This was largely precipitated by inadequate social support, non-adherence to medication regimen, lack of communication materials, financial problems, and inadequate education. Mwila et al. (2020) concluded that people living with diabetes should be provided with psychosocial therapy as well as self-care education. Although the study made use of Atlas. ti 7 which makes analysis easier and faster, it does not allow the researcher to have a closer interaction with the data gathered. Thus, might affect the interpretation of the data.

In a similar study conducted in Thailand Boonsatean, Carlsson, Ostman, and Rosner (2016) explored the lived experiences of 19 women living with type 2 diabetes in a low-income community. Data was collected using a semi-structured interview guide and was analyzed using thematic analysis. The outcome of the study revealed that the women were confronted with emotions such as worry about the future, the unpredictable nature of the disease, and the effect the disease might have on their families. Despite these, they maintained a balanced life through their inner and outer beliefs in the Buddhist teachings. Their beliefs in Buddhism served as coping strategies to remain calm and cope with the psychosocial challenges

associated with diabetes. Boonsatean et al. (2016) also indicated that persons living with diabetes require high social support to cope with the complications. The study concluded that as a means to ensure holistic care for patients living with diabetes, Buddhist beliefs could be used to assist Thai patients to manage the psychosocial issues surrounding diabetes. However, this study consisted of only women in a low economic community.

Kaur, Tee, Ariavatnam, Krishnapillai, and China (2013) assessed the prevalence of depression, anxiety, and stress among patients with diabetes in an urban community in Malaysia. This study was cross-sectional and 2,508 patients were recruited for it. The Depression, Anxiety, and Stress Scale (DASS 21) was used to measure the depressive, anxiety, and stress symptoms of participants. The outcome of the study indicated a high prevalence rate of depression (11.5%), stress (30.5%), and anxiety (12.5%) among the participants. Diabetes duration, gender, unemployment, and lack of exercise were reported as significant predictors of depression, anxiety, and stress. Kaur et al. (2013) concluded that regular screening of depression, anxiety, and stress are essential for patients with living diabetes.

Studies have also assessed the management practices and coping strategies of persons with diabetes. Ramkisson, Pillay, Sibanda (2017) explored the coping strategies and well-being of patients with type 2 diabetes in Kwa Zulu-Natal. A total of 401 patients were sampled for this study. The Diabetes Care Profile (DCP), General Health Questionnaire (GHQ), Social Support Questionnaire (SSQ), and WHO – 5 were used to measure diabetes beliefs and self-care, emotional distress, social support, and well-being respectively. The result of the study revealed an inverse relationship between social support and emotional distress. Furthermore, there was a positive relationship between social support and well-being. Ramkisson, Pillay, and Sibanda (2017) reported that although the participants were satisfied with the amount of social support they received, they still had challenges in coping with the disease.

Engstrom, Leksell, Johansson, and Gudbjörnsdottir (2019) to describe significant areas in the life of grown-up individuals with diabetes in Sweden. This qualitative study tested 29 adult patients with diabetes who were able to talk about their condition. The 29 patients consisted of 15 type 1 and 14 type 2 patients with diabetes, selected through purposive sampling. The study sampled only those adults who could describe their experiences in only Swedish, and therefore those who could not speak Swedish were excluded. The findings of the study indicated that diabetes management may be problematic especially when there is a poor support system from relatives and health-care providers. It was reported that the patients found it difficult to take constant medications and live a healthy lifestyle when support systems were weak. In this study, the patients had to manage themselves to attain a good and constant blood sugar level and live a usual life.

In Ghana, Korsah (2015) assessed the management strategies of patients with diabetes. Fifteen people with type 2 diabetes from Accra were purposively sampled for the study. Data was gathered through interviews in Twi (local dialect) and English language and analyzed using the hermeneutic phenomenological approach. The outcome of the study revealed that majority of the participants' comprehension of the causes and treatment of diabetes was largely influenced by their spiritual belief system. Korsah (2015) reported that all participants held strong spiritual beliefs about the causes of their disease. It was believed that relatives and friends must have used spiritual powers to inflict the disease upon them thus affecting patients' ways of coping. Therefore, he recommended strong cooperation and a combination of both orthodox healthcare and traditional health care systems to provide holistic care to patients with diabetes.

Mogre, Johnson, Tzelepis, and Paul (2019) assessed the hindrances to self-care activities among Ghanaians with type 2 diabetes. Semi-structured interviews were used to gather data from 23 patients and 14 health care professionals and the data was analyzed using

the constant comparative technique. The analysis revealed that ascribing the disease to spiritual factors, the absence of inspiration to work out, occupied calendar, absence of glucometers, trouble in changing old habits, absence of family support, social shame, and utilization of natural medications were noteworthy obstructions to self-care management practices among the participants. Since this study was conducted in the Northern part of Ghana, it is highly unlikely to obtain people from diverse backgrounds.

Hushie (2019), however, explored the barriers and facilitators of self-care activities among patients with type 2 diabetes in Accra, Southern Ghana. Thirty-three patients with type 2 diabetes were purposively recruited for the study. In-depth interviews were used to solicit information from the participants. The interviews were recorded, transcribed, and later analyzed using thematic and content analysis. Findings showed patients experienced inter-related challenges with diabetes self-care such as lack of family support, fear about the disease, and negotiations on recommended dietary patterns. In as much as this study was conducted in Accra, it focused on dietary practices, however, other approaches to the barriers of self-care (exercise and medication) are necessary for the development of suitable interventions to help bridge these barriers.

In summary, it can be noted that these studies have generally focused on barriers, coping strategies, and lived experiences of patients with diabetes. However, these studies did not explore how patients cope with living with diabetes complications and its impact on psychological health.

Relationship between self-care, diabetes complications, and quality of life.

With regard to the relationship between self-care and quality of life, Babazadeh et al. (2017) examined the factors associated with the quality of life of 120 patients with type 2 diabetes. This cross-sectional study was carried out at the health center of Chaldoran, West Azerbaijan Province, Iran. Data was collected using the World Health Organization Quality of

Life Scale (WHOQoL- BREFF) and the Self-care behavior scale. The result of the study indicated that self-care (diet, blood glucose, and medication) was significantly and positively associated with quality of life. Quality of life of the participants was higher for those who were males, had higher educational status, had a good economic status and younger age whilst older age was associated with a lower quality of life.

Another randomized control study to examine the effect of physical activity on quality of life among one hundred patients with diabetes was carried Taphesari et al., (2020). Subjects were randomly assigned to either an intervention or control group. Patients were made to complete the WHO QOL-BREF scale after three months of the intervention group receiving the intervention. The study reported a significant difference in the quality of life of the experimental group. At the end of the study, a significant difference was observed in the physical, environmental, and psychological components of quality of life among the experimental group. However, there were no differences were observed in the social component between both the experimental and control groups.

Similarly, Zhang, Huang, and Peng (2020) conducted a study to examine the effect of physical activities on the quality of patients with type 2 diabetes in Southern-Eastern China. Two hundred and fifty-five (255) patients were employed for this study. The Long International Physical Activity Questionnaire (IPAC-L) and the Diabetic Miletus Quality of Life Scale (DMQLS) were used to assess physical activities and quality of life respectively. The findings of the study revealed a positive correlation between physical activities and the physical, social and psychological dimensions of quality of life. Zhang, Huang, and Peng (2020) concluded that there was a need for various strategies to promote physical activities among patients living with diabetes to increase more positive outcomes. It was further recommended that subsequent studies should use different scales to explore the relationship between physical activities and quality of life.

Alfian, Sukandar, Lestari, Abdulah (2016) conducted a cross-sectional study to examine the relationship between medication adherence and quality of life among patients living with type 2 diabetes in Indonesia. Ninety-one (91) patients were consecutively sampled for this study. The Morisky Medication Scale was used to assess medication adherence whilst the Diabetes Specific Quality of Life Scale was used to measure quality of life. The outcome of the study showed that 49.4% of the participants exhibited low medication adherence, 29.7% exhibited medium medication adherence and 20.9% exhibited high medication adherence. Also, a significant positive relationship between medication adherence and quality of life was reported. Patients with lower socioeconomic statutes were reported to have a lower quality of life.

Ababio et al. (2017) conducted a study on the predictors of quality of life among patients with diabetes in Ghana and Nigeria. A total of 401 patients with type 2 diabetes (198 from Ghana and 203 from Nigeria) were recruited for this study. The WHO-BREF, Diabetes Knowledge Scale, and Diabetes Empowerment Scale were used to measure quality of life, knowledge of diabetes, and diabetes empowerment respectively. Data was analyzed using multiple regression. The findings of the study revealed that medication adherence, diabetes empowerment, and socioeconomic status were significant predictors of quality of life.

Jin et al. (2018) conducted a systematic review on the predictors of quality of life among patients with type 2 diabetes. Eighteen published studies from the Cochrane Library, Embase, PubMed, and CNKI databases were evaluated to identify the related factors of quality of life. Data were analyzed using STATA software and results showed regular physical exercises and blood sugar glucose monitoring were associated with a better quality of life. Other factors such as depression, longer duration of diabetes, poor diet (diet with more red meat), and the presence

of complications were associated with a worse quality of life. Though the eighteen studies were included in this review studies, there were vast differences (years of publication and many different quality of life scales used) among the included studies and this could have affected the accuracy of the results obtained.

Moreover, Zhao, Suhonen, Katajisto, Stolt, and Leino-Kilpi1 (2019) conducted a study to evaluate the association between diabetes-related self-care activities in association with positive health outcomes (resilience, subjective wellbeing, and disease-related quality of life). The study was cross-sectional and made up of 246 patients recruited from two tertiary hospitals located in Eastern China. The Diabetes-Related Self-Activity Scale (DRSCA), the 10-item Connor Davidson Resilience Scale (CD-RISC), the WHO 5 Well-being Index, and the Diabetes-Related Quality of Life (DRQoL) were used to measure self-care activities, resilience, wellbeing, and quality of life respectively. Also, data on social support and demographics were obtained. Data were analyzed using hierarchical multiple regression. The results of the study indicated diabetes-related self-care activities had a significant association with improved well-being but not with resilience and quality of life.

In a cross-sectional study conducted by Quah, Ng, Luo, How, and Tay (2011) on the association between health-related quality of diabetes complications and other clinical predictors among 699 patients with diabetes, the Short Form 36 Health Survey (SF-36) and the EQ-5D self-report questionnaire were used in measuring quality of life. Multiple regression was used to analyze the data obtained and the result indicated that the high quality of life of the patients was associated with being male, employed, having a higher educational background, younger age, and exercise. However low quality of life was associated with diabetes complications such as stroke, eye problems, peripheral neuropathy, and vascular diseases.

Furthermore, Alramadan et al. (2019) assessed the factors associated with microvascular and macrovascular complications among 1,121 patients with diabetes in Saudi

Arabia. Data for this study was obtained from participants' records and laboratory reports. Multiple regression was used to analyze the relationship between patients' lifestyles and diabetes complications. The results of the study indicated that physical inactivity, smoking, and obesity were risk factors for developing diabetes complications such as coronary artery disease, stroke, neuropathy, retinopathy, and diabetic foot. However, obtaining data from patients' lab and hospital reports is subject to human (clinician) error and this might consequently affect the result of the study.

Similarly, Yaghoubi et al. (2019) examined the prevalence of diabetes complications and its determinants among patients with diabetes in Canada. The data for this study was obtained from the 2011 Canadian Survey on Living with diabetes. It was reported that 80.3% of patients with diabetes reported suffering from at least one type of diabetes complication. Data was analyzed using logistic regression. The results of the study revealed that being a female, low physical activity, and longer diabetes duration were positively associated with diabetes complications such as high blood pressure poor circulation, and cataracts. However, because of an inadequate comprehensive registry, other forms of diabetes complications were not included in the study.

Rodriguez -Almagro et al., (2017) examined the association between health-related quality of life and its social, demographic, and clinical determinants. The study was an online clinical survey carried out between February and March. A total of 456 patients with diabetes in Spain were the participants in the study. A validated Spanish version of the self-administered diabetes quality of life scale was employed to measure quality of life. Data was analyzed using multivariate analysis. At the end of the study, the results indicated that there was a statistically significant association between the demographic factors (gender, education, and marital status) and at least one dimension of quality of life. Furthermore, health-related quality of life

progressively worsens as glycaemic control deteriorates and with an increased number of disease complications.

Diabetes duration, depression, diabetes distress, and quality of life.

Not only does a relationship exist between self-care and quality of life as indicated in the previous studies above. Also, studies have reported a relationship between diabetes duration and quality of life. Among them is one by Jing et al. (2018) on the predictors of quality of life of type 2 patients with diabetes in Australia. The study searched meta-analytical databases published between January 2000 and May 2016 in the Cochrane Library, Embase, PubMed, and CNK using keywords capturing quality of life, diabetes stress, diabetes duration, and predictors of quality of life and selected 43 articles. The outcome of this study indicated a longer duration of diabetes has a significantly negative relationship with quality of life. None of the studies reviewed showed a significant relationship between age and quality of life of diabetes patients.

Also, Abedini, Bijari, Miri, Emampour, and Abbasi (2020) explored the quality of life of patients with type 2 diabetes in Birjand. Using the systematic sampling technique, 300 patients were recruited for the study. Data was obtained through medical records, laboratory reports, demographic information, and the EQ-5D-5L questionnaire. The findings of the study revealed that diabetes complications, diabetes duration, age, and gender were significantly associated with quality of life. Patients with more diabetes complications and diagnosed with diabetes for over 10 years were reported to have a lower quality of life. In as much as data were obtained from patients' medical records, the study did not follow the PROM's (Patient Reported Outcome Measures) guidelines used for interpreting patients' medical records and this might influence the results of the study.

Sparring, Nystorm, Wahlstorm, Jonsonn, Ostman and Burstrom (2013) investigated the relationship between diabetes duration and health-related quality of life. Eighty hundred and

thirty-nine (839) individuals with diabetes and 1564 control individuals were sampled for this study. Data was obtained using EQ-5D and demographics. The analysis of the study revealed that being female, having a low educational status and a longer duration of diabetes were positively related to a low quality of life.

In explaining the relationship between diabetes duration and diabetes distress, Fisher, Glasgow, and Strycker (2010) assessed the four hundred and sixty-three (n=463) patients with type 1 diabetes. The participants completed measures of diabetes distress (Diabetes Distress Scale) and clinical depression (Patient Health Questionnaire 8). The findings of the study indicated that there was a significant negative relationship between diabetes duration and psychological distress (diabetes distress and depression). However, only the regimen subscale of the diabetes distress scale was used in this study and this might affect the results of the study.

Another study was conducted by Jat, Bhutto, Hussain, and Anwar (2019) to determine the relationship between anxiety, depression, and diabetes duration among 194 patients with type 2 diabetes. The Beck Anxiety and Depression Inventories were used to measure anxiety and depression. The participants were grouped into three (3) based on their duration of diabetes; (less than 5 years, 5-7 years, and greater than 7 years). From the analysis of the study, depression had a significant positive relationship with diabetes duration but anxiety did not. The results of the study further revealed that participants diagnosed with diabetes for over 7 years experienced the highest form of depression, followed by those diagnosed within 5-7 years and then those diagnosed for less than 5 years.

Baek, Tanenbaum, and Gonzalez (2014) investigated the association between the duration of diabetes and diabetes distress. One hundred and nineteen (119) (29% Latino, 61% Black, 25% White) were selected to complete validated measures of diabetes distress and social support. Multiple linear regression was used to analyze the association between diabetes

duration and diabetes distress. The study indicated that the duration of diabetes condition was related positively with diabetes distress however the relationship was moderated by social support.

Nanayakkara et al. (2018) conducted a study aimed at investigating the association between diabetes duration and psychological distress among adults with type 2 diabetes in Australia. Psychological distress assessed were depression and diabetes distress. A total of 2,552 adults with type 2 diabetes took part in the study. Data were collected using the Brief Case find for Depression and the Diabetes Distress Scale. The outcome of the study revealed diabetes duration was significantly positively correlated with depression and distress. The study also indicated age and educational status had no significant relationship with diabetes distress and depression.

Diabetes complications, diabetes distress, depression, and quality of life.

Investigating the relationship between depression, diabetes distress, and complications have revealed contradictory results. Whilst some studies showed that diabetes complication is a risk factor for psychological distress, others have reviewed contradictory findings. Arifin et al. (2019) conducted a study by comparing diabetes distress between primary and tertiary care patients with type 2 diabetes. The study also assessed whether diabetes complications had a significant impact on diabetes distress. The study involved three primary care and four tertiary care facilities in Bangladesh. The Bahasa Indonesia version of the Diabetes Distress Scale questionnaire (DDS17 Bahasa Indonesia) was used to measure diabetes distress. Ordinal regression analysis was conducted with the summation of the diabetes distress score as the dependent variable in the model. The results revealed that some independent factors were significantly positively associated with higher diabetes distress. For instance, it was reported that patients having two or more complications and a high fasting blood glucose status (FBG) had a higher level of diabetes distress.

Ismail et al. (2017) explored the relations between diabetes complications, depression, and diabetes distress among patients with type 2 diabetes in South London using a correlational design. The study selected 1,651 adults sample using a convenience sampling technique. The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms whereas the Problem Area in Diabetes (PAID) was used to assess diabetes distress. Data was analyzed using univariate analysis. Findings showed depression was positively related to an increased incidence of macrovascular complications but not microvascular complications. However, diabetes complication was not associated with diabetes distress.

Furthermore, Jacob and Kostev (2015) conducted a longitudinal study on depression among German patients with type 2 diabetes, with or without diabetes complications. The study selected 90,412 patients with type 2 diabetes within 2004–2013 as participants. The main outcome of the study revealed majority of the patients had diabetes complications. The prevalence of depression was higher in females (33.7%) than in males (26.8%) and patients with two or more diabetes complications (37.7%) than those with no complications. Specifically, retinopathy, neuropathy, nephropathy, coronary heart disease, stroke were associated with depression. However, the study utilized a longitudinal design. The longitudinal design is influenced by environmental confounding variables such as time intervals.

A study by Ferreira et al. (2015) reported no relationship between metabolic outcomes, diabetes complications, and depression. This study recruited 214 outpatients, 105 patients with type 2 diabetes, and 109 non-diabetes patients between the ages of 50-75. Beck's Depression Inventory was used to assess depression while diabetes complications were self-reported by the participants. The results of the study showed that patients with type 2 diabetes reported the highest levels of depressive symptoms.

Studies have also indicated that diabetes complications negatively affect quality of life. Venkataraman et al., (2012) assessed the association between diabetes complications and health-related quality of life among patients with diabetes. The association between diabetes retinopathy, coronary heart disease, stroke, peripheral arterial disease, nephropathy, and health-related quality of life were examined. A total sample of 2,601 participants comprising of 2,205 healthy participants and 396 patients with diabetes were used for the study. The SF-36 version 2 health survey was used to measure health-related quality of life, while diabetes complication was assessed using self-reports, clinical, and laboratory investigations. The results indicated that diabetes-related complications and health-related quality of life are inversely related. Among all the complications examined, peripheral neuropathy was strongly associated with the most reduction in HRQoL, across all domains. Also, severe retinopathy was associated with a significant reduction in HRQoL in the domains of general health, physical and social functioning, and physical and emotional role. Coronary heart disease and stroke were negatively associated with only physical domains, while peripheral arterial disease and nephropathy were not associated with a reduction in HRQoL.

Similarly, Stojanovic et al. (2018) conducted a cross-sectional study on predictors associated with health-related quality of life (HRQOL) in 285 patients with diabetes at General Hospital at Leskovac, Serbia. The Short Form-36 (SF-36) questionnaire, EuroQol-5D (EQ-5D), and EuroQol-VAS (EQ-VAS) questionnaires were used to assess health-related quality of life. Patients' medical records were examined for clinical data. Univariate and multivariate linear regression analyses were used in data analysis. At the end of the study, the socio-demographic variables indicated that age, country (rural) life, retirement education, employment, poor economic status, and low level of education were significant predictors of lower quality of life. Further, the analysis revealed that micro and macrovascular complications (angina pectoris, heart failure, diabetic retinopathy, and diabetic nephropathy) were the very

crucial factors affecting the quality of life of the patients. Diabetes complications were found to be independent risk factors for the component scores of SF-36 and EQ-VAS scores.

Niraula et al. (2013) conducted a study on the prevalence of depression and its risk factors among patients with diabetes in Nepal. Three hundred and eighty-five (385) patients with diabetes were sampled for the study. A validated Nepali Version of Beck's Depression Inventory was used to assess depression and a semi-structured questionnaire was used to obtain participants' and behavioral characteristics. The findings of the study revealed that being a female, having at least one diabetes complication, and high blood positively correlated with high levels of depression.

Pham et al., (2020) explored the effects of diabetes complications and comorbidities on the health-related quality of life of patients in Vietnam. A total of 214 patients with diabetes were recruited for the study. This was a cross-sectional study that made use of Short form 12 version 2 (SF-12v2) and EuroQOL-5 Dimensions-5 Levels (EQ-5D-5L). Multivariable regression was used to compute the effects of having one or more complications on SF -12 outcomes. The findings of the study indicated that patients having at least one complication had a reduction in their SF-12 scores specifically in social functioning, role emotion, and mental component score. The study also revealed that the health-related quality of life of patients with diabetes complications was moderately low, especially in social and psychological perspectives. Furthermore, patients living with diabetes suffering from heart diseases experienced a significant reduction in physical, social functioning, and role reduction than patients without complications.

Rationale of the Study

The studies reviewed above have provided some insight into the issue of diabetes complications and quality of life (Quah et al., 2011; Rodriguez- Almagro et al., 2017; Yaghoubi et al.,2019), as well as diabetes distress and depression (Novak et al.,2016; Ismail et al., 2017). The studies reviewed so far utilized the quantitative cross-sectional design (Jacob & Kostev, 2015; Stojanovic et al., 2018). The quantitative method does not account for social reality and how people interpret their experiences. The qualitative studies reviewed on the other hand focused mostly on the prevalence (Thailand, 2016), adherence (Mogre et al; 2017, barriers (Hushie, 2017), determinants of self-care activities, and the association between diabetes distress and self-care (Nugbey et al., 2017). However, qualitative data lacks reproducibility because it relies heavily on the researcher's biases. In as much as such biases are controlled, the preset goals of the researcher make such checks inadequate.

Using a mixed-method would have been a desirable approach since the limitations in one approach will be compensated by the other (Creswell, 2014). Moreso, the findings of either the quantitative or qualitative design could be used to explain one another to acquire a more comprehensive understanding of a phenomenon. In the Ghanaian setting, the predictors of quality of life and psychological distress—health beliefs, diabetes management empowerment, and employment—have been assessed (Ababio et al., 2018; Sarfo, et al., 2015). However, there is a lack of studies on diabetes complications and its implications (Annani-Akollor, 2017).

The methods used by existing studies are not adequate to reveal the lived experiences and the influence of diabetes complications and self-care on psychological outcomes. Therefore, this thesis seeks to use both quantitative and qualitative approaches to evaluate lived experiences, diabetes complications, self-care, and psychological outcomes (depression, diabetes distress, and quality of life) of patients with type 2 diabetes in Ghana.

Statement of Hypotheses

Based on the aims of this study and related studies reviewed, the following hypothesis were tested:

1. Patients with two or more complications will experience higher levels of depression and diabetes distress than patients with no complications
2. Patients with two or more complications will report poorer quality of life than patients with no complications.
3. Patients with two complications will engage in more self-care activities (exercise and medication) than patients with no complications.
4. Self-care activities (exercise and medication) will significantly predict quality of life.
5. Diabetes duration will significantly predict psychological distress (diabetes distress and depression) and quality of life.

Research Questions for the Qualitative Study

1. What are the lived experiences of people living with type 2 diabetes?
2. What are the challenges of self-care management among people with type 2 diabetes?
3. What are the emotional responses of people living with diabetes about their diabetes complications?
4. What are the management and coping strategies adopted by people living with type 2 diabetes?

Chapter Three

Methodology

Research Design

The mixed-method design was used for this study, specifically, the sequential explanatory mixed-method was used. The quantitative data was collected first and analyzed and afterward, the qualitative data was collected and analyzed. The explanatory-sequential approach which augments quantitative findings with qualitative findings was used. Because most of the hypotheses from the quantitative data were not supported, a qualitative study was conducted to obtain a richer explanation of the lived experiences of people living with type 2 diabetes.

Research Setting

The research settings were Achimota Hospital, Ridge Hospital, and La Hospital in the Accra Metropolitan district of the Greater Accra Region of Ghana. Though the Greater Accra Region is the smallest region of Ghana's regions, it was chosen as the setting for this study because it is the most urbanized and populated region in Ghana with residents and dwellers from diverse backgrounds and other regions in Ghana. The region has a total population of 4,010,054, accounting for 16.3% of the total Ghana population. (Ghana Statistical Service, 2010). Greater Accra Region has a total land surface of 3,245 square kilometres with seventeen (17) districts, two (2) metropolitan assemblies, ten (10) municipal assemblies, and five (5) district assemblies (Local Government Service, 2015). These study areas as stated above were chosen because they are all situated in Accra and also, the healthcare providers in these hospitals are well trained in diabetes care. Again, the use of these hospitals offered the opportunity to obtain enough participants for testing.

The first study area, Achimota Hospital, is located within Okaikoi Sub-Metropolitan District of Greater Accra. The Hospital is believed to have started in 1927 to cater for the health needs of the staff and pupils of Achimota School and other neighbouring schools until when it was taken over by the Ministry of Health in 1973. In 1973 the hospital was handed over to the Ministry of Health and was declared accessible to the public. The hospital now takes care of the health needs of other educational facilities and people within and outside the district. Services provided by the hospital include general outpatient services, maternal health services, minor surgical services, and diabetes endocrinology services.

The Ridge Hospital, the second study area, is currently known as the Greater Accra Regional Hospital and is considered to be one of the major hospitals in Greater Accra. The Hospital, situated at North Ridge in the Osu-Klottey Sub-Metropolitan District in Accra was established by the British in 1928. The hospital underwent a recent renovation to meet the growing demands for quality healthcare in the region, making it an ultra-modern 620-bed capacity hospital. Services provided by the hospital include outpatient services, diabetes and endocrinology service, neonatal intensive care, accident & emergency services, cardiology services, and general surgical services.

The third study area selected was the La General Hospital. The hospital is in the La Dade-Kotopon Municipality in the Greater Accra Region. The hospital began as a polyclinic in 1963 to provide health care services to the public and also serves as a referral unit for other private hospitals. The hospital provides numerous healthcare services, among them are; ear nose and throat services, outpatient services, laboratory services, radiotherapy, diabetes services, paediatrics services, obstetrics, and gynaecological services, accident, and emergency services.

Population, Sample, and Sample Size Determination

The population for the study was people diagnosed by professionals as having type 2 diabetes at Achimota, Ridge, and La hospitals. Participants eligible for the study were 1) aged between 18 – 60 years and 2) having type 2 diabetes for at least one year. Participants were excluded if 1) they had recently changed (<6 months) their medication from tablets to insulin injections, 2) had co-existing major comorbidities such as chronic pain, end-stage renal disease, and 3) Had experienced or is experiencing emotional problems in the past 6 months.

The sample size of the study was 123 people living with diabetes. The selection of 123 respondents was based on Tabachnick and Fidell's (2012) method for sample size calculation which suggests: N> 50+8M, where N represents the sample size and M represents the number of independent variables (diabetes complication and self-care). According to Tabachnick and Fidell (2012), this formula helps one derive the minimum sample size when using multiple regression. Since there were two (2) independent variables, the sample size was calculated as N> 50+8(2), suggesting the minimum sample size for the present study to be 66.

To obtain the subjective views of people, a qualitative method of gathering data is more profound in obtaining distinct experiences, beliefs, perceptions, and meanings. As a result, this study employed a qualitative method to capture the unique perceptions, beliefs, perceptions of patients with diabetes with regards to their self-care practices and complications. Eight (8) patients with type 2 diabetes, four males and four females with ages ranging from 48 – 75 were recruited for the study (see table 7 for details). According to Guest, Bunce, and Johnson (2006), a minimum of 10 in-depth interviews are adequate to reach saturation and generate codes and themes in a qualitative study. However, because the quantitative was collected ahead of the qualitative, COVID 19 affected the number of participants *(N=8)* for the qualitative study. The selection of the participants was done using a convenient sampling technique. This is because participants were selected based on availability and willingness to participate.

Quantitative Study

Instruments. Data was collected using a questionnaire that had 4 sections measuring, demographic variables, diabetes self-care activities, psychological distress, and quality of life (See Appendix IV). The demographics section solicited information such as gender, age, employment status, religion, diabetes duration, diabetes complication, weight, body mass index, and glycated haemoglobin levels.

For the diabetes self-care activities section, the Summary of Diabetes Self-Care Activity (DSCA) scale was used. It is a 12-item scale developed by Toobert and Glasgow (1994). It assesses five specific domains of diabetes self-management namely dietary intake, medication, blood glucose monitoring, and exercise. The scale is based on a self-reported frequency of carrying out recommended activities in the past seven days. It has a Cronbach alpha of .74. The Cronbach alpha for the subscales ranges from .54 to .84. (Jalaludin, et al. 2012). A Psychometric evaluation of the summary of diabetes self-care activities measure in Ghanaian adults living with type 2 diabetes yielded an overall internal consistency of .68. The scale was reported to have content validity and not construct validity (Mogre, Abanga, Tzelepis, Johnson & Paul, 2019). In this present study, exercise and medication were measured and these sub-scales yielded a Cronbach alpha of .76 and .71 respectively. Scores were converted to T and Z scores. Higher scores on this subscale indicate better self-care activities. Items 1, 4, 5, 11, and 12 were re-coded in this study.

Psychological distress in this study was defined as experiencing diabetes distress and/ depression symptoms and thus, measured as such. The diabetes distress scale developed by Polonsky et al. (2005) was used to measure diabetes distress. The DDS is a 17-item scale that captures four critical dimensions of diabetes distress: emotional burden, regimen distress, interpersonal distress, and physician distress. Participants responded to the items on a five-point Likert scale ranging from 1 (not a problem) to 6 (a very strong problem). The scale has a

Cronbach alpha of .87 (Polonsky et al. 1995). The Diabetes Distress Scale has been previously used to measure self-care among patients with type 2 diabetes in Ghana. The scale was found to have good validity and reliability (Cronbach's alpha for all scales = .86). (Amankwah-Poku, Amoah, Sefa-Dede & Akpalu, 2020). The Cronbach alpha for this present study is .86. Items on this scale are scored by either using the sub-scales or finding the composite score of all the items. For this present study, the total composite score was calculated and then divided by 17. A mean item score between 2.0 -2.9 was considered as moderate distress and a mean item score ≥ 3.0 is considered as a level of high distress.

Beck Depression Inventory was developed by Beck in 1961 and revised by Beck et al. in 1988. The BDI measures an individual's characteristics and depressive symptoms. It's a 21-item multiple-choice scale on a four-point Likert scale ranging from the absence of depressive symptoms (0) to the severity of depressive symptoms (3). The scale is scored from 0-3, yielding a total score ranging from 0-63 and interpreted as follows: 0-10 normal; 11-16 mild depression; 17-20 borderline depression; 21-30 moderate depression 31-40 and above 41 severe depression. The Cronbach alpha of the scale is .90 (Wang & Gorenstein, 2013). The BDI has been used to measure depressive symptoms in Sub-Saharan Africa and has been found to have a good reliability [Cronbach's alpha = 0.90] (Kagee, Nel & Saal, 2014). The Cronbach alpha of the scale in this present study is .85.

For the section on quality of life, the WHO Quality of Life Scale (WHOQOL-BREF) was used. It is a 26-item scale that assesses four domains of quality of life. These domains are physical health, psychological health, social relationships, and environmental health. The physical health domain includes items on daily activities, functional capacity, energy, pain, sleep, and mobility. The psychological domain has items that measure positive attitudes, mentality self-image, negative thoughts, self-esteem, mentality, learning ability, religion, and memory concentration. The social relationship domain contains items on sex life, personal

relationships, and social support. The environmental health domain has items on financial resources, recreation, safety, health, and social services, living physical environment, opportunities to acquire new skills and knowledge. It is a five-point ordinal scale. Scores are transformed linearly to a 0–100-scale. The overall Cronbach alpha for the scale is .89 with its four domains having their Cronbach alpha values as follows; physical domain (0.72), psychological domain (0.76), social domain (0.62), and the environmental domain (0.75) (Mazaheri, 2010). For this present study, the scale yielded an overall Cronbach alpha of .87.

Procedure

A letter seeking permission to conduct the study acquired from the Department of Psychology (UG) in addition to the research proposal and other relevant materials were submitted to the Ethics Committee for Humanities (ECH) for the approval of this study. After permission was sought from the Ethics Committee for Humanities, the ethical clearance, proposal, an introductory letter, and other relevant documents were sent to the selected hospitals to seek permission for data collection. Approval was obtained, and dates were scheduled and data collection commenced. The services of some assistants were employed for the data collection. These assistants were well trained in the administration of the questionnaires. Before each participant participated in the study, an informed consent form was administered to him or her their approval. Participants were informed about the aim of the study and their right to withdraw at any time. The data collection of the quantitative part of the study was done, followed by the qualitative. Items in the scales used in the quantitative study which were difficult to be understood by the participants were orally translated into a local dialect. For those who participated in the interviews, they were assured that their voices were not going to be used directly in the study but rather their experiences with the disease.

Ethical Consideration

First and foremost, ethical clearance was sought from the Ethics Committee for Humanities, the Achimota Hospital as well as the other hospitals. After approval was granted, an introductory letter from the Psychology Department was sent to the hospital unit heads to seek approval for data collection. When granted permission, discussions were held with the hospital authorities to determine the patients who were eligible to participate in the study. Participants were informed about the aim of the study. Participation in the research was voluntary and participants were assured of confidentiality. Informed consent was sought from the participants and they also assured that information gathered was going to be used within the confinement of this research. The quantitative data was obtained first after which the qualitative interviews followed.

Data Analysis

Quantitative Data. The data for the quantitative study was analyzed using the Statistical Package for Social Sciences (SPSS version 23). The specific statistical tools used for the various hypotheses are presented below;

Hypotheses one to three were analyzed using Multivariate Analysis of Variance (MANOVA). MANOVA was used because the hypotheses were testing comparisons existing between the various levels of the independent variables on the dependent variables. Moreover, the hypotheses had multiple dependent variables of which were all measured on an interval scale. The fourth hypothesis which stated that "self-care activities (exercise and medication) will significantly predict quality of life" was measured using standard multiple regression. A standard multiple regression was used because the hypothesis was testing relationships between several independent variables and a dependent variable. That is, the study was looking out for the variance in the dependent variable that is explained by the various independent

variables. The fifth hypothesis that diabetes duration will significantly predict diabetes distress, depression, and quality of life was analyzed using Simple Linear Regression. Simple linear regression was used because the hypotheses were testing the relationship between one independent variable and several dependent variables. Hence, each dependent variable was separately regressed on the independent variable.

Qualitative Study. Experiences related to diabetes complications and challenges of diabetes self-care practices were gathered through interviews using a semi-structured interview guide made up of open-ended questions. The interviews comprised of a demographic section to obtain basic demographic information from the participants and an interview guide section. The interview guide had seven questions with probes (See Appendix V). These questions focused on obtaining information about participants' reactions to their diagnosis, treatment received at the hospital, challenges with self-care, and how they felt about diabetes complications.

Qualitative data were analyzed using thematic content analysis (Braun & Clarke, 2006), which requires six (6) basic steps (Braun & Clarke 2006). These steps are 1) familiarizing yourself with your data (that is read and re-read the data severally to get accustomed to the data), 2) generate initial codes by noting how and where the patterns occur, 3) generate initial themes by evaluating how the codes form over-reaching themes, 4) reviewing the themes, 5) define and name the themes and 6) producing a report. Thus, the study adhered to the six requirements of Braun and Clarke. First, the interviews were transcribed verbatim. To get more conversant with the data, transcriptions were read repeatedly, after which coding was done by condensing larger data sets into smaller units. Themes were further developed by combining different codes. These themes were then reviewed, defined, and named, after which a report was written.

By reading the transcripts and through immersion, repeated ideas on self-care, diabetes complications, psychological distress, and coping strategies were noted. Initial codes were generated by reading through the transcripts to identify sections where references were made to adherence to self-care, how participants were diagnosed, their reactions, expressions of participants concerning diabetes complications, and how they coped. These codes were described and classified into various subthemes and then themes.

Trustworthiness

Trustworthiness is the degree of confidence in the methods, data, and interpretation of qualitative research (Pilot & Beck, 2014).

To ensure the trustworthiness of the qualitative findings, steps by Shenton (2004) were followed. The first is credibility which refers to the researcher's confidence in the accuracy of the research findings. In ensuring credibility, all the research settings were visited many times to get acquainted and familiar with the participants of the study. Furthermore, participants were asked to openly express their views. Iterative questioning which involves the use of probes were used to solicit in-depth information from participants. Secondly, Transferability refers to the extent to which the findings can be applied to other settings. In ensuring transferability, Lincoln & Guba (1985) propose that the research must provide adequate contextual information about the study setting to enable the reader to make transfers. As such, the research vividly described the settings, context, and individuals used in the study. Confirmability refers to how objective the study is, to minimize biases. Transcriptions were compared to the audios to ensure that the information was accurate. Finally, with supervision, the transcriptions were code into themes.

Reflexivity

Reflexivity refers to the ability to minimize prior experiences, assumptions, cultural and political beliefs that might influence the research process (Patnaik, 2013). In ensuring reflexivity, prior encounters with patients with diabetes, views, and reactions before this study were set aside to listen to the perspectives of the participants.

Chapter Four

Results

The study was conducted to examine the influence of diabetes complications and self-care activities on the psychological outcomes of people with type-2 diabetes. A sample size of 123 patients were sampled from Achimota, Ridge, and La Hospitals. The Statistical Package for Social Sciences (SPSS version 23) was used to analyze the data. This chapter presents patients' socio-demographic characteristics, preliminary analysis, and inferential statistics of the quantitative data as well as thematic analysis of the qualitative data.

Quantitative Study

The sample for the quantitative study comprised of 123 patients with diabetes. The majority of the population were female. The ages of the participants fell within the range of 43 and 80 years. About 48.8% were either fully or partially employed and 51.2% had no form of employment or were retired. Of the participants 35.9% had no education at all or just basic education, 46.3% had secondary education, 11.4% had vocational education, and 8.1 % having tertiary education. One participant (0.8%) had never been married, 56.1% were married or cohabiting, 1 (0.8%) had separated, 14.6% were divorced and 27.6% had lost a spouse. Full detail of the demographic variables is shown in Table 1 below.

Table 1

Sociodemographic characteristics of Patients

Variables	Number	Percentage
Hospital		
Achimota	39	31.7
La	46	37.4
Ridge	48	30.9
Gender of patients		
Female	98	79.7
Male	25	20.3
Age (*M=60.17 SD=7.75*)		
41-50	17	13.8
51-59	44	35.8
60-80	62	50.4
Employment Status		
Working full-time	54	43.9
Working part-time	6	4.9
Unemployed	31	25.2
Retired	32	26.0
Educational Status		
None	11	8.9
Primary	31	25.2
Secondary	57	46.3
Vocational	14	11.4
Tertiary	10	8.1
Marital Status		
Never married	1	.8
Married / Co-habiting	69	56.1
Separated	1	.8
Divorced	18	14.6
Widowed	34	27.6

Preliminary Analysis

The preliminary analysis of the quantitative study was done in four steps. They encompass an analysis of normal distribution, reliability analysis, descriptive analysis, and correlation matrix using Pearson Product's Moment correlation coefficient.

Analysis of normal distribution of variables. Test of normal distribution of the variables was done by looking out for the skewness and kurtosis. Skewness and kurtosis were within the range of -2.23 to +2.93 (see Table 1), indicating the data for this study was normally distributed. As (Garson, 2012) posits, data is normal when the skewness and kurtosis fall within the range of -3 to +3.

Reliability analysis of the scales. The internal consistency of the study variables was assessed to find out the reliability of the scales. The coefficient of the internal consistency of the measures was as follows: Diabetes Distress α =.86, Depression α =.85, Exercise =.76, Medication α =.71, and Quality of life α =.87. Field (2009) states that values above .70 indicate that the scale is reliable. Hence, the values obtained from the variables of this study indicate good reliability.

Descriptive analysis. Descriptive statistics of the data was done by analyzing the raw data obtained to find the mean and standard deviation. The results of the analysis can be seen in Table 2.

Table 2

Summary of Descriptive Statistics and Normality and Reliability Test of the variables in the Study

Variable	Mean	*SD*	*Min.*	*Max.*	Skewness	Kurtosis	Alpha
Diabetes Distress	26.48	11.25	17	75	1.81	2.50	.86
Depression	99.52	11.41	.00	39	1.43	2.19	.85
Exercise	7.97	5.96	1	19	.50	-.97	.76
Medication	7.63	.97	2	8	-2.24	2.93	.71
Quality of Life	99.52	11.41	55	121	-.79	1.60	.87

Inter-correlation matrix. The Inter-correlation matrix was analyzed using the Pearson Product Moment Correlation and the results are presented in Table 3. Tabachnick and Fidell (2012) opined that in conducting multiple regression, one needs to ensure linearity between the various independent variables, and this assumption was met in this study. Table 3 indicated that the correlation coefficient for the various independent variables to be used for multiple regression analysis was within .90. Hence, there was no violation of multicollinearity as suggested by Tabachnick and Fidell (2012).

Table 3

Inter-correlation matrix of the Study Variables

Variables	1	2	3	4	5
1. Diabetes Distress	-				
2. Exercise	-.22*	-			
3. Medication	-.17	.21*	-		
4. Quality of Life	-.49**	.31**	.05	-	
5. Depression	.46**	-.15	-.01	-.55**	-

*Note: * Correlation significant at the 0.05 level, ** Correlation significant at the 0.01 level,*

Hypotheses Testing

Hypothesis 1. This hypothesis stated that patients with two or more complications will experience higher levels of depression and distress than those with no complications. One-way between-groups multivariate analysis of variance was performed to investigate diabetes complication differences in depression, diabetes distress, quality of life, and self-care activities. Preliminary assumption was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity. It was found out that there were no serious violations. From Table 4 below, there was no statistically significant difference between individuals with two or more complications and no complications on the combined dependent variables, F (6, 113) = 1, p =.428; Wilk's Lambda = .949, partial eta squared = .051. When the results for the dependent variable were considered separately, there was no significant difference in depression and distress among patients with either diabetes complications or no complications. Therefore, the hypothesis that "patients with two or more complications will experience higher levels of depression and distress than those with no complications." was not supported.

Table 4

Multivariate Analysis of Variance comparing patients with diabetes complications and no complications on both self-care activities and, quality of life

	Sum of Squares	*Df*	Mean Square	*F*	*p*	Partial Eta Square
Depression	65.36	1, 118	65.36	.905	.343	.008
Distress	107.31	1, 118	107.31	.836	.362	.007
Quality of Life	129.58	1, 118	129.58	1.03	.311	.009
Exercise	27.89	1, 118	27.89	.790	.376	.007
Medication	.43	1, 118	.43	.442	.507	.004

Hypothesis 2. This hypothesis stated that patients with two or more complications will report poorer quality of life than patients with no complications.

One-way between-groups multivariate analysis of variance was performed to investigate diabetes complication differences in quality of life and self-care activities. Preliminary assumption was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity. It was found out that there were no serious violations. From Table 4 above, there was no statistically significant difference between individuals with complications and no complications on the combined dependent variables, F (6, 113) = 1, p =.428; Wilk's Lambda = .949, partial eta squared = .051. When the results for the dependent variable were considered separately, there was no significant difference in the quality of life among patients with either diabetes complications

or no complications. Therefore, the hypothesis that "patients with two or more complications will report poorer quality of life than patients with no complications was not supported."

Hypothesis 3. This hypothesis stated that patients with two or more complications will engage in more self-care activities (exercise and medication) than patients with no diabetes complications. From Table 4 above, when the results for the dependent variables were considered separately, there was no significant difference in exercise and medication among patients with either diabetes complications or no diabetes complications. Hence, the hypothesis that patients with two or more diabetes complications will engage in more self-care activities (exercise and medication) than patients with no diabetes complications was not supported.

Hypothesis 4. This hypothesis stated that self-care activities (exercise and medication) will significantly predict quality of life. A multiple regression analysis of the relationship between self-care activities (exercise and medication) and quality of life revealed a significant regression equation [$F_{(3, 119)} = 4.161$, $p < .01$] with R^2 of .095. From table 5 below, self-care activities (exercise and medication) made a significant contribution (9.5%) variance in explaining quality of life. When the variables of self-care activities were looked at separately, only exercise significantly and positively predicted quality of life ($\beta = .298$, $p < .01$). This implies that patients who exercised a lot happened to have an improved quality of life.

Table 5

Summary of Multiple Regression for Self-Care Activities on Quality of Life

Model	*B*	*SEB*	*B*	*F*	*p*
Constant	92.98	9.49		4.16	.000
Exercise	.57	.17	.30		.001
Medication	-.26	1.08	-.02		.813

R^2 = .095, p = .008

Hypothesis 5. This hypothesis stated that diabetes duration will significantly predict psychological distress (diabetes distress and depression) and quality of life. From Table 6 below, a simple linear regression analysis of the relationship between diabetes duration and diabetes distress revealed no significant regression equation [$F_{(1, 121)} = 1.513$, $p > .05$] with R^2 of .012. This implies that there was no significant relationship between diabetes duration and diabetes distress.

Also, from Table 6, regression analysis of the relationship between diabetes duration and depression revealed no significant regression equation [$F_{(1, 121)} = .400$, $p > .05$] with R^2 of .003. This implies that there was no significant relationship between diabetes duration and depression. Moreover, from Table 6, a simple linear regression analysis of the relationship between diabetes duration and quality of life revealed no significant regression equation [$F_{(1, 121)} = 1.063$, $p > .05$] with R^2 of .009. This implies that there was no significant relationship between diabetes duration and quality of life.

Table 6

Summary of the relationship between Diabetes duration, depression, quality of life, and diabetes distress

	Depression			Quality of Life			Distress		
	B	*SE*	*P*	*B*	*SE*	*P*	*B*	*SE*	*P*
Constant	8.4	1.44	.000	97.8	1.94	.000	28.47	1.91	.000
Diabetes Duration	.06	.16	.528	.09	.21	.304	-.11	.21	.221

Summary of quantitative findings

There was no significant difference in depression, diabetes distress, self-care activities, and quality of life among patients with either diabetes complications or no complications. It was also observed that there was a significant positive relationship between exercise and quality of life. However, the other variable of self-care activities (medication), did not significantly predict quality of life. It was further noted that diabetes duration did not significantly predict diabetes distress, depression, and quality of life.

Qualitative Study

For the qualitative study, 8 participants (Male=4, Female=4) were interviewed and themes were generated from their transcripts. Participants' gender, ages, body mass index(BMI), glycated hemoglobin (HbA1c), diabetes duration (years), and complications are presented in Table 7.

Table 7

Demographic and clinical characteristics of participants (N=8)

Participants	Sex	Age	BMI	HbA1c	Diabetes Duration	Medication	Diabetes Complications	Other Complications
1	Male	60	26.1	7.4	13	Tablet	Heart disease, Sexual dysfunction	Eye problems, Stroke, High Cholesterol, Ulcer
2	Male	64	23.4	6.5	4	Tablet	None	Asthma, High Cholesterol, Ulcer
3	Male	48	26.7	6.9	8	Tablet	None	High Cholesterol
4	Male	63	30.6	8.3	10	Tablet	Neuropathy	Asthma, Hypertension
5	Female	72	28.9	9.0	16	Tablet	Heart disease, Stroke, Neuropathy	High Cholesterol, Asthma
6	Female	59	29.5	6.6	15	Tablet	Heart disease, Eye problem, Cardiovascular disease	High Cholesterol
7	Female	75	29.2	6.8	9	Tablet	Heart disease, Neuropathy, Retinopathy	High Cholesterol, Hypertension
8	Female	55	29.5	7.5	5	Tablet	None	Fibroid

Analysis of Participants' Interviews

Four themes emerged from the transcripts of the participants. They are (1) Diagnosis of diabetes (2) Challenges with treatment (3) Coping and Support (4) Experiences with Diabetes Complications. Each theme has sub-themes as presented in Table 8.

Table 8

Theme	Sub Theme
Diagnosis of Diabetes	Triggers to diagnosis
	Reaction to diagnosis
	Education on diabetes and its management
Challenges with Treatment	Hospital Review Challenges
	Self-care Challenges
Coping and Support	Spiritual Support
	Family Support
Experiences with Diabetes Complications	Psychological distress
	Fear of death from diabetes complications
	Education on diabetes complications

The Diagnosis of diabetes

This theme was extracted based on how the participants were diagnosed with diabetes, their response to the initial diagnosis, and the education they received on diabetes and its management. Some narratives of the participants indicate experiences of symptoms they could not associate with diabetes. Visits to health facilities properly determined the true diagnosis of diabetes. However, some participants suspected having diabetes based on symptomatic experiences due to family history. Emotional reactions by some participants were sadness and worry. To calm the participants, health professionals filled the educational gaps by educating the participants on diabetes and its management. Three subthemes capture this theme. They are *(1) triggers to diagnosis, (2) reacting to diagnosis, and (3)education on diabetes management*.

Triggers to Diagnosis. This subtheme shows how participants discovered they had diabetes. Some participants recounted experiencing symptoms that were related to diabetes. This made them seek treatment and that led to their diagnosis.

> *"I felt I had it, that is, when I urinate, I taste it. I went to the Adabraka Poly Clinic. So, I met one doctor and I told him and he said I should go and do some lab tests."* **(Participant 6, Female)**.

> *"Whether I drink plenty of water or I don't, I urinate. It even occurs at midnight and when I wake up in the morning I feel weak and worried. I realized I was losing weight, I feel tired and sometimes dizzy. When I eat, I don't feel satisfied, so I was worried about what is happening to me. So I told my husband about what is happening to me and he recommended going to the hospital. So I went to a family doctor at Adabraka and he suggested lab tests to determine if I had diabetes"* **(Participant 5, Female)**.

> *"I had a lorry accident. I got cuts on my leg and the sore wasn't healing. I went to a hospital (Burnett Clinic) in New Town, Accra. The sore was not responding to treatment*

and thus suspected that I had diabetes. I was directed to have some lab tests done to identify the cause and it turned out my blood sugar level was 7.2, and they said I had diabetes. They started treating me based on the test report, and the sore started to heal" **(Participant 4, Male)**.

The extracts from the interviews above indicate that a low level of diabetes education was to blame for the participants' inability to suspect early signs of diabetes. Discomforts from symptoms eventually enforced visits to health facilities which subsequently led to the discovery of diabetes. Even for Participant 4, a lab result was needed to confirm diabetes before treatment for his unhealing could be properly managed. This shows there were initial symptoms the participant was oblivious to. For participants 5 and 6, urinary issues served as triggers that enforced hospital visits that led to the diagnosis of diabetes.

Whereas participants 5 and 6 recounted experiencing symptoms that triggered their visits to health facilities and participant 4's wound not responding to treatment and led to the diagnosis of diabetes, two participants narrated how other health conditions accidentally led to their diagnoses. For instance, participant 8, explained how she visited the hospital with fibroid and later discovered she had diabetes in the extract below:

"I didn't come with a diabetes issue, that time they said I had fibroid. I always come for a check-up, so when I came the doctor said I should go to the lab, when I went, they told me my sugar level had increased. I told him that I did not know that I have diabetes but I know they said I have fibroid so I came with a fibroid issue" **(Participant 8, Female)**.

Participant 1 narrated a similar experience:

> *"I went to Korle Bu where I was diagnosed to have what they call in lay man's language a whole in heart. I was not aware of diabetes or hypertension but I think the doctor suspected it. Because he asked me about my family history and I told him and I told him. To play on the side of caution, he decided to give me the medication for diabetes"* **(Participant 1, Male)**.

From the above extracts, the experiences narrated by the participants served as triggers to the diagnosis of diabetes. Symptoms such as frequent urination and unhealing wounds served as triggers which led to visits to health facilities and subsequently the diagnoses. Regular checks for other health conditions also culminated in the accidental diagnoses of diabetes. The triggers of diabetes diagnosis are thus sometimes accidental or under other conditions of radical nature.

Reaction to diagnosis. This subtheme describes the participants' responses to their initial diagnosis of diabetes. In exploring their reaction, negative emotional responses were identified. Some participants expressed psychological distress and adverse emotions. Participants expressed emotions such as worry, sadness, embarrassment, denial, and, panic as depicted by the following extracts:

> *"I cried a lot because I had heard a little about it, I cried. My grandfather, he had it*" **(Participant 5, Female)**.

> *"I panicked a bit because one of my aunts I lived with, she had it and I stayed with her for a while till she died. It worried me because it's an illness that is painful and some people say that it's an illness for the rich"* **(Participant 6, Female)**.

"I was embarrassed because I did not what that kind of sickness it was" **(Participant 2, Male)**.

Participant 5 became somber after her diagnosis. Her past experience with the disease was her grandparent contracting it. Her grandfather being old and possibly suffering from other age complications may have led her to believe that diabetes came with more complications than it does. Participant 6 panicked because of her aunt's experience with the disease which eventually led to her demise. Her aunt's battle with the disease created a dark impression for her about people living with diabetes. She additionally was not financially well-positioned to manage the disease. Participant 2 was showed a reaction of embarrassment because he was oblivious of the disease and would require extensive education on managing it.

Education on diabetes and its management. Some participants had some level of education on diabetes and its management and were well aware of the implication of adopting appropriate self-care activities. Other participants on the other hand had little to no idea about the disease or its management. Health professionals were thus bound by an obligation to educate these participants on the disease and trends in managing it. However, this seems not to be the case for all participants that spoke to the interviewer. Below are some excerpts from the responses of some participants to attest to these claims:

"It was the doctor who educated me first and from there I went to the dietician. He educated me on what to eat and not to eat. Also, the dietician showed me some balls of kenkey, oranges, and taught me how to eat in moderation" **(Participant 2, Male)**.

"The doctor taught me about the illness, its attributes, and symptoms and how the illness manifests in you and the consequences it came with. This really got me thinking about it but it's now here. I had to listen to the doctor and what he was teaching me and follow that direction because he told me that If I take care of myself, it's not

necessarily the case that I will die the moment I have the illness, if I take good care of myself I can live a long life. That gave me a little bit of hope" **(Participant 3, Male)**.

"They talk about the illness … when the sugar level increases, it makes you weak and frustrated or when the time to eat passes…. They taught us about the time to eat and take medicine. Diabetes complications were taught – they said maybe your eyes can be affected, your kidney can worry you or you can get a stroke out of it" **(Participant 6, Female)**.

Participants from the above excerpts attested to the fact that they had received some form of education from medical professionals. Health professionals prepared them well to living with the condition and as such knew what to expect.

The others who claimed not to have received any form of education on diabetes and its management from health professionals reported so. This is particularly true for participants 1 and 3 as revealed in the excerpts below:

"No, no he didn't do anything like that" **(Participant 1, Male)**.

"Okay, at the time I didn't know the illness and its attributes" **(Participant 3, Male)**.

The excerpts were responses from participants when they were asked questions about receiving any form of education on diabetes and its management from health practitioners.

Challenges with treatments

This theme reflects the challenges participants faced with treatment. The recounts revealed that some participants had challenges with their hospital reviews and self-care activities. Two subthemes capture this theme; namely hospital review challenges and self-care challenges.

Hospital Review Challenges. After diagnosis, patients are required to attend hospital reviews on scheduled dates. During the interview, the participants recounted their personal experiences when attending hospital reviews. Through their detailed narratives, most participants complained of being stressed on hospital review days, they complained about bureaucratic systems, and drug unavailability at the health institutions.

Participants go through stress during hospital visits. They described days for visiting the hospital for reviews as cumbersome and stress-laden. Majority of the participants bemoaned the structural organization of hospital systems. They complained that the nature of how things were structured at the hospitals and the number of patients that visit the hospital compel them to wake up earlier than they would if they did not want to wait long to see their doctors. Some also had to travel over long distances before getting to the hospitals. The extracts below to depict some of the complaints of the participants:

> "*This is a big hospital, so I get here at least by 5. I set off at 4 then by 5 I'll be here"* **(Participant 3, Male)**.
>
> *"Oh, latest by 5:30 am you should be here because we are many, I don't like missing my appointments"* **(Participant 6, Female)**.
>
> "*I took a car to Kasoa. Today I woke up at 4:20 am then I left home*" **(Participant 7, Female)**.
>
> *"You know I am from Nungua, so I wake up around 3 am, 3:30 am then I do everything"* **(Participant 8, Female)**.

Besides waking up at early hours for reviews, the participants also described challenges with the health service bureaucracy. Majority of the participants reported that the processes involved in seeing doctors are delaying. That they have to wait in queues with everybody else

for their vitals to be taken even though they are to see specialists. Going through this process in addition to checking their sugar levels, makes the final meeting with the doctor daunting. Some of these processes involved in seeing doctors can be fast-tracked to avoid delays if innovative measures are put in place. Below are excerpts that illustrate these attestations:

> *"It's long, and then they ask you to sit down. Then they come and call you in batches to see the doctor, that's the longest process"* **(Participant 1, Male)**.

> *"Some of the difficulties are that you put your folder inside the box. At their own time, they will pick them to start processing. When you put your folder in, it takes almost 1 hour before you get your folder"* **(Participant 2, Male)**.

> *"The OPD, sometimes they take too long. For the people with diabetes, Tuesday is our day so we really come early"* **(Participant 5, Female)**.

The above quotes reveal that the participants were quite concerned about the bureaucratic processes. But one participant mentioned that the lengthy processes occur occasionally. Even though the delays maybe occasionally, the ineptitude of record keepers delay service.

> *"Maybe once, you come to the hospital and you place your folder in the box at the records. By the time they are done and it gets to the nurses' station, the number of people you came to meet, you may have met about 10 people but then later you realize that you are after about 20 or 15 people. I don't how it's done at the records but folders are been misplaced"* **(Participant 4, Male)**.

Access to some medication at the hospital was another challenge faced by the participants. Some drugs though covered by insurance were not available at the health facilities. Some of the participants thus had to get alternative pharmacies to buy the drugs at

more expensive prices than they would at their hospitals of treatment. The following excerpts portray the above claims.

> *"It is a problem. Sometimes I have to go and buy it myself, sometimes they do not have metformin. So, they will write that on a white sheet for you. Though the drug is covered by the insurance, they will write it for you to go and search for it outside"* **(Participant 2, Male)**.

> *"Sometimes they will tell you to go to the store (pharmacy) that takes insurance but when you go there, they don't take the insurance. They say you have to buy the medicine, so sometimes I buy it"***(Participant 3, Male)**.

> *"No, initially we used to get everything but recently, you know how Ghana is, you won't be given everything, you will only get some. Then you will go for some at a pharmacy that takes health insurance. When you go there, they don't give you the drugs or they will tell you this we can get for you, we won't get this one so you would have to buy it"***(Participant 5, Female)**.

> *"For instance, last two weeks Tuesday was the date I came**.** The medicines the doctor wrote for me, 6 of them…they gave me one month for 3 of the medicines. They were supposed to give me 2 months but they said it's too much so they gave me only one month so I should send the rest of the drug to a pharmacy that does not take the national health insurance"* **(Participant 4, Male)**.

From the excerpts above, it is noted that participants experienced a sense of dissatisfaction in connection with the unavailability of drugs of some drugs in the hospital. In connection with drug dispensations, some participants expressed experiencing axioms of corruption.

Self-care Challenges. This subtheme reflects the challenges the participants experienced with self-care activities in managing diabetes. The participants gave extensive narrations of the challenges they face in their daily routine of self-care activities. Taking medication is a critical aspect of self-care. Some participants reported adhering to alternative orthodox medication other than what was prescribed. From the interviews, it was noted that some participants struggled with the intake of conventional medicine prescribed by health professionals. One participant expressed how she had to resort to traditional medication to pacify her husband's feelings towards the disease:

> "*When they see me taking the medicines…even my husband when he sees me taking them, it worries him but…that when shall all these end, everyday medicine, so sometimes I even stop and I take herbal medicine"* **(Participant 7, Female)**.

Her concern was mainly how her husband felt due to the daily intake of conventional medication. To quell her husband's negative impression of her new life with the disease, she resorted to orthodox medication. This kind of situation affects adherence to self-care.

Two other participants described how beneficial herbal medication had been to them:

> *"Very helpful, the bitter leaves helped me a lot. I was showed it. I did it like that, it really helped me, that's my food and it helped me a lot* **(Participant 5, Female)**.

> *"My brother in-law's wife told me she prepares "nunum" (herbs). When I feel unwell, I go and tear the leaves given to babies or dandelion or moringa. I boil it then I drink a little or sometimes I go for bitter leaf then I squeeze it, I put in the fridge for a while then I drink it"***(Participant 8, Female)**.

The excerpts above describe the narration of some participants on the positive outcomes of using herbal medicine. Bitter leaves turned out to be widely used among the participants. It was believed to be effective in helping with the disease.

Fear of side effects of drugs also turned out to be a drawback amongst the participants. Conventional medicine comes with descriptions of drugs and their side effects, as such, participants after experiencing some side effects from taking these drugs opt to discontinue or limit the usage of such drugs. Some sought doctor's advice on replacement drugs after experiencing side effects of ones they were on previously. The following excerpts illustrate this:

> *"I was on a certain drug, daonil from the Trust Hospital. One day I came here and they checked my sugar level. The doctor said the drug was making me go hypo, so he took me off daonil but sometimes the drugs make me feel so uncomfortable"***(Participant 1, Male)**.

> *"When I take the medicine then it causes heart burns"***(Participant 6, Female)**.

> *"I will say that, for medicines, I have them for a long time and now my legs hurt. Sometimes when I take it then my stomach hurts so sometimes, so, I take it or I don't take it"***(Participant 8, Female)**.

> *"One thing I think about is these foreign medicines when you take it for a certain period, it brings some problems to you, you develop some side effects from taking too much of the medicines"***(Participant 4, Male)**.

> *"Indeed, the medicines it got to a time because of the things I heard, that the medicines have side effects, I decided to use herbal drugs"* **(Participant 5, Female)**.

Besides the above excerpts, one participant adhered strictly to his medication;

"As for my drugs, I don't play with it all. When it's getting finished then I am worried" **(Participant 2, Male)**.

While most participants complained about having challenges with medication adherence, most were able to adhere to their exercise routine while others could not due to lack of motivation. This is revealed in the excerpts that follow:

"As for the exercise I don't really do it. Initially, I could get up but now am unable to because my entire body hurts. Sometimes, I feel lazy. At times, I wake up at dawn to go, one of my children calls me so we go but am unable to do it as I used to" **(Participant 5, Female)**.

"You see the exercise, sometimes when you wake up, you feel lazy to do it especially during this cold weather" **(Participant 6, Female).**

However, some of the participants understood the need for exercise and as such followed through with their routines:

"I don't do exercise consciously that am going to take a walk or am going to the gym. What I do is this which I think is a better substitute for the exercise, which, I do a lot of gardening in my house, I cut my grass and I plant my vegetables" **(Participant 1, Male).**

"Well, the exercises are different, what I usually do is press-ups for 30 minutes so that I sweat and then I go and take my bath" **(Participant 3, Male).**

"I exercise, I go for walks. I do it 3 times a week and with how I do it, my place is a story-building and there is a long pavement in front, so I go back and forth, for 30mins but as for Saturdays, I wake up around 5 am and I go for walk" **(Participant 5, Female).**

Some participants recounted how traveling disrupted their self-care routine. For instance, one participant stated that he traveled to his hometown this year and this affected his routine.

> *"I have been to my hometown this year about 4 or 5 times. For medicines like daonil, you take it and eat 30mins after. But when it's time, a case will come before you, and then the time you have to eat so the food helps the medicine will while away. So sometimes those of us who go to the hometown often change things a bit which has brought about problems"* **(Participants 4, Male)**.

> *"It affects it, for instance, this morning I have to go somewhere, so when this happens, I do not take the injection* **(Participant 6, Female)**.

These excerpts explain how leaving home is a challenge to self-care activities for diabetes management.

Education received from health professionals had impacted positively on some participants. The participants nudged in practicing self-care after being coached by health care professionals stick to adhering to healthy living. And as part of hospital requirements, participants are to check their blood sugar levels when they visit the facility. However, some participants expressed feelings of distress, frustration, and worry whenever are informed of increases in their blood sugar levels. They did not seem to understand how their sugar levels could increase after adhering to self-care practices recommended by health professionals. This demoralizes them and gives them thoughts of their efforts being unproductive. When asked how the participants felt when their blood sugar increase, these were some of the responses:

> *"I feel, I feel, I feel very frustrated because I don't know why it should be"* **(Participant 1, Male)**.

Oh, why not, am happy about it. When I come and I realize that it has increased, then I panic because the doctor you will go and see will be angry with you, why it has increased. I have been exercising. I don't play with it, in a week if I don't go at all, twice So if I found that my sugar level is going up it worries me" **(Participant 2, Male)**.

Coping and Support. The study also investigated the coping strategies adopted by the participants. This theme reflects such coping and support systems. Three subthemes which are spiritual coping, and social coping, and, financial support formed this theme.

Spiritual support. This subtheme reflects spirituality as a coping tool. Most participants mentioned rituals such as prayer as primary ways of coping with diabetes. The excerpts below are some coping strategies adopted by the participants:

"*You see, I have two girls, they are all attending ICGC and they have been praying for me"* **(Participant 2, Male)**.

"It gets to a point if you look at the condition of your health, it becomes worrisome but when you think about it a little, you have to encourage yourself that whatever it is this is not the end. If you are careful with your life, God will help you. So that's what I use to comfort myself". **(Participant 3, Male)**.

"All you have to do is pray that God will have mercy on you and help you through aging. So, if you listen to all this and you apply it to your life then by God's grace it will work out well for you". **(Participant 4, Male)**.

"Every day I go for prayers, I know that if I include that, it will calm my heart" **(Participant 6, Female)**.

The above excerpts illustrate prayer as a coping strategy that served as sources of relief and encouragement for living with the disease.

Social coping. In addition to spiritual coping, most participants mentioned family support as another tool. Relatives helped participants by reminding them of their diet, medication, showing them care as well as commending their efforts with diabetes management. Below are excerpts to illustrate this.

> *"Oh, they have helped me in how I eat, how I do everything. Even when I forget they remind me. If I am about to eat, they'll ask dad have you taken your medicine?"***(Participant 3, Male)**.

> *"Honestly my wife has helped me because even with food, I have told her that I should eat this way, I shouldn't eat late and other things, I have told her everything. Whatever I am told when I come, I tell her majority of them so that she will help me watch my diet so sometimes she reminds me that, "aren't you the one who said this and that"***(Participant 4, Male)**.

> *"I told my husband that this is what the doctor said and when I told him, he encouraged me. He reminds me that when I go to the hospital, they teach me what I'm supposed to do and what I am not"* **(Participant 5, Female)**.

The quotes above illustrate that families assisted participants with diabetes self-care. As such family plays an important role in the lives of people living with diabetes.

Financial support. Aside from the participants receiving social support from relatives, they also received some form of financial assistance. This assistance was mostly geared towards the management of diabetes. Below are excerpts to illustrate:

> *"And the one who has been supporting me financially, is my little, the nurse"***(Participant 2, Male)**.

"I get help from some people, my sister's children they really help me a lot" **(Participant 5, Female)**.

However, some participants complained of financial difficulties;

"I was crying within me because I didn't have money to come and do the lab tests, I knew I had to come here though so I decided to come and see you and then go back" **(Participant 6, Female)**.

"My children, none of them work for me to say that they will give me something and my husband too, his work is on and off. So, when he gets some, he will give me, if he doesn't have then I will try my best" **(Participant 8, Female)**.

Experiences with diabetes complications

This theme reflects the thoughts of the participants concerning the complications that come with diabetes. Responses to questions led to three subthemes coming together to form this theme. They are distress from diabetes complications, fear of death as a result of diabetes complications, and education on diabetes complications.

Some participants reported experiencing some forms of diabetes complications ranging from physiological to psychological distress. The excerpts below indicate such distress:

*"Yes, they said that I have a bit of a problem with my eyes"***(Participant 1, Male)**.

"My leg, for about 2 years I felt that my leg ached me" **(Participant 5, Female)**.

"Muscle *pull, sometimes when am lying down and I wake up then it happens and when it happens that way it will be very painful and sometimes, I scream"* **(Participant 6, Female)**.

Distress from diabetes complications. People living with diabetes complications do experience some levels of diabetes distress. This became apparent from the responses of two participants.

Participants 1 and 6, expressed experiences of distress from diabetes complications

> "*I have an eye problem which gets me worried. For instance, when I visit the hospital and they have a look at the eye, they do not tell me what's happening. However, they call others to come and look at it keeping me in suspense*" **(Participant 1, Male)**.

> *"I think about it a lot, I think about it a lot. Initially, that's how I thought about it but I thought it would go that the illness will eventually go. But for the complications my thoughts go very far, this thing, if am not careful it will worry me".* **(Participant 6, Female)**.

Fear of death from diabetes complications. Dying from diabetes complications was another distressing that plagued the thoughts of some participants:

> *"I think about it, I think about it that it can make me paralyzed, it can kill me…"* **(Participant 7, Female).**

> *"Eeeii then I will die. That's what I was saying concerning how it made me feel and then I ended up at Kofi Annan Hospital"***(Participant 8, Female).**

> *One day he came I met him here he has fallen. All this kind of… I speak to myself that "so will I be in this situation sometime to come?"****(Participant 2, Male*****).**

The excerpt above is of participant 2 recounting his experience of a person living with diabetes dying. Participant 2 was exposed was to the history of this person to help inform his choices in managing the disease.

Education on diabetes complications. Some participants had received education on some complications of living with diabetes. However, not all of them received education on the complications of living with diabetes.

> *"She explained a lot of things to me well and then I got to know the complications of this illness"* **(Participant 4, Male)**.

> *"They sold a book to us., The book had diabetes complications written them in it, so sometimes I read it"***(Participant 5, Female)**.

Participant 1 mentioned he had not received any form of education on diabetes complications:

> *"No, no he didn't do anything like that"* **(Participant 1, Male)**.

The narratives above indicate that in as much as people living with diabetes receive some form of education on diabetes complications. Some participants were mentally distressed about these complications, as well as death, being the worse end of all these complications.

Summary of qualitative findings

In summary, the diagnosis of diabetes among people with type 2 diabetes led to an array of negative emotional responses and psychological distress. Also, some patients experienced hospital-related and self-care challenges such as delayed processes at the hospital and ascribing to the use of herbal drugs respectively. Diabetes complications such as eye and leg problems were reported among some patients and in coping with the disease burden, participants received financial and social support from their families. In addition to this, spirituality was served as a source of coping.

Chapter Five

Discussion

Introduction

This present study was conducted to examine the relationship between diabetes complications, self-care, diabetes duration, and psychological factors (quality of life, depression, and distress). It also explored the lived experiences of persons with diabetes. This chapter discusses both the quantitative and qualitative findings of this study with references to reviewed literature as well as the Health Belief Model and the Self-Regulation theory. The implications, limitations, recommendations for future research, and clinical practice are further discussed.

The quantitative findings of this study revealed no significant differences in the distress and depression levels as well as self-care between patients with two or more diabetes complications and those with no diabetes complications. Furthermore, exercise, but not medication, was found to be a significant predictor of quality of life. Diabetes duration had no effect on depression, diabetes distress, or quality of life. According to the findings of the qualitative study, the majority of patients experienced negative emotions after being diagnosed with diabetes. Distance to health care facilities, the use of herbal drugs, and the fear of medication side effects were identified as barriers to effective diabetes management.

In terms of convergence and divergence of the study, both the quantitative and qualitative studies show that exercising had positive health outcomes. The studies diverged when determining whether or not diabetes complications were related to psychological distress. Only the qualitative findings revealed a connection between diabetes complications and distress levels.

Regarding the quantitative findings, the study investigated the relationships shared by diabetes complications, depression, and diabetes distress. The relationships shared by diabetes complications, self-care, and quality of life were also examined. The study further investigated the relationships between diabetes duration, depression, distress, and quality of life.

Relationships between diabetes complications, depression, diabetes distress, and quality of life

The study's first hypothesis predicted that patients who have two or more complications will experience higher levels of depression and diabetes distress than those without complications, but this prediction was not supported by the findings of this study. This finding contradicts that of Jacob and Kostev (2015), who revealed that diabetes complications such as retinopathy and stroke, among others, were associated with higher levels of depression. Furthermore, no difference was observed in the distress levels of patients with or without two or more complications. This result contradicts the findings of Arifin et al. (2019), who found that patients with two or more complications had higher levels of diabetes distress. According to the consequence domain of the self-regulation model, chronic illnesses can have various devastating consequences such as psychological distress. Due to the debilitating effects of chronic conditions, coping is essential in their management.

The findings of this study could be attributed to the fact that, despite having multiple complications, the coping strategies adopted by the patients with two or more diabetes complications were positive and healthy. According to McCoy and Theeke (2019) positive coping strategies such as problem-focused coping leads to better psychological and physical health while negative coping styles such as resignation, protest, or isolation are associated with a lower quality of life with increased diabetes-related distress and depressive symptoms. The findings of this study may also be explained by the fact that the complications experienced were not severe, resulting in patients experiencing little or no distress. The use of positive

coping strategies and the severity of diabetes complications may explain why there were no differences in depression and distress levels between patients with two or more complications and those without complications.

In testing the second hypothesis which states that patients with two or more complications will report poorer quality of life than those with no complications, no differences were observed. This finding is inconsistent with that of Pham et al. (2020) who found that patients with at least one complication had a lower quality of life as compared to those without diabetes complications. The quality of life of patients with type 2 diabetes can be impacted in a variety of ways, not all of which are related to diabetes complications. The finding of this present study could be attributed to the socioeconomic status of the participants in this study. This is evident in Ababio et al.'s (2017) which indicates a low socioeconomic status among Ghanaians and Nigerians living with diabetes. From the demographic data obtained, the majority of participants were either unemployed or retired, accounting for 51.2 percent of the sample population. This implies that patients living with type two diabetes with or without diabetes complications in this study might have reported poorer quality of life due to their low socioeconomic status. More so, individuals with low socioeconomic statuses do not partake in many health activities (Ojagbemi, 2017), leading to low quality of life. Thus, it is not surprising that the results yielded no significant differences in their quality of life among the participants of the study

Hypothesis 3 which suggested that patients with two or more complications will engage in more self-care activities than patients with no diabetes complications was also not supported. This finding is consistent with Natovich et al. (2017)'s study that showed that diabetes complications like foot ulcers did not serve as a "wake-up call" to adherence to self-care practices. According to the health belief model, an individual's perceived weakness or severity of a condition influences adherence to self-care. Thus, patients' perceptions of the illness

(diabetes) could have an impact on their adherence levels, positively or negatively. This theoretical explanation is consistent with a study conducted by Kugbey et al. (2017) whose findings showed that diabetes perception significantly predicted self-care. Further analysis of the qualitative section of this study revealed that patients used local remedies with the belief that herbal medication was superior to conventional medication administered in hospitals, affecting their adherence levels. As a result, whether or not one has diabetes complications, illness perceptions, beliefs and idiosyncrasies may explain adherence to self-care practices.

In addition, certain barriers or facilitators might have influenced adherence to self-care regardless of complications. Studies (i.e., Harvey et al., 2017; Hung et al., 2021; Mohebi et al., 2018) have emphasized that social support and financial support significantly increase individuals' adherence rates. It is highly probable that the two groups (patients with more than one diabetes complication and those without any complications) in the current study have similar social support and financial support systems. And this may account for why there was no significant difference in self-care among the two groups.

Relationship between self-care and quality of life

The fourth hypothesis which stated that there will be a significant positive relationship between self-care activities (exercise, diet, and medication) and quality of life was partially supported. It was found out that, only exercise among self-care activities significantly and positively predicted quality of life. This implies that the participants who exercised regularly happened to have an improved quality of life. Similarly, a study by Bonger et al. (2018) in Ethiopia revealed a high rate of adherence to physical activities in improving the quality of life as compared to other self-care activities. In addition, the result of this study is consistent with that of Taphesari et al. (2020) who found that physical activity leads to an improvement in the quality of life. Additional results from the qualitative analysis revealed that while some participants lacked the motivation to exercise, others engaged in some forms of physical

activities as compared to eating properly and taking medications regularly. Some participants might have understood the need and benefits of exercise thus tried their possible best to do so. However, certain cultural habits, such as the use of traditional medicines and dietary changes, are prevalent among Ghanaians and difficult to change (Buleu et al., 2013) As a result, adherence to these self-care practices as well as quality of life is affected. Thus, this could serve as an explanation for why exercise was the only self-care practice that led to an increased quality of life of the participants.

Relationship between diabetes duration, psychological distress, and quality of life

Furthermore, this study predicted that diabetes duration will have a positive relationship with psychological distress (diabetes distress and depression) and a negative relationship with quality of life. However, no relationship was found between diabetes duration and psychological distress (diabetes distress and depression) as well as diabetes duration and quality of life. This finding is inconsistent with the findings of Abedini et al.'s (2020), which reported a negative relationship between diabetes duration and quality of life. The current study's findings could be explained by the fact that, regardless of diabetes duration, factors such as the presence of other health conditions may have a significant impact on patients' quality of life. Studies reveal that patients who have other health conditions in addition to their present illness (diabetes) have poorer quality of life than those who do not (Hongthong et al., 2015). According to Nowakowska et al. (2019), majority of adults with type 2 diabetes have at least one comorbid chronic disease. As a result, despite their diabetes duration, participants in this study might have other health conditions affecting their quality of life.

The results of this present study (no relationship between diabetes duration and quality of life) could also be due to high levels of social support. Ghana is considered is as a collectivist society and Ferguson et al. (2020) study revealed that Ghanaian patients with a confirmed diagnosis of type 2 diabetes received some form of social support. According to Ramkisson,

Pillay, and Sibanda (2017), people with diabetes who receive more social support, regardless of diabetes duration, report lower levels of depression, distress and quality of life than those who receive less social support. Participants' social support may have aided in better adjustments and lower levels of depression and distress. This assertion is supported by the findings of the qualitative analysis of this study, which revealed that social support was a major coping tool for the participants regardless of the duration of their diabetes. Hence, social support might have moderated the relation between diabetes duration and psychological outcomes (quality of life, depression and diabetes distress).

Findings from Qualitative Analyses

With regards to the qualitative analysis, the processes that led to participants' diagnoses, their reactions after being diagnosed with diabetes, barriers to treatment, coping and support, experiences with diabetes complications and fear of death were explored.

The findings of this study showed that some other health conditions, such as fibroid, resulted in the unintentional diagnosis of diabetes among some participants. Furthermore, participants' suspicions of diabetes were based on symptoms they experienced. These symptoms include fatigue, frequent urination, thirst, and slow wound healing. When asked how they felt about their diagnoses, the majority of participants expressed negative feelings ranging from psychological distress to negative emotions such as despair and sadness. This psychological distress is consistent with the findings of Tareen and Tareen (2017) and Engstrom et al. (2019), who found that people with diabetes experienced mental and physical distresses such as diabetes distress and fatigue. Diabetes-related depression and anxiety were also reported by Kaur et al. (2013).

In addition, the findings of this study could be explained using the Health Belief Model, which is defined by five concepts: perceived vulnerability or susceptibility, perceived weakness or severity, perceived barriers or benefits, perceived self-efficacy, and cues to action.

This theory asserts that patients' perceptions of the severity of their illness influence their response to it. Some participants in this study were distressed as a result of their unfavourable beliefs about the illness (diabetes). They expressed sadness over the loss of relatives to diabetes, as well as the financial stress that comes with the disease. These thoughts about their situation added to their level of distress.

Challenges with Treatment

Some challenges to diabetes treatment emerged from this study. These challenges include hospital review challenges as well as self-care challenges. The study's findings revealed that participants experience psychological distress as a result of the difficulties they encounter during hospital visits. Most of them had to get up early and travel long distances to get to the hospital on time, which could explain the level of psychological distress experienced by the participants. Secondly, the bureaucratic nature of hospital systems is onerous. Despite advancements in medical care, patients still face unacceptable levels of waiting time in the hospital (Shalihin, binti Zolcefli, & Rahman, 2019). According to the interviews conducted, patients are delayed in seeing the doctor right from the time they arrive at the OPD. A similar problem has been reported in Nigeria's healthcare systems (Owolabi & Olusegun, 2019). This has a negative impact on the quality of health care provided and patients' response to health care (Iloh et al. 2013). As a result, the healthcare system's bureaucratic process requires immediate attention (Segel, 2017).

Again, most participants bemoaned the lack of access to medication covered by health insurance. This condition contributes to a negative economic impact on patients (Phuong et al, 2019). According to this study, medication scarcity contributed significantly to financial burden and levels of psychological distress because participants had to pay high prices for medications that were supposed to be covered by health insurance.

In terms of self-care challenges, the study found that while some participants engaged in some forms of exercise such as gardening and jogging, others were physically inactive and reported this to be due to a lack of motivation. The finding of this study aligns with that of Tewahido and Berhane (2017) who reported a lack of motivation to exercise among patients with diabetes in Addis Ababa. In as much as walking is the most basic form of exercise, certain factors may reduce motivation to exercise. In this study, being distracted by television and fatigue were also barriers to exercise.

Furthermore, the study's findings revealed that prejudices against medications and side effects from conventional medication use posed a challenge to self-care. This finding is consistent with the findings of Alflaskeir (2012), who discovered that negative beliefs about conventional medications affect medication adherence led to poor self-care. Some participants' beliefs about anti-diabetic medications were reflected in their perception of potential side effects from long-term use. These participants believed that the side effects of anti-diabetic medication could be devastating, making them reliant on alternative therapies such as the use of herbal medicine. This could explain their reasons for non-adherence to their conventional medication.

These findings are supported by the self-regulation theory, which consists of five interconnected beliefs: identity, cause, timeline, consequence, and cure/control. The cure/control dimension considers the individual's perception (trust in self-management) as well as treatment viability. So, if participants believed that physical activity and adherence to medication could improve their health, then they would be motivated. Furthermore, as explained with cues to action from the health belief model, external cues such as family and friends could motivate people with diabetes to practice self-care. According to Burner et al. (2014), these cues to actions may appear insignificant, but they are critical to self-care. As a

result, one explanation for the study's findings is that some participants were not socially motivated to engage in any form of physical activity or adhere to medication.

Coping and Support

The findings of this study revealed that participants received some form of social and financial supports from family members and this helped alleviate some levels of stress. Numerous studies have revealed that social support from family promotes adherence to self-care practices and helps buffer the psychological distress associated with living with diabetes (Miller & Dimatteo 2013; Obo, Kugbey & Atefoe 2021; Onu, Ifeagwazi & Prince, 2021). Social support help patient with diabetes cope with the disease's burden and to improve adherence to treatment (Ramkisson et al., 2017). However, some participants saw social support as a burden, particularly if they had relied on family for financial support. As a result, they were unable to carry out various medical requirements such as labs and scans, resulting in worry and psychological distress.

Furthermore, in this study, faith and spirituality were instrumental coping strategies used by participants. Prayers and belief in God were common among participants. This finding is consistent with the findings of Yashika et al. (2013), who investigated spirituality and religious practices in African Americans with diabetes. Ghana's healthcare system, like that of other African countries, is pluralistic, with people using spiritual, traditional, and allopathic healing methods (Kpobi & Swartz, 2019). According to Korsah (2015), many diseases in Ghana are perceived to have spiritual underpinnings, so many patients seek solace from spiritual sources. According to the self-regulation theory, individuals' health-seeking behaviours, as well as treatment decisions, are influenced by their perceptions of health and illness, once patients believe that their diseases have some form of spiritual cause, they turn to spiritual sources of coping. Faith in God, and reliance on God in general, is thought to provide meaning and transcendence to people suffering from chronic diseases (Goggin, Malcarne,

Murray, Metcalf & Wallston, 2007). As a result of the above explanation, the study's result is not surprising. Spirituality and religiosity's positive impact increases the use of spiritual and religiosity as a coping tool.

Experiences of diabetes complications and fear of death

This study found that some participants were distressed as a result of their diabetes complications. This result is backed by the findings of Arifin et al (2019), who discovered that diabetes complications were responsible for some levels of distress among patients with diabetes. This present study's finding is also consistent with that of Kuniss et al. (2018), who assessed participants' expectations and fears about diabetes-related complications. Some participants in this present study experienced complications such as eye and leg problems, which resulted in emotions such as worry. With explanations from the self-regulation model, long-term consequences of diabetes complications such as amputations and, worst of all, death may have accounted for the participants' fear. Also, the unpredictability of the illness, such as not knowing when one will be hurt, which could lead to diabetic foot syndrome and, ultimately, amputations, added to the participants' levels of fear. Others held the fear of dying from diabetes complications. These beliefs appear to be based on the experiences and deaths of other patients with diabetes. The participants' distress was heightened by their observation and knowledge of others, such as relatives dying from diabetes complications. The unpredictability of when the disease would kill them, as it had done to others, added to the participants' distress.

In summary, this study has significantly improved our understanding of the effects of physical activity on the quality of life of people with type 2 diabetes. Again, the study revealed that hospital-related stress may contribute to the psychological distress felt by persons with type 2 diabetes. Furthermore, social support is paramount in the management of type 2 diabetes.

Limitations and Recommendations

Notwithstanding the contributions of this study, the sample size used in the qualitative study was relatively small. This was due to the COVID-19 pandemic. Also, the study was limited to only patients in Accra. Future studies should extend to hospitals in other parts of the country and not be restricted to Greater Accra alone. Furthermore, future studies should consider using a longitudinal design to investigate the relation between diabetes complications, self-care, and psychological outcomes (depression, distress, and quality of life) to be able to establish a causal relation.

Implications for Practice and Clinical Care

The findings of this study have some implications for practice and clinical care. To begin, the Ministry of Health has to put measures in place to reduce the rate of bureaucracy in the health care system for patients to faith in public Hospitals. Also, healthcare providers should identify medication beliefs and provide accurate information to modify their perceptions. Additionally, family members of patients with type 2 diabetes should be included in diabetes education programs since they play a major role in self-management.

Conclusion

The study concluded that levels of depression and diabetes distress did not have any influence on diabetes complications and quality of life. Also, there was no relation between self-care and diabetes complications. However, the study reported that exercise had a major impact on the quality of life. Again, the study found out that hospital-related stress could contribute to the psychological distress experienced by persons with type 2 diabetes. Thus, there is a need to address these challenges.

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APPENDICES

Appendix I

Diabetes Complications	Frequency	Percent
None	23	18.7
One	3	2.4
Two	97	78.9
Total	123	100

Appendix II: Ethical Clearance

UNIVERSITY OF GHANA
ETHICS COMMITTEE FOR THE HUMANITIES (ECH)

Ref. No.: **ECH 051/ 19-20**

February 3, 2020

Abigail Esinam Adade
Department of Psychology
University of Ghana
Legon

ETHICAL CLEARANCE
(ECH 051/ 19-20)

On December 18th, 2019 the University of Ghana – Ethics Committee for the Humanities (ECH) at a full committee meeting reviewed and approved your protocol as follows:

TITLE OF PROTOCOL: **ADJUSTING TO THE DIAGNOSIS OF TYPE 2 DIABETES; THE ROLE OF PSYCHOLOGICAL INTERVENTION**

STUDENT INVESTIGATOR: **ABIGAIL ESINAM ADADE**

Please note that the final review report must be submitted to the Committee at the completion of the study. Your research records may be audited at any time during or after the implementation. Any modification of this research project must be submitted to ECH for review and approval prior to implementation.
Please report all serious adverse events related to this study to ECH within seven (7) days verbally and in writing within fourteen (14) days.

This certificate is valid till 3rd February 2021. You are to submit annual reports for continuing review.

Please accept my congratulations.

Yours Sincerely,

Professor C. Charles Mate-Kole
ECH Chair

Cc: Dr. Margaret Amankwah-Poku, Department of Psychology, UG.
Dr. Angela Gyasi-Gyamerah, Department of Psychology, UG.

COLLEGE OF HUMANITIES
• P. O. Box LG 74, Legon, Accra, Ghana. • Telephone: +233 (0) 303 933 866 • Email: ech@ug.edu.gh

Appendix II: Introductory Letter by the Department of Psychology, University of Ghana

UNIVERSITY OF GHANA
DEPARTMENT OF PSYCHOLOGY
SCHOOL OF SOCIAL SCIENCES

Ref. No.....PSYC 2/33/03

September 17, 2019

TO WHOM IT MAY CONCERN

LETTER OF INTRODUCTION
MISS ABIGAIL ESINAM ADADE - ID NO: 10471628

The above-named student is an MPhil Clinical Psychology student in the University of Ghana.

In partial fulfillment of the requirement for the award of MPhil degree, Miss Abigail Esinam Adade has to write and summit an original thesis. She has selected the topic: **"Psychological Intervention for the Psychological Adjustment of newly Diagnosed Patients with Diabetes".**

She has received approval from the Department of Psychology Graduate Studies Committee and the Ethics Committee for the Humanities, University of Ghana.

To enable her collect data for her work she would need to administer questionnaires and/or conduct interviews. She has selected your Hospital/Institution as suitable for her data collection.

Any assistance you may give her would be greatly appreciated.

Yours sincerely,

Prof. Joseph Osafo
(Head of Department)

COLLEGE OF HUMANITIES
P. O. Box Lg 84, Legon, Accra-ghana
• Telephone: +233 (0) 289 550 463 • Email: Psychology@ug.edu.gh • Website: www.ug.edu.gh

APPENDIX III: Study Consent Form

UNIVERSITY OF GHANA

Official Use only Protocol number

Ethics Committee for Humanities (ECH)

PROTOCOL CONSENT FORM

Section A- BACKGROUND INFORMATION

Title of Study:	Adjusting to the diagnosis of Type 2 Diabetes: The role of psychological intervention
Principal Investigator:	Abigail Esinam Adade
Certified Protocol Number	

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

The purpose of this study to assess the impact of rational emotive behavioral therapy on the psychological adjustment of patients diagnosed with diabetes. The patients will be randomly assigned to any of the groups. There will be 2 experimental groups (newly diagnosed patients and patients diagnosed above 3 years) and a control group. There will first be a baseline assessment of the experimental groups. The intervention will be run for 6 weeks. The experimental groups will receive at least 40-45 minutes of the intervention in a week. A 2-week post-intervention assessment will be conducted in both groups to check for the effectiveness of the intervention. The control group will be invited for psycho-educational sessions after the study is conducted. Participants who agree to take part in the research will be required to sign or thumbprint this after a general information of the research.

Benefits/Risks of the study

The study would be of immense significance to people diagnosed with diabetes by providing information about the role of psychological interventions (i.e., rational emotive behavioral therapy) in adjusting to their condition. It would also suggest ways of providing enough support to people living with diabetes. Again, management of the hospitals would find it of great importance because the findings of the study would communicate the relevance of psychological interventions (rational emotive behavioral therapy) and how to integrate it into the management of diabetes. There is by far no known identified risk to occur in participating in this research.

Confidentiality

Identifiable information such as names, email addresses, and telephone numbers shall not be attached with the information gathered. Data obtained will be used for the purposes of this study only. All information obtained will be kept private. The groups that will have access to the data being gathered will be the principal investigator, two research assistants who are trained in ethics related to human research, and research supervisors.

Compensation

Participants will be compensated weekly for transportation. An amount of money for transportation will be given to each participant intermittently after the intervention sessions.

Withdrawal from Study

Participation in this study voluntary and participants who volunteer to take part in the study at any point of the study can withdraw without any form of penalty.

Contact for Additional Information

For any enquiries, questions or suggestions about this research or in cases of research related injuries, kindly contact the researcher;

Abigail Esinam Adade, University of Ghana, Department of Psychology, P.O.Box LG 84, Legon.

esinamadade@gmail.com Telephone Number: 026 3626512 / 0559571130.

If you have any questions about your rights as a research participant in this study you may contact the Administrator of the Ethics Committee for Humanities, ISSER, University of Ghana at ech@isser.edu.gh / ech@ug.edu.gh or 00233- 303-933-866.

Section C- PARTICIPANT AGREEMENT

"I have read or have had someone read all of the above, asked questions, received answers regarding participation in this study, and am willing to give consent for me, my child/ward to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my personal records."

_____

Name of Participant

_____

_____

Signature or mark of Participant Date

If participant cannot read and or understand the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____

Name of witness

_____

_____

Signature of witness / Mark Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Name of Person who Obtained Consent

_____

_____

Signature of Person Who Obtained Consent Date

APPENDIX IV: Qualitative Interview Guide

Interview Schedule for Patients

Questions with Probes

1. Tell me about your diagnosis of diabetes.

a. How were you diagnosed?
b. How did it make you feel?
c. Did you contemplate on the possible cause of the illness?
d. Did you share this with someone?

2. When you were diagnosed what did the doctor/ nurse tell you about the illness and its treatment?

a. Were you given education on diabetes?
b. What exactly did they tell you about the illness?
c. So what have you learnt about diabetes since you were diagnoses?
d. Tell me all that you know about diabetes?

3. Tell me what you think about the diabetes care you are receiving at the hospital?

a. Would you say you are happy with your doctors' and nurses' recommendations?
b. Do you see your condition improving? Why do you think so?
c. Have you required any additional care besides your require appointments (e.g. seeing a dietitian, an ophthalmologist etc.).
d. Do you get frustrated in any way with care you receive? Tell me about it.

4. Tell me about your diabetes self-care management.

a. Tell me what you know about diabetes treatment.
b. How do you take care of yourself in terms of your medications, diet, exercise and blood sugar monitoring?
c. Have you had to change your lifestyle because of the treatment? Tell me about it.
d. How often are you asked to see a dietician, an ophthalmologist or other care providers?
e. Tell me about the financial aspect of your diabetes treatment.

5. Tell me about any challenges that you face with your diabetes self-care management

a. Do you get frustrate with your diabetes management?
b. Do you find any of the treatment regimen challenging to stick to? Tell me about it.
c. How do you feel when your sugar levels are high in spite of your efforts to control it?
d. Are there times when you feel like giving up on adhering to treatment? Tell me about it.
e. When you decide whether or not to continue following your treatment, what informs your decision?

6. Tell me what you know about diabetes complications.

Which ones do you know about?
What/ how did you know about them?
Do you think about the possibility of developing complications?
How does it make you feel?

6. Are your family members aware of your diagnosis?

a. How supportive have they been?
b. Tell me the ways in which they support you. Do they eat the foods you eat etc?
c. Do they nag you for not taking care of yourself or do they praise you for taking good care of yourself. Tell me about it.
d. When there are family problems does it affect your sugar levels? Why is it so?

7. Do you experience any emotional challenges in relation to your diabetes care?

a. Tell me about any emotional or psychological problems you experience which is as result of your diabetes
b. Did you report this to your care providers?
c. If you did, what did they do to help you?
d. How did you deal with these problems?
e. Would you say it affected your diabetes control? Tell me about it.

APPENDIX V: Demographic Questionnaire for Quantitative aspect

SECTION A: DEMOGRAPHIC DATA

Please respond to the following. Please circle the number that best corresponds to your views:

Age: ———————— years

Gender

1. Gender

1. Male 2. Female

2. Marital Status

1. Living alone 2. Living with partner

3. Employment Status

1. Working full-time 2. Working part-time 3. Retired4. Not employed

4. Level of Education

1. Primary 2. Secondary 3. Vocational 4. Tertiary

5. Religion

1. Christian 2. Muslim 3. Traditionalist 4. Other (specify)

6. Diabetes Medication

1. Diet only 2. Tablet, insulin & diet 3. Tablet & diet 4. Insulin and diet

8. Diet	**9. Change of Medication**
Do you maintain a strict diet?	Have you had your medication changed from tablets to insulin in the last 6 months?
1. Yes	1. Yes
2. No	2. No

11. For how long have you being diagnosed of diabetes?

_____

10. List any diabetes complications that you may have.

_____

11. List any other medical conditions that you have apart from diabetes.

_____

To be filled by the Researcher	
12. Weight: _____	**14. Body Mass Index (BMI)** _____
13. Height: _____	**15. HbA1c** _____

SECTION B: DIABETES SELF CARE ACTIVITY SCALE (DSCS)

The questions below ask you about your diabetes self-care activities during the past 7 days. If you were ill during the past 7 days, please think back to the last 7 days you were not ill.

Please respond to the following as honestly and accurately as you can.

Diet

1. How often did you follow your recommended diet over the last 7 days? (If you have not been given a specific diet by the diabetes care team, please answer according to the general guidelines you have been given).

Always **Usually** **Sometimes** **Rarely** **Never**

2. How much of the time did you successfully limit calories as recommended in your healthy eating for diabetes control?

None of the time	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**

3. During the past week, how many of your meals included high fibre food, such as fresh fruits, fresh vegetables, and peas, bran?

None of them	A few of them	Some of them	Most of them	All of them

4. During the past week, how many of your meals included high fat foods, such as butter, ice cream, oil, nuts and seeds, mayonnaise, fried food, salad dressing, crisps, pies, pizzas and sausages?

None of them	A few of them	Some of them	Most of them	All of them

5. During the past week, how many of your meals included sweets and desserts, such as pastries, cake, jam, soft drinks (not diet), chocolate and cream biscuits?

None of them	A few of them	Some of them	Most of them	All of them

Exercise

6. How often did you exercise the amount suggested by your doctor or diabetes specialist nurse?

None of them	A few of them	Some of them	Most of them	All of them

7. On how many of the last 7 days did you exercise for at least 20 minutes?

0	1	2	3	4	5	6	7

8. On how many of the last 7 days did you exercise on top of what you do as part of your work?

0	1	2	3	4	5	6	7

Blood Sugar Testing

9. On how many of the last 7 days (that you were not ill) did you test your glucose (blood sugar) level?

0	1	2	3	4	5	6	7

10. Over the last 7 days how many of the glucose (blood sugar) tests recommended by your doctor did you actually do (covering all meals and pre bed)?

None of them	A few of them	Some of them	Most of them	All of them

Medication

11. How many of your recommended insulin injections / medication did you take in the last 7 days that you were supposed to?

All of them	Most of them	Some of them	None of them

12. How many of your recommended insulin injections / medication did you have at the time you were supposed to?

All of them	Most of them	Some of them	None of them

SECTION C: Diabetes Distress Scale (DDS)

DIRECTIONS: Living with diabetes can sometimes be tough. There may be many problems and hassles concerning diabetes and they can vary greatly in severity. Problems may range from minor hassles to major life difficulties. Listed below are 17 potential problem areas that people with diabetes may experience. Consider the degree to which each of the 17 items may have distressed or bothered you DURING THE PAST MONTH and circle the appropriate number.

Please note that we are asking you to indicate the degree to which each item may be bothering you in your life, NOT whether the item is merely true for you. If you feel that a particular item is not a bother or a problem for you, you would circle "1". If it is very troublesome to you, you might circle "6". Please provide an answer to each question.

	Not a Problem	A Slight Problem	A Moderate	Somewhat Serious	A Serious Problem	A Very Serious

			Problem	Problem		Problem
1. Feeling that diabetes is taking up too much of my mental and physical energy every day.						
2. Feeling that my doctor doesn't know enough about diabetes and diabetes care.						
3. Feeling angry, scared and/or depressed when I think about living with diabetes.						
4. Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.						
5. Feeling that I am not testing my blood sugars frequently enough.						
6. Feeling that I am often failing with my diabetes routine.						
7. Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflicts with my schedule, encouraging me to eat the "wrong foods"						
8. Feeling that diabetes control my life.						
9. Feeling that my doctor doesn't take my concerns seriously enough.						

10. Not feeling confident in my day-to-day ability to manage diabetes.						
11. Feeling that I will end up with serious long-term complications, no matter what I do.						
12. Feeling that I am not sticking closely enough to a good meal plan.						
13. Feeling that friends or family don't appreciate how difficult living with diabetes can be.						
14. Feeling overwhelmed by the demands of living with diabetes.						
15. Feeling that I don't have a doctor who I can see regularly enough about my diabetes.						
16. Not feeling motivated to keep up my diabetes self-management.						
17. Feeling that friends or family don't give me the emotional support that I would like.						

SECTION D:Becks Depression Inventory

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully. And then pick out the one statement in each group that best describes the way you

have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite)

BDI 1.

0 I do not feel sad.

1 I feel sad

2 I am sad all the time and I can't snap out of it.

3 I am so sad and unhappy that I can't stand it.

BDI 2.

0 I am not particularly discouraged about the future.

1 I feel discouraged about the future.

2 I feel I have nothing to look forward to.

3 I feel the future is hopeless and that things cannot improve.

BDI 3.

0 I do not feel like a failure.

1 I feel I have failed more than the average person.

2 As I look back on my life, all I can see is a lot of failures.

3 I feel I am a complete failure as a person.

BDI 4.

0 I get as much satisfaction out of things as I used to.

1 I don't enjoy things the way I used to.

2 I don't get real satisfaction out of anything anymore.

3 I am dissatisfied or bored with everything.

BDI 5.

0 I don't feel particularly guilty

1 I feel guilty a good part of the time.

2 I feel quite guilty most of the time.

3 I feel guilty all of the time.

BDI 6.

0 I don't feel I am being punished.

1 I feel I may be punished.

2 I expect to be punished.

3 I feel I am being punished.

BDI 7.

0 I don't feel disappointed in myself.

1 I am disappointed in myself.

2 I am disgusted with myself.

3 I hate myself.

BDI 8.

0 I don't feel I am any worse than anybody else.

1 I am critical of myself for my weaknesses or mistakes.

2 I blame myself all the time for my faults.

3 I blame myself for everything bad that happens.

BDI 9.

0 I don't have any thoughts of killing myself.

1 I have thoughts of killing myself, but I would not carry them out.

2 I would like to kill myself.

3 I would kill myself if I had the chance.

BDI 10.

0 I don't cry any more than usual.

1 I cry more now than I used to.

2 I cry all the time now.

3 I used to be able to cry, but now I can't cry even though I want to

BDI 11.

0 I am no more irritated by things than I ever was.

1 I am slightly more irritated now than usual.

2 I am quite annoyed or irritated a good deal of the time.

3 I feel irritated all the time.

BDI 12.

0 I have not lost interest in other people.

1 I am less interested in other people than I used to be.

2 I have lost most of my interest in other people.

3 I have lost all of my interest in other people.

BDI 13.

0 I make decisions about as well as I ever could.

1 I put off making decisions more than I used to.

2 I have greater difficulty in making decisions more than I used to.

3 I can't make decisions at all anymore.

BDI 14.

0 I don't feel that I look any worse than I used to.

1 I am worried that I am looking old or unattractive.

2 I feel there are permanent changes in my appearance that make me look unattractive

3 I believe that I look ugly.

BDI 15.

0 I can work about as well as before.

1 It takes an extra effort to get started at doing something.

2 I have to push myself very hard to do anything.

3 I can't do any work at all.

BDI 16.

0 I can sleep as well as usual.

1 I don't sleep as well as I used to.

2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.

3 I wake up several hours earlier than I used to and cannot get back to sleep.

BDI 17.

0 I don't get more tired than usual.

1 I get tired more easily than I used to.

2 I get tired from doing almost anything.

3 I am too tired to do anything.

BDI 18.

0 My appetite is no worse than usual.

1 My appetite is not as good as it used to be.

2 My appetite is much worse now.

3 I have no appetite at all anymore.

BDI 19.

0 I haven't lost much weight, if any, lately.

1 I have lost more than five pounds.

2 I have lost more than ten pounds.

3 I have lost more than fifteen pounds.

BDI 20.

0 I am no more worried about my health than usual.

1 I am worried about physical problems like aches, pains, upset stomach, or constipation.

2 I am very worried about physical problems and it's hard to think of much else.

3 I am so worried about my physical problems that I cannot think of anything else.

BDI 21.

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I have almost no interest in sex.

3 I have lost interest in sex completely.

SECTION E: WHOQOL-BREF

This questionnaire asks how you feel about your quality of life, health, or other areas of your life. Please answer all the questions. If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the last two weeks. You should circle the number that best fits how much support you got from others over the last two weeks. So, you would circle the number 4 if you got a great deal of support from others.

Please read each question, assess your feelings, and circle the number on the scale that gives the best answer for you for each question.

1. Strongly disagree 2. Disagree 3. No idea 4. Agree 5. Strongly Agree

	1	2	3	4	5
I rate my quality of life as very good					
I am satisfied with my health					

I feel that physical pain prevents me from doing what I need to do					
I need medical treatment to function in my life					
I do not enjoy life as I am supposed to					
I feel safe in my daily life					
I am healthy in my physical environment					
I have enough energy for everyday life					
I am able to accept my bodily experience					
I have enough money to meet my needs					
Information that I need in my day to day life are readily available					
I have the opportunity for leisure activities					
I am able to get around well with others					
I am not satisfied with my sleep					
I am satisfied with my ability to perform my daily activities					
I am satisfied with my capacity for work					
I am satisfied with my myself					
How satisfied are you with your sex life					
I am satisfied with the support I get from my friends					
I am satisfied with the conditions of living place					
I am satisfied with my access to health service					
I am satisfied with my mode of transportation					
I often have negative feelings such as blue mood, despair, anxiety and depression					