FACTORS ASSOCIATED WITH GLYCEMIC CONTROL AMONG 35-60-YEAR-OLD FEMALE TYPE 2 DIABETICS ATTENDING TAVETA SUB-COUNTY HOSPITAL TAITA TAVETA COUNTY, KENYA

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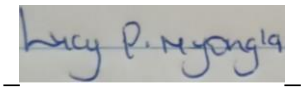
DECLARATION

This Thesis is my original work and has not been presented for the award of a degree in any other university or any other award.

Sign _  _ Date 5th June, 2023

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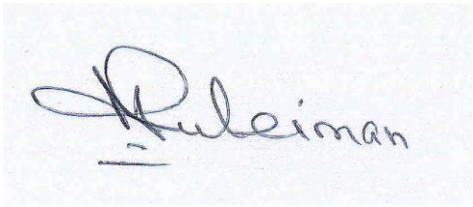
Sign  Date 5th June, 2023

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DEDICATION

I dedicate my thesis to my mother Tafroza Endesia and my siblings Marion and Phyloice for your financial, spiritual, and emotional support throughout the course.

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ABSTRACT

Diabetes mellitus is a chronic metabolic condition depicted by hyperglycemia in the absence of treatment.Stems from defects in insulin secretion, insulin action or both.Sustained hyperglycemia due to diabetes may give way to irreversible organ damage.A study done in Kenya in 2018 revealed that, those previously diagnosed with Diabetes mellitus and were currently on treatment only 7% had achieved control. The main objective of the study was factors associated with glycemic control among 35-60 year old female Diabetic patients attending Taveta sub county hospital Taita Taveta county,Kenya.The objectives of the study were to determine socio-cultural, economic, nutritional and health seeking factors, influencing glycemic control. A descriptive cross sectional design was adopted and systematic random sampling technique used to select 135 study subjects comprising

of Type 2 Diabetes Mellitus female patients aged 35-60 years who are registered at Taveta sub-County hospital diabetes outpatient clinic.Approval was sought from Mount Kenya University Ethics review committee and Taita Taveta county health department.Clearance was sought from National commission for science,Technology and innovation prior to data collection.Quantitative data on socio-cultural,economic,nutrition and health seeking factors was collected from informed consenting Type 2 Diabetes Mellitus female patients using researcher administered structured questionnaire.Qualitative data on sociocultural, and health seeking factors was obtained from key informant interviews with the incharges of diabetes clinic.Quantitative data was analyzed using Statistical Package for Social Scientists Version 20 and presented by frequencies and percentages for categorical variables; and means and standard deviations for numerical variables. Chi square test was done to evaluate associations between variables. Qualitative data was analyzed thematically after translation and transcription. The result revealed that the odds of women reminded to take medicine are 1.195 times more likely to have good glycemic control compared to women never reminded to take medicine. The women employed were 1.691 times more likely to have good glycemic control compared to women not employed. The result further shows that the odd of having a good glycemic control is 1.657 times higher for women who receive funds and support as compared to women who do not receive funds from their business. The odd of having a good glycemic control is 2.102 times higher for women who often exercise as compared to women who never exercise. The odd of having a good glycemic control is 1.416 times higher for environment of the diabetes clinic room/area that is clean as compared to environment of the diabetes clinic room/area that is somewhat clean. The most used method to control glucose is the herbal remedies to manage diabetes. The study recommends that the medication follow-up and dietary practices for the diabetic patients should be a community affair, both relatives and friends, to ensure that the diabetic patients have followed the prescribed lifestyle and precautionary health measures. The monitoring of blood sugar should be done regularly as advised by the healthcare provider. It is recommended for an increase in scope for creation of diabetes education or awareness and reach out to the patients and community.It is necessary to create affected family's support system.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADA: American Diabetes Association

CDA: Canadian Diabetes Association

CVD: Cardiovascular disease

ERC: Ethical Review Committee

FBS: Fasting Blood Sugar

FPG: Fasting plasma glucose

HBA1c:

Glycated Haemoglobin. (Haemoglobin with glucose bound to it) is tested to establish the regular blood glucose amount in the past two or three months. A concentration of 7.0% is considered optimal.

IDF: International Diabetes federation

IIF: International Insulin Foundation.

KEHHEUS: Kenya household health expenditure and utilization survey

LMIC: Low and middle income countries

NCDs: Non communicable diseases

NHSSP: National health sector strategic plan

NNSP: National Non-Communicable Diseases/Conditions Strategic Plan

MOH: Ministry of Health

OGTT: Oral glucose tolerance test

RPG: Random plasma glucose

SSA: Sub Saharan Africa

TYPE 2 DIABETES MELLITUS: Type two Diabetes mellitus

WHO: World Health Organization

OPERATIONAL DEFINITION OF KEY TERMS

Blood sugar-This is the amount of glucose found in human blood. Normal fasting blood glucose level ranges between 3.9 and 5.6 mmol/L(WHO,2020).

Diabetes mellitus Management-This is addressing short term incidents ranging from elevated or lowered blood glucose to normalizing it over time by understanding the condition(WHO,2020).

Diabetes mellitus- metabolic condition depicted by persistently raised glucose levels in blood referred to as hyperglycemia (WHO,2020).

Diet-Appropriate diet for diabetes mellitus patients based on diversified food .daily servings of food from ten food groups and daily portions consumed to minimize symptoms and dangerous complications arising from long term elevated blood sugar (ADA,2019).

Fasting blood sugar-level of sugar in blood after an overnight fast.6mmol/l is considered optimal(Lancet,2010).

Glucose-This is the primary sugar the body generates to store energy from either proteins, fats or carbohydrates. It serves as a primary source of energy in the body and is carried into each cell through the blood stream(Lancet,2010).

Glycated Haemoglobin (HBA1c)-Haemoglobin to which glucose is bound. Glycosylated haemoglobin is tested to give indication of the average level of blood glucose over the past eight to twelve weeks (WHO,2020).

Glycemic control- Regulating blood glucose levels close to the typical level. The aim for good glycemic control ought to be HbA1C of less than 7% or fasting blood sugar equal to or less than 7.0mmol/l or random blood sugar equal to or less than 11.1mmol/l (WHO,2020).

Good glycemic control-fasting blood sugar reading equal to or less than 7.0mmol/l -average of the last two successive readings (Wanjohi *et al*., 2018).

Hyperglycemia-a state whereby too much glucose flows in the blood resulting into raised blood sugar levels. Occurs when the body lacks adequate amount of insulin or lacks ability use the available insulin to generate energy from glucose. Signs of hyperglycemia include dry mouth, excessive thirst, extreme hunger and frequent urination (Wanjohi *et al*., 2018).

Hypoglycemia-a decreased level of glucose in the blood. This may arise when a diabetes mellitus patient has injected excess amounts of insulin, engaged in excess physical activity without extra food or eaten too little .Signs of hypoglycemia include:feeling nervous,shaky,sweaty or weak,headache,hunger and blurred vision (Wanjohi *et al*., 2018).

Insulin is a hormone that transfers and draws sugar from food to the cells of the body. If the body does not produce adequate or insulin properly, food sugar remains in the blood and causes high blood sugar (WHO, 2019).

Physical activity- Body movement produced by the skeletal muscle that involves energy expenditure. Includes exercises such as aerobics, cycling, running, walking or chores done at home (WHO,2019).

Poor glycemic control- fasting blood sugar reading equal to or greater than 7.0mmol/l -mean of the last two successive readings (Wanjohi *et al*., 2018).

Type 2 diabetes mellitus-chronic metabolic ailment of blood sugar regulation which results when the human body fails to use insulin effectively (ADA, 2018).

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Diabetes mellitus is a chronic metabolic blood glucose control condition characterized by hyperglycemia. It occurs due to lack of ability of the pancreas to produce insulin in sufficient amounts or when insulin produced cannot be efficiently used by the body's cells. Ninety five per cent of all diabetes worldwide Present with type two diabetes mellitus which occurs when the body fails to use insulin effectively. With time, hyperglycemia causes irreversible impairment to several tissues inside the body, paving way to the onset and progression of health complications that are life-threatening (American Diabetes Association, 2015).

Global prevalence of diabetes has almost doubled from 4.7% in 1980 to 9.3% in 2019 among the adult population (IDF Diabetes Atlas, 2019). In the past ten years, there has been a fast increase in the occurrence of diabetes in low as well as in middle income countries (WHO, 2016).

In the year 2019, approximately 463 million adults had diabetes with the likelihood that it will escalate to 700.2 million people in 26 years (IDF Diabetes Atlas, 2019).In the same year,diabetes mellitus was ranked ninth among the leading causes of death with approximately one and a half million deaths directly attributed to diabetes mellitus(WHO, 2021).

In Africa the estimated prevalence for diabetes mellitus was 4.7% in 2019 and is predicted to grow to 5.2% by the year 2045 where 40.7 million people will have diabetes mellitus (IDF Atlas, 2019). In 2019, diabetes mellitus attributable mortality was 1.8 times higher in females and caused 234,500 deaths than in males where it caused 131,700 deaths (IDF Diabetes Atlas, 2019).In the past type 2 diabetes mellitus condition was considered rare in sub Saharan Africa, nevertheless it is now firmly recognized in Africa. Rapid pace of urbanization and obesity in sub

Saharan Africa are modifiable risk factors that have precipitated epidemiological shift where non communicable diseases such as diabetes mellitus are on the rise (Motala *et al*., 2022).Approximately sixty nine per cent of sub Saharan Africa adults who live with diabetes mellitus are undiagnosed.This may lead to a high prevalence of complications emanating from uncontrolled diabetes mellitus (IDF Diabetes Atlas, 2019).Diabetes mellitus patients do not often recognize the symptoms of the disease and healthcare workers are the ones who recognize and respond to the signs and symptoms presented by the patients (IDF Diabetes Atlas, 2019).In Africa,glycemic control is the main treatment aim important for avoidance of destruction of target organs and complications arising from uncontrolled diabetes mellitus;it also determines death.

In Kenya, the overall prevalence of diabetes mellitus is 2.4%. Females have a higher prevalence of diabetes mellitus of 2.8% than males with a prevalence of 2.0 percent(Mohammed *et al*., 2018).Glycemic control or to attain and maintain blood glucose levels within recommended range in person with diabetes mellitus, is considered the main management goal for prevention of complications like kidney failure, amputations, stroke, blindness and heart attack, among diabetic patients (American Diabetes Association, 2016). Glycated haemoglobin (HbA1c) is used to monitor glycaemic control.HbA1c indicates a measure of the average plasma glucose in the previous 12 weeks. HbA1c concentration of less than 7% indicate good glycemic control. In the absence of HbA1c, fasting blood glucose or post prandial sugar values can be used to assess glycemic control.Fasting plasma glucose of <=7mmol/l and post prandial plasma glucose of <=9mmol/l indicate good glycemic control (IDF Diabetes Atlas, 2020).

Glycemic control and health outcome in Type 2 Diabetes Mellitus are directly and indirectly associated with socio-cultural,economic, nutritional and health seeking behavior factors (Walker *et al.*, 2015).A retrospective observational study done in India revealed that there was a significant higher risk of poor glycemic control associated with females (Mohammad *et al*., 2018). This could

be attributed to gender differences which play a role in an individual's adaptation to living with diabetes mellitus.

A study done in Libya on glycemic control among "type two diabetics and the role of their coping behaviours in managing diabetes" revealed that being female, unmarried, having primary education, unemployed Significantly correlated with impaired glycemic regulation. In the study it was evident that females were approximately two times more probable to have uncontrolled and poor glycemic control than males.Possible reasons for this could be differences in glucose as well as energy homeostasis,psychological factors like anxiety,stress,depression and response to treatment.women have disadvantages related to their economic and social aspects of life for example;economic dependence,lower levels of education and lower involvement in work that attracts wages.All these may function to reduce the womens' ability to maintain glycemic control within normal range.At the same time males reported more social support in adhering to their dietary regimen and caring for their feet compared to women (Ashur *et al*., 2018).

A Kenyan study on Glycemic control among Type 2 Diabetes Mellitus patients revealed that 81.6% of participants in the study had poor glycemic control and gender was associated with impaired glycemic regulation. Additionally, females had significantly higher levels of reduced glycemic control when pararelled to males and this was attributed to high body mass index and poor self-care activities (Nondi *et al.*, 2019). With reference made to hospital healthcare records of 2018, diabetes mellitus where 250 patients were recorded was the most prevalent non communicable condition in Taveta sub- County hospital. Taita Taveta where Taveta sub-County hospital is located.The subcounty had the highest prevalence of Type 2 Diabetes mellitus in the entire county.Additionally,Taveta sub county is part of Taita Taveta county which is a marginalized

county according to Commission of revenue allocation 2013. It is on this basis that the study seeks to determine the factors associated with and level of glycemic control among 35-60 year old female diabetics attending Taveta sub- County hospital outpatient clinic.

1.2 Statement of the Problem

Poor glycemic control presents a significant public health concern and has been described as a risk factor for the inception and progression of complications linked to diabetes mellitus management. These have the ability to increase health care costs and decrease both life expectancy and quality of life. Despite this confirmation, a high percentage of patients with diabetes mellitus remains poorly controlled. This is evidently the case for majority of patients under management who do not reach optimal glucose target of 7.2mmol/l (Kibirige *et al*., 2018). About 75% of 4.2 million deaths linked to diabetes mellitus in adult population aged 20-79 years occurred in people aged below 60 years (IDF Diabetes Atlas, 2019).

A study done in Korea, revealed low probability of women to achieve glycemic control after one year of treatment for type 2 diabetes (Choe *et al.*, 2018).Results of a systematic review and metaanalysis done in Ethiopia to determine glycemic control showed that only 34% of patients in 16 studies achieved glycemic control based on fasting blood sugar (Gebreyohannes *et al*., 2019).

A national survey conducted in Kenya on the "Prevalence and factors associated with prediabetes and diabetes mellitus in Kenya in adults of 18-69 years of age" revealed that the prevalence of diabetes mellitus and prediabetes was 3.1% and 2.4% respectively and among those previously diagnosed with Diabetes mellitus and were currently on treatment only 7% had achieved control (Mohamed *et al.*, 2018). Inadequate glycemic control paves way to an increase in the incidence of diabetes mellitus problems that pose a risk to public health. (Haghighatpanah *et al.*, 2018).

Understanding the interaction between socio-economic factors and glycemic control is expected to provide insight into reducing the number of chronic complications, disability and premature death as a consequence of having attained glycemic control (Krag *et al*., 2019).The proposed study seeks to establish the factors associated with glycemic control among female patients with type 2 diabetes mellitus aged 35-60 years in Taveta sub county, Kenya. The study will fill the conceptual gap by revealing the socio-cultural,economic,nutritional and health seeking behaviours factors and how they affect glycemic control among female diabetes mellitus patients.

1.3 Objectives of the Study

1.3.1 Main Objective

To investigate the factors associated with glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital,Taita Taveta county, Kenya.

1.3.2 Specific Objectives of the Study

1. To determine socio-cultural factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital.
2. To identify economic factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital.
3. To identify nutritional factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital.
4. To determine the influence of health seeking behaviour on glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital.

1.4 Purpose of the study

Determination of glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta Sub-County, a case study of Taveta Sub-County Hospital is the main study purpose. Taveta Sub-County Hospital was chosen since it is one of the largest hospitals in Taveta, and it is widely known for offering 24 hours emergency care.

The research will add to the worldwide view on the factors associated with glycemic control among type 2 diabetes mellitus female patients aged 35-60 years.

Findings of the study are therefore aimed at adding to the existing literature with respect to the particular effects of the social-cultural,economic, nutritional and health seeking behaviour factors on the glycemic control among type 2 diabetes mellitus female patients aged 35-60 years. Findings will be used to institute gender specific approaches in glycemic control among type 2 diabetes mellitus patients in the study area and elsewhere.

It shall also help focus efforts in addressing the factor(s) with the highest level of significance so as to improve on outcomes towards attaining glycemic control.

1.5 Research Questions

1. What socio-cultural factors influence glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital?
2. What are the economic factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital?
3. What nutritional factors influence glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital?

4. What is the effect of the health seeking behaviour on glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital?

1.6 Justification of the study

Findings of the study will provide awareness of the socio-cultural,economic,nutritional and health seeking behavior factors that determine glycemic control among type 2 diabetes mellitus female patients aged 35-60 years attending Taveta sub-County hospital outpatient clinic.

Findings will form a basis for formulation of Strategies and policies that enable hospital and county health committee formulate specific interventions aimed at reducing disease burden. These may be replicated in other areas as well.

The findings of this study will be used to improve scientific quality and relevance of produced knowledge through inclusion of gender dimension by determining status of glycemic levels of the 35-60 year old female type 2 diabetes mellitus patients and its relationship with sociocultural, economic, nutritional as well as health seeking behavior factors.

The study will be of public health importance because it will identify the risk factors for glycemic control and contribute to the restricted build up of literature on the subject. The women were considered for this study since the incidence of diabetes mellitus among women aged 35-60 years is on the increase, they experience higher rates of depression due to hormonal changes, eating disorders are more common among women and they are exposed to additional stress from responsibilities at work and at home. This necessitates the need for the study on their glycemic control.

1.7 Scope of the study

This study aimed to assess the factors associated with glycemic control among 35-60 year old female Type 2 Diabetes Mellitus patients who had managed the condition for at least six months at Taveta sub-County Hospital. Data was colleted between April and July 2020. This study was anchored on Dorothea Orem's theory of self-care deficiency nursing.

1.8 Limitations of the Study

Glycemic control was assessed using fasting blood sugar and not HbA1C which is the gold standard. Patients have limited ability to afford HbA1C test.Fasting blood glucose is routinely done and is within affordable range by the patient.Additionally,studies have shown that the morning fasting blood glucose can be used to measure glycemic control. This was addressed by educating patients about this limitation and advising them on regular monitoring to ensure consistent glycemic control.

Some data was collected by self-reporting; this may be limited by memory bias and social desirability bias in patients reporting their behaviours.This was addressed by making the survey anonymous,asking neutrally worded questions and ensuring that the answer options are not leading.

1.9 Delimitations

Study used Fasting blood sugar to measure glycemic control.Fasting blood sugar test is affordable and routinely used on all diabetes mellitus patients. Accuracy of results was enhanced by taking the mean of the last two consecutive FBS readings.

Study was confined to Taveta sub-County hospital. The study was conducted in a primary healthcare setting making it more relevant to health practitioner.

1.10 Assumptions of the study

The respondents answered all questions correctly without withholding crucial information.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section contains academic literature associated with the effects of the socio-cultural factors, economic factors, nutritional factors and the health seeking behaviour factors on the glycemic

control of the Diabetes mellitus patients. It includes empirical and theoretical literature in various fields done regarding the study research and highlights the conceptual framework for the study.

2.2 Empirical Literature

An analysis done by International Diabetes Federation revealed that the prevalence of diabetes retinopathy among people living with with diabetes mellitus was 35% and this was associated with deteriorating glycemic control; it also revealed that good glycemic control evidenced by HbA1c of 7% can lead to a 35% risk reduction of amputation (IDF Diabetes Atlas, 2018).

The International Diabetes Federation reported that there is a considerable percentage of people in Sub-Saharan Africa with undiagnosed diabetes mellitus, those who are not aware that they have diabetes mellitus. Half the people living with type two diabetes mellitus do not know that they have the disease and consequently they are not receiving treatment (IDF Diabetes Atlas, 2019).

This is a major challenge and increases the possibility of developing chronic complications such as nerve damage, kidney damage and foot damage paving way to increased morbidity and mortality as evidenced by figures indicated on global estimates on diabetes mellitus prevalence.

Kenya just as the rest of sub-Saharan Africa is facing an increase in prevalence of Diabetes Mellitus and the diabetes related complications are now functioning as contributory factors to a major burden of diseases in the country (Mohammed *et al*., 2018).

This part contains literature from other scholars on the socio-demographic and social-economic factors and Glycemic control of the Type 2 Diabetes Mellitus Patients.

2.2.1 Socio-cultural factors and Glycemic Control of Type 2 Diabetes mellitus Patients

A study aimed to assess social support and its relationship to self-care in type 2 diabetic patients in Qom, Iran (Mohebi *et al*., 2018). A cross-sectional study was conducted on 325 diabetics attending the Diabetes Mellitus Association. Results demonstrated significant correlation between diabetes mellitus self-care activities and social support provided to the patients. In this study, there was association between socio support received by Type 2 Diabetes Mellitus patients and self-care behaviours aimed at controlling their glycemic levels. Interventions that improve the social support received and self-care among Type 2 Diabetes Mellitus patients may increase the effectiveness in enhancing glycemic control. Some patents perceived that the disease was caused by witchcraft and resorted to traditional healers for management of their condition.Additionaly some patients attributed treatment outcome to God's will as they believed God could affect all facets of any form of treatment. Practices such as taking communion, visiting faith healers and being annointed with holy oil or water constituted Christian healing. Combining biomedical remedies and religious practices was perceived to increase the effectiveness of managing diabetes mellitus.

A study was conducted in the United States of America, focusing on gender, illness-related diabetes social support, and glycemic control (Mondesir *et al*., 2018). The outcomes implied a noticeable presence of gender differences in the reception of disease-associated social support among diabetic individuals, as well as in the control of blood sugar levels, or glycemic control. The study did not find a significant correlation for men regarding the relationship between social support and glycemic control. However, interestingly, it was observed that specific elements of disease-specific social support related to diabetes mellitus were significantly associated with women's ability to maintain an optimal level of glycemic control.

A study was done in India among Type 2 Diabetes Mellitus patients in a health facility to establish if gender has a role to play in glycemic control. In the study, female gender was observed to be linked to persistence of diabetic distress which contributes to poor glycemic control, difficulty in diabetes mellitus self-management and worsening diabetes mellitus states over time (Lee *et al*., 2018). The study revealed that the rate of depression exhibited among people with Diabetes Mellitus was higher when compared to the rate of depression in the general population. Women experienced depression almost two times as often as men and the risk rose with the presence of Diabetes Mellitus. Hormonal influences contribute to increased frequency of depression in women. Menstrual cycle, alterations during pregnancy, miscarriage, post-partum period, premenopausal period and menopause all have a bearing on depression among women.

A research project on the influence of social support and coping mechanisms in adults diagnosed with Type 2 Diabetes was aimed at determining whether patients who perceived their social support as weak had lower well-being and functionality compared to those who perceived their support to be strong (Shao *et al*., 2018). The cross-sectional research took place in both public and private institutions along the north coast of KwaZulu-Natal, South Africa. Upon receiving a diagnosis of Type 2 Diabetes Mellitus, patients initially reacted with shock, seeing the disease as an immediate threat to their lives and means of income. The study's results showed an inverse relationship between social support and coping strategies, suggesting that an increase in social support is associated with a reduction in emotional distress levels. The research also found that females were less successful in achieving glycemic control than males. This difference was possibly due to women reporting more difficulty in following the diabetes regimen than men. Many women also reported experiencing additional stressors like single motherhood, caring for children and elderly parents, and managing other obligations both at work and at home. Financial worries

about how to fund both medical and non-medical supplies for managing the disease contributed to this stress.

The study also revealed that another source of stress for diabetes mellitus patients was maintaining glycemic control within normal range and keeping their disease condition well managed. Stressful experience is associated with release of counter-regulatory hormones and mobilization of energy which results in raised glucose amounts. Social support is essential in assisting the diabetes mellitus patient manage the disease condition and to be more adherent to treatment consequently achieving glycemic control.Additionally,stress can precipitate disruption of diabetes mellitus control by affecting diet, physical activity and diabetes self-care activities. Patients received socio support through financial aid, reminders to take medication and support groups through friendships with other people living with diabetes mellitus in the community.

A cross sectional study done in Ethiopia on the factors associated with glycemic control revealed that 70.8% of participants had poor glycemic control and diabetes mellitus was more likely to be poorly controlled among rural inhabitants (Fiseha *et al*., 2018). The percentage of patients who had their blood sugar checked by a doctor was more in urban areas compared to rural areas. This could be attributed to easier access to quality healthcare facilities by urban inhabitants compared to rural inhabitants. The diabetes mellitus patients in urban areas might have a greater awareness of the benefits of regular check up at the clinic, have higher education level and increased availability of information on diabetes than their rural counterparts.

A study in Vihiga County Hospital on socio cultural dynamics influencing diabetes mellitus control revealed that 86% of 120 respondents interviewed indicated that,their participation in fasting to fulfill their religious faith was an impediment to glycemic control in their diabetes mellitus management.81% confirmed limiting consumption of specific foods due to religious beliefs was

challenging their diabetes mellitus control (Sitawa, 2016). In the study, it was established that religious beliefs such as fasting and restriction on intake of specific foods could influence the management of diabetes mellitus. The study also established that some diabetes mellitus patients adjusted treatment to avoid social stigma from the community on suspicion that they had a condition such as HIV/AIDS. This affected disease prognosis and also made it difficult for the healthcare worker to assess treatment effectiveness.

2.2.2 Economic Factors and Glycemic Control of Type 2 Diabetes mellitus Patients

A Canadian study investigated the impact of income on type 2 diabetes, obesity, overweight, and physical inactivity. The findings indicated a significant and independent association between household income and these health conditions. Lower-income households were more likely to have type 2 diabetes, obesity, overweight, and physical inactivity. Economic factors play a crucial role in access to healthcare, healthy food, and opportunities for physical activity. Addressing socioeconomic disparities and promoting equitable access to resources can help improve glycemic control and reduce the prevalence of these conditions (Bird *et al*., 2018).

A study conducted on the Association between Socioeconomic Status and Diabetes mellitus aimed to determine the association between social economic factors such as the income and diabetes mellitus in Thailand (Suwannaphant *et al*., 2019). This study established that there was an association between low educational achievement and diabetes mellitus in Thailand and diabetes mellitus patients who exhibited poor glycemic control showed characteristics of a lower-class economic position. Persons with Diabetes mellitus used higher healthcare resources. Cost was related to higher expenditure in treating late Diabetes mellitus complications and the economic loss due to lost economic opportunity. In addition, other social economic covariates such as gender,

monthly income, age, employment and region significantly correlated with diabetes mellitus; those with female gender, low educational attainment and old age were vulnerable to diabetes mellitus.

The probability of losing gainful employment resulting from ill health precipitated by diabetes mellitus complications are high among those of low economic strata (Basu and Garg, 2018). Consequently reduced income for the family could affect out of pocket diabetes mellitus related expenditure on healthcare. In the same study low education standing was reported to be linked to limited knowledge of diabetes mellitus self-care practices. Lack of current knowledge of diabetes mellitus self-care translates into loss of confidence in the patient's ability to strictly follow prescribed diabetic self-care practices recommended by the healthcare providers. This may impair glycemic control.

It was established that patients sought non biomedical services in management of diabetes mellitus since biomedical treatments created financial pressure that was beyond their reach. Traditional remedies appeared more economical to acquire. However, when diabetes mellitus symptoms worsened the patients employed biomedical treatments (Rahman *et al*., 2020). Further the study established that the association between poor glycemic control and low socio-economic status have these mediating factors: not following the recommended diet and medication, not honouring appointments to essential health services as evidenced by irregular scheduled visits to diabetes clinics and non monitoring of their blood sugar levels at home. Prescriptions of multiple medicinal drugs for both diabetes mellitus management and for treatment or prevention of comorbidities constrains patients financially. Diabetes mellitus monitoring equipment come at a cost that some patients are unable to afford.

A hospital facility based cross sectional study was done on challenges and factors associated with poor glycemic control among type 2 diabetes mellitus patients at Nekemte Hospital in Ethiopia.

The level of glycemic control was established by obtaining the mean of the fasting blood sugar readings for the three previous hospital visits. Both descriptive and inferential statistics were used in data analysis for 228 patients (Fekadu *et al.,* 2019). The results of the study showed poor diabetes mellitus control among 67% of patients. Significant association existed between poor glycemic control and education level, physical exercise, age, duration of disease treatment and smoking. The study also revealed there exhibited poor glycemic control among patients due to financial limitations since they had to settle bills for their diabetes mellitus drugs and blood glucose tests through out of pocket means.

The Ministry of Health in Kenya established that the quality of life of individuals with diabetes mellitus is negatively affected owing to increased morbidity rates and mortality rates. Loss of employment as a consequence of diabetes mellitus related complications affected one's financial status. Limb amputations or poor eyesight could limit the number and kind of economic activities in which the diabetes mellitus patient can engage in (Ministry of health, 2015).

Financial obligations related to diabetes mellitus management affects an individual's, a family's and the country's economy. Higher family income increased the likelihood of proper care being provided to persons with diabetes mellitus moreso if the affected family member is actively working. Greater care is expected to translate into better glycemic control and fewer diabetes mellitus related complications. When resources are scanty, the option was to choose between monitoring and treating. Monitoring got neglected and did not receive the attention it deserves. Glycemic control was found to be directly related to total healthcare cost, hospitalization as well as medical costs. Maintenance of good glycemic control among people living with diabetes mellitus can lower the economic impact of the disease.

2.2.3 Nutritional Factors and Glycemic Control of Type 2 Diabetes mellitus Patients

A research aimed at identifying glycaemia regulation determinants among people with Type 2 Diabetes Mellitus was done in Bangladesh (Afroz *et al*., 2019). Data from 1253 adult Type 2 Diabetes Mellitus patients obtained through face-to-face interview and hospital records from 6 hospitals were studied cross-sectionally. Numerous analyzes have been conducted on logistic regression. The results showed a very low level of management in 54.7 percent of respondents. Poor glycemic control was associated with unhealthy eating habits, low level of education, living in a rural locality, irregular follow up check-ups, insulin use and history of coronary artery diseases.

A study done in India to establish the factors that correlate with poor glycemic control in Type 2 Diabetes Mellitus patients revealed that low socio-economic standing was related to physical inactivity,not following prescribed medication regimen and unhealthy diet (Mohammad et al., 2018).In the study,dietary modifications for management of diabetes mellitus could be a source of conflicts and subsequently stress within the family. This could result in non adherence to prescribed dietary advice due to resistance to recommendations. The relatively high cost of vegetables and lean meat was a limiting factor in the use of these foods as part of diabetes mellitus management regimen.

Results from a study conducted in Ethiopia seeking to identify the factors associated with poor glycemic control revealed that, failure to do blood glucose level self-monitoring, engaging in physical exercise for three days or less per week and total cholesterol amount equal to or greater than 200 mg/dl were the independent causes of poor glycemic control (Mamo *et al*., 2019). The study further showed that dietary management was difficult to achieve especially for female patients due to typical family meal preparation patterns Facility-based case-control study design

was applied to patients with type 2 diabetes mellitus on follow-up at the diabetes clinic. Consecutive sampling method was applied and the data collected and entered using epidata manager Version 3.1 and later analyzed using SPSS Version 21. Logistic regression analysis was then performed.

The study revealed that unwillingness to eat from common pool during social gatherings put diabetes mellitus patients in a dilemma of choosing to maintain cordial relationships and strictly following dietary advice for diabetes mellitus management. It was also revealed that Diabetes mellitus patients failed to deliberately exercise due to perception that; their daily routine offered them adequate exercise, pain constraint, view that their environment was not suitable for exercise and lack of affordable facilities.

An analysis was done on the results of 410 patients in a study on the factors affecting glycemic control among Type II diabetes mellitus patients of the Machakos Level Five outpatient hospital. In unmatched Case-control design where type II diabetes mellitus patients with poor glycemic control (Fasting blood sugar reading above 7.0mmol/l) were compared with type II diabetics with good glycemic control (Fasting blood sugar reading less than 7.0mmol/l). The patients were sampled by employing simple random sampling method. Data was collected from consenting patients, with the use of structured questionnaires (Wanjohi *et al*., 2018). The sample size was 84 patients and the multi variable logistic regression was used to demonstrate the relationship of the predictors with glycemic control. This study led to the conclusion that adherence to recommended diet and physical activity are significantly related with glycemic control.

Results from a study on sex differences and correlates of poor glycaemic control in type 2 diabetes done in Brazil and Venezuela established that Glycemic control among females is influenced by obesity or increase in body mass index and women not adhehering to their dietary

recommendations so as to satisfy their family's dietary preferences (Duarte *et al*., 2019).The research also suggested that eating disorders were more common in women with Diabetes mellitus than in women who did not have Diabetes Mellitus.

Physical activity is broadly employed for use as a non drug remedy that assists prevent diabetes mellitus complications.In a study on the factors associated with poor glycemic control amongst rural residents with diabetes in Korea, it was revealed that the group who failed to participate in physical activity exhibited poor glycemic control which was 1.68 times higher than that one of the group who engaged in physical activity.It was revealed that regular physical activity has a constructive effect on uncontrolled blood sugar (Ahn and Yang, 2019).

Physical activity involves glucose uptake by the active muscle through increasing blood flow and subsequently increases the number of insulin receptors. This has the overall effect of increasing insulin sensitivity (Nayak *et al*., 2015). Results from a study conducted in Ethiopia on the factors associated with poor glycemic control among adult patients with type two diabetes mellitus in Jimma university medical center reveal that physical activity influenced poor glycemic control.It was established that a patient engaged in physical activity for less than three days in a week was likely to exhibit poor glycemic control compared to the one who engaged in physical activity for more than three days in a week (Mamo *et al*., 2019).

2.2.4 Health Seeking Factors and Glycemic Control of Type 2 Diabetes mellitus Patients

Diabetes mellitus caused 50,000 people in United States of America to seek treatment for kidney failure, was attributed to 44 percent of all new cases of renal failure and also caused more than 73,000 lower limb amputations, which translated into 60% of all lower limb amputations (Santos *et al.*, 2018).

A cross sectional study done involving 98 diabetes mellitus patients conducted on awareness, practices and treatment seeking behavior of Type 2 Diabetes Mellitus patients in Delhi aimed to evaluate the patient's understanding of their illness and its symptoms, practices, behavior-seeking care and the average cost of managing it. A whole diagnosis was established through conducting two community surveys and interviewed by administering pretested questionnaire. Data was analyzed using SPSS software, version 17. The study results revealed that the patients did not know the usefulness of regular treatment and management, consequently most of them were not taking diabetes mellitus medication.They were fatigued and this affected their adherence to clinic appointments. It was also revealed that some patients completed their dosage of medication only because they incurred financial costs in purchasing the drugs (Kishore *et al.*, 2018).

Studies demonstrated that healthcare seeking pattern was influenced by living conditions and lacked consistency with patients alternating among diverse healthcare providers (Atwine & Hjelm, 2018). In a study on perspectives of traditional healers on healthcare-seeking behavior and Type 2 Diabetes Mellitus management; it was established that Patients initially resorted to traditional herbal remedies which they believed provided relief from diabetes mellitus symptoms. Results of the study also revealed that Patients with diabetes mellitus sought healthcare in the professional healthcare sector principally to address severe symptoms linked to diabetes mellitus or glycemic control. Females focused on diabetes mellitus management follow up and infections or joint pain while males described fewer problems. More women than men resorted to traditional medicine men and medicine women for prescriptions of herbal remedies and food supplements when they perceived healthcare had failed to meet their expectations.

A study on on glycemic control and its associated factors in type 2 diabetes mellitus patients at Felege Hiwot and Debre Markos Referral; established that the odds of good glycemic control

among diabetes mellitus patients whose diastolic pressure was less than 90 mmHg was 29.5% times higher when compared with diabetes mellitus patients whose diastolic pressure Was greater than or equal to 90 mmHg (Shita and Lyasu, 2020). In the same study it was observed that the odds of good glycemic control for patients whose systolic blood pressure was less than 140 mmHg were 60.1% higher when compared to those patients whose systolic blood pressure was equal to or greater than 140 mmHg. The possible explanation for this could be the additional antihypertensive pill burden and the complication preventing the utilization of glucose function to increase the fasting blood sugar level.

A study titled factors associated with poor glycemic control amongst rural residents with diabetes in Korea observed that lack of interpretation of health related records denied the diabetes mellitus patient a chance to understand the meaning of blood sugar level and blood pressure (Ahn and Yang, 2019). It was noted that healthcare managers need to take up an active role in diabetes mellitus management. This is through providing patient with information that is useful in helping the patient maintain a healthy lifestyle, have good compliance on treatment regimen and enhance self-efficacy to controlled blood sugar.

Intermittent availability of prescribed medication compelled patients to seek medication in alternative areas or to go without medication (Metta *et al.*, 2018). A study was done to evaluate meanings given to diabetes symptoms and care-seeking practices among adults in southeastern Tanzania. The study revealed that patients in remote areas located in rural villages faced difficulty accessing diabetes mellitus clinics. This was due to high cost of transportation required for movement from homes to diabetes mellitus clinics, accommodation expenses, laboratory tests and food needed during the appointment day. Adverse weather conditions sometimes hampered patients' accessibility to the clinic forcing them to miss or postpone appointments. In the study, it

was also established that long length of time spent seeking treatment at diabetes mellitus clinic translated into financial loss due to missed opportunity for working to earn daily wages. Some patients experienced adverse effects such as fainting after waiting for long on the queue at the diabetes mellitus clinic.

Patients in the study indicated that unfavourable treatment such as public humiliation and disapproval by healthcare workers prevented them from honouring appointments and seeking treatment for diabetes mellitus related comorbidities. The patients felt frightened to ask questions or seek clarification on matters related to management of their condition. These factors affect the health seeking beaviour of diabetes mellitus patients.

Findings of a study on care seeking dynamics among patients with diabetes mellitus and Hypertension in selected rural settings in Kenya revealed that 58 per cent of the 1100 respondents attended regular scheduled clinic visits with respective healthcare provider, additionally having social support while on treatment and hospitalization had positive association with appropriate health seeking behavior (Karinja *et a*l., 2019). In the study, it was established that differences in health protective behavior between diabetic males and females aiming to maintain glycemic control have been noted. Women were found to be less compliant because adherence to traditional sex roles presents a hidden barrier. The woman may not be willing to modify her family's lifestyle to accommodate her health needs, feel she has limited support from her family or fail to disclose her illness to her family.

2.3 Theoretical framework

2.3.1 Dorothea Orem's theory

The Self-Care Deficit Nursing Theory (SCDNT) developed by Dorothea Orem is widely used in nursing practice and has significantly influenced nursing research, education, and quality of patient care. Orem's theory emphasizes patient's self-care capacities and the process of designing and providing therapeutic self-care for patients who are unable to care for themselves. Orem developed her theory in the 1950s when she worked as a consultant in the U.S. Department of Health, Education, and Welfare (now Health and Human Services). She was trying to improve the quality of nursing in state-run hospitals. Over the years, her theory was further developed, and the completed theory was published in "Nursing: Concepts of Practice" in 1971.

Orem's theory consists of three related theories; Theory of Self-Care: People should be selfreliant, responsible for their own care and others in their family needing care; Theory of SelfCare Deficit: People need nursing care when they have limitations that prevent them from performing self-care; Theory of Nursing Systems: The nurse should provide care for and assist in meeting the self-care demands of the patient.

Orem's theory might inform factors influencing glycemic control among Type 2 Diabetes Mellitus female patients; Orem's theory can help in identifying the socio-cultural influences that might affect a patient's ability to manage their condition. For instance, cultural beliefs might influence a patient's acceptance of the disease or their willingness to adhere to a treatment regimen. Understanding these socio-cultural influences is crucial in developing a personalized nursing care plan that can effectively support patients in their self-care activities.

Economic status can significantly influence a patient's ability to access necessary healthcare resources, medications, and nutritious food. Orem's theory supports the understanding that nurses may need to consider these economic factors when developing a care plan, as these factors might affect the patient's self-care abilities.

Nutrition is critical for managing Type 2 Diabetes. Orem's theory would suggest that patients should be educated about the importance of diversified nutrition and how it influences their blood glucose levels. However, if the patient is unable to take responsibility for their dietary needs due to factors like a lack of knowledge or resources, the nurse should step in to provide care and education.

Orem's theory supports the idea that patients should be responsible for their own health. However, various factors might affect a patient's health-seeking behaviors, including their personal beliefs about health and illness, their past experiences with healthcare providers, and their understanding of their health condition. Orem's theory helps in identifying these factors and developing a care plan that supports the patient in improving their health-seeking behaviors and self-care skills.

2.4 Conceptual Framework

Independent variables **Dependent variable**

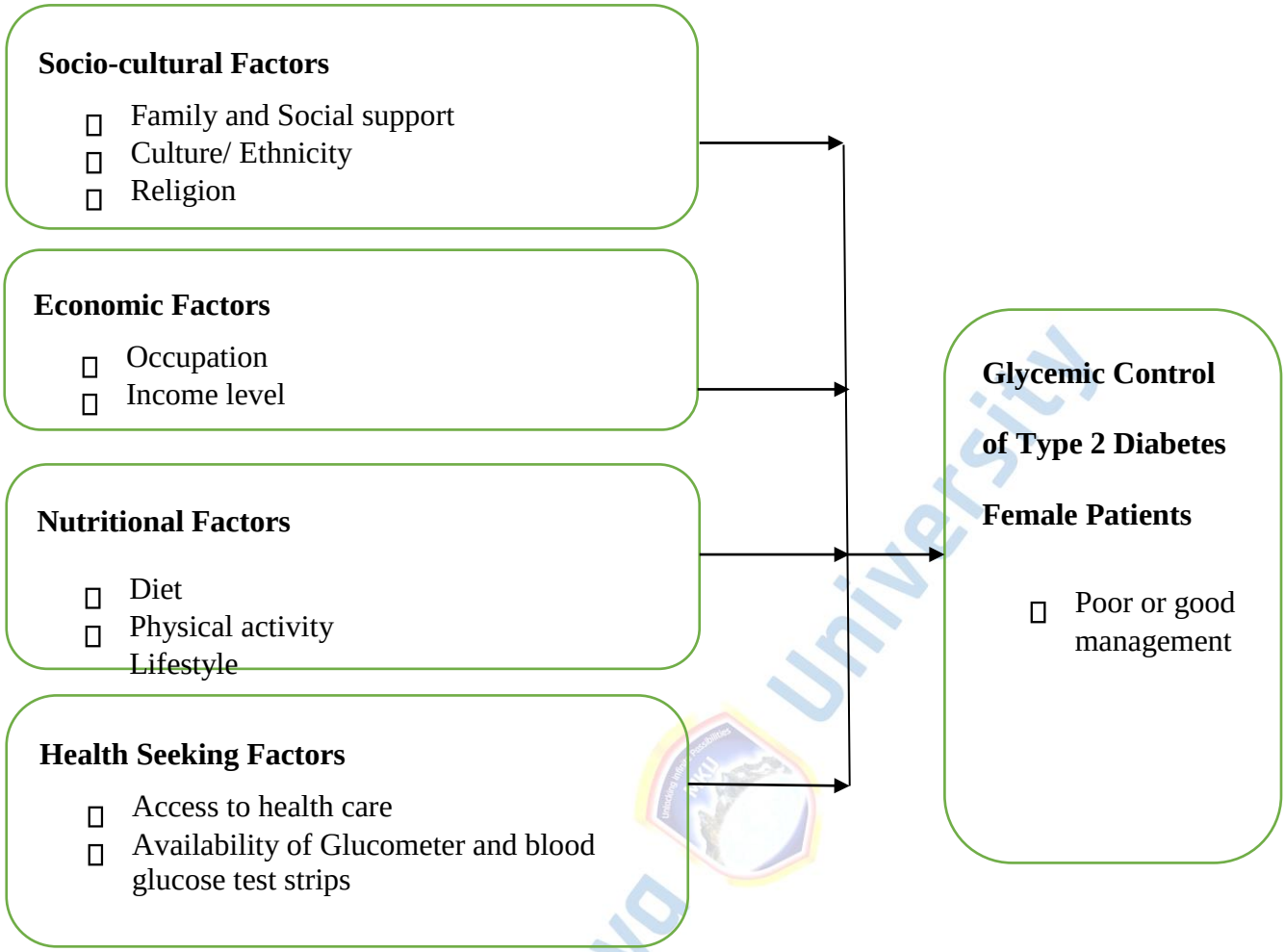


Figure 2.1 Conceptual Framework

Source: Author, from Literature review (2020).

2.4.1 Socio-cultural factors

Socio-cultural factors play a significant role in influencing glycemic control. Social and cultural factors encompass a wide range of variables, such as beliefs, attitudes, norms, and practices within a particular society or community. These factors can influence how individuals perceive and manage their diabetes. For example, cultural beliefs about food choices, traditional healing practices, and social support systems may impact a patient's adherence to treatment regimens and lifestyle modifications necessary for glycemic control.

2.4.2 Economic factors

Economic factors also have a strong influence on glycemic control. Economic factors refer to the financial resources available to individuals, their access to healthcare services, and the affordability of diabetes management tools and medications. Limited financial resources may result in inadequate access to proper healthcare, leading to suboptimal glycemic control. Economic factors may also affect the ability to afford nutritious food, engage in physical activity, and maintain a healthy lifestyle, all of which are essential for managing diabetes effectively.

2.4.3 Nutritional factors

Nutritional factors play a crucial role in glycemic control among patients with type 2 diabetes mellitus. The type and quality of food consumed, portion sizes, meal timing, and dietary habits can significantly impact blood glucose levels. Poor dietary choices, such as a high intake of processed foods, sugary beverages, and unhealthy fats, can contribute to uncontrolled blood sugar levels. On the other hand, a diversified diet that includes appropriate carbohydrate, protein, and fat intake, along with regular monitoring of portion sizes, can support better glycemic control.

2.4.4 Health-seeking factors

Health-seeking behavior is a critical variable in determining glycemic control among type 2 diabetes mellitus female patients. Health-seeking behavior refers to the actions individuals take to seek and access healthcare services, follow treatment recommendations, and manage their condition effectively. Factors such as healthcare knowledge, attitudes towards healthcare providers, perceived barriers to accessing care, and self-care practices can all influence healthseeking behavior. Patients who actively engage in regular check-ups, adhere to medication schedules, and adopt healthy lifestyle behaviors are more likely to achieve and maintain glycemic control.

2.5 Recap of literature review

The empirical literature examined the impact of socio-cultural factors on glycemic control in Type 2 Diabetes Mellitus (T2DM) patients. Studies conducted in Iran, the United States, India, South Africa, Ethiopia, and Kenya revealed significant associations between social support, gender disparities, religious beliefs, and cultural practices with self-care behaviors, emotional distress, depression, and glycemic control. Improving social support and addressing sociocultural dynamics can enhance T2DM management and glycemic control.

The literature examined the influence of economic factors on glycemic control in Type 2 Diabetes Mellitus (T2DM) patients. Studies conducted in Canada, Thailand, Ethiopia, and Kenya revealed significant associations between household income, socioeconomic status, employment, education level, and diabetes mellitus. Lower-income households and individuals with low socioeconomic status were more likely to have T2DM, poor glycemic control, and limited access to healthcare resources. Economic constraints hindered adherence to self-care practices and medication, leading to poor glycemic control. Addressing socioeconomic disparities and providing affordable access to healthcare can improve glycemic control and reduce the economic burden of diabetes mellitus.

The empirical literature explored the relationship between nutritional factors and glycemic control in Type 2 Diabetes Mellitus (T2DM) patients. Studies conducted in Bangladesh, India, Ethiopia, Kenya, Brazil, Venezuela, and Korea revealed associations between unhealthy eating habits, low socioeconomic status, physical inactivity, non-adherence to medication and dietary recommendations, irregular follow-up check-ups, and poor glycemic control. Factors such as low education, rural locality, insulin use, history of coronary artery disease, unwillingness to adhere to dietary advice, and lack of physical activity were identified as contributors to poor glycemic

control. Promoting healthy eating habits, improving education and awareness, and encouraging regular physical activity are important for achieving better glycemic control in T2DM patients.

The empirical literature also examined health-seeking factors and their impact on glycemic control in Type 2 Diabetes Mellitus (T2DM) patients. Studies conducted in various countries revealed that factors such as lack of awareness, financial constraints, reliance on traditional healers, inconsistent healthcare seeking patterns, limited access to healthcare facilities, medication availability, interpretation of health records, and social support influenced glycemic control. Addressing these factors through education, improving access to healthcare, providing consistent medication supply, and promoting supportive environments can enhance healthseeking behavior and improve glycemic control in T2DM patients.

2.6 Research Gaps

From the empirical literature, various research gaps were identified which our study aimed to fill. For instance there is limited understanding of the mechanisms through which cultural and religious beliefs influence diabetes mellitus management and the integration of cultural practices with biomedical treatments. Sitawa (2016) identified that cultural and religious beliefs, such as fasting and restrictions on food consumption, can impact diabetes mellitus management. However, further research is needed to explore the specific mechanisms through which these beliefs influence self-care behaviors and treatment outcomes.

In addition, there is incomplete understanding of the gender differences in the relationship between social support and glycemic control in individuals with diabetes mellitus. For instance, Mondesir *et al*. (2018) found noticeable gender differences in the reception of disease-associated social support and glycemic control. However, there is a need for further research to explore the

underlying factors contributing to these gender differences and understand the specific social, psychological, and physiological mechanisms involved.

There is limited understanding of the specific pathways through which socio-economic factors influence diabetes mellitus management and the economic burden of the disease. Bird *et al*. (2018) conducted a Canadian study that indicated a significant association between household income and type 2 diabetes, obesity, overweight, and physical inactivity. However, further research is needed to elucidate the mechanisms through which socio-economic factors impact glycemic control and to explore interventions that address socio-economic disparities and promote equitable access to resources.

The studies have insufficient exploration of the relationship between physical activity and glycemic control among individuals with Type 2 Diabetes Mellitus. The studies by Ahn and Yang (2019) and Mamo *et al*. (2019) highlight the association between physical activity and glycemic control. However, there is a need for more research to understand the optimal frequency, intensity, and duration of physical activity required for improved glycemic control in different populations.

The studies by Metta *et a*l. (2018) and Karinja *et al*. (2019) highlight the negative impact of unfavorable treatment experiences, such as public humiliation and disapproval by healthcare workers, on health-seeking behavior among individuals with diabetes mellitus. Additionally, the positive association between social support and appropriate health-seeking behavior is noted.

Further research is needed to explore the psychological and social factors that influence healthseeking behavior, including the role of healthcare provider attitudes and patient support networks, and to develop strategies to promote patient empowerment and positive healthcare experiences.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that will be used to carry out this study, and it is divided into the following sections: research design, location of study, target population, sampling procedure and techniques, sample population, construction of research instruments, testing for validity and reliability, data collection methods and procedures, proposed data analysis techniques and procedures and finally ethical considerations for the research to be implemented.

3.2 Research Design

This study adopted a cross-sectional descriptive design. Both quantitative and qualitative approaches of data collection were utilized to obtain the pertinent and precise information and help elicit observations, opinions and attitudes concerning socio-cultural factors, economic aspects, nutritional factors and health-seeking behavior for glycemic control among Type 2
Diabetes Mellitus patients attending Taveta sub-County Hospital.

3.2.1 Operationalization of Study Variables

Independent Variables

Independent variables include socio-cultural, economic, nutrition related and health seeking behavior factors.

Socio-cultural factors

Age was measured in years

Level of education was classified as primary, secondary, tertiary or no formal education.

Marital status was assessed as Single, married or divorced/separated/widowed

Family and social support was categorized as present or lacking

Culture/ethnicity- ethnicity was indicated

Religion was assessed as Christian, Muslim or others

Economic factors

Occupation was assessed in three categories namely: employed, unemployed or retired from employment.

Income levels was assessed as no income, less than Kes.5,000 Between Kes.5,000 and 20,000, greater than Kes.20,000

Nutrition related factors

Diet was assessed as adherent or non- adherent to dietary recommendations

Physical activity was assessed as low, moderate or high

Lifestyle was assessed as alcohol user or non- alcohol user

Health seeking behavior factors

Access to healthcare was assessed by ease or limited access to healthcare

Availability of equipment was assessed by possession of a glucometer by the patient and number of times patient does self-monitoring of blood glucose per week.

3.2.2 Outcome variable/dependent variable

Glycemic control-Fasting blood sugar was used to evaluate glycemic control. This was determined by taking the mean of the last two successive fasting blood glucose readings.

Good glycemic control was a fasting blood glucose measurement equal to or less than 7.0mmol/l determined by taking the mean of the last two successive fasting blood sugar readings.

Poor glycemic control was a fasting blood glucose measurement greater than7.0mmol/l determined by taking the mean of the last two consecutive FBG readings. Sustained glycemic control measure among the patients is useful in prediction compared to instantaneous glycemic control measure, which prompted the recording and averaging of patients glycemic control
levels.

3.3 Location of the study

The study site was Taveta sub–County Hospital. The hospital is located in Taveta sub-County located on 3.3933°S, 37.6774°E, Taita Taveta County. Taveta sub-County has a total population of 91,222 persons; 47,410 males and 43,812 females according to 2019 national census. Taveta sub-County was purposively selected because it is a marginalized area, border town with heavy commercial activities. Central role of food affects all facets of a person's life.Obstacles linked to self-discipline, family, emotions and social support are interlinked and overlapping. Marginalization magnifies the barriers. Taveta sub-County being primarily a rural setting is a host to persons with diverse backgrounds in addition to the native inhabitants. As such, the Taveta Sub-County Hospital is an ideal study site due to its service of patients from varied backgrounds, thus offering a rich and comprehensive perspective on the issues being investigated. Additionally, the hospital operates an outpatient Diabetes Mellitus clinic once weekly, making it even more relevant to the study.

3.4 Target Population

The target population comprised of every patient aged 35-60 years who comes to the diabetic outpatient clinic at Taveta sub-County Hospital.

3.4.1 Inclusion criteria

Female patients aged 35-60 years living with Type 2 Diabetes Mellitus and attending Taveta subCounty Hospital outpatient clinic for at least six months who gave informed consent to participate in the study.

3.4.2 Exclusion criteria

Patients who met the inclusion criteria but required emergency medical attention, or were expectant and or lactating

3.5 Sampling procedures and techniques

Sampling is the selection of some part of an aggregate on the basis of which the basis of which an inference is made (Fraenkel and Norman, 1990). A sample was constituted by selecting the required number of respondents from the population, using systematic Random sampling technique. Approximately 60 patients are seen on every clinic day conducted once a week. On clinic day, every two patients selected a number using lottery method. One who picked odd number was selected to participate in the study. If she accepted, she was recruited. On completing interview, the procedure was replicated on the next available clients until a sample of 15 participants were selected every day. This was done again on subsequent clinic days until the sample of 135 respondents was attained. Since the study aimed to reach a total of 135 respondents sampling 15 patients each clinic day allowed for this total to be reached in nine weeks. This was be the estimated duration of the study, and a reasonable time frame for research. This sample size

was adopted from the study by Nduati *et al*. (2016) who assessed factors associated with glycemic control among type 2 diabetes mellitus patients attending Mathari
National Teaching Hospital.

3.6 Sample population

The study population was female Type 2 Diabetes Mellitus patients aged 35-60 years who have been enrolled for care and treatment at the Diabetic outpatient clinic of Taveta sub-County Hospital. The study population was approximated to be 178. Female Adults aged 35-60 years of with Type 2 Diabetes Mellitus as the primary diagnosis have managed the condition for at least six months and are attending diabetic clinic between April 2021 and July 2021 was included in the study. The selected age group is more independent in matters of decision-making (Zepeda *et al*., 2013).

Estimated sample size was determined using the single proportion formula (Fishers et al.,1998).

$$\frac{n=(Z\alpha/2)^2 P(1-P)}{d^2}$$

Where n=desirable sample size

Z(α/2)=confidence interval (95%) level of significance 1.96

P=proportion of patients with poor glycemic control (estimated at 48.1% from a descriptive cross-sectional study conducted by Nduati *et al*. (2016) between 2015 and 2016, collected quantitative data from 103 female and 46 male Type 2 Diabetes Mellitus patients aged 35 years and above diagnosed with diabetes mellitus; were on treatment and follow up for at least one year found that 48.1% of females had achieved good glycemic control).

d=precision of measurement (acceptable marginal error)

P=0.5 d=0.05

$$n = \frac{(1.96)^2 (0.481) (1-0.481)}{(0.05)^2} = 384$$

Correcting for a finite population less than 10,000

Currently, there are 178 female Type 2 Diabetes Mellitus patients aged 35-60 years old in Taveta sub-County Hospital

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

Where N=estimates of the population size (total number of Type 2 Diabetes Mellitus patients)

nf=desired sample size when the study population is less than 10,000

$$nf = \frac{384}{1+(384/178)}$$

$$nf = \frac{384}{1+384/178} = 122$$

10% contingency $10/100 \times 122 = 13$

$122+13=135$

Final sample size is 135

3.7 Construction of research instruments

In the quantitative aspect of the analysis, primary data was used. Data collection is the way to receive data on inquiry. The fundamental research methods used in sociology are: surveys, quantitative systems and regular assessments.

The study collected both primary and secondary data. Secondary data was obtained from scholarly paper reviews and client record on fasting blood sugar level. The gold standard measurement for glycemic control is HbA1C (WHO, 2006). However, a cross sectional study conducted in Nekemte showed a direct association amongst fasting blood sugar, post prandial blood sugar and HbA1C (Swetha, 2018). The study assessed glycemic control using the mean of the last two successive fasting blood sugar readings instead of HbA1C measurement. This is because in resource constrained areas the HbA1C test is not routinely done and the use of fasting blood sugar is recommended (Swetha, 2018).

Quantitative data was collected by use of structured questionnaires. Qualitative data was obtained through one key informant interview with the in charges of diabetes mellitus clinic and one focused group discussions with the patients.

3.8 Testing for Validity and Reliability

3.8.1 Reliability

Reliability is the consistency of measurement data (Babbie, 2004). It was enhanced by including several comparable items on a measure, by assessing a diverse sample of persons and by carrying out standardized testing procedures. **Internal consistency reliability**

The questionnaire was tested internally for general reliability. The Cronbach alpha which is a numerical coefficient of reliability was used to ensure internal consistency reliability.

Internal equality measures the relationship between several items in a related study, and whether any elements that suggest that a similar total construct is calculated produce relative results.

Cronbach's alpha was computed by comparing the score for each scale item with the total score for each individual respondent. This was compared to the variance for all individual scale item scores. $\alpha = \frac{k \times c}{v+(k-1)c}$ where k refers to the number of scale items c refers to the average of all covariances between items v refers to the average of the variance of each item

The resulting α coefficient of reliability ranges from 0 (all scale items are independent from one another and do not correlate) to 1 (all scale items have high covariances) providing this overall assessment of a measure's reliability.

The higher the α coefficient the more the items have shared covariance and probably measure the same underlying concept

An estimation of the reliability of this exam was used as the appropriate estimate of $\alpha=0.7$ (Nunnaly, 1978)

Test-retest reliability

It is the degree to which results are steady over time.

It involves administering the same measurement instrument such as a questionnaire to the same group of respondents under the same conditions on two different occasions and correlating the scores (Hogan,2007).

The reliability coefficient is the correlation between the scores on the first and second testing.

Pre-testing of the data collection tools was done in Mwatate Sub-county hospital with 15 Type 2 Diabetes Mellitus women patients and 1 health worker end of March 2021.

Necessary changes were effected in the data collection tools.

Stability was established by calculating the Pearson's correlation coefficient through comparing the scores on the first and second testing. If the correlation coefficient values are ≥0.7 then the instruments were considered to have strong reliability.

3.8.2 Validity

Validity is the extent to which the test item sample is a representative of the content of the test designed to measure (Creswell, 2003). Validity implies accuracy, it is the level to which a testing instrument measures what is to be assessed. The questionnaires were a series of reports on demographic traits of the type 2 diabetes mellitus patients, the social cultural, economic, nutrition related and health seeking behaviour factors affecting the glycemic levels of the type 2 diabetes mellitus patients which was analyzed to ensure material validity. The questions were written in simple English for convenience and to ensure that the respondents do not have a hard time understanding the questions.

Content validity

Assessment of content validity of a measure is achieved by using a professional in a specific area of specialization (Mugenda and Mugenda, 2003). Professional expertise was sought from experts

in the subject matter, specifically from my supervisors. They reviewed the instruments and computed the percentage of questions considered to be relevant. An average of the two scores was obtained, if the value is greater than 90 per cent then the instrument was considered valid. If it is not then there was consultation with the supervisors to develop well-structured tools. The tools were reviewed by the supervisors of the study.

Construct validity

It is the level to which a test measure evaluates the underlying theoretical concept it ought to measure. This was ascertained through consultation with my supervisors to develop wellstructured research tools.

Validity was determined by administering few questionnaires to a pilot group in Mwatate sub county hospital in order to evaluate whether the questionnaire has ability to measure what it is required to measure.

3.9 Data collection methods and procedures

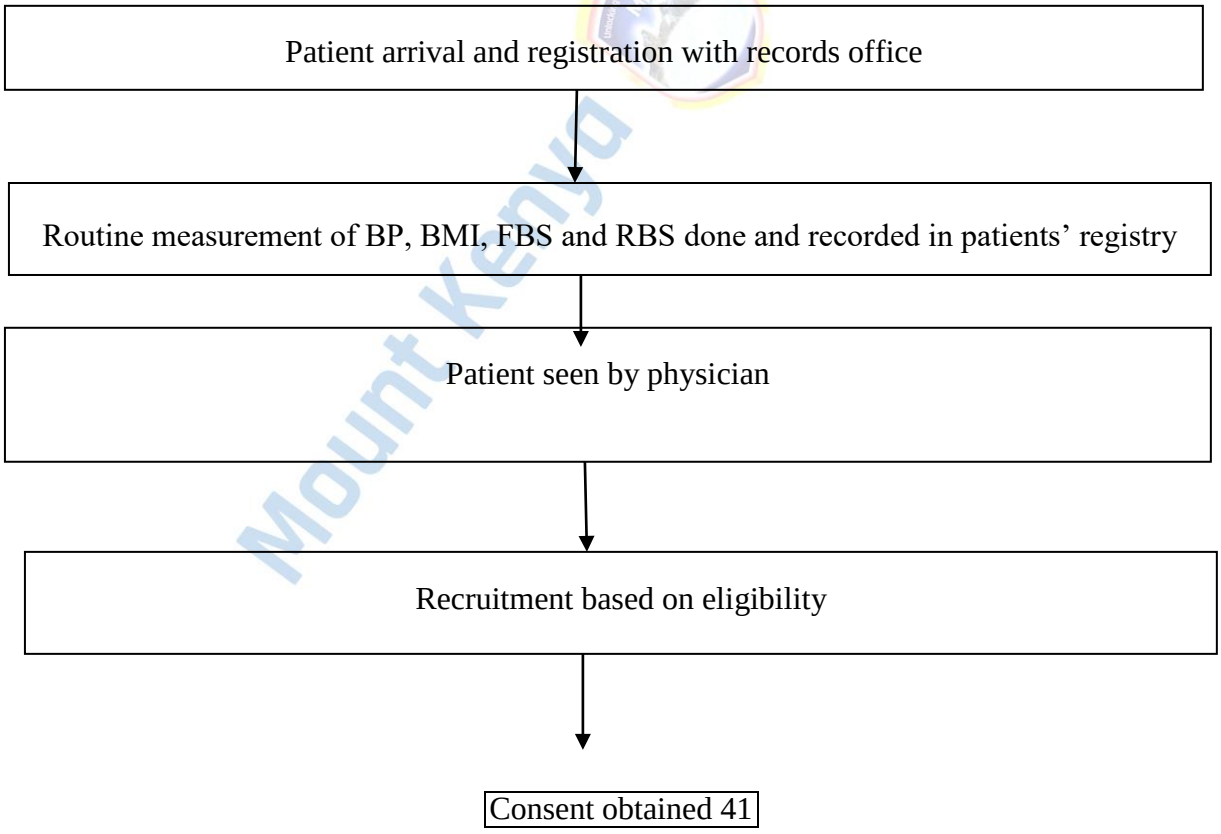
It is the accurate process of gathering data / information on both raw and statistical questions using methods such as views of participants, debate in groups, explanations and historical events. A structured questionnaire was used to collect data for this study. The use of questionnaires in this study was in order since they assemble information that isn't explicitly recognizable as they get some information on feelings, perspectives motivations and also experiences each of the individuals has gone through. Questionnaires have the extra favored point of view of being more affordable, using less time as instruments of gathering information and important information in getting target data. Qualitative data was obtained through one key informant interview with the in charge of diabetes mellitus clinic and two focused group discussions with the patients.

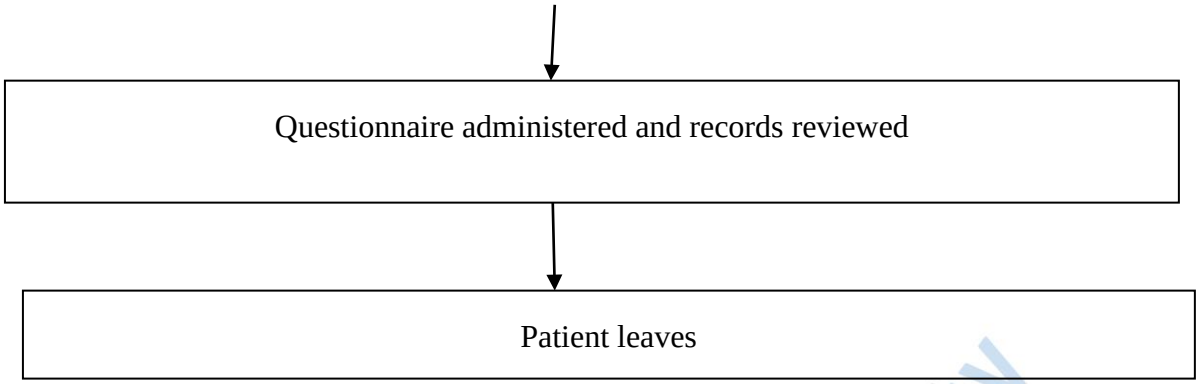
The content of the questionnaire was obtained from modifying sample diabetic patient questionnaires from International Diabetes Federation.

The data collection process was conducted by the researcher assisted by two trained personnel.

On the days of the medical appointments, standardized questionnaires were administered to all diabetes mellitus type 2 patients who gave informed consent. These questionnaires were only issued to those female patients of age bracket 35 and 60 years. The administration of the questionnaires was done with the support of 2 research assistants. Each questionnaire was divided into six sections; first the part on demographic characteristics, second the part on sociocultural factors, third section on economic factors, fourth section on nutritional factors, fifth section on health seeking factors and the sixth part on the glycemic levels of the type 2 diabetes mellitus patients.

Study flow chart of patient movement through the clinic from arrival to recruitment.





3.10 Data analysis techniques and procedures

Qualitative and quantitative data was obtained. The qualitative data collected was categorized, coded and grouped into different themes, helping to explain the perceptions, feelings and actions of the databases collected from various sources. This was done using the chi-square and the odd ratios regression. The odd ratio regression and the Chi-square tests were carried out to test for association between variables. The association between exposure and an outcome is measured by Odds Ratio (OR). The OR represents the odds that an outcome occurred given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. The Chi-square test was intended to test how likely it is that an observed distribution is due to chance. It is also called a "goodness of fit" statistic, because it measures how well the observed distribution of data fits with the distribution that is expected if the variables are independent. Qualitative data from key informant interviews and focused group discussions were evaluated, classified based on research objectives and reported as narrations from respondents.

Quantitative data was cleaned, entered and statistically analyzed using SPSS version 20. $P<0.05$at 95% confidence interval was considered significant (Taylor,2001). The research results and interpretation was presented in tables, pie charts and bar graphs to describe, organize and summarize data. The conclusions were used for discussion and recommendation.

3.11 Ethical considerations

The study considered ethical issues in order to enhance response rate of the respondents. An introduction letter was sought from the Mount Kenya University postgraduate school; ethical approval was sought from Mount Kenya University Ethics Review Committee. In addition, a study permit was acquired from National commission for science,Technology and innovation and clearance obtained from Health Administration, Taita-Taveta County. The relevance of the study was explained to the participants. The study guaranteed the participants of the discretion and concealment of their identities.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This section of the study covered data findings and drawing corroborated discussion based on the past literature findings. The analysis software that was adopted for the study is SPSS version 20.0. The study utilized a 0.05 level of significance for all statistical techniques in this section. The results are displayed in tables and charts, and organized in relation to the study's objectives

4.2 Response Rate

The number of questionnaires administered to the respondents were for the entire sample size of 135. The results on response rate are shown in the table 4.1 below.

Table 4.1 Response rate

Questionnaire	Frequency	Percent
Duly filled and returned	110	81
Uncollected/ unfilled	25	19
Total	135	100

The study had a total of 110 questionnaires which were duly filled and returned representing 81% of the response rate. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for research studies, 60% is good and 70% being very good. Since the response rate of this study was 81% this implied that it was adequate.

4.3 Demographic analysis

This study is a social study and therefore needs to consider the demographic characteristics of the respondents. The demographic characteristics that were used in this study included; marital status, age bracket, highest level of school attended and religion.

Table 4.2 Demographic characteristics

		Frequency	**Percent**
Marital status	Married	78	70.9
	Divorced	4	3.6
	Separated	14	12.7
	Widowed	11	10
	Co-habiting/living in	3	2.7
Age bracket	35-45 years	36	32.7
	46-55 years	43	39.1
	56-60 years	31	28.2
Education level	Primary	54	49.1
	Secondary	36	32.7
	College	17	15.5
	University	3	2.7
Religion	Roman catholic	52	47.3
	Protestant/other Christian	44	40
	Muslim	12	10.9
	No religion	2	1.8

The results show that majority of the patients (70.9%) in the diabetic outpatient clinic were married, 12.7% of the patients were separated, 10% were widowed, 3.6% were divorced whereas 2.7% were Co-habiting partners.

From the results, majority of the respondents were aged between 46 – 55 years (39%), 33% were aged between 35 to 45 years, whereas 28% were aged between 56 to 60 years. Since the patients were selected randomly, the distribution of respondents was uneven in terms of age.

From the results, majority of the respondents had gone up to primary education (49%), 33% had gone up to secondary education, 16% had gone up to college education, whereas 2.7% had gone up to university education.

The results show that majority of the patients (47%) in the diabetic outpatient clinic were Roman Catholic, 40% of the patients were Protestants, 10.9% were Muslims whereas 1.8% were not in religion.

4.4 Social cultural factors

The research assessed the socio-cultural factors influencing glycemic control among type 2 diabetes mellitus female patients. The analysis was based on the objective of social cultural factors. The illustrations are as shown in Table 4.3

Table 4.3 Receipt of shots frequency

	Frequency	Percent
Never	107	97.3
Once a week	3	2.7

The findings in Table 4.3 revealed that 97% never receive a shot from family member or friend, whereas 3% receive a shot from family member or friend once a week. This implies that the majority of the patients rarely receive shots.

The socio-cultural factors of interaction of individuals were further assessed and illustration is as per Table 4.4.

Table 4.4 Socio-cultural factors

	Never	**Rarely**	**Often**
How often does a family member or friend, remind you to take your diabetes medicine?	13.6%	55.5%	30.9%
How often does a family member or friend, ask you about the results of blood test?	20.0%	48.2%	31.8%
How often does a family member or friend, make sure you have materials for blood sugar testing?	21.8%	41.8%	36.4%
How often does a family member or friend, get on your case after you eat something you shouldn't?	26.4%	33.6%	40.0%
How often does a family member or friend, remind you to exercise?	44.5%	39.1%	16.4%
How often does a family member or friend, are available to listen to concerns or worries about diabetes mellitus care?	9.1%	40.0%	50.9%

From the findings most respondents (55%) noted that a family member or friend rarely remind them to take their diabetes mellitus medicine, 31% noted that often times they are reminded while 14% noted that they are never reminded. Majority (48%) noted that they a family member or friend rarely ask them about the results of blood test, 32% noted that often times they are asked while 20% noted that they are never asked.

Most respondents (42%) noted that a family member or friend rarely make sure they have materials for blood testing, 36% noted that often times they receive attention in provision while 22% noted that they never receive attention in provision of blood sugar testing materials. Majority (40%) noted that a family member or friend often get on their case after they eat something they shouldn't, 34% noted that rarely they are asked on eating out of their diet while 26% noted that they are never questioned on what they take as diet. Most respondents (45%) noted that a family member or friend never remind them to exercise, 39% noted that rarely they are reminded to exercise while 16% noted that they are often reminded to exercise.

Majority (51%) stipulated that a family member or friend often are available to listen to concerns or worries about diabetes mellitus care, 40% stipulated that rarely listen to concerns or worries about diabetes mellitus care while 9% stipulated that the community listen to concerns or worries about diabetes mellitus care. This implies that there are rare reminders from family members or friends in most instances on practical lifestyles (self-care activities) such as exercises and medication process supports. However, the findings also reveal that the social support regarding availability to the diabetic patients to listen to their concerns and worries is often. Therefore, social support to the patients on their activities is necessary to enhance good glycemic control. Similar results from a research by Mohebi *et al*. (2018) demonstrated significant correlation between self-

care activities and social support in type 2 diabetics. Interventions that improve the social support and self-care among diabetic patients may increase the effectiveness in enhancing glycemic control. The study assessed the methods most preferred by the community in managing diabetes mellitus and findings are as presented in Table 4.5.

Table 4.5 Managing diabetes mellitus preferred method

	Frequency	Percent
Medication	29	26.4
Diet	3	2.7
Exercise	9	8.2
Using herbal remedies	65	59.1
Praying	4	3.6

Most respondents prefer using herbal remedies (59%), with 26.4% preferring medication methods, 8.2% preferred exercise method to manage diabetes mellitus, 3.6% preferred praying method, whereas, the least preferred (2.7%) method was diet.

The key informant interview respondents noted that “religious beliefs mostly attributed to fasting advise against certain foods, which can contradict the diet practices advisory on glycemic control”. This serves as a challenge to the patient. It was further noted that educational level is a factor that contributes to the level of glycemic control. The respondent noted that low level of education lead

to poor understanding of diabetic effects and concerns. It was further noted that family responsibilities for most women within the sub-county is a hindrance to effective glycemic control due to responsibility of taking care of their families. The respondents further noted that the cultural food among Taveta natives is bananas and maize which are carbohydrates. Therefore, there is need for proper management one is able to control their sugars through diet advice. The respondents noted that gender roles conflict is also a contributory factor to poor glycemic control.

The study assessed the influence of social cultural factors on glycemic control among type 2 diabetes mellitus female patients. Findings are as presented in Table 4.6.

Table 4.6 Bivariate Regression Results of social cultural factors on glycemic control

Social cultural factors		Glycemic control						Regression Results			
		Poor	%	Good	%	N	Chi sig	Sig.	OR	95 % CI Lower	Upper
SCF1_frequency_of_shots(1)	Once a week	24	41.2	83	58.8	17	0.198 (0.657)	0.668	0.578	0.055	6.655
SCF2_frequency_of_medicine_rem	Never	2	13.3	13	86.7	15	20.198 (0.000)	0.003	REF	REF	REF
	Rarely	8	13.1	53	86.9	61		0.982	1.019	0.193	5.382
	Often	15	44.1	19	55.9	34		0.045	1.195	0.038	2.8
SCF3_blood_test_results	Never	2	9.1	20	90.9	22	24.08 (0.000)	0.000	REF	REF	REF
	Rarely	5	9.4	48	90.6	53		0.963	0.962	0.172	5.365
	Often3Q	18	51.4	17	48.6	35		0.004	1.094	0.019	4.467
SCF4_blood_test_materials	Never	3	12.5	21	87.5	24	10.681 (0.005)	0.007	REF	REF	REF
	Rarely	6	13.0	40	87.0	46		0.949	0.952	0.216	4.197
	Often	16	40.0	24	60.0	40		0.027	6.214	2.055	9.839

SCF5_Diet_uptake_followup	Never	2	6.9	27	93.1	29	21.582 (0.000)	0.000	REF	REF	REF
	Rarely	3	8.1	34	91.9	37		0.854	0.84	0.131	5.388
	Often	20	45.5	24	54.5	44		0.002	3.089	1.019	6.421
SCF6_exercise_reminder	Never	5	10.2	44	89.8	49	9.867 (0.007)	0.012	REF	REF	REF
	Rarely	12	27.9	31	72.1	43		0.035	1.295	1.094	2.918
	Often	8	44.4	10	55.6	18		0.004	3.142	2.038	5.527
SCF7_concerns_and_worries	Never	2	20.0	8	80.0	10	23.714 (0.000)	0.471	REF	REF	REF
	Rarely	0	0.0	44	100.0	44		0.997	4.04E+08	0.000	.
	Often	23	41.1	33	58.9	56		0.220	0.359	0.079	1.846
SCF8_diabetes_management_methods	Medication	7	24.1	22	75.9	29	4.571 (0.334)	0.834	REF	REF	REF
	Diet	1	33.3	2	66.7	3		0.728	0.636	0.058	8.123
	Exercise Using herbal remedies	0	0.0	9	100.0	9		0.999	5.14E+08	0.000	.
	Praying	15	23.1	50	76.9	65		0.911	1.061	0.379	2.964
		2	50.0	2	50	4		0.293	0.318	0.038	2.695

At a significance level of 0.05 to ordinal scale and a bivariate logistic Data was transformed and conducted to determine the influence of Social cultural factors on glycemic control among type 2 diabetes mellitus female patients aged 35-60 years, and thus screen the Social cultural factors for inclusion in multivariable logistic regression. The result revealed that women who are often reminded to take medicine are 1.195 times more likely to have good glycemic control compared to women never reminded to take medicine (Odds 1.195,p=0.04).

The result revealed that the odd of having a good glycemic control is 1.094 times higher for women who are often times asked about blood test results as compared to women who are never asked about blood test results (Odds=1.094, p=0.004). The odd of having a good glycemic control is 6.214 times higher for women who have materials for blood testing as compared to women who don't have materials for blood testing (Odds=6.214,p=0.027). The odd of having a good glycemic control is 3.089 times higher for women who are followed up after eating something they shouldn't as compared to women who are not followed up after eating something they shouldn't (Odds=6.214,p=0.027). The findings imply that availability of blood testing materials and consistent follow-up on diet uptake disciplines the patients in their glycemic control levels. The consistent reminder to do take medicine in the recommended time and hours was found to be impactful in the glycemic control levels among the patients. Similar findings were found in a study carried out a study done in the United States of America (Mondesir *et al*. ,2016) Results suggested that selected components of disease-related social support for diabetes mellitus were correlated with maintaining good glycemic control in women.

The result revealed that the odd of having a good glycemic control is 1.294 times higher for women who are rarely reminded to exercise as compared to women who are never reminded to exercise (Odds=1.294,p=0.035). Further, the odd of having a good glycemic control is 3.142 times higher for women who are often reminded to exercise as compared to women who are never reminded to exercise (Odds= 3.142,p=0.004). The findings imply that consistent exercises are necessary for the glycemic control among diabetic patients, and therefore a reminder to undertake exercises influences the glycemic levels among patients. A study conducted on "Social support and coping in adults with type 2 diabetes" had similar findings which indicated presence of an inverse association between social support and coping (Shao *et al*., 2017). This indicated that a rise in social support is correlated with a decrease in level of emotional distress and thus a possibility of a

good glycemic control. Social support is essential in assisting the diabetes mellitus patient manage the disease condition and to be more adherent to treatment consequently achieving glycemic control.

4.5 Economic factors

The research evaluated the economic factors influencing glycemic control among type 2 diabetes mellitus female patients. The analysis was based on the objective of economic factors. The illustrations in Table 4.7 show that the employment status of the respondents, majority being employed.

Table 4.7 Employment status

	Frequency	Percent
Employed	85	77.3
Unemployed	25	22.7

The results show that majority of the patients (77.3%) in the diabetic outpatient clinic were employed, whereas 22.7% were unemployed.

The assessment of the employment terms of the employed patients was presented in Table 4.8.

Table 4.8 Employment terms

	Frequency	Percent
Casual terms	65	76.5
Permanent terms	20	23.5

The findings reveal that majority of the patients (76.5%) in the diabetic outpatient clinic were employed on casual terms, whereas 23.5% were employed on permanent terms.

The respondent in the key interview noted that lack of employment and low income business contributes to low funds to support family needs and proper medication of diabetes mellitus condition. Lack of family financial support for medical expenses and laboratory tests are contributory factors which act as hindrances for medical follow-up.

The evaluation of the other economic factors of the patients was presented in Table 4.9.

Table 4.9 Economic factors

	Yes	**No**
Do you receive any funds from business	54.5%	45.5%
Do you receive any financial support from friends and relatives in Kenya	43.6%	56.4%
Do you receive any financial support from relatives located abroad	15.5%	84.5%
Do you receive money from funds that support the aged, disabled or disadvantaged	30.9%	69.1%

Does any of your household member receive money from CDF or Bursary funds	67.3%	32.7%
Have you ever used NHIF or free medical services from County or National government	98.2%	1.8%

Most respondents (54.5%) agreed that they receive some funds from business with 45.5% indicated they don't receive any funds from business. Majority (56.4%) noted that they don't receive any financial support from friends and relatives in Kenya, with 43.6% stipulated that they receive financial support. It was noted by majority (84.5%) that they don't receive any financial support from relatives located abroad, with 15.5% stipulating that they receive support from relatives located abroad. The findings show that the diabetic patients mostly depend on their personal funds such as owned/household business. There is low dependence and support from external partners such as friends, family members and charity organizations. Similar findings was found in a study conducted in Canada to determine income's independent effect on type 2 diabetes mellitus and revealed that a significant and independent relationship existed between household income and the prevalence of Type 2 Diabetes Mellitus (Bird *et al*., 2018).

Most respondents (69%) disagreed that they receive money from funds that support the aged, disabled or disadvantaged with 31% indicated they receive any funds that support the aged, disabled or disadvantaged. Majority (67.3%) noted that some of their household members received money from CDF or Bursary funds, with 32.7% stipulating that none of their household members received money from CDF or Bursary funds. It was noted by majority (98.2%) that they have used NHIF or free medical services from county or national government, with 1.8% stipulating that they have not

used NHIF or free medical services. The findings show that nonhealth government agencies such as the aged foundation does not accord funds support to the diabetic patients. However, the governmental health agencies such as NHIF offer support to patients. A study carried out on the Association between Socioeconomic Status and Diabetes mellitus established that diabetes mellitus patients who exhibited poor glycemic control showed characteristics of a lower-class economic position and struggle in their financial responsibilities (Suwannaphant *et al*., 2019).

The study assessed the influence of economic factors on glycemic control among type 2 diabetes mellitus female patients. Findings are as presented in Table 4.10.

Table 4.10 Bivariate Regression Results of economic factors on glycemic control

Economic factors		Glycemic control						Regression Results			
		Poor	%	Good	%	N	Chi sig	Sig.	OR	95% CI Lower	Upper
EF_Employment_status	Employed	18	21.2	67	78.8	85	23.714 (0.000)	0.006	1.691	0.259	1.909
	Unemployed	7	28.0	18	72.0	25					
EF_employment_terms	Casual terms	16	24.6	49	75.4	65	0.323 (0.000)	0.571	1.306	0.519	3.287
	Permanent terms	9	20.0	36	80.0	45					
EF3_business_funds	Yes	16	26.7	44	73.3	60	21.166 (0.000)	0.003	1.657	0.660	4.161
	No	9	18.0	41	82.0	50					
EF4_friends_funds	Yes	14	29.2	34	70.8	48	22.011 (0.000)	0.001	1.909	0.775	4.701
	No	11	17.7	51	82.3	62					
EF5_relatives_abroad	Yes	6	35.3	11	64.7	17	1.808 (0.179)	0.185	2.124	0.697	6.479
	No	19	20.4	74	79.6	93					
EF6_disabled_funds	Yes	4	11.8	30	88.2	34	3.368 (0.066)	0.075	0.349	0.110	1.112
	No	21	27.6	55	72.4	76					

EF7_CDF_funds	Yes	17	23.0	57	77.0	74	0.008 (0.930)	0.93	1.044	0.402	2.711
	No	8	22.2	28	77.8	36					
EF8_NHIF_use	Yes	23	21.3	85	78.7	108	23.714 (0.000)	0.999	0	0	.
	No	2	100.0	0	0.0	2					

At a significance level of 0.05 to ordinal scale and a bivariate logistic Data was transformed and conducted to determine the influence of economic factors on glycemic control among type 2 diabetes mellitus female patients aged 35-60 years, and thus screen the economic factors for inclusion in multivariable logistic regression. The result revealed that women employed are 1.691 times more likely to have good glycemic control compared to women not employed (Odds 1.691,p=0.006). The result revealed that the odd of having a good glycemic control is 1.657 times higher for women who receive funds from their business as compared to women who do not receive funds from their business (Odds=1.657,p=0.003). The findings reveal that employed individuals have a better control of their glycemic levels, since their minds are engaged and undertake exercises easily, in comparison to the unemployed. The Ministry of Health in Kenya established that the quality of life of persons with diabetes mellitus is negatively affected owing to increased rates of morbidity and mortality which has been contributed to by the financial challenges (MOH, 2015). Financial obligations related to diabetes mellitus management affects an individual's, a family's and the country's economy.

The odd of having a good glycemic control is 1.909 times higher for women who receive financial support from friends and relatives in Kenya as compared to women who don't receive financial support from friends and relatives in Kenya (Odds= 1.909,p=0.001). Therefore, financial support is a consideration factor to relieve stress and anxiety of diabetic patients which promotes glycemic control ease. similar findings were found in a study that assessed the income variances in glycemic control among United States of America older adults with diabetes mellitus and stated that high financial standards or greater income levels was associated with better glycemic control when compared to those with lower education (Dupre *et al*., 2018).

4.6 Nutritional Factors

The research assessed the nutritional factors influencing glycemic control among type 2 diabetes mellitus female patients. The analysis was based on the objective of nutritional factors. The illustrations on dietary practices are as shown in Table 4.11

Table 4.11 Lifestyle practices

Lifestyle practices	Never	Rarely	Often
How often do you take alcohol	75.5%	19%	5.5%
How often do you eat high fat foods such as red meat or full fat dairy products	5.5%	78.2%	16.4%
How often do you exercise	16.4%	65.5%	18.2%

Most respondents (75.5%) noted that they never take alcohol, 19% stipulated that they rarely take alcohol while 5.5% noted that they often times take alcohol. Majority (78%) noted that they rarely eat high fat foods such as red meat or full fat dairy products, 16% noted that often times eat high fat foods while 6% noted that they never eat high fat foods. The eating habits and dietary practices were found to be contributory factors towards glycemic control. A similar research aimed at identifying glycaemia regulation determinants among people with Type 2 Diabetes Mellitus was done in Bangladesh and results showed poor glycemic control was associated with unhealthy eating habits (Afroz *et al*., 2019). Most respondents (65.5%) noted that they rarely do exercise, 18% indicated that often times they do exercise while 16% noted that they never do exercise. Good dietary habits and exercises promote the glycemic levels of respondents.

The evaluation of the Nutritional health status of different patients was as illustrated in Table 4.12.

Table 4.12 Nutritional health status

	Yes	**No**
Do you always remember to take 3 meals a day	10.9%	87.3%
Do you experience pain when moving or walking about	74.5%	25.5%
Do you have a chronic condition other than the challenge of diabetes mellitus	78.2%	21.8%

Most respondents (87.3%) noted that they do not always remember to take 3 meals a day with 10.9% indicating they always remember to take 3 meals a day. Majority (74.5%) noted that they experience pain when moving or walking about, with 25.5% stipulated that they don't experience pain when moving or walking about. It was noted by majority (78.2%) that they have a chronic

condition other than the challenge of diabetes mellitus, with 21.8% stipulating that they have other chronic condition.

The study assessed the influence of nutritional factors on glycemic control among type 2 diabetes mellitus female patients. Findings are as presented in Table 4.13.

Table 4.13 Bivariate Regression Results of nutritional factors on glycemic control

Nutritional factors		Glycemic control						Regression Results			
		Poor	%	Good	%	N	Chi sig	Sig.	OR	95% CI Lower	Upper
NF1_alcohol_intake	Never	24	28.9	59	71.1	83	17.434 (0.004)	0.013			
	Rarely	1	4.8	20	95.2	21		0.046	0.136	0.033	4.066
	Often	0		6	100.0	6		0.999	6.57E+08	0	.
NF2_3_meals_intake	No	2	16.7	10	83.3	12	0.922 (0.631)	0.855	REF	REF	REF
	Yes	23	24.0	73	76.0	96		0.575	0.635	0.13	3.109
NF3_fatty_foods	Never	3	50.0	3	50.0	6	22.937 (0.000)	0.008	REF	REF	REF
	Rarely	19	22.1	67	77.9	86		0.141	0.526	0.058	8.913
	Often	3	16.7	15	83.3	18		0.019	0.5	0.066	3.852
NF4_exercises	Never	2	11.1	16	88.9	18	14.75 (0.001)	0.002	REF	REF	REF
	Rarely	12	16.7	60	83.3	72		0.564	0.625	0.127	3.081
	Often	11	55.0	9	45.0	20		0.009	2.102	1.018	4.568
NF5_pain_experience	No	21	25.6	61	74.4	82	1.524 (0.217)	0.224	2.066	0.642	6.648

	Yes	4	14.3	24	85.7	28					
NF6_chronic_condition	No	21	24.4	65	75.6	86	0.642 (0.423)	0.426	1.615	0.496	5.262
	Yes	4	16.7	20	83.3	24					

At a significance level of 0.05 to ordinal scale and a bivariate logistic Data was transformed and conducted to determine the influence of nutritional factors on glycemic control among type 2 diabetes mellitus female patients aged 35-60 years, and thus screen the nutritional factors for inclusion in multivariable logistic regression. The result revealed that the odd of having a good glycemic control is 0.136 times higher for women who rarely take alcohol as compared to women who never take alcohol (Odds= 0.136, p=0.046). The eating habits and dietary practices were found to be contributory factors towards glycemic control. Good glycemic control is enhanced by factor of non-alcoholism.A study on the "factors affecting glycemic control among Type II diabetic patients of the Machakos Level Five outpatient patients" concluded that adherence to recommended diet and physical activity are significantly related with glycemic control (Wanjohi, 2018).

The respondents in the key informant interviews noted that lack of proper awareness on dietary practices affect proper control of glycemic levels. Respondents noted that scarcity of diverse and affordable food with inadequate funds to purchase proper recommended diet is a hindrance to good glycemic control

The odd of having a good glycemic control is 0.5 times higher for women who eat high fat foods such as red meat or full fat dairy products as compared to women who do not eat high fat foods such as red meat or full fat dairy products (Odds= 0.5,p=0.019). The odd of having a good glycemic control is 2.102 times higher for women who often exercise as compared to women who never

exercise (Odds= 2.102, p=0.009). Dietary practices such as red meat and fatty foods intake alter the glycemic levels of patients greatly. Further, exercises serve as control mechanism of glycemic levels. A similar research aimed at identifying glycaemia regulation determinants among people with Type 2 Diabetes Mellitus was done in Bangladesh and results showed poor glycemic control was associated with unhealthy eating habits (Afroz *et al*., 2019)

4.7 Health-seeking behavior

The study evaluated the health seeking behavior factors influencing glycemic control among type 2 diabetes mellitus female patients. The analysis was based on the objective of health seeking behavior factors. The illustrations on dietary practices are as shown in Table 4.14 **Table 4.14 Clinic checkups attendance**

	Never	Rarely	Often
How often do you go for unscheduled checkups	7.3%	51.8%	40.9%
How often do you go for scheduled clinic checkups	1.8%	8.2%	90.0%

Majority (51.8%) noted that they rarely go for unscheduled checkups, 40.9% noted that often times they go for unscheduled checkups while 7.3% noted that they never go for unscheduled checkups. Most respondents (90%) noted that they often go for scheduled clinic checkups, 8% indicated that rarely go for scheduled clinic checkups while 2% noted that they never go for scheduled clinic checkups. Scheduled clinic checkups enhance the management of glycemic levels, with the consistent and relevant advice from health practitioners. A cross sectional study done involving 98 diabetes mellitus patients conducted on "Awareness, Practices and Treatment Seeking Behavior of Type 2 Diabetes Mellitus Patients" in Delhi revealed that the patients did not know the usefulness of regular treatment and management, consequently most of them were not taking diabetes mellitus medication (Kishore *et al.*, 2018).

The study assessed treatment that Health care workers give the diabetes mellitus patients. Illustrations are as per Table 4.15.

Table 4.15 Health care workers behavior

	Frequency	Percent
Never	1	0.9
Sometimes	19	17.3
Often	90	81.8

Majority (81.8%) noted that often health care workers treat them with courtesy and respect when they visit a clinic, 17.3% noted that sometimes health care workers treat them with courtesy while 0.9% noted that health care workers never treat them with courtesy.

On assessing the environment of the diabetes mellitus clinic room, findings are as shown in Table 4.16.

Table 4.16 Clinic room environment

	Frequency	Percent
Somewhat Clean	24	21.8
Clean	86	78.2

Majority (78.2%) noted that the environment of the diabetes mellitus clinic room/area is clean, while 21.8% noted that the environment of the diabetes mellitus clinic room/area is somewhat

clean. The findings on the cleanliness of clinic rooms is due to the choice of the respondents to attend clinics where the health conditions and the quality of services is high.

The study assessed the frequency of monitoring the blood sugar. Illustrations are as per Table 4.17.

Table 4.17 Monitoring the blood sugar

	Frequency	Percent
Daily	38	34.5
At a visit to health care facility	45	40.9
Weekly	27	24.5

Majority (40.9%) noted that they monitor the blood sugar at a visit to health care facility, 34.5% noted that they monitor their blood sugar daily while 24.5% noted that they monitor their blood sugar weekly.

On assessing the nearness of the clinics attended, findings are as shown in Table 4.18. **Table 4.18 Nearness of clinic**

	Frequency	Percent
Near	53	48.2
Far	39	35.5
Very far	18	16.4

Majority (48.2%) noted that the health care facility they attend is near, 35.5% noted that the health care facility they attend is far while 16.4% noted that the health care facility they attend is very far.

The respondents in the key informant interview noted that some women are involved with alcohol drinking and cigarette smoking leading to poor glycemic effects. Further it was noted that the love for junk foods and poor feeding lifestyles influenced by social media adversely affect glycemic levels. The respondent further noted that poor weight control is linked to poor feeding habits which affect the glycemic levels of patients. The respondents of the interviews noted that non-adherence to appointments and lack of equipment and materials for blood sugar monitoring are the main challenges faced by diabetic patients. It was noted that some patient seek health services when condition of diabetes mellitus is out of control.

The study assessed the influence of Health seeking factors on glycemic control among type 2 diabetes mellitus female patients. Findings are as presented in Table 4.19.

Table 4.19 Bivariate Regression Results of Health seeking factors on glycemic control

		Regression Results		
Health seeking factors	**Glycemic control**	**Sig.**	**OR**	**95 % CI**

		Poor	%	Good	%	N	Chi sig			Lower	Upper
HS1_unscheduled_checkups	Never	0	0.0	8	100.0	8	6.107 (0.047)	0.192	REF	REF	REF
	Rarely	10	17.5	47	82.5	57		0.999	0	0	.
	Often	15	33.3	30	66.7	45		0.999	0	0	.
HS2_scheduled_clinics	Never	1	50.0	1	50.0	2	16.107 (0.001)	0.010	REF	REF	REF
	Rarely	0	0.0	9	100.0	9		0.009	10.623	6.233	15.23
	Often	24	24.2	75	75.8	99		0.007	13.125	10.188	51.888
HS3_respect_treatment	Never	1	100.0	0	0.0	1	6.107 (0.047)	0.147	REF	REF	REF
	Sometimes	0	0.0	19	100.0	19		0.999	2.61E+18	0	.
	Always	24	26.7	66	73.3	90		1	4.44E+09	0	.
HS4_clinic_environment	Somewhat Clean	3	12.5	21	87.5	24	21.828 (0.006)	0.047	1.416	0.113	1.53
	Clean	22	25.6	64	74.4	86					
HS5_sugar_monitoring	Daily	18	47.4	20	52.6	38	20.204 (0.000)	0.000	REF	REF	REF
	At a visit to health care facility	5	11.1	40	88.9	45		0.001	0.2	0.0333	2.219
	Weekly	2	7.4	25	92.6	27		0.003	0.25	0.029	4.333
HS6_nearest_clinic	Near	15	28.3	38	71.7	53	6.107 (0.047)	0.316	REF	REF	REF
	far	8	20.5	31	79.5	39		0.396	1.53	0.574	4.077
	very far	2	11.1	16	88.9	18		0.156	3.158	0.646	15.436

At a significance level of 0.05 to ordinal scale and a bivariate logistic Data was transformed and conducted to determine the influence of Health seeking factors on glycemic control among type 2

diabetes mellitus female patients aged 35-60 years, and thus screen the Health seeking factors for inclusion in multivariable logistic regression. The result revealed that the odd of having a good glycemic control is 10.62 times higher for women who rarely go for scheduled clinic checkups as compared to women who never go for scheduled clinic checkups (Odds= 10.62, p=0.009). The odd of having a good glycemic control is 13.125 times higher for women who often go for scheduled clinic checkups as compared to women who never go for scheduled clinic checkups (Odds= 13.125,p=0.007). Scheduled clinic checkups enhance the management of glycemic levels, with the consistent and relevant advice from health practitioners. A similar research aimed at identifying glycaemia regulation determinants among people with Type 2 Diabetes Mellitus was done in Bangladesh and results showed poor glycemic control was associated with low level of education, infrequent follow up check-ups, and insulin use (Afroz *et al*., 2019).

The odd of having a good glycemic control is 1.416 times higher for patients who feel the environment of the diabetes mellitus clinic room/area that is clean as compared to patients who feel the environment of the diabetes mellitus clinic room/area that is somewhat clean (Odds=1.416,p=0.047). The odd of having a good glycemic control is 0.2 times higher for women who monitor their blood sugar at a visit to health care facility as compared to women who monitor their blood sugar daily (Odds= 0.2,p=0.001). Further, the odd of having a good glycemic control is 0.25 times higher for women who monitor their blood sugar weekly as compared to women who monitor their blood sugar daily (Odds= 0.25,p=0.003). The hygiene levels and regular monitoring of blood sugar among the patients are factors that maintain the blood sugar levels at good state. Results from a study conducted in Ethiopia seeking to identify the factors associated with poor glycemic revealed that, failure to do blood glucose level selfmonitoring, engaging in physical exercise for three days or less per week and total cholesterol of 200 mg/dl or more were the independent factors associated with poor glycemic control (Mamo *et al*., 2019).

4.8 Patient hospital results

The study collected the patients' results of weight, height, blood pressure and patient glycemic levels. Illustration is as per Table 4.20, Table 4.21 and Table 4.22.

Table 4.20 BMI status

BMI	Frequency	Percent
Underweight	3	2.7
Normal	46	41.8
Overweight	36	32.7
Obese	25	22.7

The findings revealed that the majority of the respondents (41.8%) had normal body mass index, 32.7% had overweight BMI level, 22.7% were obese whereas 2.7% were underweight.

Table 4.21 Blood pressure level

	Frequency	Percent
Normal blood pressure	49	44.5
Pre-hypertension	14	12.7
Hypertension	47	42.7

The results show that the majority of the respondents (44.5%) had normal blood pressure, 42.7% had hypertension, whereas 12.7% were had a pre-hypertension condition. Table 4.22 Glycemic control level

	Frequency	Percent
Good glycemic control	25	22.7

Poor glycemic control	85	77.3

Most respondents (77.3%) had a poor glycemic control level while 22.7% had a good glycemic control. The findings show that the patients need assistance to control their glycemic levels.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter relates the study objectives to the research findings. It documents the findings in summary, discussion of the findings in relation to related studies as well as the conclusion. The limitations and recommendations for further research are also highlighted.

5.2 Summary

This section provides a summary of the findings from the analysis. This was done in line with the objectives of the study the first variable determined socio-cultural factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital. The socio-cultural factors assessed include the relationship of friends and relatives with the diabetic patients. The findings show that women rarely receive a shot from family member or friend. Further, family members or friends rarely remind them to take their diabetes mellitus medicine or follow up on the results of blood test. It is on rare circumstances the patients are made sure they have materials for blood testing or reminded to take exercises. However, majority noted that family members or friends often get on their case after they eat something they shouldn't. Most

respondents prefer using herbal remedies with some others preferring medication methods to manage diabetes mellitus. Other methods preferred are praying and diet management. The result revealed that revealed often times women reminded to take medicine are 1.195 times more likely to have good glycemic control compared to women never reminded to take medicine. The odd of having a good glycemic control is 3.089 times higher for women who are followed up after eat something they shouldn't as compared to women who are not followed up after eat something they shouldn't.

The second objective was to identify economic factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital. The result revealed that revealed women employed are 1.691 times more likely to have good glycemic control compared to women not employed. The result revealed that the odd of having a good glycemic control is 1.657 times higher for women who receive funds from their business as compared to women who do not receive funds from their business. The odd of having a good glycemic control is 1.909 times higher for women who receive financial support from friends and relatives in Kenya as compared to women who don't receive financial support from friends and relatives in Kenya.

The third objective was to identify nutritional factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital. The result revealed that the odd of having a good glycemic control is 0.136 times higher for women who rarely take alcohol as compared to women who never take alcohol. The odd of having a good glycemic control is 0.5 times higher for women who eat high fat foods such as red meat or full fat dairy products as compared to women who do not eat high fat foods such as red meat or full fat dairy products. The odd of having a good glycemic control is 2.102 times higher for women who often exercise as compared to women who never exercise.

The fourth objective was to determine health seeking behaviour factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta sub-County Hospital

The result revealed that the odd of having a good glycemic control is 10.62 times higher for women who rarely go for scheduled clinic checkups as compared to women who never go for scheduled clinic checkups. The odd of having a good glycemic control is 13.125 times higher for women who often go for scheduled clinic checkups as compared to women who never go for scheduled clinic checkups. The odd of having a good glycemic control is 1.416 times higher for female patients who feel the environment of the diabetes mellitus clinic room/area that is clean as compared to female patients who feel that the environment of the diabetes mellitus clinic room/area that is somewhat clean. The odd of having a good glycemic control is 0.2 times higher for women who monitor their blood sugar at a visit to health care facility as compared to women who monitor their blood sugar daily. Further, the odd of having a good glycemic control is 0.25 times higher for women who monitor their blood sugar weekly as compared to women who monitor their blood sugar daily

5.3 Conclusions

The analysis of the study data led to several key findings in understanding the factors influencing glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in Taveta subCounty Hospital.

Socio-cultural factors showed an important role in managing diabetes, particularly the involvement of family and friends. Although it was found that familial help is infrequent, patients who were regularly reminded to take their medication and were checked on after eating inappropriate foods had a higher likelihood of achieving good glycemic control. It was also observed that the patients often turned to alternative treatments such as herbal remedies, prayer, and diet management, suggesting a prevalent role of cultural belief systems in their healthcare decisions.

Economic factors were found to significantly influence glycemic control. Employed women and those who received funds from their businesses or financial support from friends and relatives were more likely to have better control of their blood glucose levels. This suggests that economic stability and support may improve patients' ability to manage their condition effectively.

Nutritional factors and lifestyle habits also played a significant role in glycemic control. Reduced alcohol consumption, a diet free from high fat foods, and regular exercise were associated with improved control over blood glucose levels. This underscores the importance of proper dietary habits and physical activity in the management of diabetes.

Lastly, health-seeking behavior notably influenced glycemic control. Regular clinic visits, perceiving cleanliness in the clinic environment, and daily blood sugar monitoring were linked with better glycemic control. This indicates the importance of regular monitoring, adherence to appointments, and perception of cleanliness for successful diabetes management. However, it was also found that women who monitored their blood sugar less frequently during healthcare visits seemed to have better glycemic control, highlighting the need for further exploration in this area.

5.4 Recommendations

The study recommends that the medication follow-up and dietary practices for the diabetic patients should be a community affair, both relatives and friends, to ensure that the diabetic patients have followed the prescribed lifestyle and precautionary health measures.

The county government should include Families during health education, to create awareness on the methods they can use to keep healthy in their lifestyle.

The patients should be trained and educated to strictly follow the diet practices advised by the health practitioners. The patients should highly avoid so fatty foods to control their glycemic levels

appropriately. Further, the patient should be encouraged to take exercises daily and avoid harmful habits such as alcohol intake.

The patients should be trained by health professionals to attend all scheduled clinic checkups to get the health care personnel and nutritionists counsel the patients based on the progress assessment. The patients should moreover keep the progress communicated to the health officers when there are changes in their sugar levels. The monitoring of blood sugar should be done regularly. It is recommended for an increase in scope for creation of diabetic awareness and reach out to the patients and community. The creation of support system by the government involving family and members of the community affected is necessary.

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APPENDICES

Appendix 1: Consent Form

Dear participant,

My name is Lucy Nyong'a a public health masters at Mount Kenya University, School of Public Health. Kindly read this consent form carefully before filling the questionnaire. I am readily available if further clarifications are required.

The purpose of the study: I am carrying out a study to investigate the status of glycemic control among type 2 diabetes mellitus female patients aged 35-60 years in in Taveta sub-County Hospital.

Participation: Participation is voluntary. The participant is allowed to withdraw at any point during data collection process. No penalties or consequences will be imposed because of withdrawal.

Benefits of the study: It will generate information that can be useful in improving the health of type 2 diabetes mellitus patients. There are no direct benefits to the participant, though it's for academic purposes and information will be treated with confidentiality.

Procedure: If you are willing to participate in the study, I will request you to sign below. Thereafter, I will ask you questions related to glycemic control among type 2 diabetes mellitus.

Associated Risks: There are no associated risks. Your privacy is guaranteed. We will prioritize your business first and only continue with the interview during your resting periods.

In case of any questions, kindly text or contact me via 0726644698. Further information can be obtained from Mount Kenya University Ethics Review Committe*e* P. O. BOX 342-01000, Thika. Email:info@mku.ac.ke

Participant's Statement

I understand that my participation is voluntary and that I may refuse to participate or withdraw my consent and stop taking part at any time without any penalty or risks.

I hereby willingly consent to participate in the study.

Participant's Signature_____Date_____

Interviewer Signature……Date _____

Appendix 2: Questionnaire

Questionnaire on Factors associated with Glycemic control among female diabetics aged 35-60 years attending Taveta sub-county hospital outpatient clinic

SECTION A: DEMOGRAPHICS

What is your marital status?

Married

Divorced

Separated

Widowed

Co-habiting/living in

What is your age bracket?

35-45

45-55

56-60

What is the highest level of school you attended?

Primary

Secondary

College

University

What is your religion?

Roman Catholic

Protestant/other Christian

Muslim

No religion

Section B: Social cultural factors

These sections aims at assessing the social cultural factors that influence glycemic control

How often does a family member or friend, give you shots?

Never

Once a week Daily

How often does a family member or friend, remind you to take your diabetes medicine?

Never

Rarely Often

How often does a family member or friend, ask you about the results of blood test?

Never

Rarely Often

How often does a family member or friend, make sure you have materials for blood testing?

Never

Rarely

Often

How often does a family member or friend, get on your case after you eat something you shouldn't? Never

Rarely

Often

How often does a family member or friend, remind you to exercise?

Never

Rarely

Often

How often does a family member or friend, are available to listen to concerns or worries about diabetes care?

Never

Rarely

Often

Which of the following methods is most preferred by your community in managing diabetes

Medication

Diet

Exercise

Using herbal remedies

Praying

Section C: Economic factors

This section attempts to assess the economic factors that influence glycemic control. Tick the most appropriate response

Which of the following reflects your employments status?

Employed

Unemployed

If your answer to above question is “employed”, on what terms?

Casual terms

Permanent terms

Do you receive any funds from business?

Yes

No

Do you receive any financial support from friends and relatives in Kenya?

Yes

No

Do you receive any financial support from relatives located abroad?

Yes

No

Do you receive money from funds that support the aged, disabled or disadvantaged?

Yes

No

Does any of your household member received money from CDF or Bursary funds?

Yes

No

Have you ever used NHIF or free medical services from county or national governments

Yes

No

Section D: Nutritional Factors

This section attempts to assess the nutritional factors that influence glycemic control. Tick the most appropriate response

How often do you take alcohol?

Never

Rarely

Often

Do you always remember to take 3 meals a day?

No

Yes

How often do you exercise?

Never

Rarely

Often

Do you experience pain when moving or walking about?

No

Yes

Do you have a chronic condition other than the challenge of diabetes?

No

Yes

Section E: Health seeking behavior

This section attempts to assess the health seeking behaviors that influence glycemic control. For each statement, please select one option that best describes your experience at diabetes clinic.

How often do you go for unscheduled checkups?

Never

Rarely

Often

How often do you go for scheduled clinic checkups?

Never

Rarely

Often

Health care workers treat me with courtesy and respect when I visit a clinic

Never

Sometimes

Always

How was the environment of the diabetes clinic room/area?

Dirty

Somewhat Clean

Clean

How often do you monitor your blood sugar?

Daily

At a visit to health care facility

Weekly

32. How far is the nearest clinic?

a) Near

b) far

c) very far

SECTION F: PATIENT RESULTS-OBTAINED FROM THE HOSPITAL

Fasting blood sugar mmol/l:Latest reading……

Fasting blood sugar mmol/l: Preceding reading…….

Fasting blood sugar mmol/l:Average…….

Weight in Kg……..

Height in cm……..

BP mm/Hg……

Appendix 3: Focus Group Discussion Interview Guide

Focus Group Discussion Interview Guide for women aged 35-60 years with Type 2 Diabetes Mellitus

Community and patient support group meeting discussion on

DETERMINATION OF GLYCEMIC CONTROL AMONG 35-60-YEAR-OLD FEMALE TYPE 2 DIABETICS ATTENDING TAVETA SUB-COUNTY HOSPITAL OUTPATIENT CLINIC TAITA TAVETA COUNTY, KENYA

Instructions for the Moderator

Use this guide to facilitate an open discussion amongst the group of participants. Control the discussion to balance out participation and prevent any participants from dominating the discussion (i.e., refocus the discussion, use non-verbal cues, address questions to individuals less likely to talk, etc.). Use probing techniques that you have learned (i.e. repeat the question, paraphrase the reply, ask for specific details, etc.) when participants give incomplete or irrelevant answers in order to get clearer responses. Minimize group pressure by probing for alternative views. Take note that the discussion should encourage free flow of ideas and information among the participants.

Remember to:

- *Introduce yourself and the note taker*
- *Explain the purpose and format of the discussion.*
- *Tell participants how long the discussion will take. (30-45MINS)*
- *Put participants at ease and encourage open dialogue.*
- *Tell participants the discussion is informal, everyone is expected to participate, and all divergent views are welcome.*
- *Maintain a neutral attitude.*

Instructions for the note taker

Document the discussion in the participants' language retaining phrases and grammatical use. Notes should be extensive and should reflect the content and tone of the discussion as well as non-verbal behavior/body language. This question guide can help you to follow and document the discussion. However, be alert and prepared for spontaneous questions from the facilitator. Take

meaningful and clear notes that, if necessary, you will be able to elaborate during the team de-brief immediately following the discussion. Do not paraphrase or summarize participant contributions. This will be done as part of the analysis during which the team will identify and group main points, frequently aired opinions, consensus, disagreement, trends/patterns and major outliers.

Remember to:

- *Remain silent and invisible.*
- *Capture information that will help to later formulate recommendations.*
- *Document the opinions and views of participants only and refrain from adding your own.*
- *Document the sociogram as the discussion goes along and* attach it to the transcribed notes

Opening Statement:

I would like to thank each one of you for agreeing to be a part of this FGD. My name is <<Name>>I will be leading the discussion session. My colleague <<Name>> will assist with taking the discussion notes. We are here today on behalf of the Ministry of Health and one Lucy Nyong'a who is a student at Mount Kenya University taking a Masters course in Public health. Specifically, we would like to discuss your experiences as Women who are living with type 2 diabetes mellitus your views on glycemic control among women aged 35-60 years type 2 diabetes mellitus patients in Taita Taveta County.

There are no wrong or right answers and what you say will be kept confidential. You are therefore encouraged to participate actively and freely during the discussion. We also request you to allow the session to be audio-taped to enable us to capture all the important discussion

points since you are likely to speak faster than we write. The recorded information will be destroyed after analysis. Do you have any questions at this point about this discussion? Ask each participant to introduce himself or herself in turns as you assign them identifiers for purposes of anonymity.

If there are no questions, we can begin…

Ice breaker

According to your community what is diabetes?

1. Economic Factors

a) Is Diabetes a disease of the rich?

b) How do you think you got Diabetes?

c) What are some of the things that keep you from making changes in your eating habits?

2. Nutritional factors

a) How does having Diabetes impact your daily life?

b) What do you consider when deciding the foods to eat?

3. Health seeking factors

a) How often do you need to see your primary care provider?

b) What special things do you need to take care of your Diabetes?

c) Who do you trust the most to give you information about Diabetes?

d) Describe either a good or a bad experience you have had receiving Diabetes information at Diabetes clinic. What made the experience either good or bad?

4. Social Support Factors

a) Who did you tell when you were first told that you had Diabetes?

b) How important is family involvement in setting priorities for Diabetes management?

c) If a friend or a relative were diagnosed with Diabetes tomorrow, what one piece of advice would you give them?

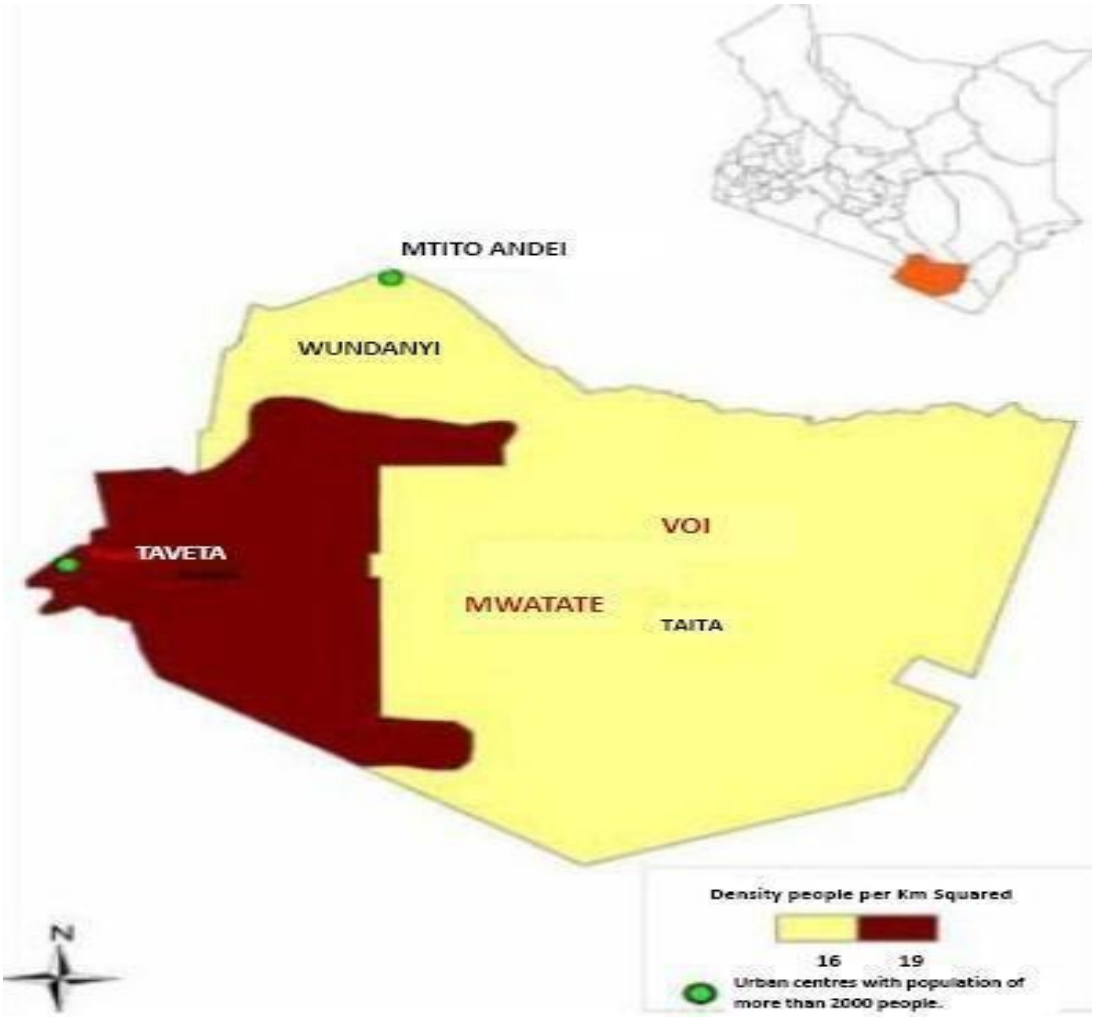
Thank you for your participation

Appendix 4: Key Informant Interview guide

1. Tell me about yourself, what is your position in the DM clinic? What is your cadre?
2. How do you currently provide treatment for patients with Diabetes?
3. What are some of the challenges that you and your patients face?
4. What are some of the things that are working well?
5. What do you think are healthy behaviours that female Diabetes patients engage in that have a positive impact on their overall management of Diabetes? How common do you think these behaviours are in Taveta?
6. What do you think are unhealthy behaviours that female Diabetes patients engage in that have a negative impact on their overall management of Diabetes? How common do you think these behaviours are in Taveta?

7. What do you perceive to be some of the main gaps in care and services for your patients with Diabetes?
8. What challenges do you face communicating with your patients? Are there any cultural or spiritual considerations you need to take into account when providing care?
9. What else is important for us to know about Diabetes management in Taveta sub-County Hospital that we may not have asked about?

Appendix 6: Map of the study area


MTITO ANDEI
WUNDANYI
VOI
TAVETA
MWATATE
TAITA
N
Density people per Km Squared
16
19
Urban centres with population of more than 2000 people.

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Date of Issue: **24/March/2021**

RESEARCH LICENSE

This is to Certify that Ms.. Lucy Phelister Nyonga of Mount Kenya University, has been licensed to conduct research in Taita-Taveta on the topic: ESTABLISHMENTOFGLYCEMICCONTROLAMONG35-60-YEAR-OLD FEMALETYPE2DIABETICSATTENDINGTAVETASUB-COUNTY HOSPITALTAITATAVETACOUNTY,KEN for the period ending : 24/March/2022.

License No: **NACOSTI/P/21/9653**

874918

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Mount Kenya University

REF: **MKU/ERC/1763** Date: 17 February 2021
TO: **LUCY PHELISTER NYONG'A**

REG: **MPH/2016/54419**

Dear Sir/Madam,

RE: ESTABLISHMENT OF GLYCEMIC CONTROL AMONG 35-60-YEAR-OLD FEMALE TYPE 2 DIABETICS ATTENDING TAVETA SUB-COUNTY HOSPITAL TAITA TAVETA COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **836.** The approval period is **17/02/2021 - 16/02/2022.**

This approval is subject to compliance with the following requirements;

i. Only approved documents including informed consents, study instruments, MTA will be used
ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Dr. Peter G. Kirira
Chairman, Mount Kenya University IERC

Mount Kenya University

DIRECTORATE OF GRADUATE STUDIES

MPH/2016/54419

12th March, 2021

The Director, Research Coordination Division
National Commission for Science, Technology & Innovation
Utalii House, 8th & 9th Floor
P.O Box 30623- 00100
NAIROBI

Dear Sir/Madam,

RE: LUCY PHELISTER NYONG'A – REGISTRATION NO. MPH/2016/54419

The purpose of this letter is to introduce the above named student who is pursuing **Master of Public Health** in the Department of **Epidemiology and Biostatistics** in the School of **Public Health.**

The title of her research is *"Establishment of Glycemic Control among 35-60-year-old Female Type 2 Diabetics attending Taveta Sub-County Hospital Taita Taveta County, Kenya."*

She has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data for her research between **March and May, 2021.**

Any assistance accorded to her will be highly appreciated.

Thank you.

Mount Kenya University
P.O. Box 342-01000, THIKA
Office of the Director
Graduate Studies

Dr. Samuel M. Karenga, Ph.D.
Director, Graduate Studies
Enc.

THE COUNTY GOVERNMENT OF TAITA TAVETA
OFFICE OF THE COUNTY EXECUTIVE FOR HEALTH SERVICES

Telephone: 0432030745/6
Email: ttvthealthservices@gmail.com

P.O. Box 18-80300
VOI

Ref. No. TTVT/HS/CDH/LET/VOL.1/ (066) **Date: 13th APRIL 2021**

Lucy Phelister Nyong'a
MPH/54419/2016
Mount Kenya University
P.O. Box 9436-00200
Nairobi.

REF: APPROVAL LETTER TO CONDUCT RESEARCH ON ESTABLISHMENT OF GLYCEMIC CONTROL AMONG 35-60-YEAR-OLD TYPE 2 DIABETICS ATTENDING TAVETA SUB-COUNTY HOSPITAL, TAITA TAVETA COUNTY KENYA

The above subject refers.

The Department of Health hereby grant Lucy Phelister Nyong'a Registration number MPH/54419/2016 to do Research on establishment of glycemic control among 35-60-year-old type 2 diabetics attending Taveta sub-county hospital, Taita Taveta county

As such, your feedback on the above research shall inform the County on Diabetic Client management and inform the County on Policy formulation and Implementation

Kindly observe every precaution as per the Ministry of Health guidelines to support the fight against COVID-19 as you conduct this noble exercise

We look forward for your cooperation

TAITA TAVETA COUNTY GOVERNMENT
OFFICE OF THE COUNTY DIRECTOR
13 APR 2021
HEALTH SERVICES
P.O. Box 1216-80304, WUNDANYI

Elvis Mwandawiro
The County Director of Health,
Taita Taveta County

CC: CECM Health Services
CCOH Health Services

Nyong'a, L. P. ., Mugo, J. W. ., & Suleiman, M. A. . (2022). INFLUENCE OF HEALTH SEEKING BEHAVIOUR ON GLYCEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS FEMALE PATIENTS AGED 35-60 YEARS IN TAVETA SUB-COUNTY HOSPITAL. *Journal of Health, Medicine and Nursing*, *8*(1), 27–41.

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