BARRIERS TO DIABETES SELF CARE AMONG TYPE TWO DIABETES PATIENTS ATTENDING KIRWARA SUB COUNTY HOSPITAL, MURANGA COUNTY, KENYA

BY

SALOME NYAMBURA KINYANJUI
REG NO: SPH/PGH/NC/1010/2018

DEFINITION OF TERMS

Barriers: A significant obstacle that makes it difficult for something to be achieved (Oxford English Dictionary, 2019)

Glycaemic control: Regulation and maintenance of blood glucose levels within normal ranges (IDF, 2009)
Glycated hemoglobin (HbA1C): A measure of average blood sugar level during the past two to three months (Diabetes Atlas, IDF 2009)
Hyperglycaemia: Also termed as raised blood sugar, is a common effect of uncontrolled diabetes over time that leads to serious damage to many of body systems especially the nerves and blood vessels (IDF Atlas 2013)
Insulin: A hormone that regulates blood sugar (WHO, 2010)

Patient: A person who is receiving medical treatment from a hospital or a doctor (Oxford English Dictionary, 2019)
Self-care: Refers to the daily activities and decisions a person with diabetes takes to manage their condition, maintain stable blood glucose levels, prevent complications, and improve overall quality of life (WHO, 1998).

Type 2 diabetes mellitus: A systemic disease that is chronic and severe and is diagnosed by elevated plasma glucose (Quittenbaum, 2007). The disease occurs when the body cannot use insulin it produces effectively or when pancreas cannot produce enough insulin (WHO, 2009)

ABSTRACT

Background: Diabetes mellitus is a chronic condition that arises from either insufficient insulin production by the pancreas or inefficient insulin utilization by the body. Effective self-care is critically important because it helps patients regulate blood sugar levels, prevent complications such as cardiovascular diseases, kidney failure, and neuropathy and improve overall quality of life. In Kenya, the

prevalence of diabetes is steadily rising, making self-care practices such as adherence to diet plans, physical activity, and regular monitoring essential for reducing morbidity and mortality. Despite this, no study has been conducted to understand the barriers to diabetes mellitus self-care practices among type 2 diabetes patients in Muranga County, Kenya, highlighting a significant gap in knowledge that must be addressed to strengthen interventions and improve patient outcomes.

Objectives: To determine the level of practice of self-care activities, patient related and the cultural factors which act as barriers to optimal self-care among patients with type two diabetes mellitus attending Kirwara sub-County Hospital.

Methods: A cross-sectional study conducted using systematic sampling technique to sample 200 respondents from the 420 registered diabetes patients at Kirwara sub-County Hospital. A semi-structured questionnaire collected data from type 2 diabetes patients attending the clinic. Categorical descriptive data was analyzed using percentages and frequencies while continuous data used means and standard deviation. The relationships between the independent and dependent variables were ascertained using Chi-square test.

Results: The study revealed that 45% of the respondents had a family history (42.5% having their mothers and 23.5% had their fathers) of diabetes. Having and using a meal plan and checking haemoglobin level ensures good diabetic self-care. Tobacco use ($p=0.000$) decreases diabetic self-care ($p=0.000$). Religious practices such as fasting have negative effects on diabetic self-care. Cultural practices such as use of herbal medicines significant effects diabetic self-care and may increase the risk of diabetic complications.

Conclusion: Tobacco use, religious practices like fasting and cultural practices such as using herbal medicine all decrease the practice of diabetic foot self-care.

Recommendations: Health care workers should support patients with type 2 diabetes mellitus by providing comprehensive health education, develop individualized diabetic meal plans, promote the reduction of tobacco use, and encourage positive behavior changes related to culture and nutrition. By combining education, lifestyle guidance, and cultural sensitivity, health care providers can empower patients to make sustainable choices that enhance their long-term health outcomes.

CHAPTER ONE: INTRODUCTION

1.1 Background

Persistent hyperglycemia, accompanied by disruptions in protein, lipid, and carbohydrate homeostasis due to deficiencies in insulin action, secretion, or both, are hallmarks of diabetes mellitus, a metabolic disease with diverse etiologies (World Health Organization, 2003). Diabetes mellitus is not only a chronic condition but also a major driver of global morbidity and mortality. According to the Global Burden of Disease Study 2021, diabetes is among the leading causes of death and disability worldwide, affecting over 500 million individuals in 2021 and causing approximately 1.6 million deaths annually (Global Burden of Disease Study, 2021). Type 2 diabetes mellitus (T2DM) accounts for over 97% of diabetes-related deaths, with its burden rising sharply due to lifestyle changes, obesity, and aging populations (Global Burden of Disease Study, 2021).

In 2015, every seven seconds someone somewhere in the world died from diabetes and its related conditions and these accounted for four million deaths globally in the year. Diabetes mellitus prevalence is rising rapidly. Globally, it was projected that 194 million individuals had diabetes in 2003, 366 million in 2011, 382 million in 2013, and an estimated 415 million in 2015. If no measures are taken, the population is predicted to increase to 642 million by 2040 (IDF, 2015).

According to the International Diabetes Federation (IDF), 522 million people will have diabetes by 2030, and 599 million people will have a higher disease burden in low- and middle-income countries by 2035. It has been described in other publications as a pandemic that kills 10,000 individuals every day (Diabetes Leadership Forum, 2010).

In sub-Saharan Africa, diabetes was regarded as a rare disease. According to data from the International Diabetes Federation (IDF), 12 million people in the region were expected to die from diabetes-related causes in 2010 (IDF Diabetes Atlas 2013).

According to a local study conducted in Kenya, the prevalence of impaired glucose tolerance is 8.6% in rural and 13.2% in urban areas, whereas the prevalence of diabetes is 4.2% in the general population and 2.2% in urban areas (Maina et al., 2011).

According to data from the Diabetes Management Information Center in Kenya, the prevalence is 4.2% in the overall population, 2.7 in rural areas, and 10.7% in urban areas (Diabetes Management Information Center 2014).

Directions for ensuring a substantial decrease in the avoidable burden of disease in Kenya are provided by the country's 2015–2020 national policy for the prevention and management of non-communicable diseases (NCDs). In keeping with Vision 2030, the publication offers a plan for lowering avoidable morbidity and mortality from NCDs and enhancing the standard of living for all Kenyans.

According to the National Clinical Guidelines for the Management of Diabetes Mellitus (2010), health professionals in Kenya can follow these detailed guidelines to deliver the best possible care (MOPH 2010). The International Diabetes Federation's (IDF) clinical recommendations for the management of diabetes in sub-Saharan Africa offer straightforward and useful methods for evaluating diabetics and making the appropriate diagnosis. Insulin injections or oral medications are two medical options for managing diabetes (Rod et al., 2009).

In addition to receiving medical care, individuals with type II diabetes can improve their glycemic control by implementing a variety of self-management techniques. People with diabetes or at risk of developing the disease can effectively manage it on their own by engaging in a series of activities known as diabetes self-care behaviors. These include diabetes-related dietary adjustments, physical activity, taking medication, keeping doctor's appointments, and keeping an eye on the condition via blood sugar monitors or foot care. These behaviors taken together is referred to as self-management (Funnell et al., 2011).

The operational definition of self-care is what people with diabetes mellitus do for themselves to prevent and treat sickness as well as to establish and preserve health. (WHO, 1998). Health literacy, self-awareness of one's physical and mental health, physical activity, healthy nutrition, risk avoidance and mitigation, cleanliness, and the prudent and responsible use of goods, services, diagnostics, and medications are all factors used to measure self-care. Good self-care evaluates participants based on the afore mentioned criteria, and the frequency of each self-care activity was noted. Good self-care practice was defined as having the mean of all self-care activities listed. Poor self-care practices are also evaluated using the afore-mentioned criteria. The lower the mean score on the total self-care assessments, the fewer self-care practices were deemed to be poor. Despite the fact that many people already engage in some form of self-care, they can still do more (Chambers et al., 2006). According to Shrivastava et al. (2013), self-care in diabetes is an evolutionary process of knowledge and awareness development by learning to cope with the disease's complicated nature in a social setting. Through diabetes self-care, patients can monitor and make healthy decisions each day to maintain blood sugar levels as close to normal as feasible.

Patients frequently fail to get the intended results because of the obstacles affecting their self-care, even when complete management plans are offered (Marrero et al., 2015).

Promoting effective self-care activities requires an understanding of the obstacles to diabetes self-care. Diabetes self-care obstacles are divided into two categories: those imposed by patients and those imposed by healthcare providers.

Non-adherence to food, exercise, blood glucose monitoring, and medication, as well as a lack of social support, a lack of understanding about diabetes, and psychological variables including depression, stress, and stigma, are common patient barriers to diabetes self-care. Self-care behaviors are greatly influenced by these (Marrero et al., 2015).

In patients with multiple medications, poor communication with healthcare providers, inadequate knowledge and comprehension of the disease, suboptimal self-monitoring of blood glucose, and psychosocial factors like depression, suboptimal adherence to standard diabetes care recommendations are frequently observed (Onwudiwe et al., 2011).

Healthcare professionals have challenges in providing high-quality diabetes treatment to their patients and in delivering care. The first step in helping healthcare professionals recognize their role in empowering patients, helping them to overcome obstacles and inspiring them to make desired behavioral changes in order to help them receive the best care possible is understanding the obstacles to diabetes self-care (Barclay, 2009). The researcher's goal is to ascertain the obstacles to diabetes self-care among patients with type

2 diabetes who visits the diabetes clinic at Kirwara sub-County Hospital in Muranga County.

1.2 Problem statement

Despite the availability of effective management strategies, self-care practices remain a major barrier to optimal glycemic control. Inadequate blood glucose monitoring, unhealthy diets, physical inactivity, and medication non-adherence are common challenges that worsen diabetes mellitus management outcomes (Shrivastava, Shrivastava, & Ramasamy, 2013). These behaviors accelerate the development of complications such as cardiovascular disease, kidney failure, neuropathy, and retinopathy, which contribute significantly to global diabetes-related morbidity and mortality (WHO, 2016; IDF, 2021). Strengthening patient education, adherence support, and lifestyle interventions is therefore essential to reduce the burden of diabetes.

Diabetes is a serious public health issue in sub-Saharan Africa (SSA), where its prevalence is rising. It is anticipated that by 2045, there would be 55 million adults in the region with diabetes, up from an expected 24 million in 2021 (IDF, 2021). However, more than 50% of people with diabetes in SSA are undiagnosed, and those who are diagnosed often face barriers such as limited access to healthcare services, low health literacy, poverty, and lack of diabetes education (Atun et al., 2017; Hall et al., 2021). Studies in countries such as Nigeria, Tanzania and Ethiopia have shown that cultural beliefs, economic hardship, and poor understanding of diabetes management significantly hinder patients' ability to practice self-care (Mohammed et al., 2019; Mumu et al., 2020). Consequently, many patients in the region suffer from preventable complications including retinopathy, neuropathy, and cardiovascular diseases.

In Kenya, diabetes is a growing concern, with the national prevalence estimated at 3.3% among adults aged 20–79 years (IDF, 2021). The Kenya STEP wise Survey (2015) reported that only 20% of people diagnosed with diabetes were able to maintain good glycemic control, largely due to poor self-care practices. Barriers to diabetes self-care in Kenya

include low awareness levels, inadequate diabetes education, high cost of care, and limited access to medications and diagnostic services, particularly in rural and sub-county hospitals (Mohamed et al., 2018; Otieno et al., 2020). In Murang'a County, where Kirwara sub-County Hospital is located, the burden of diabetes and its complications continue to rise, yet little is known about the specific barriers that patients face in managing their condition effectively.

According to the World Health Organization (WHO), 3.3% of Kenyans have diabetes, and by 2025, that number is predicted to increase to 4.5%.

Due to unawareness among Kenyans, two-thirds of diabetic patients lack diabetes self-care, and this is quite a big challenge to the health sector (WHO, 2023). Muranga County particularly has been recorded as having high mortality cases mainly due to diabetes complications. The WHO has linked self-care to diabetes type two to preventing complications and death (Malanda *et al.*, 2012).

Furthermore, despite the possibility of better glycaemic control, which lowers diabetes complications and enhances quality of life, prior research indicates that persons with Type 2 Diabetes Mellitus frequently struggle to follow self-care regimens.

Nevertheless, there is a dearth of information available regarding the obstacles to the best self-care practices and practical methods that individuals with Type 2 Diabetes Mellitus employ to successfully integrate care plans into their daily routines (Reick et al., 2010).

1.3 Justification

Diabetes melitus is unique among many chronic diseases in that patients can actively manage the condition through consistent self-care practices. These practices include adherence to prescribed medications (Powers et al., 2020; Shrivastava et al., 2013). However, despite the well-documented benefits of diabetes self-management, a large proportion of patients fail to adhere to recommended practices, leading to disease progression and increased healthcare costs.

Globally, non-adherence to diabetes self-care has been linked to a range of factors, including limited knowledge of diabetes management, poor health literacy, socioeconomic constraints, psychological stress, and inadequate social or healthcare system support (Khattab et al., 2010). Even in countries with relatively advanced healthcare systems, such as the United States, studies have shown that only about 50% of patients maintain consistent self-care routines (Powers et al., 2020). These challenges are exacerbated in LMICs, where health infrastructure is weak, and access to quality care is limited. As such, the global public health community increasingly recognizes the urgent need to understand and address barriers to diabetes self-care at local, regional, and national levels.

In sub-Saharan Africa (SSA), the challenge is particularly pronounced. This is largely due to inadequate access to healthcare services, low health literacy, poverty, stigma, and cultural beliefs surrounding illness and treatment (Atun et al., 2017; Hall et al., 2021). In many SSA countries, including Kenya, patients must travel long distance to access diabetes services, often paying out-of-pocket for medications, glucometers, and nutritional support. Additionally, health systems are generally geared toward acute care,

with minimal investment in chronic disease education, follow-up, and patient-centered support mechanisms.

The situation in Kenya is no different. According to the Kenya STEPwise Survey for NCD Risk Factors (2015), the national prevalence of diabetes among adults aged 18–69 is estimated at 3.3%, although this is likely an underestimation due to high rates of underdiagnosis. The Ministry of Health has recognized the growing threat of diabetes and developed policies such as the Kenya National Diabetes Strategy (2010–2015) and integrated NCD services at the primary healthcare level. Despite these efforts, diabetes outcomes remain suboptimal. Studies have reported poor glycemic control in more than 60% of diagnosed patients, high rates of diabetes-related complications, and increasing numbers of diabetes-related hospital admissions (Mohamed et al., 2018; Otieno et al., 2020). Importantly, these poor outcomes are not due solely to clinical factors; they are heavily influenced by poor self-care practices resulting from socioeconomic, behavioral, and health system barriers.

At the community level, there is growing concern about the increasing burden of diabetes in rural and peri-urban areas. Kirwara Sub-County Hospital, located in Murang'a County in central Kenya, provides care to a diverse population that includes both urban and rural residents. While the facility has a diabetes clinic that serves many patients with Type 2 diabetes, anecdotal evidence and reports from healthcare providers suggest that many patients do not adhere to treatment regimens or lifestyle recommendations. Poor diet, irregular medication use, lack of physical activity, and failure to monitor blood glucose levels are commonly reported. These issues often lead to preventable complications and repeat hospital visits, which place further strain on the local health system.

Despite the observed challenges, there is a lack of empirical research examining the specific barriers to diabetes self-care in this setting. Most existing studies in Kenya have focused on urban areas or tertiary hospitals (Mohamed et al., 2018; Otieno et al., 2020). These settings may not reflect the realities faced by patients in smaller facilities like Kirwara Sub-County Hospital, where resources are more limited, and community beliefs may significantly influence health behavior. As such, there is a critical need to generate context-specific data that can inform locally appropriate interventions.

This study is therefore justified in multiple ways. First, it addresses a significant public health issue — the poor self-care practices among people with T2DM — which directly contributes to morbidity and mortality in Kenya and globally. Second, by offering a thorough examination of the obstacles to diabetic self-care in a rural sub-county setting—which is underrepresented in research—it aims to close a gap in the body of existing material. Third, the findings from this study can inform the design of interventions tailored to the needs, beliefs, and socioeconomic realities of patients in Murang'a County. These could include community-based education programs, health worker training, improved follow-up systems, or subsidized access to glucose monitoring supplies.

Fourth, the research findings will be valuable to policymakers, healthcare providers, and other stakeholders seeking to improve diabetes care and NCD control in Kenya. As the Ministry of Health continues to prioritize universal health coverage and decentralization of chronic disease care, data from grassroots health facilities will be essential for planning and resource allocation. This study could also contribute to the revision or development of local guidelines for diabetes education and support in primary care settings.

Finally, by involving patients directly in identifying the barriers they face, this study promotes a patient-centered approach to chronic disease care. It acknowledges that effective diabetes management is not simply a matter of prescribing medication but requires a holistic understanding of the challenges that individuals face in their day-to-day lives. Empowering patients through knowledge, support, and systems that enable self-care is critical to achieving long-term improvements in diabetes outcomes.

It is anticipated that the results of this study will close the current gaps in information regarding the social, structural, and organizational aspects of diabetic self-care in Kenya.

The findings will help Kirwara sub-County Hospital administration to institute measures to reduce the barriers and improve the glycemic control of the patients, which will lead to reduced diabetes complications and improved quality of life.

They will also be used by health care professionals to get solutions to the barriers of optimal self-care among patients with type two diabetes mellitus to empower them on the best ways to prevent, control and manage the disease in order to attain and maintain optimal glucose levels.

In conclusion, this study is timely, relevant, and necessary. It will contribute to the growing body of knowledge on diabetes self-management, provide practical recommendations for improving care at Kirwara Sub-County Hospital and similar facilities, and support broader public health goals related to NCD prevention and control in Kenya.

1.4 Research questions

1. What is the level of practice of self-care activities among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County?
2. What are the patient related barriers to diabetes self-care among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County?
3. What are cultural factors which act as barriers to optimal self-care among patients with type two diabetes mellitus attending Kirwara sub-County Hospital, Muranga County?

1.5 Research objectives

1.5.1 Broad objective

To determine the level of diabetes self-care practices and associated barriers among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County.

1.5.2 Specific objectives

- To determine the level of practice of self-care activities among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County.
- To describe patient related barriers to diabetes self-care among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County.
- To describe socio cultural factors which act as barriers to diabetes self-care among type two diabetes mellitus patients attending Kirwara sub-County Hospital, Muranga County.

CHAPTER TWO : LITERATURE REVIEW

2.1 Introduction

Diabetes mellitus is a chronic metabolic disease typified by hyperglycemia, which arises from insufficient pancreatic insulin secretion, poor insulin action on body cells, or both. It is associated with both acute and chronic complications, with chronic complications developing after prolonged periods of sub-optimal blood glucose control. These complications include cardiovascular diseases, diabetic retinopathy leading to blindness, diabetic nephropathy causing kidney disease, diabetic neuropathy affecting the nervous system, and sexual dysfunction (World Health Organization, 2016).

Poorly controlled hyperglycemia contributes to microvascular complications (retinopathy, nephropathy, neuropathy) and macro vascular complications (coronary artery disease, stroke, peripheral artery disease), which together account for a substantial proportion of diabetes-related deaths and disability. According to the International Diabetes Federation (IDF, 2021), diabetes affects over 537 million adults globally, with projections rising to 643 million by 2030 and 783 million by 2045. Vascular complications alone contribute to 26.8% of diabetes-related mortality worldwide (Lu et al., 2023).

The World Health Organization categorizes diabetes according to its cause: type 1 diabetes, which is brought on by the autoimmune destruction of the pancreatic beta cells, which prevents the organ from producing insulin. Five to ten percent of all instances of diabetes are caused by it. Abnormal insulin secretion causes insulin deficit, insulin resistance, or both, which in turn causes diabetes mellitus type 2. Between 90% and 95% of all cases of diabetes that are diagnosed are caused by it. It may go unnoticed for years until problems arise, and it can happen at any age (WHO, 2021).

It's linked to being overweight or obese, which can make muscles resistant to insulin and raise blood sugar levels (WHO, 2021).

One type of diabetes that is initially identified during pregnancy is called gestational diabetes mellitus (GDM). The risk of type 2 diabetes in later life is 20% to 50% higher for women who have had gestational diabetes mellitus. Other particular forms of diabetes include drug-induced diabetes, pancreatic illness, and diabetes brought on by hereditary beta-cell abnormalities (WHO, 2006).

Self‑care in Type 2 Diabetes Mellitus (T2DM) encompasses a range of activities that individuals perform to manage their disease and maintain health, including adherence to medication, dietary regulation, physical activity, glucose monitoring, foot care, and lifestyle modification. The effectiveness of these practices is well established: good self‑management reduces morbidity and the risk of complications, improves glycemic control, and enhances quality of life. However, despite this knowledge, many patients globally fail to adopt or sustain recommended self‑care behaviours. Understanding the barriers that impede self‑care is essential to designing interventions that are both effective and contextually relevant. This literature review surveys the evidence on barriers to self‑care in T2DM, first from global studies, then narrowing to Sub‑Saharan Africa, and finally examining the situation in Kenya, highlighting gaps that justify further investigation in settings such as Kirwara Sub‑County Hospital.

2.2 Global perspectives on barriers to diabetes self-care

Research from high-, middle-, and low-income countries demonstrates that barriers to self-care are multifaceted, often interacting at patient, provider, system, and community levels. Globally identified patient-level barriers include insufficient knowledge about diabetes etiology and treatment, low health literacy, psychological distress or diabetes distress, lack of motivation, fear or stigma, and socio-demographic factors like older age, low education, and low income. In the DAWN2 survey involving over 4,700 healthcare professionals across 17 countries, for example, many respondents identified resistance to lifestyle change, non-compliance, and insulin reluctance as predominant patient-level obstacles to achieving glycemic targets (IDF, 2021).

Lifestyle behavior in particular – diet and exercise – faces both personal and external constraints. A narrative review of global physical activity among patients with diabetes found barriers such as lack of safe spaces, cost of exercise programs, time constraints, lack of social support, and co-morbid health limitations. Similarly, dietary self-care is impeded by food cost, cultural food preferences, limited access to healthy food, and misinformation (WHO, 2021).

Healthcare system and provider factors also play a major role: limited provider time, poor communication, inadequate education support, fragmented care, and high patient loads have all been reported. Technology, when used, can help but is frequently limited by access, acceptability, or literacy. Summarily, global literature points to a complex web of interacting barriers, many of which are exacerbated in resource-constrained settings (IDF, 2021).

2.3 Barriers to self-care in sub-Saharan Africa

Within sub-Saharan Africa (SSA), literature reveals that self-care practices among persons with T2DM are generally low, especially in terms of blood glucose

self-monitoring, regular physical activity, dietary adherence, and foot care (Stephani et al. 2018).

Qualitative studies across SSA highlight additional contextual and cultural barriers: beliefs about the causes of diabetes (e.g. spiritual or supernatural explanations), use of traditional healers, community and family norms that may conflict with biomedical advice, and lack of social support. For example, in Ethiopia a qualitative exploratory study found that cultural values, social networks, educational status, and economic constraints intersect to hinder self-management.

Health system barriers in SSA include scarce resources (such as glucometers, diagnostic services and supplies), inconsistent availability of medication, limited specialized care, and poorly structured diabetes education. There is often limited follow-up and support, especially in rural and remote settings. Intervention studies—though fewer—show promise. A recent review of self-care interventions (2013–2023) in SSA found that self-management education, SMS reminders, provision of testing supplies, and culturally tailored programmes improved self-care outcomes in many settings, though with mixed effects.

2.4 Patient-related factors

2.4.1 Age

Age is a major demographic characteristic that influences many dimensions of health, including disease burden, healthcare utilization, psychological outlook, and capacity for self-management. In Type 2 diabetes mellitus (T2DM), age can affect both the prevalence and the complexity of disease, as well as the ability and motivation of individuals to engage in self-care behaviours. Selfcare includes medication adherence, dietary control, physical activity, and coping with the psychosocial aspects of living with a chronic disease. Understanding how age affects barriers and facilitators of self-care is essential, especially when designing interventions targeted at different age groups. Below, we review the literature on how age relates to diabetes self-care: first from global and older adult studies, then in middle or younger age brackets, then in Kenya and similar settings, and finally what remains underexplored. Many studies have focused on older adults (often defined as ≥ 60 or ≥ 65 years) as a distinct group with special challenges in managing diabetes self-care. An integrative review published in the Journal of Gerontological Nursing (Saunders, 2018) synthesized qualitative studies (2007–2018) on barriers to self-management in older adults with T2DM.

In Thailand, a cross-sectional study among older adults (>60 yrs) found that better health literacy and self-efficacy were significantly correlated with better self-care behaviours and improved glycaemic control. In that study, over half of participants had abnormal fasting blood sugar levels (Parichat et al, 2023).

In China (Jinan, Shandong Province), a qualitative descriptive study of older adults with T2DM explored perceived facilitators and barriers. Key barriers included age-related

physical limitations (vision problems, mobility, comorbidities), psychological issues (fear of hypoglycaemia, depression or anxiety), as well as external support factors such as family involvement or lack thereof. Facilitators included having family members who were healthcare professionals, visual cues/reminders, and support from others who also have diabetes (Chen Wu et al, 2024).

These studies show that among older patients, age influences self-care through multiple dimensions: Physical decline or comorbidities: Reduced mobility, vision or hearing loss, cognitive decline hamper ability to exercise, measure glucose, administer medications, or interpret instructions. Psychological and emotional burden: Older adults may have more distress, fear, or anxiety about complications, reduced motivation, or internalized beliefs (e.g. “at this age what difference will it make?”) that reduce self-care engagement. Knowledge, literacy, and understanding: Lower health literacy, less exposure to diabetes education, or difficulties learning new self-care routines in advanced age (Soha et al, 2024). Social support and dependence: Greater dependence on caregivers or family for help, which may help (if support is good) or hinder (if support is lacking or inconsistent). Also, older adults may experience social isolation. Healthcare system factors: Age-related barriers may include complexity of medication regimens, fear of adjusting doses, less use of technology, poor provider communication adapted to older patients’ needs. The study of older adults aged ≥69 years in the US, which tested an intervention where a geriatric diabetes team assessed age-specific barriers, showed that older patients were often reluctant to adjust insulin doses without provider guidance (Medha et al, 2013).

Though much of the literature deals with older age, comparisons across age groups sometimes reveal differences in how barriers manifest.

The study "Empowerment among adult patients with type 2 diabetes: age differentials …" in Finland compared age sets 20–50, 51–60, and 61–70 years. It found that younger adults had lower empowerment, worse psychosocial wellbeing, less continuity of care, and less social support compared to older groups; yet paradoxically, they reported higher levels of person-centred care (Nina et al, 2021). In some qualitative studies of older groups (e.g. Korean older adults with T2DM), cultural expectations, gender roles, and life-long habits formed in earlier years make changing behaviours (diet, exercise) more difficult (Misoon et al, 2020).

These findings suggest that while older age brings physical, psychological, and knowledge constraints, younger patients may face different barriers: possibly competing life responsibilities (work, family), less stability in routine, less social or community recognition of chronic disease, or lower healthcare access or priority.

Age has been shown in global literature to be a significant factor influencing self-care in Type 2 diabetes. Older adults generally face additional and often multiple barriers—physical, cognitive, social, psychological, health literacy—that younger or middle-aged persons may not face to the same extent. However, the precise nature of these barriers, how they interact with other factors, and how they manifest in rural Kenyan settings remain underexplored. In particular, in the context of Kirwara Sub-County Hospital, there is a need for both quantitative and qualitative data to uncover how age shapes self-care barriers among patients, which would inform interventions that are age-sensitive and contextually relevant.

Studies reviewed showed that there is an association between age and regular type two diabetes mellitus self-care. Young age has been associated with low adherence to glucose monitoring, low adherence to clinic appointments, low compliance to medication and low HbA1c testing (Hosler Melnik, 2005). Study reported that a younger age with diabetes was associated with higher HbA1c (Daly et al., 2009). Good and consistent self-care for Type 2 DM was linked to older persons (Zanetti et al., 2010).

According to Rhee et al. (2005), older persons had lower HbA1c readings and are more likely to keep their appointments with medical specialists. However, poor coping and self-care skills were linked to older persons (Samuel-Hodge et al., 2008).

2.4.2 Gender

Gender plays a critical role in shaping health behaviors, access to healthcare, and adherence to self-care practices among individuals with long-term illnesses like Type 2 diabetes (T2DM). Self-care in diabetes involves multiple daily decisions and behaviors including dietary regulation, medication adherence, blood glucose monitoring, physical activity, and foot care — all of which may be influenced by sociocultural gender roles, economic disparities, and psychosocial factors (Shrivastava, Shrivastava & Ramasamy, 2013; Powers et al., 2020). Understanding how gender affects diabetes self-management is therefore essential for developing equitable and effective interventions.

Globally, gender disparities have been documented in diabetes care and outcomes. Studies show that women with T2DM often experience poorer glycemic control and higher rates of complications compared to men (Kautzky-Willer et al., 2016; WHO, 2023). Several factors contribute to this difference. Women are more likely to face socioeconomic constraints, including limited financial autonomy and increased caregiving responsibilities, which may reduce their ability to prioritize self-care (Abate & Chandalia, 2015). Additionally, psychosocial factors, such as depression and anxiety, are more prevalent among women with diabetes, negatively affecting adherence to medication and dietary recommendations (Crawford et al., 2021).

Conversely, some studies have found that men tend to engage less in preventive and health-seeking behaviors and may neglect regular monitoring or dietary control, viewing them as less masculine or unnecessary (Mathew et al., 2018). This suggests that both genders experience unique barriers — women often struggle with limited autonomy and role burden, while men may be hindered by cultural norms that discourage help-seeking or consistent care.

In sub-Saharan Africa (SSA), gender dynamics significantly affect diabetes self-care behaviors due to entrenched social and cultural norms. Women in many African settings often bear a disproportionate share of domestic and caregiving duties, leaving them with limited time for physical activity or clinic attendance (Atun et al., 2017; Mohammed et al., 2019). Moreover, economic dependency on spouses or male relatives can restrict women's ability to afford medications, glucose test strips, or healthy dietary options (Hall et al., 2021).

Studies conducted in Nigeria, Ethiopia, and Ghana have highlighted that women are less likely to adhere to dietary recommendations due to family food preferences or cultural expectations that they prepare and eat the same meals as other household members (Gebre et al., 2021; Amoah et al., 2019). Conversely, men are more likely to delay healthcare seeking or miss follow-up appointments due to work-related demands or denial of illness severity (Chiwanga et al., 2020). Such gendered patterns contribute to differing diabetes outcomes, with women often experiencing higher rates of uncontrolled blood glucose and diabetes-related distress.

Furthermore, health education interventions in SSA are often not gender-sensitive. Educational programs may fail to consider literacy levels, gender roles, or cultural expectations that influence how men and women perceive and practice self-care (Mumu et al., 2020). Addressing these gender disparities requires integrating gender-responsive approaches in diabetes education, counseling, and policy formulation.

In Kenya, gender differences in diabetes management have also been observed. According to the Kenya STEPwise Survey (2015), women report higher healthcare-seeking behavior than men, but this does not always translate into better glycemic control, possibly due to household responsibilities and limited financial independence. Research by Mohamed et al. (2018) and Otieno et al. (2020) revealed that many women face barriers related to economic dependency, cultural food practices, and low access to diabetes education, particularly in rural areas. Women in patriarchal households may lack decision-making power regarding food purchases or healthcare expenses, limiting their ability to follow recommended diets or attend regular medical appointments.

Men, on the other hand, are more likely to neglect self-monitoring and physical activity, often perceiving diabetes care as a "female" or "nurturing" activity that does not align with traditional masculine roles (Njambi et al., 2021). Additionally, societal expectations for men to be breadwinners may lead to prioritizing work over self-care or clinic visits. In Murang'a County and similar rural settings, these gendered challenges are compounded by low health literacy and limited access to diabetes education and support groups.

Consequently, gender remains a significant determinant of diabetes self-care behaviors in Kenya, influencing not only knowledge and attitudes but also access to resources and support systems. Recognizing these gender-based differences is crucial in designing context-specific interventions to improve diabetes outcomes in both men and women.

Existing literature demonstrates that gender significantly influences diabetes self-care behaviors through complex sociocultural, economic, and psychological mechanisms. While global and regional studies have explored gender disparities in diabetes management, there is limited evidence from local-level research in rural Kenyan contexts, particularly within Murang'a County. Addressing this gap is vital for developing gender-responsive diabetes management strategies that promote equitable healthcare access and improve health outcomes for all patients.

According to Baumann et al. (2010), women are more likely to follow dietary recommendations, males engage in more frequent physical self-care activities, and men are more concerned about the complications of diabetes. Additionally, research revealed that men's self-care routines were statistically significant more than women's. (Chio and others, 2009).

According to another study, women in their reproductive years who had previously received diabetes education or knowledge and who had taken diabetes medication had a high social life and few difficulties associated to the disease. Others discovered that men had more experience with physical activity than women (Montague et al., 2005). (Ortiz

and others, 2010). According to other research, women were accustomed to engaging in physical activities that were not leisure related Plotnikoff and colleagues (2007).

2.4.3 Income level

Income level, often operationalized as household income, employment status, or broader socioeconomic status (SES) — is a consistently reported determinant of health behaviors and outcomes for people living with T2DM. Income affects the ability to purchase medications and supplies, access healthcare services, acquire healthy foods, and participate in diabetes education or physical activity. Low income therefore commonly translates into poorer self-care practices and worse glycemic control (Powers et al., 2020; Atun et al., 2017).

Worldwide evidence shows a robust association between low income/SES and suboptimal diabetes self-management. Systematic reviews and large observational studies indicate that individuals with lower income are more likely to report: Medication non-adherence due to cost of drugs or competing household needs. Reduced frequency of blood glucose monitoring, because of inability to afford glucometers and test strips. Poor dietary quality, as healthy food options (fresh fruit, vegetables, lean protein) are often more expensive and less accessible than energy-dense, processed foods. Lower participation in structured diabetes education and self-management programs because of direct costs (fees, transport) and indirect costs (time off work, childcare).

These income-related barriers lead to higher rates of uncontrolled hyperglycemia and diabetes complications in low SES groups globally (Powers et al., 2020; WHO, 2023). Additionally, health system factors such as co-payments and fragmented insurance coverage magnify the effect of low income on access to sustained diabetes care in many settings (IDF, 2021).

In Sub-Saharan Africa (SSA), the impact of income on diabetes self-care is particularly pronounced because of predominantly out-of-pocket health financing, gaps in primary care capacity for chronic disease management, and food insecurity in many communities (Atun et al., 2017; Hall et al., 2021). Key findings from regional studies include: Cost of medications and supplies is one of the primary reasons patients skip doses or stop treatment altogether. Where insulin or oral hypoglycemic agents must be paid for out-of-pocket, treatment interruptions are common. Diagnostic and monitoring services (HbA1c tests, glucose

test strips) are frequently unavailable at lower-level facilities or are unaffordable, limiting self-monitoring and clinical follow-up. Food insecurity and limited healthy food availability force many low-income households to rely on cheaper, carbohydrate-dense staples, undermining dietary self-management. Transportation costs and lost wages are barriers to clinic attendance for both routine care and education sessions.

Systematic reviews from SSA underscore that low income interacts with health system weaknesses and cultural practices to create persistent barriers to self-care (Mohammed et al., 2019; Mumu et al., 2020). Interventions that reduce direct costs (subsidized medicines, community delivery of supplies) or that bring education and services closer to communities show promise in mitigating income-related barriers.

Kenyan studies reflect similar patterns: low household income and related poverty indicators are strongly associated with poorer diabetes self-care behaviors and outcomes (Kenya MoH, 2015; Mohamed et al., 2018; Otieno et al., 2020). Specific observations relevant to the Kirwara sub-county context include: High out-of-pocket costs for medicines and tests — even where primary care is available, patients sometimes forgo medications or monitoring because of cost. Limited availability of affordable, healthy foods in rural markets and the economic reality of subsistence farming families reduce feasibility of recommended diets. Transport and opportunity costs (time away from income-generating activities) hinder regular clinic attendance and participation in education programs, especially among low-income patients. Informal coping strategies, such as dose-skipping, sharing medicines, or using herbal remedies, are reported where financial constraints prevent standard care adherence.

Research from Kenyan counties similar to Murang'a suggests that income level often operates alongside education and gender to determine who can follow self-care advice — for example, low-income women with limited decision-making power may face compounded barriers when they also lack resources to buy medications or special foods (Otieno et al., 2020; Njambi et al., 2021).

From the literature, several interrelated mechanisms explain why income influences diabetes self-management: Material access, ability to buy medicines, test supplies, and healthy foods. Healthcare access — capacity to pay for clinic visits, laboratory tests, and transport. Time and opportunity costs — low-income patients prioritize immediate income generation over time-intensive self-care activities. Psychosocial stress — financial strain increases stress and depression, which are known to impair self-management behaviors. Health literacy and education — income often correlates with educational attainment, affecting understanding of self-care recommendations.

The literature recommends multi-pronged approaches to mitigate income-related barriers: Financial protection mechanisms (subsidies, insurance coverage for essential diabetes medicines and tests). Decentralized, low-cost delivery models (task-shifting, community health worker support, mobile clinics). Contextualized dietary counseling that considers local food affordability and availability. Income-sensitive scheduling of clinics and education (after-hours or community-based sessions to reduce wage loss). Integration of psychosocial support and linkage to social services for patients facing extreme poverty.

Income level is a major, consistently documented determinant of diabetes self-care globally and in low-resource settings such as SSA and Kenya. Low income restricts material and service access, increases psychosocial stress, and limits the feasibility of recommended lifestyle changes. For Kirwara Sub-County Hospital, understanding how income interacts with other local factors (gender, education, health system access) will be critical to designing interventions that are both effective and equitable.

According to the reviewed research, patients with Type 2 Diabetes Mellitus' self-care practices and their income levels are strongly correlated. Compared to patients with middle- and high-incomes, those with low incomes are less able to take care of themselves. High self-care skills are associated with high income (Chio et al., 2009). High income is linked to self-care and physical exercise activities in well-equipped and recreational settings, such as strength training and aerobic classes, whereas low income is linked to physical activities in non-leisure settings, such as housework and errand walking (Plotnikoff et al 2007).

Patients with low incomes are more likely to have low HbA1c tests and poor medication compliance (Hosler et al., 2005). Compared to patients with higher incomes, those with lower incomes are less likely to adhere well to self-care practices. Healthy foods that are advised for people with diabetes can be afforded by patients who fall into the relatively high-income category. Compared to patients with middle- and high-incomes, those with low incomes have lower self-care abilities, while those with high incomes have higher self-care abilities (Sorato et al., 2016).

2.4.4 Knowledge

Knowledge about diabetes and its management is a critical determinant of patients' ability to engage in effective self-care practices. Diabetes self-care involves daily activities such as blood glucose monitoring, adhering to prescribed medication, dietary regulation, physical activity, and foot care. Patients who understand the disease process, its complications, and the purpose of treatment are more likely to maintain optimal self-care behaviors and achieve better glycemic control (Shrivastava, Shrivastava, & Ramasamy, 2013; Powers et al., 2020). Conversely, insufficient knowledge or misconceptions about diabetes often result in poor adherence to medical advice, increased risk of complications, and poor quality of life.

Inadequate knowledge, however, remains a global challenge. Studies in both developed and developing countries show that many patients have limited understanding of diabetes symptoms, complications, and self-management practices (Rahaman et al., 2017). For instance, Shrivastava et al. (2013) reported that even in high-income countries, patients often fail to comprehend the importance of continuous self-care and adherence, leading to poor outcomes. The lack of structured education programs and low health literacy levels have been identified as major contributors to this gap worldwide.

In Sub-Saharan Africa (SSA), low levels of diabetes knowledge are among the most significant barriers to effective self-care. Studies across the region reveal that many patients have limited awareness of the disease process, dietary requirements, and preventive practices, partly due to inadequate patient education and weak health systems (Atun et al., 2017; Hall et al., 2021).

For instance, Berhe et al. (2014) found that Ethiopian adults with limited knowledge about diabetes were significantly less likely to adhere to self-care behaviors, including glucose monitoring and dietary compliance. Kamuhabwa and Charles (2014) in Tanzania similarly reported that poor knowledge about diabetes complications led to low uptake of preventive practices such as foot care and eye screening. In Nigeria, Fadare et al. (2015) found that only 39% of T2DM patients demonstrated good knowledge of diabetes self-care, and this correlated positively with education level and access to diabetes education.

Factors contributing to low knowledge levels in SSA include low literacy, lack of structured diabetes education programs, cultural beliefs, and language barriers (Mumu et al., 2020). Additionally, many patients depend on informal sources such as family or traditional healers for health information, which may promote misconceptions about diabetes causes and treatment (Mohammed et al., 2019).

The Kenya STEPwise Survey (2015) revealed that while awareness of diabetes as a disease is increasing, knowledge on self-management remains poor, especially in rural and low-literacy populations.

A study by Maina et al. (2018) conducted in Nairobi found that only 46% of Type 2 diabetes patients had adequate knowledge about diabetes self-care, and these individuals were more likely to adhere to dietary and medication recommendations. In Murang'a and Kiambu Counties, Otieno et al. (2020) and Njambi et al. (2021) reported that low knowledge and lack of counseling were key contributors to poor self-care practices, including irregular blood sugar monitoring and inappropriate dietary choices. Furthermore, patients often receive limited education during clinical visits due to healthcare worker shortages and time constraints (Mohamed et al., 2018).

In rural areas such as Kirwara Sub-County, limited access to diabetes educators, language differences, and reliance on informal communication channels exacerbate knowledge gaps. Many patients are unaware of the long-term complications of diabetes or the importance of consistent self-management. This knowledge deficiency leads to suboptimal health outcomes and frequent hospital readmissions for preventable complications.

Improving diabetes knowledge through structured education programs, individualized counseling, and community-based interventions has been shown to enhance self-care outcomes. The American Diabetes Association (ADA, 2022) and WHO (2023) recommend integrating diabetes self-management education (DSME) into primary care and ensuring culturally tailored materials to address literacy and language differences. In Kenya, leveraging community health volunteers and digital health platforms offers promising avenues to increase diabetes awareness, particularly in sub-county and rural facilities like Kirwara Hospital.

Knowledge is a foundational determinant of diabetes self-care behavior. Globally and regionally, evidence demonstrates that higher diabetes knowledge correlates with better medication adherence, diet control, and self-monitoring. In Sub-Saharan Africa and Kenya, however, knowledge gaps persist due to inadequate patient education, low literacy, and limited healthcare resources.

According to Daly et al. (2009), managing type 2 diabetes necessitates knowledge and comprehension of what to do, when to do it, and how to do it. Education and consistent diabetes self-care are related, according to the analyzed studies. Low HbA1c testing and poor medication compliance are linked to low levels of education and diabetes awareness (Hosler & Pan, 2005).

Poor coping and self-care skills are linked to low educational attainment (Hodge et al., 2008). According to a study by Ali and Al-Rasheedi (2014), patients with higher levels of education were more aware of the difficulties associated with diabetes and were more likely to follow their self-care regimens.

Reduced self-confidence, increased stress, and poor health were all associated with low educational attainment. Diabetes self-care behaviors were found to be negatively impacted by low educational attainment. Diabetes self-care practices will rise in tandem with educational attainment (Tafti et al., 2015).

Patients with diabetes who have more education are more efficient and capable of engaging in self-care practices (Parham et al., 2013). Glycemic control and efficient diabetic self-care are hampered by some patients' ignorance of the disease.

Research by Lawton et al. (2005) found that some individuals missed meals to avoid taking their prescription medications or only took them when their blood glucose levels were extremely high. Blood glucose monitoring, food, exercise, medication, and foot care have all been linked to knowledge of

diabetes management (Ahola et al., 2013).

The sophisticated self-care skills required to enhance glycemic control may be difficult for patients with low literacy to learn, and they also have limited knowledge of their illness. As demonstrated by a study by Rothman et al. (2004), literacy would be a significant determinant of who would benefit from an intervention for diabetes mellitus self-management. According to a study by Danai et al. (2004), there is no discernible difference between education and blood sugar control. According to the study, there is no meaningful correlation between self-care behavior and educational attainment. (Sorato and others, 2006)

2.5 Level of self- care

2.5.1 Diet and nutrition

Dietary management is a cornerstone of Type 2 diabetes (T2DM) self-care. Appropriate nutrition helps achieve glycemic control, reduce cardiovascular risk, and prevent or slow the complications. However, maintaining recommended dietary patterns is influenced by knowledge, food availability, cost, culture, and individual preferences — all factors that shape whether patients can adopt and sustain dietary self-management (Evert et al., 2019; Powers et al., 2020).

Globally, evidence strongly supports the role of medical nutrition therapy and individualized dietary counseling in improving glycemic outcomes and quality of life for people with T2DM. Consensus guidelines emphasize personalized meal planning, portion control, carbohydrate management, and attention to overall quality of the diet (Evert et al., 2019; ADA/Standards, 2022). Randomized trials and meta-analyses have shown that structured dietary interventions including Mediterranean, DASH, and low-glycemic index diets can improve HbA1c, lipid profiles, and weight compared with usual care (Schwingshackl et al., 2018; Evert et al., 2019).

Nevertheless, translating guideline recommendations into daily practice is challenging. Barriers documented worldwide include: limited access to culturally appropriate nutrition education, food insecurity, competing food preferences within households, limited cooking skills, and conflicting commercial food environments that favor processed, energy-dense foods (WHO, 2023; Powers et al., 2020). Socioeconomic gradients are pronounced: lower-income groups often consume cheaper, carbohydrate-dense diets and have less consistent intake of vegetables, fruits, and lean proteins patterns associated with poorer glycemic control.

In Sub-Saharan Africa (SSA), dietary self-management is shaped by a mix of food environment constraints, cultural dietary patterns, and economic realities. Staple diets across many SSA settings are high in carbohydrates (e.g., maize, cassava, rice, ugali/fufu) and often low in vegetables and protein, making carbohydrate portion control difficult (Atun et al., 2017; Hall et al., 2021). Studies in the region report:

Low uptake of recommended dietary changes due to food cost and availability, particularly in rural areas where markets have limited variety. Cultural food norms that prioritize communal eating and staple foods, reducing flexibility for individual dietary prescriptions.

Limited access to trained dietitians/nutritionists and an absence of routine, context-specific nutrition counseling at primary care level (Mumu et al., 2020; Mohammed et al., 2019). Moreover, the double burden of under- and over-nutrition in some SSA communities complicates messaging: health workers

must reconcile calorie adequacy with glycemic control in populations where seasonal food scarcity exists. These contextual factors contribute to inconsistent dietary adherence and suboptimal glycemic outcomes.

In Kenya, dietary practices among people with T2DM reflect national food culture and local economic conditions. The Kenya STEPwise and site-specific studies show that many patients struggle to adopt recommended diets because: Staple reliance: Maize ugali, potatoes, and other high-glycemic staples remain central to most meals, making portion control and substitution challenging. Cost and seasonality: Fresh fruits, vegetables, and lean proteins are often more expensive or seasonally unavailable, especially in rural and peri-urban markets. Limited nutrition counseling: Overstretched clinics provide minimal individualized dietary education; food advice tends to be generic rather than tailored to local dishes and budgets (Mohamed et al., 2018; Otieno et al., 2020). Household dynamics: Shared meals and gendered food roles constrain ability of one member to follow a distinct diet; women who prepare family meals may find it difficult to change recipes for themselves alone (Mohamed et al., 2018; Otieno et al., 2020).

Studies from Kenyan counties similar to Murang'a report low rates of adherence to recommended dietary changes and indicate that nutrition interventions that do not consider local foodways and affordability are unlikely to succeed. For patients attending Kirwara sub-County Hospital, likely dietary barriers include dependence on carbohydrate-heavy staples, limited market access to diverse and affordable healthy foods, seasonality of vegetables and fruits, limited availability of trained nutrition staff at the facility, and household-level barriers (shared meals, economic prioritization). These contextual realities mean that standard dietary advice from urban or high-income settings may be impractical without adaptation. Diet and nutrition are central determinants of diabetes self-care. While evidence supports the effectiveness of medical nutrition therapy, multiple barriers economic, cultural, structural, and health-system related limit adherence in low-resource and rural settings. For Kirwara Sub-County Hospital, interventions must be locally tailored, economically realistic, and household-sensitive to improve dietary adherence and glycemic outcomes.

One of the main pillars of diabetes care is dietary change, which ought to be the primary line of treatment. The Kenya National Diabetes Educators Manual, created by the Ministry of Health in 2010, is based primarily on diet. One of the most important components of managing diabetes is nutrition, which might include insulin, diet alone, or diet combined with oral glucose-lowering medications.

Age, weight, gender, career, health, and diabetes management all have an impact on dietary choices. (Asif 2014). Fifty to sixty percent of diabetes prevention and care is provided by dietary therapy. Nonetheless, one of the most difficult parts of self-care is still adhering to the concepts of meal planning and nutrition.

Meal plans comprise breakfast, lunch, supper, and two snacks, per the general nutrition standards published by the American Diabetes Association in 2006. Approximately eight servings of fruits and vegetables are included in each one-day regimen. In order to meet the required daily consumption of 1550–1650 calories, fruits and vegetables are incorporated into practically every meal and snack.

The number of calories varies according to age, gender, degree of activity, and whether or not a person needs to reduce weight. More than 25 grams of dietary fiber per day 25 grams for women and 38 grams for men 300 mg or less of cholesterol per day, 2300 mg or less of sodium per day, moderate carbohydrates (approximately 45% of calories), limiting trans fats (unhealthy fats) to less than 10% of calories, and a focus on monounsaturated and polyunsaturated fats (healthy fats) to support heart health (ADA, 2006). The ideal diet for persons with type 2 diabetes mellitus is a topic of debate. Some arguments center on low

vs moderate fat, glycaemic index methods, and high fiber. The general opinion is to reduce daily consumption of saturated fats and increase consumption of fruits and vegetables.

According to a National Health Interview Survey research conducted in the United States, barely 60% of people adhered to the suggested diet. According to reports, the majority of people with type 2 diabetes were overweight, did not exercise to the necessary levels, and did not consume enough fruits, vegetables, and fats as advised by the American Diabetes Association (ADA, 2002).

According to a study by Karin et al. (2002), most persons with type 2 diabetes in the study consumed less fruit and vegetables each day than the minimal amount advised and ate a diet heavy in saturated fat.

Mexican Americans and those over 65 were more likely to consume more fruits, vegetables, and lower-fat diets. It is not recommended for diabetics to smoke. It causes blood sugar levels to rise and impairs the body's reaction to insulin. It damages the heart and lungs and can hasten the development of eyesight issues. Smokers with diabetes have a threefold increased risk of dying from heart disease or stroke compared to nonsmokers. AADE7 (2010)

According to the Nurses' Health Study (NHS), (2011), the quality of lipids and carbs has a significant impact on the onset of diabetes. Increased consumption of cereal fiber and polyunsaturated fat was linked to a lower risk of diabetes, whereas a higher dietary glycaemic load (GL) was linked to a higher risk.

A lot of emerging countries are going through fast social and economic change, which causes changes in eating patterns and lifestyle choices. People are losing their traditional eating habits as they adjust to more urban and industrialized food situations. Living conditions have gotten more and more sedentary. By reducing physical activity and raising body weight and central adiposity, these changes significantly increase the risk of type 2 diabetes mellitus (NHS, 2011).

2.5.2 Exercises and physical activity

Along with nutrition, medicine physical activity and exercise are essential components of diabetes therapy for those with type 2 diabetes. When nutrition and exercise are used appropriately, the body becomes more sensitive to insulin, glycemic control is improved, and the need for insulin or oral medicines is reduced. According to the International Diabetic Federation, if there are no contraindications, 30-45 minutes three to five days a week, 150 minutes per week of moderate-intensity aerobic exercise, or three times per week of resistance training are recommended (IDF, 2013).

Nearly one-third of research participants said they did not regularly engage in physical activity, and another 38% said they did not engage in enough physical activity. No regular exercise was reported by women, older people, and those with lower incomes. According to Karin et al. (2002), the majority of the sample was fat or overweight. No physical activity was reported by half of those with incomes below the poverty line. Low income, female sex, and those 65 years of age and older were linked to physical inactivity. There was no correlation found between physical inactivity and BMI, diabetes treatment type, or educational attainment (Karin et al., 2002). In individuals with type 2 diabetes, the effects of structured exercise treatments on body mass and HbA1c showed that the group that participated in structured exercise interventions had a significantly lower HbA1c than the control groups (Boule et al., 2001). The exercise and control groups, on the other hand, did not have different body weights (Boulé et al., 2001).

The best proof of resistance training's benefits for Type 2 Diabetes Mellitus came from two research trials. (Dunstan and others, 2002) and (Castaneda and others, 2002). The average age of participants in both studies was 66 years, and the resistance-training regimen included three sets of high-intensity exercises three times a week. Absolute HbA1c decreased by 1.1–1.2% in resistance training subjects while control subjects showed no discernible change (Dunstan et al., 2002).

In a second phase of one of these experiments, which lasted from months 7–12, training was conducted at home instead of in a facility. Changes in body composition persisted, but exercise adherence and intensity were less than during the first six months, and the group-to-group HbA1c difference stopped being statistically significant. Although it has less of an impact than aerobic activities, resistant training is useful for those with Type 2 diabetes mellitus (Castaneda et al., 2002).

Several epidemiologic studies demonstrate that whereas sedentary behaviors raise the risk of diabetes, greater physical exercise lowers it. They demonstrated that a 14% rise in the incidence of diabetes was linked to every 2 hours of additional television viewing each day. A 12% decrease in risk was linked to every two-hour daily increase in standing or walking. A 34% decrease in risk was linked to every hour of vigorous walking per day. (NIH, 2011). The findings showed a connection between diabetes risk and levels of physical exercise. Over the past century, physical exercise has been replaced by increased mobility and industrialization in industrialized countries. The use of cars is linked to less physical activity, and this trend is currently growing in developing nations (Bell et al., 2002).

2.5.3 Lifestyle

According to the World Health Organization (2023), the increasing prevalence of T2DM is strongly linked to sedentary lifestyles, poor dietary habits, and obesity. Studies conducted in high-income countries reveal that patients who regularly engage in physical activity, maintain a balanced diet, and avoid tobacco and alcohol have better glycemic control and fewer complications (Chawla et al., 2016). Conversely, barriers such as work schedules, fatigue, lack of motivation, and inadequate knowledge about healthy diets often lead to poor adherence to self-care practices (Shrivastava, Shrivastava & Ramasamy, 2013).

In Sub-Saharan Africa (SSA), lifestyle factors are increasingly recognized as significant determinants of diabetes outcomes. The region is undergoing rapid urbanization, leading to changes in diet and physical activity patterns that predispose individuals to poor self-care (Atun et al., 2017). Studies from Ethiopia, Nigeria, and South Africa indicate that low physical activity levels, high consumption of refined carbohydrates, and inadequate understanding of dietary requirements contribute to poor glycemic control (Mogre et al., 2019; Mumu et al., 2020). Additionally, sociocultural practices and misconceptions—such as the belief that traditional herbal remedies can replace prescribed medication—further undermine adherence to recommended lifestyle modifications (Mohammed et al., 2019).

The lack of recreational facilities, unsafe environments for exercise, and limited access to nutritious food also pose challenges to lifestyle modification in SSA. Many patients struggle to integrate exercise and healthy eating into their daily routines, partly due to economic constraints and limited diabetes education from health providers (Hall et al., 2021).

In Kenya, the influence of lifestyle factors on diabetes self-care is well documented. The Kenya STEPwise Survey (2015) highlighted that a large proportion of adults engage in low levels of physical activity and consume diets rich in saturated fats and refined sugars—behaviors that exacerbate diabetes risk and complicate disease management. Research conducted in Nairobi and Kisumu counties found that patients who engaged in regular physical activity and adhered to dietary recommendations were more likely to

achieve optimal glycemic control than those who did not (Mohamed et al., 2018; Otieno et al., 2020). However, barriers such as inadequate knowledge, cultural preferences for high-

carbohydrate diets, lack of social support, and competing family responsibilities often hinder adoption of healthy lifestyles.

In rural areas like Murang'a County, dietary practices are often influenced by local food availability and traditional beliefs. Many patients rely on starchy foods such as maize meal and potatoes, which complicate blood sugar control. Moreover, economic hardship limits access to healthy food options such as fruits, vegetables, and lean proteins (Kimani et al., 2022). Physical activity is often viewed as unnecessary once daily farm chores are completed, while structured exercise programs are uncommon. These challenges underscore the importance of culturally sensitive and context-specific interventions to promote lifestyle modification among diabetes patients.

Lifestyle modification is central to diabetes self-management, yet various socioeconomic, cultural, and environmental factors limit patients' ability to adopt and maintain healthy behaviors. Globally and regionally, research highlights the urgent need for behavioral change interventions, community education, and supportive policies that make healthy living more accessible. In the Kenyan context, particularly in rural settings like Kirwara Sub-County Hospital, there is limited empirical evidence on how lifestyle factors specifically affect diabetes self-care. Addressing this gap will contribute to the development of targeted education and support strategies to enhance self-care adherence and improve diabetes outcomes.

One term used to characterize type 2 diabetes mellitus is "a disease of civilization." Modern technology is the cause of a predicament that the globe is currently coping with. He contends that individuals are consuming more calories than ever before due to a modern,

sedentary lifestyle, which causes them to gain weight and become obese, which in turn causes type 2 diabetes mellitus to rise quickly. People now consume more calorie-dense food than they did in the past due to advanced technologies used in food production and processing (Feudtner 2011)

People may avoid walking thanks to modern transportation technology, and the transition from manual to machine labor has resulted in a decline in physical activity. An accelerated diabetes epidemic is caused by a number of variables, including a high rate of smoking, excessive alcohol consumption, a high consumption of refined carbohydrates, and a decline in physical activity. One of the main causes of the global epidemic of type 2 diabetes mellitus and rising obesity is excessive calorie intake (Feudtner, 2011).

2.1.1.1 Smoking

Smoking cigarettes is a risk factor for type 2 diabetes on its own. According to a study, smokers had a 45% higher chance of getting diabetes than non-smokers. Additionally, a correlation was found between the risk of diabetes and the quantity of cigarette smoked (Willi et al., 2007).

2.1.1.2 Alcohol use

Drinking alcohol in moderation is linked to a lower risk of developing diabetes. Excessive calorie intake and obesity, elevated triglyceride levels, pancreatitis, disruption of glucose and carbohydrate metabolism, and liver impairment are only a few of the detrimental metabolic effects of heavy alcohol consumption. More people are adopting westernized lifestyles, which are represented by drinking and wealth, as a result of the rising rates of excessive drinking among the urban middle and upper classes (Koppes et al., 2005).

2.1.2 Blood-glucose monitoring

Since self-monitoring blood glucose provides the patient with regular feedback, it is seen as an excellent tool for managing diabetes. The frequency of testing is determined individually. Decisions can be informed by monitoring. HbA1c measurement and blood glucose monitoring are used to accomplish this. A glucometer can detect both hypoglycemia and hyperglycemia and provides a direct measurement of the glucose concentration at the time of the test.

Patients should receive instruction on how to use blood glucose monitoring devices and what to do in response to the results (Tidy, 2014).

Self-monitoring of blood glucose has been found to be effective for patients with type 1 diabetes mellitus and for patients with type 2 diabetes mellitus using insulin. Evidence suggests that self-monitoring of blood glucose is of limited clinical effectiveness in improving glycaemic control in people with Type 2 Diabetes Mellitus on oral agents or diet alone (Clar *et al.*, 2010).

American Diabetes Association recommends self-monitoring of blood glucose (SMBG) at least once per day and at least two HbA1c tests in a year (ADA, 2015)

2.1.3 Adherence to medication

Optimal adherence helps maintain blood glucose levels within target ranges, reduces the risk of complications, and improves quality of life (Powers et al., 2020). Conversely, poor adherence to medication is a widespread challenge that undermines effective diabetes management globally.

Globally, non-adherence to diabetes medication remains a major barrier to achieving glycemic control. Studies estimate that only 50–60% of individuals with T2DM adhere adequately to their prescribed treatment regimens (Jimmy & Jose, 2011; Khattab et al., 2010). In developed countries, despite better access to healthcare, medication adherence is often affected by psychological factors such as depression, denial, and treatment fatigue (Krapek et al., 2004).

Empirical studies have demonstrated that patients who adhere to medication regimens achieve better glycemic control, have fewer hospitalizations, and experience lower mortality rates (Polonsky & Henry, 2016). Interventions such as diabetes education, use of reminder systems, and patient-centered counseling have been shown to significantly improve adherence (Powers et al., 2020).

In Sub-Saharan Africa (SSA), poor adherence to diabetes medication is a common problem, often resulting from a combination of economic, social, and health system factors. A study conducted in Nigeria reported that only 45% of patients adhered to prescribed oral hypoglycemic agents, with cost of medication and forgetfulness cited as major barriers (Fadare et al., 2015). Similarly, research in Ethiopia and Tanzania found that low health literacy, long distances to health facilities, and frequent stock-outs of medicines contributed to poor adherence (Mogre et al., 2019; Mumu et al., 2020).

Cultural beliefs and reliance on traditional medicine further complicate adherence in the region. Some patients alternate between conventional and herbal therapies due to mistrust of modern medicine or misconceptions about diabetes being curable (Mohammed et al., 2019). Limited healthcare provider follow-up and inadequate counseling also weaken patients' understanding of their treatment regimen, leading to medication discontinuation or irregular use. These challenges highlight the need for context-specific adherence interventions that address socioeconomic realities and cultural beliefs in SSA.

In Kenya, medication adherence among diabetes patients remains suboptimal. The Kenya STEPwise Survey (2015) reported that many individuals with diagnosed diabetes were not taking their medication regularly, primarily due to high cost of drugs, limited supply in public facilities, and poor knowledge of diabetes management. Studies conducted in Nairobi and Kisumu revealed that medication adherence was significantly associated with educational level, income status, and duration of illness (Mohamed et al., 2018; Otieno et al., 2020). Patients who had received diabetes education and counseling were more likely to adhere to their prescribed medications compared to those who had not.

In rural areas, including Murang'a County, barriers such as financial constraints, long travel distances to clinics, irregular drug supply, and lack of continuous patient education hinder consistent medication use. Some patients resort to skipping doses or using herbal alternatives when medicines are unavailable or unaffordable (Kimani et al., 2022).

Adherence to medication is a cornerstone of diabetes self-care, yet numerous patient-related, socioeconomic, and system-level barriers impede consistent drug use. However, in Sub-Saharan Africa and Kenya, structural and contextual factors particularly poverty, limited drug access, and cultural perceptions remain major obstacles. There is a need for localized research and tailored interventions to identify specific barriers and strategies that can enhance medication adherence among T2DM patients, particularly in rural settings such as Kirwara Sub-County Hospital.

A lower risk of complications from diabetes, a lower death rate, and a lower financial burden are all linked to good medication adherence. However, only 67–85% of oral medicine doses and roughly 60% of insulin doses are taken by people with Type 2 Diabetes Mellitus, indicating that a significant percentage of patients do not take their medications as directed.

Patient-related, condition-related, socioeconomic, health system-related, and therapy-related factors all influence adherence (McGovernet al., 2016). There was a robust correlation between lower HbA1c levels and higher adherence-satisfaction with taking medication and checking blood glucose (Daly et al., 2009).

2.5 Cultural related factors

Cultural beliefs and practices significantly shape individuals' perceptions, attitudes, and behaviors toward health and illness, including chronic conditions such as diabetes mellitus. In the context of diabetes management, culture influences dietary habits, physical activity, health-seeking behavior, and the acceptance or rejection of biomedical treatment (Nam et al., 2011; WHO, 2023).

Globally, cultural beliefs play a key role in how individuals interpret the cause and management of diabetes. In many societies, chronic diseases like diabetes are viewed through cultural and religious lenses that influence adherence to medical advice (Nam et al., 2011). For instance, in some Asian and Middle Eastern cultures, illnesses are perceived as a result of spiritual or moral imbalance, prompting patients to seek traditional or faith-based remedies instead of biomedical treatment (Al-Sahouri et al., 2019).

Furthermore, cultural norms affect dietary practices, which are central to diabetes self-care. Similarly, fasting during religious observances such as Ramadan poses challenges for blood glucose control among Muslim patients (Hassanein et al., 2021).

Healthcare providers' cultural competence—the ability to understand and respect patients' cultural backgrounds—has been identified as a key determinant of effective diabetes management. Patients are more likely to engage in self-care behaviors when healthcare services are culturally sensitive and aligned

with their beliefs and practices (Clement et al., 2020).

In sub-Saharan Africa (SSA), cultural beliefs and traditional health practices significantly influence diabetes self-care. Many community attribute diabetes to supernatural causes such as curses, witchcraft, or divine punishment (Mogre et al., 2019; Adeniyi et al., 2016). Consequently, patients may first seek help from traditional healers, herbalists, or spiritual leaders rather than biomedical facilities. This delay in seeking formal medical care often results in poor glycemic control and increased complications (Mohammed et al., 2019).

Cultural dietary patterns in SSA also play a central role. Staple foods such as maize meal, cassava, and yams are high in carbohydrates, making it difficult for patients to adhere to recommended low-glycemic diets (Mogre et al., 2019). In some communities, obesity is culturally associated with prosperity and good health, discouraging individuals from maintaining a healthy weight (Adeniyi et al., 2016).

Gender norms and social roles further compound the challenge. In patriarchal societies, women may have limited autonomy over food choices and healthcare decisions, which affects their ability to adhere to dietary or medical recommendations (Osei-Yeboah et al., 2021). Additionally, stigma associated with diabetes as a "disease of the wealthy" or a sign of laziness leads some individuals to conceal their condition, limiting social support and adherence to self-care routines (Kretchy et al., 2014).

In Kenya, cultural beliefs and traditional practices remain important determinants of diabetes self-care, particularly in rural settings such as Murang'a County. Several studies have shown that some patients perceive diabetes as a temporary or curable illness, leading them to seek herbal or spiritual remedies rather than adhering to long-term biomedical treatment (Kimani et al., 2022; Otieno et al., 2020). Traditional healers play a major role in community health, and their advice often competes with biomedical guidance from healthcare workers.

Food-related cultural practices also influence self-care behaviors. For instance, staple foods such as ugali, potatoes, and bananas are deeply rooted in the Kikuyu culture and are consumed in large portions, making dietary modification challenging (Karanja et al., 2019). Religious fasting among Christian and Muslim populations can disrupt medication schedules and meal timing, negatively affecting glycemic control.

Moreover, social perceptions of illness and gender roles influence diabetes care in Kenyan households. Men are often reluctant to seek medical help due to cultural notions of masculinity, while women may prioritize family responsibilities over self-care (Mohamed et al., 2018). Cultural attitudes toward body size also impact self-care, with overweight individuals sometimes viewed as healthy and prosperous, reducing motivation for weight control or physical activity (Githinji et al., 2021).

Cultural-related factors profoundly affect diabetes self-care practices by shaping individuals' health beliefs, dietary habits, and treatment choices. Globally, cultural food preferences and religious practices pose challenges to adherence, while in Sub-Saharan Africa and Kenya, reliance on traditional medicine, gender norms, and cultural interpretations of disease significantly hinder self-care. Effective diabetes management interventions must therefore be culturally sensitive, integrating local beliefs, community structures, and culturally tailored education to promote better self-care among T2DM patients.

Cultural influences interfere with successful self-care of diabetes mellitus. Understanding the influence of culture is necessary in identifying the barriers to self-care and improves the disease outcomes. Cultural competence is crucial for all health care providers since individuals of all racial and ethnic groups have

health-related beliefs, attitudes, and values (Catherine et al., 2009). The identification and interpretation of symptoms are influenced by cultural influences. Ethnicity may have an impact on how the community and families view and care for individuals with diabetes as well as how they engage with medical professionals (Chandra, 2012).

2.1.4 Health beliefs and behaviors

Beliefs may contribute to low self-care practices. According to Owens et al. (2006), many Somali ethnic groups feel that fat is beautiful and that having a bigger, rounder body is a sign of riches, prosperity, and good health.

A study in Nigeria showed that some patients with diabetes type two believed that herbalists could cure diabetes. More women compared to men sort for alternative forms of treatment due to their lower socioeconomic status (Nwankwo, 2004).

Diabetes is frequently thought to be a result of eating too much sugar, stress, anxiety, or as a punishment for bad behavior. Many traditional health systems are incompatible with the concept of a chronic illness. One could consider it an atrocity that ongoing lifetime treatment is required. In certain American tribes, research has revealed that Native Americans seek ritual healing from spiritual healers who utilize herbs to treat their ailments. They contend that ritual healing brings equilibrium back to the body, mind, and soul (ADA, 2015).

The affected people frequently made a commitment to leading balanced and harmonious lives in terms of their diet, exercise, social interactions, prayer, and sleep. Herbs with hypoglycemic properties, such as copalquin, garlic, onion, and prickly pear cactus, were frequently used.

According to rural Southern African Americans, diabetes, often referred to as sugar or sweet blood in their culture, is brought on by an imbalance in the consumption of sugary and starchy foods, which is exacerbated by excessive stress and anxiety (ADA, 2015).

Praying, believing in God, and using bitter foods, herbs, and fruits like lemon, garlic, and juniper berries to balance blood sugar were common remedies. Diabetes was a part of the traditional Chinese medical system that Chinese Americans adopted.

Traditionally, diabetes was viewed as a hot or yang disease that could be cured with cold or yin treatments. It was thought that ginseng might heal diabetes and restore vigor, thus it was utilized as a cooling herb. Patients from Puerto Rico and Mexico think that diabetes is the consequence of God's will or punishment, or that they eat too much sugar. They treated diabetes with herbs and prayers. They claimed that the latter helped them feel more at ease, which helped their diabetes (ADA, 2015).

In Africa, cultural and economic problems exacerbate the difficulties faced by those with type 2 diabetes. Because Africans usually only eat one large meal each day, blood sugar levels rise significantly after the meal has been processed. The lack of doctors in Kenya and the fact that over half of them live in cities mean that individuals in rural areas do not receive enough medical care (Reimer et al., 2001).

Those who live in rural areas must drive a considerable distance to access diabetes clinics, which are typically found at hospitals in towns. The availability of traditional healers, whose beliefs are more culturally acceptable, leads patients to seek treatment through traditional means. Furthermore, traditional healers have made it easier for their clients to pay them; they will take payments in the form of farm

products or domestic animals, which makes their services more cost-effective than those of modern health experts (Mc Ferran, 2008).

2.1.5 Religious beliefs

Although spiritual and religious beliefs and practices can help people cope with chronic illnesses by offering them hope, support, and confidence, they can also get in the way of effective coping because people may neglect self-care practices in favor of prayer or meditation. A study on the impact of spiritual and religious beliefs and practices on diabetes self-care in African American adults was conducted in the United States. It looked at the relationship between spirituality, religion, and diabetes self-care practices, such as diet, exercise, blood glucose self-testing, and foot care practices. According to the study, those who performed better on tests of social support, spiritual and religious beliefs and practices, and self-care for diabetes engaged in more diabetes-related activities and smoked less (Watkins et al., 2013).

Among Muslims, fasting is a very important religious practice. Ramadan is a time when people fast from sunrise until sunset. Despite the possibility of fasting exemptions for those who are ill, many diabetics do not believe they are sick enough to qualify for this exemption (Reimer et al., 2001).

Participants in a survey of Muslims stated that they accepted their fate because they believed that getting diabetes was Allah's decision and consequently beyond their control. The majority of them believed that following dietary guidelines was the responsibility of an ill person and ascribed their views and self-care practices to Allah's will.

Poor diabetes control, particularly during Ramadan fasting, was caused by some Muslim participants' attitude of enjoying life and leaving the rest to Allah, despite the fact that the majority of participants were worried about the consequences of inadequate diabetes control (Naeem, 2003).

A qualitative study of type 2 diabetes patients in Kuwait revealed that their God-centered locus of control and fatalism affected their adherence to medication and other diabetes self- care practices. Many participants stated that while medications may help manage diabetes, they believed that only God could heal the condition (Alhaddad, 2015).

2.1.6 Dietary practices

Dietary practice is one of the most crucial aspects of diabetes self-care, directly influencing blood glucose control and long-term health outcomes. Appropriate dietary management involves adherence to individualized meal plans that balance carbohydrate intake, portion size, and nutrient composition (American Diabetes Association [ADA], 2023). Despite widespread knowledge of dietary recommendations, many individuals with Type 2 Diabetes Mellitus (T2DM) struggle to maintain consistent and healthy eating behaviors due to cultural, socioeconomic, and behavioral factors (Powers et al., 2020).

Factors contributing to poor dietary adherence include lack of nutritional knowledge, social influences, food preferences, and emotional eating (Ndanuko et al., 2016). In addition, fast food culture and urbanization have increased the availability of calorie-dense, nutrient-poor foods, leading to rising obesity and diabetes prevalence worldwide (WHO, 2023). Interventions focusing on nutrition education, counseling, and self-monitoring have been found to improve dietary behaviors and self-care outcomes among diabetes patients globally (Powers et al., 2020).

In Sub-Saharan Africa (SSA), dietary practices are often shaped by cultural, economic, and environmental factors. Many traditional diets in the region are carbohydrate-based, relying heavily on staple foods such as maize, cassava, yam, and rice (Mogre et al., 2019). Although these foods provide energy, they often contribute to postprandial hyperglycemia among T2DM patients. Limited access to affordable, diverse, and healthy foods poses a significant challenge to diabetes self-care in low-income populations (Adeniyi et al., 2016).

Educational interventions have proven effective in improving dietary practices among T2DM patients in SSA. For instance, patients who received dietary counseling from health professionals were more likely to adhere to meal plans and achieve better glycemic control (Osei-Yeboah et al., 2021). However, inconsistent dietary counseling and limited nutrition education in many health facilities continue to hinder dietary self-management in the region (Mohammed et al., 2019).

In Kenya, dietary practices remain a major determinant of diabetes self-care outcomes. The Kenya STEPwise Survey (2015) indicated that poor dietary habits, including high consumption of refined carbohydrates, fried foods, and sugary beverages, are prevalent among individuals with T2DM. Economic constraints, limited access to diverse foods, and low awareness of proper nutrition contribute to poor adherence to recommended diets (Mohamed et al., 2018).

Studies conducted in Nairobi, Kisumu, and Murang'a have shown that most diabetes patients struggle to follow prescribed meal plans due to food insecurity, cultural food preferences, and misconceptions about diabetes-friendly diets (Karanja et al., 2019; Kimani et al., 2022). For instance, staple foods such as ugali, matoke, rice, and potatoes—often consumed in large portions—make carbohydrate moderation difficult. In addition, family eating patterns and cultural expectations surrounding communal meals influence individual dietary choices, especially in rural communities (Githinji et al., 2021).

Access to diet counseling remains limited in many Kenyan healthcare facilities. Patients often report receiving minimal guidance on what to eat, relying instead on informal advice or personal experience (Otieno et al., 2020). This lack of professional dietary support, combined with economic and cultural barriers, makes sustained dietary adherence a challenge for diabetes patients attending rural hospitals such as Kirwara Sub-County Hospital.

Dietary practices are fundamental to effective diabetes self-care, yet maintaining appropriate eating habits remains challenging across different settings. Globally, factors such as poor nutritional knowledge and modern dietary patterns hinder adherence, while in Sub-Saharan Africa, socioeconomic constraints and cultural food traditions exacerbate poor dietary control. In Kenya, challenges are intensified by limited dietary education, cultural preferences for high-carbohydrate staples, and financial limitations. Addressing these barriers requires culturally sensitive nutritional education, improved access to affordable healthy foods, and individualized diet counseling to enhance dietary adherence and overall self-care among T2DM patients.

Food is used in ways that are defined by culture. Economic, familial, psychological, emotional, and religious variables all influence a person's diet.

According to diabetic diet prescriptions, following the standard food measurements often leads to needless limitations, overindulgence, and repetitive ingestion of specific foods.

Reducing consumption of refined sugars, carbs, and foods that release glucose during digestion is the mainstay of the conventional diabetic treatment. Dietary reductions in carbohydrate intake may result in unhealthy levels of protein and fat. This is typically the result of cultural misunderstandings regarding the significance of diet in diabetes control, poverty, and illiteracy (Asif 2014).

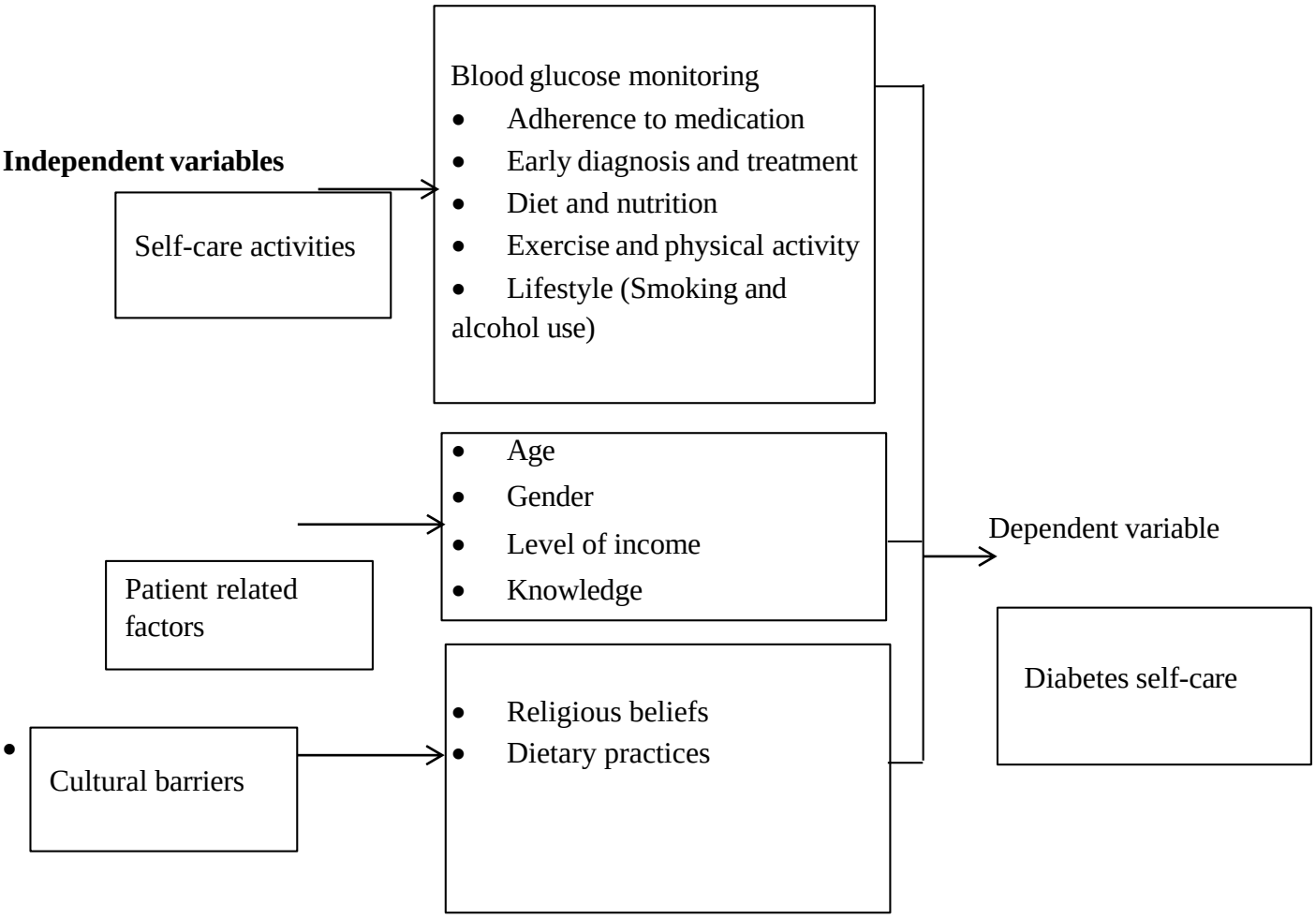
Low income and food costs are the most challenging aspects of diabetes self-care management for certain patients, who may not follow the recommended diet because they lack the skills to measure their food intake. Kenyans typically have a diet high in starches, with sporadic meat and little amounts of fruits and vegetables. Many Kenyan tribes eat little vegetables, even though the nation produces a lot of them for export (Suren, 2006). As per Ayurveda Kenya (2014), diabetic patients should cut out all sugar-containing foods, such as wheat, rice, potatoes, sugar, sugar cane, and sweet fruits; consume homemade cottage cheese and different types of soured milk, like curd and butter milk; cut back on fats, particularly butter and ghee; include at least one bitter dish at each meal; and eat a lot of green vegetables. Raw herbs and vegetables help to increase insulin synthesis and stimulate the pancreas (Ayurveda, 2014).

2.6 Overall summary

The reviewed literature highlights that barriers to diabetes self-care are multifaceted, spanning individual, social, cultural, and systemic domains. While knowledge, motivation, and self-efficacy are vital for effective diabetes management, socioeconomic and cultural contexts largely determine patients' ability to apply self-care principles.

Globally, the emphasis has been on structured education and lifestyle interventions, yet in Sub-Saharan Africa and Kenya, systemic and contextual challenges such as poverty, inadequate health literacy, cultural practices, and weak healthcare infrastructure continue to impede progress.

2.5 Conceptual framework (Source: Hossein et al., 2016)



CHAPTER THREE: METHODOLOGY

3.1 study area

The study was carried out at Kirwara sub-County Hospital which is in Gatanga sub-County. Gatanga sub-County is one of the seven sub-counties that form Muranga County. The population density of the sub-county is 366 people per square kilometer, with 178,248 people living there.

Kirwara sub-County Hospital serves the people of Gatanga sub-County which has six wards that is Kariara, Gatanga, Kihumbu-ini, Mugumoini, Ithanga, Kakuzi/Mitubiri. It also serves patients from Thika and Kandara. The hospital has many departments, one of which is the Diabetic Clinic. The average number of registered diabetic patients monthly in Kirwara sub-County Hospital is 420 (Diabetes Logbook Kirwara sub-County Hospital, 2019).

3.2 Study population

Type two diabetes mellitus patients attending Kirwara sub-County Hospital.

3.3 Study design

A cross-sectional study was used. It was chosen since it was cheap to conduct, less time-consuming and appropriate since data was collected at a point in time.

3.4 Sample size determination

Fishers *et al*., (1998) formula was used to calculate the sample size.

$$\mathbf{n} = \frac{\mathbf{z^2\, p\, q}}{\mathbf{d^2}}$$

Where, **n** = desired sample size

z = Standard normal deviate of 1.96 which corresponds to 95% confidence level

p = 50% = 0.5 (50% was used because the characteristic of interest which is the number of diabetic patients practicing self -care was not known)

d = degree of accuracy +/- 0.05%

q = 1 - p

Therefore, $\mathbf{n} = \frac{\mathbf{z^2\, p\, q}}{\mathbf{d^2}}$

$= \frac{1.96^2 \times 0.5 \times 0.5}{(0.05)^2}$

$= \frac{0.9604}{0.0025}$

n= **384**

Since the target population is less than 10,000, the formula below was used to get the desired sample size

$$\mathbf{nf} = \frac{\mathbf{n}}{\mathbf{1 + n/N}}$$

Where **nf**= the desired sample size (when the population is less than 10,000)

n = the desired sample (when the population is more than 10,000)

N = the estimate of the population size (420)

$$\mathbf{nf} = \frac{\mathbf{n}}{\mathbf{1 + n/N}}$$

$= \frac{\mathbf{384}}{\mathbf{1+384/420}}$

= **200**

The desired sample size = 200 patients

3.5 Sampling technique

Systematic sampling technique was used. Kirwara sub-County Hospital diabetic clinic has about 420 registered patients with type two diabetes mellitus. The data was collected within a period of one month. The sampling interval was calculated by dividing the total expected study population by the sample size and was given by:

420 = 2

200

If a participant did not meet the inclusion criteria, it was removed from the study and replaced with any number from 1 to 420 which had not been selected.3.6 Inclusion criteria

The study included:

- All patients with type two diabetes mellitus attending diabetes clinic at Kirwara sub-County Hospital.

3.7 Exclusion criteria

The study excluded:

- Patients with Type 2 Diabetes Mellitus in Kirwara sub-County Hospital who were mentally challenged.
- Those who were critically ill during data collection.

3.8 Data collection

The data was collected using an interviewer-administered questionnaire. The questionnaire had four sections: (Part A) socio-demographic information (Part B) self-care activities, (Part C) patient related factors and (Part D) cultural factors among type two diabetics' patients.

Questionnaire collected data on dependent and independent variables. Dependent variable: Diabetic self-care practices Independent variable: Patient related barriers, and barriers to optimal self-care

A semi-structured questionnaire was administered to the diabetes type two patients while at the clinic. It had open ended questions and closed ended questions. The researcher administered the questionnaires to the patient respondents and made clarifications as well as assists those who could not be able to read and write.

3.9 Data analysis

The data collected was entered into a computer and analyzed using SPSS software. Compliance with diabetic self-care practices was assessed using a 100% adherence threshold, meaning that only patients who consistently performed all recommended self-care activities were considered compliant. According to the American Diabetes Association (ADA, 2017), full compliance with self-care behaviors including proper diet, physical activity, medication adherence, and regular monitoring plays a critical role in improving glycemic control, preventing complications, and enabling individuals with diabetes to live longer and healthier lives. This methodological approach ensured both rigorous statistical analysis and alignment with internationally recognized standards for diabetes management

During data analysis, for a person to have 100% compliance, that is, to have good diabetic self-care, one must be having a monitored blood glucose, adhering to medication, having a meal plan and how often they use this meal plan was used to check if the patient is having good diabetic self-care.

Missing compliance to any or all of the stipulated self-care activities, the results during data analyses will be poor diabetes self- care.

Patient related and cultural factors were also analyzed, and the data was translated into graphs and charts with respective details below each of them as per question in the study tool. Each question was from three

sections in the study tool which consisted of independent variables that is self-care activities, patient related barriers and cultural barriers where data was collected from.

To examine patient-related factors and cultural barriers, the Chi-square test of independence was applied, allowing for the identification of any statistically significant associations. NVivo software was used to analyze open ended questions and main steps used were: Familiarization with the data, Generating initial codes, generating themes, Reviewing potential themes, Definition and naming themes.

A p-value of less than 0.05 was deemed to indicate statistical significance, and a result above the mean value indicated a good self-care practice. Good self-care was defined by the mean calculation. Correlation analyses was used to establish the significant association at p-value <0.05.

3.10 Data presentation and dissemination

Data was presented using tables, frequency charts, bar charts and pie charts to summarize responses for further analysis, interpretation and facilitation of comparison. Dissemination was done to Moi University School of Public Health and Kirwara sub-County Hospital Management. Publication of the study findings will be made as well as presentations to various diabetes conferences.

3.11 Ethical consideration

The Institutional Research and Ethics Committee (IREC) of Moi University and Moi Teaching and Referral Hospital gave ethical approval, while Kirwara sub-County Health Management granted authorization to conduct study in the hospital. The study participants gave their consent as well. No participant was forced to take part in the research. The researcher gave the respondents assurances of anonymity and confidentiality. The questionnaire used did not include the names or any other identifiers of the participants.

3.12 Study limitations

The study relied heavily on the feedback of participants. The participant in some instances gave information that they were uncomfortable in disclosing on matters considered as personal. This was overcome by assuring the respondent confidentiality.

It was a challenge to do a follow up response to measure the level of practice of self-care activities which could help to validate the initial responses since a cross-sectional study was conducted. This was addressed by ensuring the questions adhered to measure of level of practice of self-care activities in the questionnaire.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the findings of the study as per specific objectives. The findings were presented thematically comprising of socio-demographic and economic characteristics, self-care activities, patient related and cultural barriers. The data obtained in this section were keyed in spreadsheet, analyzed using

statistical package for social sciences software and the results presented as appropriate as narratives and in tables and figures.

4.2 The response rate

The number of questionnaires administered were 200 and the same number were received back, giving a response rate of 100%.

4.3 Socio-demographic and economic characteristics

The variables assessed under socio-demographic and economic characteristics include: Number of respondents per ward living with diabetes disease, occupation and level of education. The study findings revealed that Gatanga Ward had the highest number of residents living with diabetes at 37% followed by Kariara Ward at 31% while Landless Ward, Kimathi Ward and Matara Ward had the least at 0.5% each. The study showed that most (50.5%) of the respondents' current occupation was agriculture which encompassed farming and rearing animals to provide food and other products. Three percent (3%) did domestic service, which included taking care of children, cleaning, cooking and gardening. The study findings revealed that majority (36%) of the study respondents had attained secondary school level of education, 30% had attained the primary school level

, 19% had attained the tertiary level while 15% had no formal education as shown in table 4.1 below:

Table 4.1: Distribution of study respondents by socio-demographic and economic characteristics

Variable	Value label	Frequency (N)	Percentage (%)
Number of respondents per ward living with diabetes disease.	Kariara ward	62	31%
	Mugumoini ward	28	14%
	Kihumbuini ward	24	12%
	Gatanga ward	74	37%
	Ithanga ward	4	2%
	Kandara ward	5	2.5%
	Landless ward	1	0.5%
	Kimathi ward	1	0.5%
	Matara ward	1	0.5%
	Total	**200**	**100**
Occupation	Retirees	16	8%
	Professional	3	1.5%
	Unskilled manual	36	18%
	Businesswoman/man	13	6.5%
	Agriculture	101	50.5%
	Domestic service	3	1.5%
	Others specification not working	21	10.5%

	Technical/managerial	7	3.5%
	Total	**200**	**100**
Level of education	Primary school	60	30%
	Secondary school	72	36%
	Tertiary	38	19%
	No formal education	30	15%
	Total	**200**	**100**

4.4 Self-care activities

The variables assessed under self-care activities included knowledge on diabetes, use of diabetes meal plan, physical exercise activities, psychosocial support group, use of recommended meal plan, alcohol consumption, use of tobacco, blood sugar checking, comorbidities and procedures done in the last 12 months. The results of the study indicated that majority (96%), of the respondents were aware of their disease status. Furthermore, 81% of the participants had established a meal plan. Additionally, only 29% reported that they engaged in regular exercise, whereas 48.50% either never exercised or did so infrequently. The study showed that 31% of the respondents were not on any psychosocial support group while 69% belonged to a support group. Approximately 17.5% of the respondents stated that they drink alcohol while 82.5% didn't. About 7.50% of the respondents said they used tobacco while 92.5% stated that they don't use tobacco while 45.5% stated that they check blood sugar at home while 54.5% said that they don't check. The respondents blood sugar levels were noted to be between 5 to 9.5 range. This was in comparison to the normal range of between 3.9 to 5.6. About half, (53.3%) of the study respondents revealed that they have had their weight checked in the last twelve months and only 0.5% have had dilated eye examination as shown in table 4.2 below:

Table 4.2: Distribution of study respondents by self-care activities. (N=200)

Variable	Value label	Frequency (N)	Percentage (%)
Knowledge on diabetes	Yes	192	96%
	No	8	4%
Use a diabetic meal-plan	Yes	162	81%
	No	37	18.5%
Physical exercise activities	Never or rarely	97	48.5%

	2 times per week	35	17.5%
	3 times per week	7	3.5%
	4 times per week	5	2.5%
	Everyday	56	28%
Have a psychosocial support group	Yes	138	69%
	No	62	31%
Use of recommended meal plan	Always	38	19%
	Sometimes	88	44%
	Rarely	43	21.5%
	Never	31	15.5%
Alcohol consumption	Yes	35	17.5%
	No	165	82.5%
Use of tobacco	Yes	15	7.5%
	No	185	92.5%
Blood sugar checking	Yes	91	45.5%
	No	109	54.5%
Blood sugar range	5-9.5 mmol/L	65	32.6%
	10-14.5 mmol/L	40	20%
	15-19.5 mmol/L	27	13.7%
	20-25.5 mmol/L	51	25.3%
	25-30 mmol/L	15	7.3%
	30-35.5 mmol/L	2	1.1%
Comorbidities	Yes	139	69.5%
	No	61	30.5%
Procedure done in the last 12 months	Dilated eye exam	1	0.5%
	Dental exam	2	1%
	Weight	107	53.5%
	Eye exam blood pressure	2	1%
	Blood pressure and weight	46	23%
	Dilated eye exam and blood pressure	23	11.5%
	Blood pressure and foot exam	12	6%
	Dilated eye exam, foot exam	4	2%
	Foot exam	3	1.5%

4.1.1 Chi-square analysis test

A Chi-square test was carried out. The variables that showed significant association ($p<0.05$) with diabetes self-care was knowledge on use of diabetic meal plan, physical exercise activities, alcohol consumption, tobacco smoking, blood sugar checking and blood sugar range. The other variables that include psychosocial support group ($p=0.026$) and comorbidities ($p=0.103$) did not show any significant association with diabetes self-care as shown in table 4.3 below.

Table 4.3: Chi-square test showing the level of diabetic self-care and its statistical significance

Variable	Category	High Self-care	Low Self-care	Significance at p<0.05
Knowledge on diabetes	Yes	187 (93.5%)	5 (2.5%)	$\chi2$ =4.548,
	No	1 (0.5%)	7 (3.5%)	df=1, p=0.0005*
Use a diabetic meal-plan	Yes	153 (76.5%)	9 (4.5%)	$\chi2$ =9.331,
	No	3 (1.5%)	34 (17%)	df=1, p=0.000*
Physical exercise activities	Never or rarely	4 (2%)	93 (46.5%)	$\chi2$ =1.509,
	2 times per week	10 (5%)	25 (12.5%)	df=4, p=0.000*
	3 times per week	6 (3%)	1 (0.5%)	
	4 times per week	4 (2%)	1 (0.5%)	
	Everyday	54 (27%)	2 (1%)	
Have a psychosocial support group	Yes	96 (48%)	42 (21%)	$\chi2$ =2.533,
	No	16 (8%)	46 (23%)	df=1, p=0.026
Use of recommended meal plan	Always	35 (17.5%)	3 (1.5%)	$\chi2$ =8.061,
	Sometimes	49 (24.5%)	39 (19.5%)	df=3, p=0.001*
	Rarely	7 (3.5%)	36 (18%)	
	Never	1 (0.5%)	30 (15%)	
Alcohol consumption	Yes	2 (1%)	33 (16.5%)	$\chi2$ =3.297,
	No	160 (80%)	5 (2.5%)	df=1, p=0.000*
Use of tobacco	Yes	0	15 (7.5%)	$\chi2$ =4.749,
	No	162 (81%)	23 (11.5%)	df=1, p=0.000*
Blood sugar checking	Yes	87 (43.5%)	4 (2%)	$\chi2$ =3.557,
	No	75 (37.5%)	34 (17%)	df=1, p=0.000*
Blood sugar range	5-9.5 mmol/L	65 (32.5%)	0	$\chi2$ =10.231,
	10-14.5 mmol/L	23 (11.5%)	17 (8.5%)	df=5, p=0.000*
	15-19.5 mmol/L	15 (7.5%)	12 (6%)	
	20-25.5 mmol/L	2 (1%)	49 (24.5%)	
	25-30 mmol/L	2 (1%)	13 (6.5%)	
	30-35.5 mmol/L	2 (1%)	0	
Comorbidities	Yes	108 (54%)	31 (15.5%)	$\chi2$ =10.218,
	No	54 (27%)	7 (3.5%)	df=1, p=0.103

* Significant at p< 0.05

4.1.2 Correlation analysis test Based on the findings

Using a Meal Plan: How often someone uses a recommended meal plan makes a big difference. People who use a meal plan more often (even just sometimes or rarely compared to never) are much more likely to have high self-care.

Things like physical elements, how much someone avoids risks, whether they smoke, check their blood sugar, and have other diseases, didn't show statistical significance, suggesting they do not independently contribute to predicting the outcome as indicated in table 4.4 below:

Table 4.4: Logistic Regression

Predictor	Coefficient (B)	Standard Error (S.E.)	Wald Statistic	df	Significance (Sig.)	Odds Ratio (Exp(B))
Physical elements (1)	0.688	0.619	1.236	1	0.266	1.989
Risk avoidance (Overall)			0.337	3	0.953	
Use of recommended meal plan (Overall)			32.376	4	0	
Tobacco Taking (1)	-0.606	0.956	0.402	1	0.526	0.545
Checking blood sugar at home (1)	-0.055	0.462	0.014	1	0.905	0.946
Any other disease (1)	0.138	0.38	0.131	1	0.717	1.148

4.5 Patient-related factors

The variables assessed under self-care activities include, taking of diabetes drugs, family history of diabetes, missing of drugs, checked by a health worker and reasons for missing of drugs. The study findings revealed that, most (74%) of the respondents were taking oral drugs, 15.65% were taking both insulin and oral drugs, 9.65% were on insulin only, The study showed that 45% of the respondents agreed that they have family history of diabetes and 55% have no history of diabetes.30% of the respondent's miss drugs at regular

intervals, 23.5% missed one or more a week, 1.00% once per day and 2.5% one or more a day. The study revealed that 55% of the respondents said they are checked weekly by a health worker and 19.0% rarely checked their blood sugars. Most, (33%) of the respondents said the main reason for missing drugs was lack of money to buy drugs, as shown in table
4.5 below:

Table 4.5: Distribution of study respondents by patient related factors

Variable	Value label	Frequency (N)	Percentage (%)
Taking of diabetes drugs	Both Insulin and oral drugs	31	15.5%
	Insulin only	19	9.5%
	Oral drugs only	148	74%
	None	2	1%
	Total	**200**	**100**
Family history of diabetes	Yes	90	45%
	No	110	55%
	Total	**200**	**100**
Missing of drugs	Once per day	2	1%
	Two or more a day	5	2.5%
	One or more a week	47	23.5%
	At regular interval	60	30%
	I don't miss	86	43%
	Total	**200**	**100**
Checked by a health	Rarely or never	38	19%

worker	Every 2-3 months	8	4%
	Monthly	3	1.5%
	Weekly	110	55%
	Daily	22	11%
	Every 4-6 months	19	9.5%
	Total	**200**	**100**
Reasons for missing drugs	I can't afford drugs prescribed	66	33%
	I forgot	27	13.5%
	I use alternative or traditional medicines	2	1%
	I have side effect problems	16	8%
	I shake a lot.	3	1.5%
	I don't miss	86	43%
	Total	**200**	**100**

4.5.1 Chi-square analysis test showing statistical significance between patient related factors and diabetic self-care

A Chi-square test was carried out. The variables that showed significant associations ($p<0.05$) with diabetes self-care included taking of diabetes drugs, missing of drugs and family history of diabetes.

Table 4.6: Chi-square test: Relationship between patient related factors and diabetes self-care

Variable	Category	High Self-care	Low Self-care	Significance at p<0.05
Taking of diabetes drugs	Both Insulin and oral drugs	28 (14%)	3 (1.5%)	$\chi2$ =9.104, df=3, p=0.001*
	Insulin only	15 (7.5%)	4 (2%)	
	Oral drugs only	77 (38.5%)	71 (35.5%)	
	None	0	2 (1%)	
Missing of drugs	Once per day	1 (0.5%)	1 (0.5%)	$\chi2$ =3.296, df=4, p=0.000*
	Two or more a day	1 (0.5%)	4 (2%)	
	One or more a week	0	47 (23.5%)	
	At regular interval	0	60 (30%)	
	I don't miss	85 (42.5%)	1 (0.5%)	
Family history of diabetes	Yes	4 (2%)	86 (43%)	$\chi2$ =4.531, df=1, p=0.000*
	No	97 (48.5%)	13 (6.5%)	

* Significant at $p< 0.05$

4.5.2 Correlation analysis test

Based on the findings;

- **Taking of diabetes drugs:** The more frequently the study respondents took diabetes drugs without missing, the more likely it increased the chances of having a high diabetes self-care.
- **Checked by a health worker**: The study respondents who were checked by a health worker on weekly basis were found to have a high diabetes self-care.

Table 4.7: Logistic regression

Predictor	Coefficient (B)	Standard Error (S.E.)	Wald Statistic	df	Significance (Sig.)	Odds Ratio (Exp(B))
Taking of diabetes drugs	0.983	1.111	0.784	3	0.002	2.674
Checked by a health worker	0.377	0.174	4.698	5	0.003	4.752

4.6 Cultural barriers

The variables assessed under cultural barriers included cultural beliefs affecting diabetes self-care, religious practices, use of herbal medicine and visiting traditional healers. In this study, 44.5% of the respondents stated that cultural influence affects the way they take care of their diabetic condition. The study revealed that 19% of the respondents stated that religion has influence on the way they take care of diabetic condition. In this study 6.5% of the respondents stated that they have used herbal medicine to cure diabetes Melitus. The study showed that 28% of the respondents visited traditional healers once where they were given alternative medicine as shown in table 4.8 below:

Table 4.8: Distribution of study respondents by cultural barriers

Variable	Value label	Frequency (N)	Percentage (%)
Cultural beliefs affect diabetes self-care	Yes	89	44.5%
	No	111	55.5%
	Total	**200**	**100**
Religious practices	Yes	38	19%
	No	162	81%
	Total	**200**	**100**
Use of herbal medicine	Yes	13	6.5%
	No	187	93.5%
	Total	**200**	**100**
Visited traditional healer	Yes	56	28%
	No	144	72%
	Total	**200**	**100**

4.6.1 Chi-square analysis test

A Chi-square test was carried out. The variables that showed significant association ($p<0.05$) with diabetes self-care were use of herbal medicine and visiting traditional healers as shown in table 4.9 below:

Table 4.9: Chi-square test

Variable	Category	High self-care	Low self-care	Significance at p<0.05
Cultural beliefs affect diabetes self-care	Yes	9 (4.5%)	80 (40%)	$\chi2$ =7.395, df=1, p=0.001*
	No	98 (49%)	13 (6.5%)	
Use of herbal	Yes	5 (2.5%)	8 (4%)	$\chi2$ =8.385,

medicine	No	68 (34%)	119 (59.5%)	df=1, p=0.003*
Visited traditional healers	Yes	7 (3.5%)	49 (24.5%)	$\chi 2$ =4.531, df=1, p=0.000*
	No	45 (22.5%)	99 (49.5%)	

* Significant at p< 0.05

4.6.2 Correlation analysis test

Based on the findings:

Use of herbal medicines: The study respondents who discarded prescribed medicines to use herbal medicines were found to have a lowered diabetes self-care.

Visiting traditional healers: The study respondents who visited traditional healers in place of hospitals were found to have a low diabetes self-care.

Table 4.10: Logistic regression

Predictor	Coefficient (B)	Standard Error (S.E.)	Wald Statistic	df	Significance (Sig.)	Odds Ratio (Exp(B))
Use ofherbal medicines	0.427	0.996	0.862	1	0.000	0.874
Visiting traditional healers	0.624	0.135	1.493	1	0.001	1.425

4.7 Open-ended interviews

Study respondents were interviewed during the study focusing on cultural barriers relating to diabetes self-care. They indicated that social and cultural barriers lead diabetic patients to choose cultural beliefs for management due to several reasons such as limitation of medication access, stigma, and thus they sought medical help only when their condition worsens as indicated in table 4.11 below.

Table 4.11: Open-ended interviews respondent's distribution.

Area of focus	Distribution	Percentage
Health beliefs and behaviors	80	40%
Religious beliefs	60	30%
Dietary Practices	60	30%

4.7.1 Health beliefs and behaviors

A person's perceived capacity to carry out a certain behavior is related to their health beliefs, especially their sense of self-efficacy. These self-efficacy beliefs may have an impact on people's decisions to try particular actions as well as how they will be executed.

Health belief systems are found in every culture, and they explain what causes illness, how to treat or cure it, and who should be engaged. The degree to which patients believe that patient education is relevant to

their culture can have a significant impact on how they respond to material and how likely they are to apply it. Every participant in this study acknowledged that their health attitudes and actions affected their diabetes self-care practices.

4.7.2 Religious beliefs

Ethnic and religious views can affect how patients perceive health, how they manage their health, and how they make health-related decisions. Clinicians may give medical advice without knowing how health beliefs affect how that advice is taken if they are not properly trained.

The study participants reported that some of the religious beliefs in relationship to diabetes drug taking had an influence on the diabetes self-care activities.

4.7.3 Dietary practices

The routine choices a person makes about what to eat are known as dietary habits. Dietary decisions and practices have a big impact on longevity, health, and quality of life. It has the power to define culture and influence religion. Most of the study participants reported that there were some foods which their culture allowed them to take even though the health care workers had recommended them to avoid.

CHAPTER FIVE: DISCUSSION

5.1 Socio-demographic and economic characteristics

Those with lower income were less likely to take care of themselves than those with middle-and high-income. High income was linked to self-care and physical exercise activities in well-equipped and recreational settings, such as strength training and aerobic classes, whereas low income was linked to physical activities in non-leisure settings, such as housework and errand walking. According to a study by Sorato et al. (2016), patients with lower income were less likely than those with higher income to adhere well to self-care practices.

Healthy diets are advised for people with diabetes, and patients in the relatively high-income group may purchase them. Self-care skills are positively correlated with high income and negatively correlated with low income compared to patients with middle- and high-income. According to the study findings, 36% of participants had finished secondary school, 30% had finished primary school, 19% had completed university education, and 15% had not attended any formal schooling. Regular diabetes self-care was shown to be significantly ($p<0.05$) correlated with educational attainment. Higher educated study participants were more likely to adhere to self-care routines and were more aware of the difficulties associated with diabetes. Low educational attainment among respondents was associated with worse health, higher levels of stress, and decreased self-confidence. Diabetes self-care behaviors were also negatively impacted by low education level. These results were consistent with a study by Rothman et al. (2004) found that having knowledge and skills would be a significant predictor of who would benefit from a diabetic mellitus self-management intervention.

5.2 Self-care activities

In this study, it was revealed that 48.5% of the study respondents never exercised or rarely exercised while 28% exercised regularly. Exercise and physical activity were found to have a significant relationship with the level of income and risk of diabetes among the study respondents. Study respondents with low incomes reported no regular exercise. Individuals aged 65 years and above and low income were associated with physical inactivity. These findings were similar to those from a study conducted by NIH, 2011 which revealed that increased physical activity reduces risk of diabetes, whereas sedentary behaviors increase

risk. Moreover, a study conducted by Bell et al., in 2002 revealed that increased mechanization and driving have displaced physical activity over the last century in industrialized nations. The trend is now increasing in developing countries. Increased use of automobiles is associated with reduced physical activity. The study findings revealed that 81% of the study respondents had a diabetic meal plan while 19% didn't. It was revealed that 15.5% of the study respondents never use the recommended meal plan. In this study, it was revealed that 7.5% of the respondents said they use tobacco and 92.5% stated that they don't use. There was a significant association (p=0.000) between tobacco use and diabetes self-care activities. This finding was in concordance with Willi et al., 2007 which revealed that smokers had a 45% increased risk of developing diabetes compared with non-smokers. In this study, 45.5% of study respondents stated that they check blood sugar at home while 54.5% stated that they don't check blood sugar. It was discovered that self-monitoring blood glucose was beneficial for both individuals with type 1 diabetes and those with type 2 diabetes who were taking insulin. Research indicates that self-monitoring blood glucose level has limited clinical utility in enhancing glycemic control in individuals with Type 2 Diabetes Mellitus who are taking oral medications or following a diet.

5.3 Patient-related factors

In this study, it was revealed that 45% of the respondents had a family history of diabetes and 55% had no history of diabetes. Moreover, 42.5% of the respondents have had their mothers having diabetic disease, 23.5% had their fathers having diabetic disease, 33% have had their grandparents having the disease and 1% have had their aunts having the disease. It was also revealed that 30% of the respondent's miss drugs at regular interval, 23.5% one or more a week, 1.0% once per day and 2.5% one or more a day. Adherence to medication was found to have a significant association with diabetes self-care. It was revealed that 33.0% of the respondents said the main reason for missing drugs was lack of money to buy drugs while 3.5% cited traveling away from home as the main reason for missing drugs. Good adherence to medication regimes was associated with reduced risk of diabetes complications, reduced mortality and reduced economic burden. This finding agreed with a study conducted by McGovern et al., 2016 which revealed that diabetes drug adherence was determined by patient-related factors. The study showed that 9.5% of the respondents don't check their blood sugars, 29.5% of the respondents check their blood sugars 2 hours after meals 17.0% check their blood sugar after every 2 weeks or when they feel ill. Patients with type 2 diabetes mellitus who use insulin have found self-monitoring blood glucose to be beneficial. However, there is evidence that self-monitoring blood glucose has limited clinical effectiveness in improving glycaemic control in individuals with type 2 diabetes mellitus who are taking oral medications or diet alone. The overall impact of self-monitoring blood glucose on glycaemic control in type 2 diabetic patients not on insulin is minimal for the first six months after starting and diminishes after a year, according to Malanda et al. (2019). According to the American Diabetes Association, self-monitoring of blood glucose (SMBG) should be done at least once daily and at least two HbA1c tests should be performed annually. This supports a study by Khardori et al. (2020) that found that blood pressure, cholesterol, and glucose levels must be monitored in order to treat Type 2 Diabetes Mellitus effectively.

5.4 Cultural barriers

In this study, 44.5% of the respondents stated that culture influence affected the way they take care of diabetic conditions. Respondents cited rituals such as witchcraft (6.32%), c u l t u r a l lifestyle (28.42%) as the main hindrances of taking care of themselves. This finding concurred with a study conducted by Catherine et al., 2019 who revealed that cultural influences interfere with successful self-care of diabetes mellitus. Understanding the influence of culture is necessary in identifying the barriers to self-care and improving the disease outcomes. The members of many ethnic and racial groups possess beliefs, attitudes,

and values related to health, making the development of cultural competence essential for every health care provider (Catherine et al., 2019). In this study, 18.78% of the respondents stated that religion has influence on the way they take care of diabetic condition, 35.0% of the respondents reported that prayer and fasting as their main hindrances in taking care of diabetes and 10% cited believe in supernatural healing as their main hindrance in taking care of diabetes. Spiritual and religious beliefs and activities can assist in coping with chronic illnesses by providing support, confidence and hope or they can interfere with successful coping, as people may neglect self-care activities by relying on prayer or meditation to manage their illness. The relationship between spirituality, religion, and diabetes self-care behaviors, such as diet, physical activity, blood glucose self-testing, and foot care behaviors, was investigated in a study conducted in the United States on how spiritual and religious beliefs and practices affected diabetes self-care in African American adults. The findings showed that individuals who scored higher on measures of spiritual and religious beliefs and practices and social support engaged in more diabetes self-care activities and smoked less (Watkins et al., 2018). In this study 27.78% of the respondents once they visit traditional healers, they were given alternative medicine, 22% were advised that there were dowry problems and should give dowry to the clan, 11% were advised to stop taking prescribed drugs and would be healed when the traditional healers pray, 22.22% were advised to give sacrifice or money and would be healed, 16.67% were advised to pray and stay away from family members since they were jealous of them. This finding was in concordance with a study conducted in Nigeria by Nwankwo, 2019 which showed that some patients with Type 2 Diabetes Mellitus believed that herbalists could cure diabetes. More women compared to men sort for alternative forms of treatment due to their lower socioeconomic status (Nwankwo, 2019).

CHAPTER SIX CONCLUSION AND: RECOMMENDATIONS

6.1 Conclusion

The level of income determined the level of self-care of Type 2 Diabetes Mellitus. Respondents with higher income had a better outcome as compared to those who had a lower income.

The level of education influenced the outcome of self-care on Type 2 Diabetes Mellitus. Those with a higher level of education had better self-care practices as compared to those with a low level of education.

There was concurrent use of herbal remedies, alcohol and tobacco smoking with use of diabetes medication among the respondents which resulted to sub-optimal self-care. Respondents who received social support had better outcomes as compared to those who did not receive any social support. Tobacco smokers had an increased risk of developing diabetes compared with non-smokers.

Diet intake as per recommended meal plan was low. Significant number of patients did not engage in any exercises or physical activities. Self-monitoring of blood glucose was low. The uptake of HbA1c was low. Missing drugs was due to high cost of medications, Uptake of test and procedures to monitor diabetes was low. Cultural influences also interfered with diabetic self-care.

6.2 Recommendations

- **Promote Income-Generating Activities:** Encourage respondents to engage in sustainable income-earning initiatives to increase their monthly earnings. This will enable them to meet the costs of diabetes management, including purchasing medication and covering laboratory investigations.

- **Establish Patient Support Groups:** Facilitate the formation of Type 2 Diabetes Mellitus support groups, with regular follow-up by community health volunteers and healthcare providers to strengthen

peer support and improve adherence.

- **Promote physical activity and exercise:** Healthcare professionals should educate and motivate patients on the benefits of regular exercise and physical activity, emphasizing its role in improving glycemic control and overall health.

- **Enhance psychosocial support:** Psychosocial support teams should actively follow up with clinic defaulters, providing counseling and encouragement to improve adherence and self-care practices.

- **Strengthen medication adherence:** Healthcare providers should encourage patients to avoid missing drug doses by using reminders such as alarms, pill organizers, or family support systems.

- **Discourage harmful cultural and religious practices:** Health education should emphasize avoiding concurrent use of herbal remedies with prescribed diabetes medication, as well as discouraging alcohol consumption and tobacco smoking, which worsen disease outcomes.

- **Provide nutritional counseling:** Nutritionists should guide patients on adopting recommended diet plans, discouraging high-fat and high-sugar foods, encouraging high-fiber diets, increased fruit and vegetable intake, and avoiding missed meals.

- **Sensitize patients on laboratory monitoring:** Patients should be educated on the importance of regular laboratory tests and procedures to monitor disease progression and prevent complications.

REFERENCES

- Abbott, C. A., Garrow, A. P., Carrington, A. L., Morris, J., Van Ross, E. R., &Boulton, A. J. (2005). Foot ulcer risk is lower in South-Asian and African-Caribbean compared with European diabetic patients in the UK the North-West Diabetes Foot Care Study. *Diabetes care*, *28*(8), 1869-1875.

- ADA. (2022). Standards of medical care in diabetes—2022. Diabetes Care, 45(Suppl. 1), S17–S38.

- Adem, A. M., Gebremariam, E. T., Gelaw, B. K., & Tsegay, G. (2014). Self-care practices and associated factors among diabetic patients in Addis Ababa, Ethiopia. African Journal of Primary Health Care & Family Medicine, 6(1), 1–6.

- Agwu, E., Dafiewhare, E. O., &Ekanem, P. E. (2011). *Possible Diabetic-Foot Complications in Sub-Saharan Africa*.INTECH Open Access Publisher.

- Ahmad, N. S., Ramadas, A., & Ellahi, B. (2019). The effectiveness of self-care interventions in Type 2 diabetes mellitus patients: A systematic review. Health Education Journal, 78(6), 751–764.

- Ahola, A. J., &Groop, P. H. (2013).Barriers to self-management of diabetes. *Diabetic Medicine*, *30*(4), 413-420.

- Al-Khawaldeh, O. A., Al-Hassan, M. A., & Froelicher, E. S. (2012). Self-efficacy, self-management, and glycemic control in adults with type 2 diabetes mellitus. Journal of Diabetes and Its Complications, 26(1), 10–16.

- Al-Rasheedi, A. A. S. (2014). The Role of Educational Level in Glycaemic Control among Patients with Type II Diabetes Mellitus. *International journal of health sciences*, *8*(2), 177.
- Amente, T., & Belachew, T. (2019). Self-care practices and associated factors among diabetes patients on follow-up in hospitals of Arsi Zone, Oromia Region. Ethiopian Journal of Health Sciences, 29(2), 209–220.
- American diabetes association ADA. (2017) guidelines
- American Diabetes Association. (2004). Physical activity/exercise and diabetes. *Diabetes care*, *27*(supplement 1), s58-s62.
- American Diabetes Association. (2006). Nutrition Recommendations and Interventions for Diabetes–2006 A position statement of the American Diabetes Association. *Diabetes Care*, *29*(9), 2140-2157.
- American Diabetes Association. (2010). Standards of medical care in Diabetes—2010.*Diabetes care*, *33*(Supplement 1), S11-S61.
- American Diabetes Association. (2014). Standards of Medical Care in Diabetes-2014.
- American Diabetes Association. (2022). Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes—2022. Diabetes Care, 45(Suppl. 1), S17–S38.
- American journal of preventive medicine 2000,19,9-14
- Ammari, A. A. (2016). The association between foot-care self-efficacy beliefs, Physical self-concept and actual foot-care behavior in people with diabetes mellitus: a cross-sectional study. *International Journal of Musculoskeletal Pain Prevention*, *1*(3), 93-99.
- Asif, M. (2014). The prevention and control the type-2 diabetes by changing lifestyle and dietary pattern. *Journal of education and health promotion*, *3*(1), 1.
- Ataklte, F., Erqou, S., Kaptoge, S., Taye, B., Echouffo-Tcheugui, J. B., & Kengne, A. P.
- (2014). Burden of diabetes in Sub-Saharan Africa: A systematic review and meta analysis.
- Bulletin of the World Health Organization, 92(3), 197–205.Bahiru, M., & colleagues. (2020). Socioeconomic determinants of self-care in adults with Type 2 diabetes in Ethiopia: a multilevel analysis. Diabetes Research and Clinical Practice, 162, 108079.
- Bell, A. C., Ge, K., &Popkin, B. M. (2002). The road to obesity or the path to prevention: motorized transportation and obesity in China. *Obesity Research*, *10*(4), 277-283.
- Bize, R., Johnson, J. A., &Plotnikoff, R. C. (2007). Physical activity level and health-related quality of life in the general adult population: a systematic review. *Preventive*
- *medicine*, *45*(6), 401-415.
- Bonger, Z., Shiferaw, S., & Tariku, E. Z. (2018). Adherence to diabetes self-care practices and its associated factors among patients with type 2 diabetes in Addis Ababa, Ethiopia. Patient Preference and Adherence, 12, 963–970.

- Bonger, Z., Shiferaw, S., & Tariku, E. Z. (2018). Adherence to diabetes self-care practices and associated factors among patients with type 2 diabetes in Addis Ababa, Ethiopia. Patient Preference and Adherence, 12, 963–970.

- Bukhsh, A., Khan, T. M., Lee, S. W. H., et al. (2019). Self-care practices and barriers to good glycemic control in type 2 diabetes patients in resource-constrained settings: A systematic review. Frontiers in Endocrinology, 10, 1–16.

- Bukhsh, A., Khan, T. M., Lee, S. W. H., Lee, L. H., Chan, K. G., & Goh, B. H. (2019).
- Self-care practices and barriers to good glycemic control in type 2 diabetes patients in resource-constrained settings: A systematic review. Frontiers in Endocrinology, 10, 1–16.
- Carcone, A. I., Ellis, D. A., Weisz, A., &Naar-King, S. (2011). Social support for diabetes illness management: supporting adolescents and caregivers. *Journal of developmental and behavioral pediatrics: JDBP*, *32*(8), 581.

- Centers for Disease Control and Prevention, US Department of Health and Human Services, & Centers for Disease Control and Prevention (CDC). (2012). Diabetes report card 2012.*Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services*.

- Chambers, R., Wakley, G., & Blenkinsopp, A. (2006).*Supporting self-care in primary care*.Radcliffe Publishing.

- Ciulla, T. A., Amador, A. G., &Zinman, B. (2003).Diabetic retinopathy and diabetic macular edema pathophysiology, screening, and novel therapies.*Diabetes care*, *26*(9), 2653-2664.

- Culloch, D. K., Munshi, M., Nathan, D. M., Schmader, K. E., & Mulder, J. E. (2014).Treatment of type 2 diabetes mellitus in the older patient.*UpTodate. October 2014*.

- Daly, J. M., Hartz, A. J., Xu, Y., Levy, B. T., James, P. A., Merchant, M. L., & Garrett, R.
- E. (2009). An assessment of attitudes, behaviors, and outcomes of patients with type 2 diabetes. *The Journal of the American Board of Family Medicine*, *22*(3), 280-290.

- Dehghani-Tafti, A., Mahmoudabad, S. S. M., Morowatisharifabad, M. A., Ardakani, M. A., Rezaeipandari, H., &Lotfi, M. H. (2015).Determinants of Self-Care in Diabetic Patients Based on Health Belief Model.*Global journal of health science*, *7*(5), 33.Dornhorst, A., & Rossi, M. (1998).Risk and prevention of type 2 diabetes in women with gestational diabetes.*Diabetes care*, *21*, B43.

- Fekadu, G., Yigzaw, M., Alemu, S., & Mengistu, Y. (2014). Assessment of the level and associated factors with knowledge and practice of diabetes self-care among diabetic patients. Ethiopian Journal of Health Sciences, 24(2), 123–130.

- Fekadu, G., Yigzaw, M., Alemu, S., & Mengistu, Y. (2014). Knowledge, attitude and practice of diabetes self-care among diabetic patients. Ethiopian Journal of Health Sciences, 24(2), 123–130.

- Feudtner, C. (2011). Diabetes: the sweet irony of modern technology. *Bulletin of the World Health Organization*, *89*(2), 90-91.

- Fowler, M. J. (2008).Micro vascular and macro vascular complications of diabetes.*Clinical diabetes*, *26*(2), 77-82.

- Glasgow REstrycker LA,preventive care for diabetes management in primary care samples.
- Glasgow, R. E., Toobert, D. J., & Gillette, C. D. (2001). Psychosocial barriers to diabetes self-management and quality of life.*Diabetes spectrum*, *14*(1), 33-41.23.

- Hall, V., Thomsen, R. W., Hendrickson, O., &Lohse, N. (2011). Diabetes in Sub Saharan Africa 1999-2011: epidemiology and public health implications. A systematic review.*BMC public health*, *11*(1), 1.

- Hosler, A. S., &Melnik, T. A. (2005).Population-based assessment of diabetes care and self-management among Puerto Rican adults in New York City. *The Diabetes Educator*, *31*(3), 418-426.

- Hosler, A. S., Berberian, E. L., Spence, M. M., & Hoffman, D. P. (2005).Outcome and cost of a statewide diabetes screening and awareness initiative in New York. *Journal of Public Health Management and Practice*, *11*(1), 59-64.

- Hu, F. B. (2011). Globalization of Diabetes The role of diet, lifestyle, and genes.*Diabetes care*, *34*(6), 1249-1257.

- IDF. (2021). IDF Diabetes Atlas (10th ed.). Brussels: International Diabetes Federation. International Diabetes Federation. (2021). IDF Diabetes Atlas (10th ed.). Brussels: IDF.
- Jeragh-Alhaddad, F. B., Waheedi, M., Barber, N. D., & Brock, T. P. (2015). Barriers to medication taking among Kuwaiti patients with type 2 diabetes: a qualitative study. *Patient preference and adherence*, *9*, 1491.

- Kaduka, L. U., Kombe, Y., Kenya, E., Kuria, E., Bore, J. K., Bukania, Z. N., & Mwangi,
- M. (2012). Lifestyle and nutritional challenges facing urban residents with type 2 diabetes mellitus in Kenya: A descriptive study. BMC Endocrine Disorders, 12(1), 1–8.

- Kassa, H., Woldemichael, K., & Woldeyes, D. (2020). Self-care practice and associated factors among diabetes mellitus patients on follow-up in hospitals of South Ethiopia. Journal of Diabetes Research, 2020, 1–9.

- Kassa, H., Woldemichael, K., & Woldeyes, D. (2020). Self-care practice and associated factors among diabetes mellitus patients on follow-up in South Ethiopia. Journal of Diabetes Research, 2020, 1–9.

- Khattab, M., Khader, Y. S., Al-Khawaldeh, A., & Ajlouni, K. (2010). Factors associated with poor glycemic control among patients with type 2 diabetes. Journal of Diabetes and Its Complications, 24(2), 84–89.

- Khattab, M., Khader, Y. S., Al-Khawaldeh, A., & Ajlouni, K. (2010). Factors associated with poor glycemic control among patients with type 2 diabetes. Journal of Diabetes and Its Complications, 24(2), 84–89.

- Krein, S. L., Heisler, M., Piette, J. D., Makki, F., & Kerr, E. A. (2005). The effect of chronic pain on diabetes patients' self-management.*Diabetes Care*, *28*(1), 65-70.

- Kugbey, N., Asante, K. O., & Meyer-Weitz, A. (2017). Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: A cross-sectional study. BMC Research Notes, 10(1), 381.

- Lawton, J., Ahmad, N., Hanna, L., Douglas, M., & Hallowell, N. (2006). 'I can't do any serious exercise': barriers to physical activity amongst people of Pakistani and Indian origin with type 2 diabetes. *Health Education Research*, *21*(1), 43-54.

- Malanda, U. L., Welschen, L., Riphagen, I. I., Dekker, J. M., Nijpels, G., & Bot, S. D. (2012).Self-monitoring of blood glucose in patients with type 2 diabetes mellitus who are not using insulin.*The Cochrane Library*.

- Ministry of Health Kenya. (2015). Kenya National Strategy for the Prevention and Control of Non-Communicable Diseases 2015–2020. Nairobi: Government of Kenya.

- Mogre, V., Johnson, N. A., Tzelepis, F., & Paul, C. (2019). Barriers to diabetic self-care: A qualitative study of patients and healthcare providers in Ghana. Journal of Health Psychology, 24(14), 1865–1877.

- Nam, S., Chesla, C., Stotts, N. A., Kroon, L., & Janson, S. L. (2011). Barriers to diabetes management: Patient and provider factors. Diabetes Research and Clinical Practice, 93(1), 1–9.

- Norris, S. L., Engelgau, M. M., & Narayan, K. M. V. (2001). Effectiveness of self-management training in type 2 diabetes: A systematic review of randomized controlled trials. Diabetes Care, 24(3), 561–587.

- Otieno, C. F., Kariuki, M., & Ng'ang'a, L. (2003). Quality of glycaemic control in ambulatory diabetics at the Kenyatta National Hospital, Nairobi. East African Medical Journal, 80(8), 406–410.

- Otieno, C. F., Kariuki, M., & Ng'ang'a, L. (2003). Quality of glycaemic control in ambulatory diabetics at the Kenyatta National Hospital, Nairobi. East African Medical Journal, 80(8), 406–410.

- Powers, M. A., Bardsley, J., Cypress, M., et al. (2017). Diabetes self-management education and support in type 2 diabetes: A joint position statement. The Diabetes Educator, 43(1), 40–53.

- Powers, M. A., Bardsley, J., Cypress, M., et al. (2017). Diabetes self-management education and support in type 2 diabetes: A joint position statement. The Diabetes Educator, 43(1), 40–53.

- Powers, M. A., Bardsley, J., Cypress, M., et al. (2020). Diabetes self-management education and support in adults with type 2 diabetes: Update 2020. Diabetes Care, 43(8), 1636–1649.Powers, M. A., Bardsley, J., Cypress, M., et al. (2020). Diabetes self-management education and support in adults with type 2 diabetes: Update 2020. Diabetes Care, 43(8), 1636–1649.

- PubMed Central Collection. (various). A curated set of openly available articles on diabetes self-management in LMICs; useful for rapid literature access and full-text retrieval when developing the

literature review for Kirwara Hospital research.

- Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. Journal of Diabetes & Metabolic Disorders, 12(1), 14.

- Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. Journal of Diabetes & Metabolic Disorders, 12(1), 14.

- Shruthi, M. N., Shetty, R., & Prabhu, S. (2015). Patient-related barriers to effective diabetes self-care: A hospital-based cross-sectional study. Journal of Clinical and Diagnostic Research, 9(11), OC01–OC04.

- Toobert D.j Hapson SE,Glasgow RE.The summary of diabetes selfcare activities measures,Diabetes care 2000,23

- UNICEF/WHO/IDF Reports. (2020–2024). Various policy briefs on NCDs and diabetes access. Multilateral agency reports that document global and regional policy landscapes, insulin access initiatives, and financing mechanisms relevant to diabetes care. Useful for policy recommendations and advocacy chapters in the final research report.

- Verdery, A., et al. (2023). Peer support groups and diabetes self-management in Western Kenya: implementation lessons. Implementation Science Communications, 4, 55. This implementation study examines peer-support models, reporting improved adherence and psychosocial outcomes where groups were sustained. Peer-support presents a feasible, low- cost approach for improving self-care at community levels including Murang'a.

- Wangari, N., & Kiragu, R. (2022). Knowledge and self-management practices among T2DM patients attending a county teaching hospital in Central Kenya. East Africa Medical Journal, 99(7), 88–102. A facility-based study assessing patient knowledge and self-management behaviours, highlighting gaps in dietary practice and exercise. The findings are pragmatic for designing education materials tailored to county hospital populations.

- Wanjohi, F. W., Mwendwa, M. J., Mutai, J., & Kiboi, W. (2020). Adherence to self-care practices and glycemic control among patients with type 2 diabetes in Embu County, Kenya. International Journal of Diabetes Research, 9(2), 29–36.

- Wanjohi, F. W., Mwendwa, M. J., Mutai, J., & Kiboi, W. (2020). Adherence to self-care practices and glycemic control among patients with type 2 diabetes in Embu County, Kenya. International Journal of Diabetes Research, 9(2), 29–36.

- WHO. (2020). Diabetes fact sheet. WHO's fact sheet provides concise, authoritative global information on diabetes burden, prevention, and management priorities. It serves as a high-level reference for justifying the public health importance of diabetes research in Kenyan counties.

- WHO's fact sheet provides concise, authoritative global information on diabetes burden, prevention, and management priorities. It serves as a high-level reference for justifying the public health importance of diabetes research in Kenyan counties.

- World Bank & Ministry of Health (Kenya). (2018). Kenya STEPwise survey for non-communicable disease risk factors 2015 report. National risk factor data and methodological notes for STEPS surveys which are instrumental for contextualizing behavioral risks and for secondary data comparisons in county-level diabetes studies.

- World Health Organization. (2023). Diabetes. Retrieved from https://www.who.int/news-room/fact-sheets/detail/diabetes.

- Yimer, S., Addissie, A., Girma, T., Reja, A., Abdela, A., & Ahmed, A. (2025). Effectiveness of diabetes self-management education and support interventions in the WHO African Region: a systematic review and meta-analysis. Frontiers in Clinical Diabetes and Healthcare.This forthcoming systematic review and meta-analysis synthesizes DSME and support interventions across the WHO African Region, highlighting modest improvements in glycemic control when interventions are contextually adapted. The findings are important for evidence-based recommendations for DSME programs at Kirwara Hospital.

- Zwane, J., et al. (2023). Self-management of diabetes and associated factors among out-patients in Tshwane, South Africa. International Journal of Environmental Research and Public Health, 20(10), 5887. An urban South African study that examines multifactorial determinants of self-care, indicating the persistence of systemic and socioeconomic barriers even in better-resourced settings. Comparative analysis can help identify which barriers are context-specific and which are widespread across SSA.