

**INFLUENCE OF NUTRITIONAL COUNSELING, SOCIO-ECONOMIC STATUS, AND  
SOCIAL POLICY ON DIABETES MANAGEMENT IN THE SOMALI COMMUNITY  
OF GARISSA COUNTY**

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REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC  
HEALTH OF KENYA METHODIST UNIVERSITY**

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## DECLARATION

This research thesis is my original work and has not been presented for a degree or any other award in any other University.

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## **DEDICATION**

Praise to Allah for making this journey successful. This work is dedicated to my loving family for all the inspirations and encouragement.

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## ABSTRACT

The twenty-first century has underscored the critical role of proper nutrition, emphasizing a healthy and balanced diet, in mitigating the prevalence of diabetes and related autoimmune conditions. This study focuses on Type 1 and Type 2 Diabetes Mellitus (DM), which are increasingly recognized as significant health challenges. Conducted in Garissa County, the research examines the effectiveness of nutritional counseling provided by professional healthcare workers. The study assesses the influence of nutrition counseling, socio-economic status and policy on diabetes management in the Somali community of Garissa County. The study specifically sought to examine the relationship between socio-economic status (income, education, occupation) and diabetes management outcomes, to assess the role of self-care practices including dietary habits, physical activity, and stress management, in diabetes outcomes, to explore the role of policies and health programs in facilitating diabetes care and nutritional counselling and to identify barriers and facilitators to effective diabetes management related to socio-economic and policy contexts. The study was anchored on the Andersen- Expanded Behavioural Model and the Theory of Planned Behaviour. The study further employed a cross-sectional research design and targeted a population of 2400 individuals with Type 1 and Type 2 diabetes, employing a stratified random sampling technique to select 331 participants. A semi-structured questionnaire and key informant interviews were utilized to collect data. Statistical analysis, conducted using the Statistical Package for Social Studies Version 25, involved quantitative data analysis to evaluate the final field data. The results, presented through frequency tables, pie charts, and bar graphs, clearly illustrate the frequencies and percentages involved. The findings revealed that socio-economic factors significantly influenced outcomes, with 71.0% unemployment and 91.9% lacking health insurance linked to limited access to medications (significant association with management effectiveness,  $\chi^2=12.85$ ,  $p=0.002$ ); individual behavioral factors were pivotal, as high medication adherence (98.2% moderate to very high) correlated with strong overall plan adherence ( $\chi^2=14.67$ ,  $p<0.001$ ) and frequent physical activity (62.1%) boosted confidence ( $\chi^2=10.24$ ,  $p=0.006$ ); and social policies showed limited effectiveness, with only 7.4% awareness and 8.8% benefiting from programs, yielding no significant associations with adherence ( $\chi^2=1.23$ ,  $p=0.267$ ) or confidence ( $\chi^2=4.89$ ,  $p=0.087$ ). To address these challenges, targeted interventions such as community-based health literacy programs, expanded nutrition counselling, and subsidized medication initiatives, alongside comprehensive policy reforms, are essential to enhance diabetes care and improve health outcomes. Future research should investigate the facilitators of effective diabetes management strategies among healthcare providers and community leaders, as well as the barriers they face in delivering nutritional counselling and diabetes education, to strengthen service delivery and community health outcomes.

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## **ABBREVIATIONS AND ACRONYMS**

|         |                                                           |
|---------|-----------------------------------------------------------|
| AU      | African Union                                             |
| CAM     | Complementary and Alternative Medicine                    |
| CDC     | Centre for Disease Control                                |
| CVD     | Cardiovascular Disease                                    |
| DAWN    | Diabetes Attitudes, Wishes, and Needs                     |
| DM      | Diabetes Mellitus                                         |
| DRC     | Democratic Republic of Kenya                              |
| DSME    | Diabetes Self-Management Education                        |
| EA      | East Africa                                               |
| ESRD    | End-Stage Renal Disease                                   |
| FGD     | Focus Group Discussion                                    |
| GoK     | Government of Kenya                                       |
| IDF     | International Diabetes Federation                         |
| IOTF    | International Obesity Task Force                          |
| KEMU    | Kenya Methodist University                                |
| KNDS    | Kenya National Diabetes Strategy                          |
| LTSS    | Long-Term Services Support                                |
| MNT     | Medical Nutritional Therapy                               |
| MoH     | Ministry of Health                                        |
| NACOSTI | National Commission for Science Technology and Innovation |
| NCD     | Non-Communicable Disease                                  |
| QoL     | Quality of Life                                           |
| SA      | South Africa                                              |

|      |                             |
|------|-----------------------------|
| SDG  | Strategic Development Goals |
| SSA  | Sub-Saharan Africa          |
| T1DM | Type 1 Diabetes Mellitus    |
| T2DM | Type 1 Diabetes Mellitus    |
| TPB  | Theory of Planned Behaviour |
| UN   | United Nations              |
| WDF  | World Diabetes Federation   |
| WHO  | World Health Organization   |

## **CHAPTER ONE: INTRODUCTION**

### **1.0 Introduction**

This chapter offers an initial exploration of the variables under investigation, examining their global, national, and regional contexts. It provides essential background details on the study, including the research problem and its objectives. Additionally, it outlines the research questions and explains the rationale for undertaking the study. The chapter also addresses the constraints and scope of the research, emphasizing its significance. Furthermore, it presents the underlying assumptions of the study and concludes with a definition of key terms.

### **1.1 Background of the Study**

The emerging studies in the growing field of nutrition continue to prove the fact that diabetes is a complex and chronic condition that often calls for continuous medical attention in dealing with multifactorial risk-reduction strategies above and beyond the management of glucose. This therefore means that ongoing diabetes self-management education and support is vital to empower people, prevent complication and reduce risk. Lin, et al. (2020) postulates that diabetes is taken as one of the top-ten global public health concern in recent times, owing to the heavy burden it imposes on the public health systems, as well as the health and socio-economic implications it poses on an individual, the household, and country, particularly in the Americas region.

Research by Khan et al. (2020), indicates that the incidence of diabetes has increased significantly across both industrialized and emerging nations over recent decades. The International Diabetes Federation (IDF) estimates that around 451 million adults are currently affected by diabetes, with projections suggesting this figure could rise to 693 million by 2045. This upward trend is driven by multiple factors, including the rising adoption of poor dietary practices, sedentary lifestyles, inadequate health education efforts, and a lack of nutritional guidance, among other influences.

According to Elsayed et al. (2023), both Type 1 and Type 2 diabetes are associated with a range of complications, including retinopathy, cardiovascular disease, depression, and amputation; these complications are made even worse by the increased and inadequate control of blood glucose. Elsayed et. al. (2023) reiterate that ongoing advocacy for diabetes management education, nutritional counseling and support is key to empowering person to prevent, reduce, manage and or provide intervention to impose diabetes outcomes.

Malik and Hashmi (2020) posit that in the case of India and Pakistan, diet is a key element in the management of diabetes just like every other disease, thus a healthy eating guide, routine physical activity, combined with effective pharmacotherapy, all form critical elements of diabetes management. This therefore means that nutritional therapy and or nutritional counseling is an integral part of diabetes management. Helm et al. (2022) postulates, that, diabetes self-management and Medical Nutritional Therapy (MNT) have been recognized as an effective intervention to the management of hyperglycemia. Yet, despite its known benefits, MNT is noted to have the largest long-term failure percentage.

Ezezika (2021) assert that the implementation of large-scale MNT interventions is an ongoing challenge in many parts of the African continent.

The MNT known as nutritional counseling is designed to manage certain chronic conditions through a somewhat individualized nutritional plan (Ezezika, 2021). In spite of these interventions, nutritional counseling adopted for diabetes, is still not fully elucidated in most health institutions found in Sub-Saharan Africa (SSA). The escalating costs of treatment, unreliable supply chains for essential medications, lack of national diabetes initiatives, and inadequate allocation of healthcare resources are key contributors to the diabetes challenge in Africa (Mercer, 2019).

The situation is particularly concerning in East Africa (EA), where a majority of diabetic patients lacks fundamental knowledge about diabetes management. Furthermore, many individuals resort to herbal medicine as a treatment for diabetes, and they face difficulties in accessing regular medical care unless they experience severe symptoms or complications. A review by Endris (2022) identified the barriers and facilitators of MNT in Ethiopia, the research found some areas of improvements, such as; strengthening supportive policy, strong leadership, strategic leadership and coordination across multiple sectors with the aim of enhancing role of nutritional counseling in the successful management of diabetes. According to Mohamed et al. (2021), Somalia community has seen a rise in diabetes prevalence among its population aged 20 to 79.

Data from the International Diabetes Federation (IDF) indicates that diabetes prevalence rose from 3% in 2010 to 5.1% in 2019, showing an average annual increase of approximately 42.98% in low- and middle-income countries (LMICs). In Kenya, similar to other LMICs, there is a rising prevalence of diabetes mellitus (DM). In 2019, around

1.8 million adults were living with diabetes, with projections estimating an increase to 2.2 million by 2030 (International Diabetes Federation [IDF], 2019). Health (2020) reports that the incidence of diabetes varies widely across areas, with the rates in rural areas being as low as 2.7% and up to 10.7% in cities. The average at the national level accounts for about 3.3%. MNT has been identified by Asati (2020) as a necessary part of diabetes care; however, the mainstay of therapy is still somewhat overshadowed in some environments. The research conducted by Abdalla (2022) found that the growing burden of type 2 diabetes at Garissa County Referral Hospital is strongly linked to residents' lifestyles, particularly limited physical activity and diets high in cholesterol from animal-based foods. Earlier, Abdalla (2019) argued that there is a disproportionate burden of Type-II Diabetes Mellitus (T2DM) within the different communities residing in Garissa County. These findings likely underscore the urgent need for tailored interventions to address the prevalence of diabetes among this specific ethnic group. With Garissa County Referral Hospital serving as a central healthcare hub for the region, the data presented in Abdalla's study illuminates the significant impact of T2DM on the Somali population accessing healthcare services. Furthermore, Abdalla's research demonstrates the efficacy of health education interventions in managing T2DM among adults within Garissa County. These findings provide a compelling rationale for the focus on nutritional counseling as a means to address diabetes management within the Somali community in Garissa County, emphasizing the necessity of tailored interventions to mitigate the burden of this chronic condition effectively.

The Somali community, a major ethnic group, predominantly resides in Kenya's North Eastern region, Somalia, Eastern Ethiopia, and Djibouti, where they tend to live in

relatively isolated conditions. Abdalla (2019) reported that at Garissa General Hospital, the prevalence of diabetic retinopathy among Somalis seeking medical care was 15.1%. The study further indicated that a limited number of Somali patients presented with diabetic eye complications. Garissa County, situated near the Kenya-Somalia border, is recognized as one of Kenya's regions with a significant disease burden and frequently faces challenges related to food insecurity.

According to Mohamed (2020), the county's reliance on pastoralism is threatened by unpredictable rainfall patterns, leading to food insecurity and poor health outcomes. Furthermore, despite ongoing awareness campaigns, the uptake of health services, particularly nutrition-related care, remains low in Garissa and other Arid and Semi-Arid Lands (ASALs), as highlighted by the Kenya Demographic and Health Survey (2021). As such, enhancing knowledge of nutrition is essential for influencing health-related behavior and practices. A deeper understanding of health-seeking behavior and nutrition can help reduce diagnostic delays, improve adherence to treatment, and strengthen health promotion efforts within contexts like Garissa County

Garissa County, is renowned for its rich history, with indigenous Somali communities with subgroups like the Ogaden, Ajuran, Degodia, and others (Garissa County Government, 2022). The Somali community in in this area faces unique challenges related to diabetes management, including cultural dietary practices, limited access to healthcare services, and potential language barriers. The county's demographic composition offers an ideal context for studying the efficacy of such interventions. Moreover, the county grapple with a notable prevalence of diabetes, notably among its Somali inhabitants, potentially stems from lifestyle changes, dietary practices, and genetic predispositions

(Abdalla, 2019). Compounded by limited access to healthcare services, particularly in rural areas where the Somali community is concentrated, understanding the effectiveness of nutritional counseling becomes paramount for enhancing healthcare delivery and outcomes. By conducting research in Garissa County, tailored interventions can be developed to align with the dietary habits, preferences, and cultural beliefs of the Somali community, thus ensuring the cultural relevance and efficacy of such initiatives, crucial elements in promoting health equity and improved outcomes.

## **1.2 Statement of the Problem**

The prevalence of DM is escalating at an alarming rate worldwide, to the extent that the illness is considered among one of the leading causes of death and associated health complications in developing countries (Khan et al., 2020). The disease, largely preventable, makes the upsurge of uncontrolled diabetes pandemic a concern to health professionals; despite nutrition choices acknowledged as a contributing and modifiable factor fueling rise, and in spite of the fact that therapy is a facet in DM care.

The Type 2 diabetes continue to rise in Africa, worsened by barriers to MNT penetration and a proportion of people not always adhering to nutritional counseling. According to the International Diabetes Federation (2025), approximately 1.86 million Kenyan adults aged 20–79 years were living with diabetes in 2025, with projections estimating a rise to 2.30 million by 2030. Type 2 diabetes, which is largely preventable through lifestyle modifications, accounts for the majority of cases, yet its management remains suboptimal due to barriers such as limited access to nutritional counseling and poor adherence to dietary recommendations.

In Garissa County, home to a predominantly Somali population, these challenges are exacerbated by socio-economic constraints, including high unemployment (71.0%) and lack of health insurance (91.9%), as well as cultural dietary practices and limited healthcare access in rural areas. Despite the recognized role of nutritional counseling in empowering individuals to manage blood glucose levels and reduce complications, there is a significant gap in research exploring its effectiveness among the Somali community in Garissa County. This study addresses the urgent need to investigate how nutritional counseling, socio-economic factors, and social policies influence diabetes management in this specific population, aiming to inform targeted interventions to mitigate the growing burden of Type 2 diabetes.

### **1.3 Purpose of the Study**

The current approaches stress on management of diabetes via a tight monitoring of blood glucose, medication, adherence to MNT and adjustment to dietary modification. This is mainly because nutritional counseling for citizen with diabetes aims to empower them to manage their blood sugar levels through highly informed dietary choices, aimed at mitigation diabetes-related complication and improving overall well-being. Therefore, this study involves understanding how best food impacts blood sugar, to encourage adopting appropriate meal plans and developing sustainable lifestyle changes. It is on theses premise that the purpose of the study was to examine the role of nutritional counseling in the management of diabetes with the need to address emerging gaps.

## **1.4 Research Objectives**

The general objective of the study was to examine the influence of nutritional counseling, socio-economic status and policy on diabetes management in the Somali community of Garissa County. The specific objectives included;

- i. To examine the relationship between socio-economic status (income, education, occupation) and diabetes management outcomes.
- ii. To assess the role of self-care practices including dietary habits, physical activity, and stress management, in diabetes outcomes
- iii. To explore the role of policies and health programs in facilitating diabetes care and nutritional counselling
- iv. To identify barriers and facilitators to effective diabetes management related to socio-economic and policy contexts

## **1.5 Research Questions**

The study was be guided by the following research questions;

- i. What is the relationship between socio-economic status (income, education, occupation) and diabetes management outcomes?
- ii. What role do self-care practices, including dietary habits, physical activity, and stress management, play in diabetes outcomes?
- iii. How do policies and health programs facilitate diabetes care and nutritional counseling?
- iv. What are the barriers and facilitators to effective diabetes management related to socio-economic and policy contexts?

## **1.6 Justification of the Study**

Diabetes mellitus remains a major global public health concern in the twenty-first century, characterized as a chronic disease often requiring lifelong treatment, with complications from Type 2 diabetes leading to increased disability, physical inactivity, reduced life expectancy, enormous health costs, and diminished Quality of Life (QoL), all while the United Nations' Sustainable Development Goal (SDG) 3 aims to ensure healthy lives and promote well-being for all ages (Nations, 2015). This study endeavors to support SDG 3 by assisting patients in maintaining healthy lifestyles and enhancing their well-being, particularly in low- and middle-income countries where rising prevalence and complications burden individuals, families, and healthcare systems, emphasizing that effective control is influenced by non-clinical factors such as nutrition, socio-economic conditions, and policies. Nutritional counseling plays a pivotal role in equipping patients with knowledge and skills for self-management, yet its influence on outcomes is underexplored, especially in populations with limited access to qualified professionals. Socio-economic status (SES) is a key determinant of health, as lower SES individuals face barriers like restricted healthcare access, unaffordable medications, and poor dietary options that hinder diabetes control, necessitating equitable interventions. The policy environment, including health insurance, national guidelines, and community support systems, shapes care access and adherence, but its interactions with patient outcomes require deeper investigation. By evaluating the combined influence of nutritional counseling, SES, and policies on diabetes management in the Somali community of Garissa County, this study addresses critical literature gaps, provides evidence-based

recommendations for integrated care models in resource-limited settings, and highlights mediating factors like healthcare access, health literacy, and patient motivation that facilitate or impede interventions, offering a holistic understanding to improve outcomes.

### **1.7 Limitations of the Study**

The information on the inner workings of nutritional management may be too technical and some participants might be hesitant to respond. In addition, to prevent any bias, the researcher interviewed persons at different positions in the society, health facility and community. This research has a Somali ethnicity focus that is dictated by the study location and the level of literacy or understanding may pose a potential challenge.

### **1.8 Delimitations of the Study**

The study purposed to avoid potential limitations by properly orienting all the identified research respondents and assuring from the onset that the research was for academic and community empowerment, and backed by the necessary authorization letters and research permits. Additionally, this study was undertaken within an institutional set-up, that being Garissa General Hospital. Finally, the researcher deliberately sought-out respondents from participant who are regular patients and with authority to speak on the subject matter and who are literate that show appreciation of key objectives under study.

### **1.9 Significance of the Study**

Studying nutritional counseling was crucial for this work to ensure effective diabetes management. This research study is designed to empower individuals with the knowledge and skills to make better-informed food choices. Thus, research in nutritional counseling is critical for effective diabetes management because it readily provides evidence-based

strategies to help policy makers to reduce the risk of complications. This research provides evidence-based strategies to aid individuals make dietary choices.

This research also enables the development of personalized nutritional plans tailored to individual needs and preferences. This research acknowledges the importance of enhancing a patient's belief in their capacity to effectively take care of themselves, which is a crucial aspect of encouraging proactive self-management (self-care). Patient empowerment has emerged as an alternative to the conventional compliance-focused method of diabetes management.

Traditional nutritional guidance alone is inadequate for managing diabetes among individuals. To mitigate its impact in Kenya, it is imperative to introduce a novel diabetes nutrition counseling service in the diabetes management approach. While nutrition education remains a critical component of diabetes treatment and management, there is a noticeable gap in research evaluating its effects on diabetes control and overall health in the Kenyan context.

#### **1.10 Assumptions of the Study**

This research took into account that the respondents would be very honest when asked to disclose the required information. The utmost importance was given to ensuring and upholding privacy, anonymity, and confidentiality throughout the research process. The research (participants) respondents were given a free choice to opt to withdrawn from the study at any time and with no ramifications.

### 1.11 Operational Definition of Terms

The definitions provided in this chapter outline the operational meanings of terms used throughout the study, focusing on general terms and key concepts.

**Diabetes mellitus** is a category of metabolic disorders marked by persistently elevated blood sugar levels over an extended period. Common symptoms include frequent urination, heightened thirst, and increased appetite (Ministry of Health, [MoH], 2015).

**Nutrition counseling** is a process in which a qualified health professional, such as a registered dietitian, helps individuals make informed decisions about their food choices and eating habits. The goal of nutrition counseling is to improve overall health and well-being by helping people eat a nutritious diet that meets their individual needs. (Nations, Strategic Development Goals 3, 2015).

**Type 1 diabetes** is a chronic autoimmune condition where the body mistakenly attacks its own insulin-producing cells in the pancreas. Insulin, a vital hormone, facilitates the body's utilization of glucose for energy (MoH, 2020).

**Type 2 Diabetes** is a chronic metabolic condition characterized by elevated blood sugar levels due to the body's reduced ability to effectively use or produce insulin (MoH, 2015).

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews scholarly writings on diabetes and nutritional counseling in management of diabetes from academic journals, scholarly articles, books, reports and other periodicals. This literature review consists of a theoretical framework work, empirical review, conceptual framework and emerging knowledge gaps.

### **2.2 Empirical Literature Review**

The empirical review in this section analyzed various research done concerning the area of investigation that were similar to the research objectives. This review was based on observed and measured phenomena and derives knowledge from actual experience rather than mere belief or theory.

#### **2.2.1 Prevalence of Diabetes and the Associated Factors**

Diabetes mellitus remains a prevalent chronic condition that continues to impact individuals across all genders, ages, races, creeds, and backgrounds. It encompasses a range of diseases that typically influence the body's utilization of blood sugar. Among the various types of diabetes, Type 2 diabetes is the most frequently encountered. An array of treatment approaches are employed to effectively manage the condition, enabling individuals to lead a healthy life and minimize the risk of complications. Yu and Lee (2022) cite that, the main cause of diabetes varies by the type of diabetes. Blood sugar levels are a key indicator in diagnosing diabetes, as glucose serves as a crucial energy source for the body's muscles and tissues.

According to Akalu (2020), diabetes is a condition that manifests in just two main forms: Type 1 Diabetes Mellitus (T1DM) and Type 2 Diabetes Mellitus (T2DM). Deshmukh (2021) explains that the former is caused by the body's failure to produce insulin while the latter is associated with insulin resistance and a slow decrease in insulin secretion. Diabetes is one of the top five leading death causes in the United States (Zhang, 2018). The World Health Organization estimated that the number of people with diabetes worldwide was about 171 million in 2010 and this number might increase to 366 million in 2030 (Khani et al., 2021). The disease is becoming known as one of the major global health problems because of its rising prevalence and the high cost of treatment.

According to Alope et al. (2022), diabetes mellitus (DM) is recognized as a prevalent endocrine disorder characterized by insufficient or ineffective production of insulin by the pancreas, leading to abnormal levels of glucose in the blood. This condition is known to adversely affect various bodily systems, including blood vessels, kidneys, eyes, heart, and the nervous system. The existence of DM in the body leads to increased risk of many other complications, some of which include cardiovascular diseases, peripheral vascular diseases, stroke, neuropathy, retinopathy, blindness and amputations, to mention but a few current advances in the management of diabetes mellitus (Alope et al., 2022). The disease is mainly treatment through long-term drug intervention, the secondary aims are usually to prevent long-term diabetes complications by elimination various risk factors to increase longevity (Lin et al., 2020). For instance, insulin replacement therapy is one of the approaches used with patients with T1DM while diet and lifestyle modifications are considered the cornerstone and treatment of T2DM (Khani et al., 2021). It is important to highlight that the management of patients with diabetes has increasingly become a crucial

aspect of clinical practices, aiming to enhance the quality of care and evidence-based approaches in nutritional medicine.

Yan (2022) points out that the occurrence of T2DM has been raised to a high-level public health concern mainly attributed to the combination of rapid economic growth, changing lifestyles, and an aging population, whereby developing countries and middle-income nations are the most affected. According to Deshmukh (2021), the number of adults worldwide suffering from T2DM in 2021 was about 536.6 million which was approximately 10.5 percent of the global adult population. Projections indicate that in 2045, the number may elevate to roughly 783.2 million, or 12.2% of the world's adult population. The latest epidemiological study recognized significant factors contributing to diabetes mellitus (DM) in old age, where the result showed that people aged sixty-five and above are the most vulnerable group to DM in comparison with other age groups. Consequently, T2DM frequency among the elderly is still increasing. Consequently, it is essential to conduct a detailed assessment of the epidemiological characteristics and associated risk factors of DM in this demographic. Furthermore, designing targeted interventions and management strategies tailored to specific populations is critical in addressing this issue.

Misra (2023) points-out those countries in South Asia including Pakistan, Sri Lanka, Bangladesh, Bhutan, Maldives and China account for an estimate sixty percent of the global population with diabetes. Elsayed et al. (2023) states that the increase in prevalence in these countries has jumped to two-fold during the last decade and it is also expected to increase exponentially with time. Yan, (2022) cites that the migrant Asian Indians in the

United States have a very high rate of insulin resistance owing to an inherent genetic predisposition and a rapid rise of Body Mass Index (BMI), particularly with persons of higher income and higher levels of education.

Grundlingh et al. (2022) reports that the occurrence of diabetes has risen in the developing countries and gives an example where diabetes was the second leading cause of death in South Africa (SA) in 2016 and 2017. The scholar also emphasizes that women are the most affected group and that the number of people most affected, i.e., those between 20 and 70 years old, was probably close to 4.58 million as of 2019. This ranking was done based on criteria that included, among others, glucose and obesity. Mohammed et al. (2018) explains that a great part of the uncertainty associated with the occurrence of diabetes is due to the lack of accurate, up-to-date data for Sub-Saharan Africa (SSA). As a matter of fact, Grundlingh et al. (2022) gives examples of locations such as Ethiopia, South Africa, and the Democratic Republic of Congo (DRC) that are the most affected areas by diabetes. Despite the growth of DM in East Africa, there is a great need for improved DM and care, which remains unmet with continued low prioritization of screening research, nutritional counseling and prevention.

The cross-sectional study by Kingori et al. (2021) examined diabetes prevalence and risk factors in rural Imenti South, Meru County, Kenya and revealed a prevalence of 15.4% (95% CI: 12.3–19.1), higher among women (16.35%) than men (13.95%). Using Poisson regression, the study identified significant associations with advancing age, obesity (BMI  $\geq 30$  kg/m<sup>2</sup>), hypertension, hypercholesterolemia, physical inactivity, and alcohol consumption, highlighting a higher-than-national rural prevalence driven by modifiable lifestyle and clinical risk factors. Despite a robust methodology, limitations such as a

modest sample size and reliance on self-reported data, which may introduce recall bias, suggest caution in generalizing findings. Complementing these findings, Muoki et al. (2021) emphasize the critical role of effective diabetes management in enhancing clinical and nutritional care quality, while Ongosi (2020) highlights the rising diabetes prevalence in Garissa County, underscoring the urgent need for targeted prevention, treatment, and management strategies to address complications in rural Kenyan settings. Together, these studies advocate for tailored interventions, such as lifestyle modification and improved screening, to mitigate the growing diabetes burden in resource-constrained regions.

### **2.2.2 Prevention, Treatment and Care of Diabetes Mellitus**

Treating T1DM typically involves administering insulin through multiple daily injections or an insulin pump. Managing diabetes from its early stages is advantageous in reducing the progression of the condition and the accompanying complications. It is important to note that T2DM is a chronic disease characterized by a gradual decline in glucose metabolism, leading to various systemic complications (Muoki et al., 2021). Lifestyle factors have been found to be strongly associated with diabetes, as supported by Ongosi (2020) through robust epidemiological evidence. Additionally, intervention studies, as mentioned by Yan (2022), have shown that dietary and physical activity modifications can sometimes delay or even prevent the onset of T2DM in individuals with impaired glucose levels.

The occurrence of DM is projected to keep rising, positioning it as both a widespread and financially burdensome health condition. Type 2 diabetes mellitus as one of the most common forms, is marked by the body's resistance to insulin and a relative shortfall in

insulin production. Although a sedentary lifestyle and obesity are frequently linked to DM, Muoki et al. (2021) note that these are not the sole contributors to the disease's onset and persistence. Adopting healthier lifestyle habits has proven beneficial in both the prevention and management of DM, particularly for individuals at high risk.

Abdalla (2022) has demonstrated that lifestyle modifications focusing on diet and exercise, with the aim of reducing weight, can be a feasible and cost-effective approach to preventing diabetes among individuals at high risk. The study observes that most African countries are experiencing a shift in dietary patterns that have led to an increase in the consumption of energy-dense foods, which are often saturated with sugars, fat and salt. This combined with the fact that 30 per cent to 60 per cent of the overall population does not meet the minimum recommended physical activity, making it a real challenge to prevent and or avoid the onset of DM. Muoki et. al. (2021) postulates that the role of prevention of DN is preventable through lifestyle prevention and interventions, that aim at relatively modest lifestyle changes.

In their study, Alope et al. (2022) emphasized the importance of providing individuals with chronic diabetes not just with effective treatment, but also with consistent care, comprehensive information, and sufficient support. These factors are crucial in promoting self-management and empowering patients to achieve optimal control over their condition. On a related note, Deshmukh et al. (2022) highlighted a concerning trend among a significant majority of type 2 diabetes mellitus (T2DM) patients in East Asia. They found that many individuals lack fundamental knowledge about diabetes management and instead rely on herbal medicine for treatment. Additionally, due to

various reasons, such as limited access or financial constraints, some patients only seek medical assistance when they experience complications. Lindstrom and Wikstrom (2016) cites that education for people living with diabetes is today considered an important component of DM care and it is mainly aimed to develop skills in self-management and always contribute to the patient empowerment. Lindstrom and Wikstrom, (2016) posits that effective education does need health professional, with knowledge and expertise in education, diabetes management and nutritional counseling, few states in Nigeria have enabled educational programs that exist in stand-alone national

### **2.2.3 Diabetes Nutritional Counseling**

The idea of national counseling can be broadly defined as a series of intentional learning experiences aimed at encouraging individuals to willingly adopt healthy eating and nutritional habits that contribute to overall well-being and good health (Deshmukh et al., 2022). Managing one's diet is often regarded as a challenging aspect of self-care, necessitating effective nutritional education to help individuals overcome obstacles to proper dietary self-care (Elsayed et al., 2023).

Viljoen, et al. (2023) points-out that research done in Canada found that Registered Dieticians (RDs) have a vital role to play in patient support of people living with diabetes, the RDs have very limited chances to support patients with metabolic conditions through the use of carbohydrate-restricted diets. The carbohydrate-restricted diet is increasingly considered a viable treatment option when it comes to insulin-resistant conditions such as Type 2 diabetes (Grammatikopoulou & Goulis, 2022).

According to Elsayed et al. (2023), the primary focus of nutrition education and counseling is to promote appropriate dietary behavioral changes. This aligns with the

Diabetes Self-Management Education (DSME) approach, which also emphasizes behavior change as the main objective. Moreover, when providing nutrition counseling to individuals with diabetes, it is desirable for it to result in positive modifications in dietary behavior, particularly in terms of making healthier food choices. Elsayed et al. (2023) emphasize that the anticipated outcomes of such changes include enhanced glycemic control and blood pressure management.

#### **2.2.4 Barriers to the Uptake of Diabetes Nutritional Counseling**

Diabetes is one of the major health issues in the world that has been increasing rapidly and requires the patient's effective self-management in order to see the positive outcomes of the patient's condition as well as to lower the healthcare costs. Consultation regarding diet is an essential part of the patient's education process where they are taught how to make correct decisions concerning food, exercise, and blood sugar monitoring (Misra, 2023). Despite its critical role, the uptake of diabetes nutritional counseling faces numerous challenges. This section explores these barriers, to provide a comprehensive understanding of the obstacles hindering effective diabetes self-management education.

##### **2.2.4.1 Socioeconomic Barriers**

The rising global burden of diabetes mellitus, particularly type 2 diabetes, places significant strain on healthcare systems, especially in low- and middle-income countries where socioeconomic factors exacerbate challenges in disease management. In Sub-Saharan Africa (SSA), the increasing prevalence of diabetes and its complications, such as cardiovascular disease, underscores the urgent need for effective interventions like

nutritional counseling to promote self-management and mitigate adverse health outcomes. However, socioeconomic barriers, including financial constraints, limited healthcare access, and cultural practices, often hinder the uptake of such interventions, particularly in resource-constrained settings like rural Kenya. This empirical review synthesizes recent evidence on the socioeconomic barriers to adopting nutritional counselling for diabetes management, highlighting their impact on health outcomes and the critical role of social support and policy interventions in addressing these challenges.

Research exploring barriers to healthy lifestyle practices highlights the pervasive impact of resource limitations. For instance, Yoon et al. (2022) found that among multi-ethnic Asian populations with prediabetes, limited access to affordable resources, such as fitness facilities or healthy food options, significantly impedes engagement in physical activity and adherence to balanced diets. Similarly, low motivation and inadequate social support from family or community networks further discourage individuals from sustaining exercise routines or dietary changes necessary for diabetes control (Woodward et al., 2024). In some cases, individuals turn to Complementary and Alternative Medicine (CAM) due to its affordability and perceived ability to address healthcare needs unmet by conventional medical services, particularly in settings with limited access to formal healthcare systems (Woodward et al., 2024). These findings underscore the complex interplay of socioeconomic, behavioral, and cultural factors that shape diabetes self-management practices.

Social support from family, peers, and healthcare providers plays a pivotal role in enhancing adherence to diabetes self-management behaviors. Studies indicate that

educational guidance, direct assistance, and reinforcement of healthy behaviors through supportive networks positively influence treatment adherence and health outcomes (Mokaya et al., 2022). For example, community-based support systems that provide nutritional education and encourage lifestyle modifications can empower individuals to make informed dietary choices and maintain glycemic control (Yoon et al., 2022). However, internal barriers, such as financial constraints and the high cost of diabetes care, including medications and nutritional counseling, often lead patients to forgo necessary treatments or reduce compliance with recommended interventions (Asati, 2021). These socioeconomic challenges highlight the need for targeted policy interventions, such as subsidized healthcare services and community-based nutritional programs, to improve access and affordability.

Addressing socioeconomic barriers to nutritional counseling requires a multifaceted approach that integrates accessible healthcare, culturally sensitive education, and robust social support systems. The evidence suggests that financial constraints, limited resource access, and low health literacy significantly impede effective diabetes management, particularly in underserved populations (Stotz et al., 2021). Interventions that leverage community networks, provide affordable medication and food options, and enhance patient-provider communication can mitigate these barriers and promote sustainable self-management practices (Mokaya et al., 2022). By prioritizing equitable access to nutritional counseling and addressing socioeconomic disparities, healthcare systems can reduce the diabetes burden and improve health outcomes in resource-constrained settings like rural Kenya.

#### **2.2.4.2 Demographic-Related Barriers**

Demographic factors, including age, gender, ethnicity, and cultural practices, significantly shape the uptake of nutritional counselling for diabetes management, influencing individuals' engagement with self-care practices. Babago and Obwenya (2023) highlighted that personal belief systems, such as underestimating the severity of asymptomatic conditions like hypertension due to a lack of immediate symptoms or incentives, create barriers to consistent medication adherence and effective diabetes control. These challenges are compounded by irregular medical follow-ups, medication side effects, and demographic influences like ethnicity and gender, which affect social support, disease acceptance, quality of life, and long-term treatment adherence (Babago & Obwenya, 2023). Failing to address these demographic variations can hinder sustained diabetes management, necessitating interventions tailored to specific cultural and social contexts to enhance the effectiveness of nutritional counselling.

Research in diverse populations reveals additional demographic barriers to diabetes self-management. For instance, Reeves et al. (2023) identified misconceptions about insulin, non-adherence to treatment plans, limited diabetes knowledge, reliance on alternative remedies, fear of injections, and socioeconomic challenges as prevalent barriers, particularly among ethnically diverse groups. Babago and Obwenya (2023) further noted that among Filipino Americans with type 2 diabetes, younger individuals demonstrated lower adherence to self-care practices, including dietary compliance, medication adherence, and regular blood glucose monitoring, compared to older adults, highlighting age as a critical demographic factor influencing engagement with nutritional counselling.

These findings underscore the need for age- and ethnicity-specific strategies to improve diabetes management outcomes.

Social support, particularly from partners and family, plays a vital role in overcoming demographic barriers to physical activity and dietary adherence. Sinha et al. (2022) found that among women with a history of gestational diabetes, partners positively influenced exercise routines during and after pregnancy, emphasizing the importance of leveraging familial support to promote physical activity. The study highlighted the need to address personal beliefs about the benefits of exercise and the role of social influences to encourage sustained engagement in diabetes self-care practices (Sinha et al., 2022). Incorporating such demographic considerations into nutritional counselling programs can enhance their relevance and effectiveness for diverse populations.

Cultural and linguistic factors further complicate the uptake of nutritional counselling in diabetes management. Zavala et al. (2022) reported that in Mexican adults, cultural practices such as frequent social gatherings and extended family living arrangements posed significant challenges to adhering to healthy diets, limiting the effectiveness of dietary interventions. Additionally, language barriers, cultural differences, and patient demographic characteristics create obstacles for healthcare providers, particularly in urban settings, when delivering diabetes care and nutritional counselling (Peyyety et al., 2023). These findings highlight the critical need for culturally sensitive, demographically tailored interventions to address barriers and improve the uptake of nutritional counselling for effective diabetes management in diverse populations.

#### **2.2.4.3 Psychological Barriers**

Psychological barriers significantly impede the uptake of nutritional counseling for effective long-term diabetes management, often intertwined with the complexity and demands of prescribed treatment regimens. Research by Woodward et al. (2024) highlights that individuals with diabetes face challenges stemming from the emotional and cognitive burden of adhering to multifaceted treatment plans, which include regular healthcare consultations, dietary modifications, exercise routines, glucose self-monitoring, and medication management. These psychological obstacles, such as anxiety and low motivation, can deter consistent engagement with nutritional counseling, particularly when patients perceive the regimen as overwhelming or lack confidence in their ability to sustain lifestyle changes (Woodward et al., 2024). Addressing these barriers requires targeted interventions that enhance psychological resilience and provide tailored support to improve adherence to self-care practices.

In a recent study conducted by Matthias (2023), the main obstacles perceived by individuals in regards to long-term diabetes management have been emphasized. These obstacles primarily arise from psychological factors and are intricately connected to the rigor of the prescribed treatment plan. The treatment plan encompasses various essential elements, such as regular consultations with healthcare professionals, modifications in dietary habits, adherence to exercise routines, self-monitoring of glucose levels, and effective management of medication.

A qualitative study by Ross et al. (2023) conducted in the UK underscores the emotional toll of a diabetes diagnosis, with patients reporting limited understanding of their often asymptomatic condition and its long-term implications. Participants expressed needs for

enhanced follow-up care, peer support groups, nutritional guidance, detailed medication information, accessible educational materials, and extended clinic hours to alleviate psychological distress and improve self-management (Ross et al., 2023). For individuals managing multiple chronic conditions, additional psychosocial challenges, such as stress and depression, independently worsen health outcomes, emphasizing the necessity of comprehensive care that addresses these unique psychological needs to ensure effective diabetes management (Liu et al., 2022).

Psychological and diabetes-related factors further complicate the adoption of long-term preventive measures, as evidenced by research from Boocock et al. (2021), which found that visible disease consequences, such as physical limitations, contribute to negative body image and strained intimate relationships. Individuals with type 2 diabetes and obesity often face weight-related stigma, which exacerbates psychological barriers to managing both conditions effectively (Neven et al., 2022). This stigma, coupled with feelings of personal responsibility for their weight and diabetes, undermines self-efficacy and adherence to nutritional counseling, highlighting the need for psychological support to address discrimination and foster positive self-perception (Neven et al., 2022). Integrating psychological interventions, such as counseling and peer support, into diabetes care can mitigate these barriers, promoting better engagement with nutritional strategies and improving overall health outcomes.

#### **2.2.4.4 Individual Behavioural Barriers**

Individual behavioural barriers play a critical role in limiting the uptake of nutritional counseling for type 2 diabetes mellitus (T2DM) management, affecting patients' ability to

integrate dietary and lifestyle changes into their daily routines. A systematic review by Boocock et al. (2021) identified internal barriers, such as perceived lack of time, low motivation, and skepticism about the benefits of exercise relative to the effort involved, which patients can influence through personal decision-making but often lead to disengagement from recommended physical activities. External barriers, including cultural norms, environmental constraints like weather, and inadequate access to suitable exercise facilities, further complicate adherence to nutritional and exercise regimens essential for diabetes control (Boocock et al., 2021). These barriers highlight the need for personalized strategies that address individual perceptions and external challenges to enhance engagement with nutritional counseling.

Medication non-compliance emerges as a prominent behavioural barrier, contributing to suboptimal glycemic and blood pressure control in T2DM patients. Liu et al. (2022) found that lower adherence levels result in poorer health outcomes, frequently requiring additional medications that exacerbate treatment complexity and discourage sustained compliance. Moreover, Ross et al. (2023) observed that prolonged diabetes duration is associated with diminished adherence to self-care practices, such as consistent dietary modifications and regular blood glucose monitoring, increasing the risk of long-term complications like cardiovascular issues. Interventions focusing on behavioural change techniques, including goal-setting and motivational interviewing, are crucial to overcoming these barriers and promoting better integration of nutritional counseling into daily diabetes management.

Behavioural barriers also intersect with psychological factors, where negative perceptions and habits further deter effective self-management. For instance, Zavala et al. (2022) noted that in diverse populations, habitual reliance on convenience foods and sedentary lifestyles, reinforced by behavioural inertia, resists the adoption of healthier dietary patterns recommended in nutritional counseling. This resistance is often compounded by a lack of immediate perceived rewards from behavioural changes, leading to procrastination or abandonment of counseling-recommended practices (Liu et al., 2022). To address this, educational programs that emphasize incremental behavioural adjustments and provide feedback on progress can help build momentum and reinforce positive habits in T2DM patients.

Overcoming individual behavioural barriers requires a multifaceted approach that incorporates support systems and tailored education to sustain long-term adherence. Research by Boocock et al. (2021) suggests that peer support groups and digital tools can mitigate barriers like isolation or forgetfulness, encouraging consistent engagement with nutritional guidelines. Additionally, addressing behavioural cues through habit formation strategies, such as routine integration and reward mechanisms, can enhance motivation and reduce the perceived burden of change (Ross et al., 2023). Ultimately, empowering patients with practical tools to navigate these barriers is essential for improving the efficacy of nutritional counseling in managing T2DM and preventing complications.

#### **2.2.4.5 Individual Health Status**

The coexistence of multiple health conditions often contributes to diminished well-being, heightened anxiety, and limited understanding of diabetes management and physical

activity, which discourages regular exercise participation (Neven et al., 2022). These barriers are particularly significant for individuals facing impaired physical function, high disease burden, financial constraints, comorbidities, persistent depressive symptoms, poor communication with healthcare providers, and low-income status (Liu et al., 2022). Such challenges exacerbate difficulties in maintaining effective self-care practices critical for diabetes control.

Effective diabetes management hinges on a collaborative partnership between healthcare professionals and patients, but limited access to healthcare facilities and suboptimal patient-provider relationships often compromise care quality. Research by Ross et al. (2023) reveals that healthcare workers frequently fail to implement evidence-based practices consistently, leaving many patients undertreated despite evidence supporting intensive risk-reduction strategies. In an Australian study, Mayr et al. (2023) found that primary care providers often attribute inadequate diabetes care to patients' lack of motivation, highlighting a gap in fostering patient-centered care approaches.

Clinical inertia, defined as delays in initiating or intensifying treatment, remains a prevalent challenge in diabetes care, with physicians' concerns about hypoglycemia from strict glycemic control serving as a major barrier to intensive insulin therapy (Boocock et al., 2021). Muoki et al. (2021) note that healthcare providers often neglect involving patients in decision-making, which can reduce treatment adherence. Similarly, Ross et al. (2023) emphasize that inadequate education about the progressive nature of diabetes can lead to patient discouragement during medication escalation, particularly with insulin therapy, contributing to poor compliance and long-term complications.

Primary prevention and early detection are vital for reducing the impact of type 2 diabetes and metabolic syndrome, as lifestyle modifications and active patient involvement are essential for effective management (Mayr et al., 2023). For chronic conditions requiring daily decision-making, patients and caregivers must identify and address barriers through collaborative efforts. Research by Neven et al. (2022) in diverse cultural contexts demonstrates that healthcare providers who promote autonomy and competence in medication use and self-management significantly enhance adherence, quality of life, and physiological outcomes among diabetic patients.

## **2.3 Theoretical Framework**

This section presents the theoretical framework, serving as the foundation that supports the research study's theory. The applicable theoretical framework provides a comprehensive explanation and detailed description of the theory, while also illustrating its connection to the research problem being investigated. Therefore, this research study was anchored on the Andersen- Expanded Behavioural Model and the Theory of Planned Behaviour respectively.

### **2.3.1 Andersen Expanded Behavioural Model**

This research employed the Anderson behavioural model of health services use to examine the role of nutritional counseling in the management of diabetes. The main purpose of this framework is to interrogate the conditions that either impeded or facilitate utilization, and the chief goal being to develop a behavioural model which provides measures of access to medical care. According to Travers and Hirschman, (2020), the Andersen Expanded Behavioural Model of Health Services Use was first birthed in the 1960s and has

undergone several adaptations to better explain the factors linked to the utilization of Long-term Services and Support (LTSS).

The expanded Andersen behavioral model of health services utilization reveals the capability to evaluate indicators of access and comprehend the contextual factors that influence the accessibility and utilization of healthcare services. Anderson (1995) suggests that societal determinants and healthcare system factors also play a key role in shaping effective service utilization.

The original concept of the model was conceived by Ronald Anderson in the late 1960s with the objective of enhancing our understanding of the factors influencing the utilization of health services by families. Its primary purpose was to establish a framework for defining and quantifying fair and impartial access to healthcare. By amalgamating various concepts that address the "how," "when," and "why" aspects of healthcare utilization, the model aimed to facilitate the development of effective policies promoting equitable access (Travers & Hirschman, 2020). Based on this model, it is proposed that individuals' patterns of health behaviors are influenced by their inherent predisposition to care, factors that either hinder or facilitate access to care, and the overall necessity for additional care, such as nutritional counseling.

According to this model, the utilization of health services, encompassing public health initiatives, hospital care, dietetics, medical consultations, dental care, and more, is predominantly influenced by three key dynamics: predisposing factors, enabling factors, and the level of need. Travers and Hirschman, (2020) opines that behaviour is only one of the very many factors that influence health care utilization. This model was utilized on the

basis because it advocates for use of health facilities by championing for strategies to increase receipt of physician advice and other professional health advice such as MNT that improve access to regular sources of health care.

### **2.3.2 Theory of Planned Behaviour**

The Theory of Planned Behavior (TPB), formulated by Icek Ajzen in 1985, builds upon the earlier Theory of Reasoned Action from 1980. TPB aims to forecast and understand human conduct in contexts where people experience different levels of control over their actions. Central to this framework is the idea that behavioral intention is the main factor influencing actual behavior. This intention is shaped by three main elements: attitudes toward the behavior, social pressures perceived as subjective norms, and the individual's perceived ability to control the behavior.

Yu and Lee (2022) note that TPB includes six elements, but the three primary components attitude, subjective norms, and perceived behavioral control serve as the foundational predictors of intention and subsequent behavior. However, not all elements may be consciously weighed by individuals when making decisions. Zhang (2018) emphasizes that background factors such as demographics and personality traits influence behavior indirectly through these three core determinants.

This theory is particularly relevant to the current study as it helps explain both the independent variables (e.g., personal beliefs and perceived control related to nutrition counseling and lifestyle choices) and the dependent variable (adherence to diabetes management behaviors). TPB provides a framework for understanding how individual

attitudes and social influences shape behavioral intentions related to nutrition, physical activity, and treatment adherence among diabetic patients.

Despite its wide applicability, TPB has been criticized for assuming that behavior is always the result of a rational, linear decision-making process. Critics argue that it overlooks the role of emotions, habits, and environmental constraints, which may significantly influence behavior regardless of intentions. Moreover, the model may not fully capture spontaneous or habitual behaviors that occur without deliberate planning.

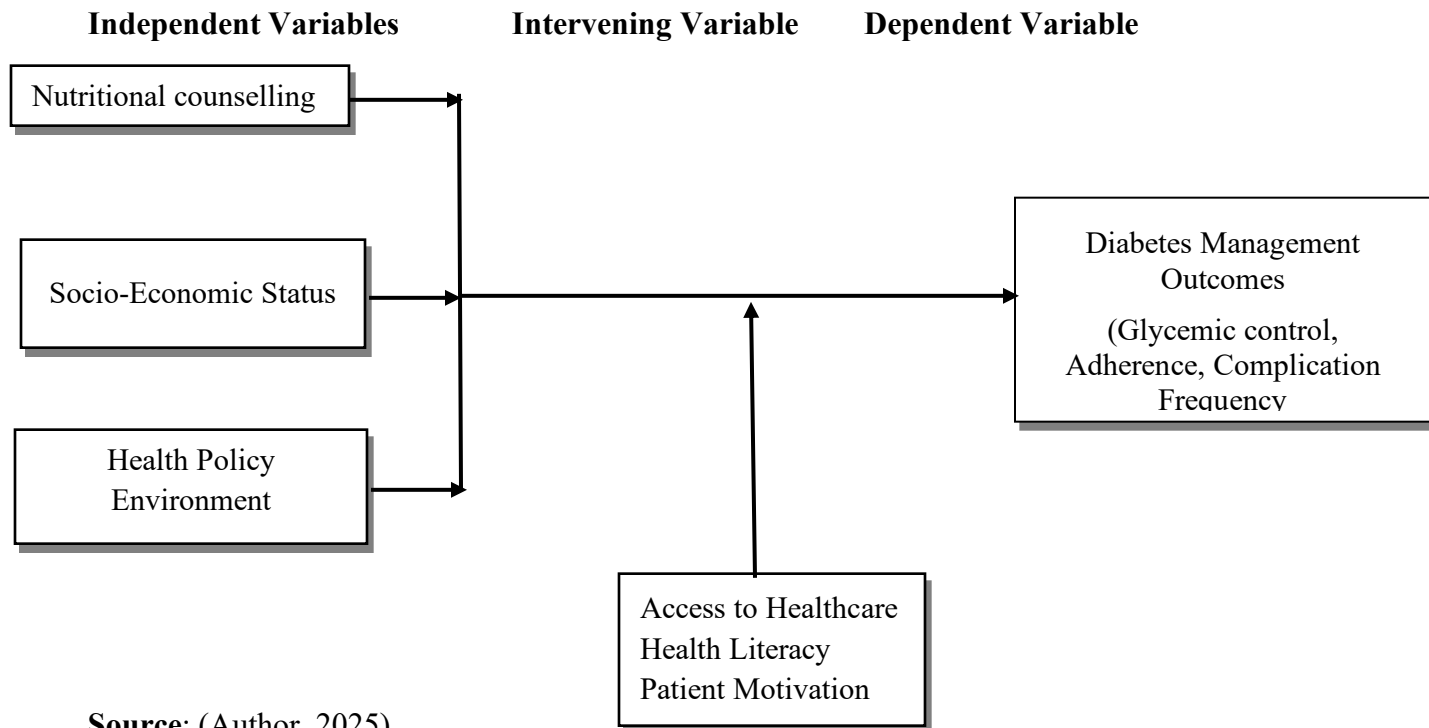
The nutritional factors have been loosely identified as a preventive risk factor for diabetes mellitus. Hence health educators serve an important role in training the population to adopt for healthy behaviour and learn the risk factors of diseases. Therefore, it means that in order to influence and change the behaviour of the population, the health educators must have an appreciation of the health and social characteristics, attitudes, values, skills and the basic past behaviour of individuals (Zhang, 2018). Much as the change of behaviour is sometimes challenging, considering a behavioural model assists to change one's beliefs about the diabetes disease. The TPB is taken as a social-cognitive theory that provides a useful framework for understating and predicting health-related behaviours. The theory is an important model in executing nutritional counseling.

## **2.4 Conceptual Framework**

In research, a conceptual framework serves as a vital tool for elucidating the fundamental concepts or variables that require investigation, as well as the interconnections between these variables. The framework is a representation of the relationship expected to see between one's variables or the properties that one wants to study.

**Figure 2.1:**

*Conceptual framework*



**Source:** (Author, 2025)

## 2.5 Knowledge Gaps

Despite growing global awareness of the importance of comprehensive diabetes management, current research often focuses on clinical interventions such as medication adherence and blood glucose monitoring, with limited emphasis on the broader contextual factors influencing patient outcomes. Specifically, there is insufficient integration of nutritional counseling, socio-economic conditions, and health policy frameworks in many studies addressing diabetes care—especially within low- and middle-income countries. Furthermore, while nutritional counseling is widely recognized as essential for diabetes management, there is a lack of evidence on how its delivery and effectiveness vary across

different socio-economic groups. Most studies fail to assess whether patients' economic status, access to nutritionists, or understanding of dietary advice significantly affect their ability to implement lifestyle changes.

In addition, the role of national and institutional policy in facilitating or hindering access to nutritional support and diabetes education remains underexplored. There is a need for empirical data on how health policies either bridge or widen disparities in diabetes care.

This study seeks to address these gaps by evaluating the combined influence of nutritional counseling, socio-economic status, and health policy on diabetes management outcomes.

The findings will provide critical insights into how these factors interact and inform more holistic, equitable, and policy-driven strategies for managing diabetes effectively

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter presents the methodology adopted for the study, detailing the methods used to collect and analyze data. It also outlines the overall research design, approaches, and procedures applied throughout the research process. Key components addressed in this chapter include:

### **3.2 Study Area**

Garissa County, located in the former North Eastern Province of Kenya, is well-known for its principal town, Garissa, which is recognized as one of the safest urban centers in Eastern and Central Africa. As the administrative hub of the county, Garissa holds considerable significance. According to the 2019 Census, the county is home to a population of 623,060 residents. Garissa County encompasses several constituencies, including Garissa Township, Ijara, Dadaab, Lagdera, Fafi, and Balambala. The county's main objective is to provide healthcare services that are of high quality, easily accessible, affordable, innovative, and culturally suitable for its residents.

The county is supported by the Garissa County Referral Hospital, 6 sub-county hospitals, 56 dispensaries, 21 health centers, and 123 private clinics and nursing homes. Additionally, it hosts the largest refugee complex in Dadaab, which is served by 3 hospitals and 8 health posts. This study was conducted at Garissa General (Level 5) Hospital and level 4 hospitals located in Balambala, Lagdera, Garissa Township, Hulugho, and Ijara. It should be highlighted that the delivery of high-quality healthcare services is mainly focused in urban regions. On average, residents have to travel approximately 35

kilometers to reach the nearest health facility. The main hospital in the region is the Garissa General Hospital.

**Figure 3.1:**

*Level 4 and 5 Healthcare Facilities in Garissa County*



### 3.3 Research Design

This study employed a cross-sectional research design, classified as an observational approach, as described by Kombo and Tromp (2006). In this design, both the variables of interest outcomes and exposures are measured at the same point in time. For this study, data on key variables were collected simultaneously from the participants. Cross-sectional designs are particularly useful for capturing a snapshot of a population's characteristics at a given moment. As Orodho (2003) notes, this approach is often applied to identify prevailing patterns or attributes within a specific group during a defined time frame.

This study adopted both qualitative and quantitative research methods. Quantitative research focuses on the measurement of quantity or amount, making it valuable for studies where data can be expressed numerically. On the other hand, qualitative research deals with data that pertains to quality or type. It is particularly beneficial for uncovering underlying motives and desires of participants (Kothari, 2004).

### **3.4 Study Population**

The study was centered on individuals with Type 1 and Type 2 diabetes who have been treated at the diabetes clinic located at Garissa General (Level 5) Hospital and those who have been attending clinics in 6 sub-county hospitals for at least three months. Such a period affords an adequate provision of Medical Nutrition Therapy to the patients. In addition, the healthcare professionals involved in caring for Type 1 and Type 2 diabetes patients at the clinic were also invited to participate in the study. There are 1200 patients registered at the clinic of Garissa General Hospital and the clinic operates for five days. Around 20 patients are attended to during the consultant clinic each day. The total number of diabetic patients in the six sub-County hospitals is not mentioned. However, we can make an approximate calculation from the available data. To make an informed estimate, we assume that each sub-County hospital serves a proportional number of diabetic patients similar to the Garissa County Referral Hospital. Each sub-County hospital serves an average of 200 patients (a conservative estimate based on the referral hospital's patient load), the total would be  $200 \text{ patients/hospital} \times 6 \text{ hospitals} = 1200 \text{ patients}$ . Therefore, the total estimated patients are:  $1200 \text{ (Referral Hospital)} + 1200 \text{ (Sub-County Hospitals)} = 2400 \text{ adult diabetic patients}$ .

### **3.4.1 Inclusion criteria**

- i. Adults diagnosed with Type 1 and Type 2 Diabetes who attend designated diabetes clinics within selected healthcare facilities.
- ii. Individuals with a confirmed diagnosis of Type 1 and Type 2 Diabetes who have consistently visited the clinic for at least three months. This duration allows for assessment of glycosylated hemoglobin levels and supports eligibility for study participation.
- iii. Type 2 Diabetes patients who have willingly agreed to take part in the study by providing informed consent.
- iv. Healthcare providers such as doctors, clinical officers, nutritionists, and nurses actively involved in the care of Type 2 Diabetes patients in both public and private healthcare settings, and who consent to participate in the research.

### **3.4.2 Exclusion Criteria**

- i. Individuals below 18 years of age were ineligible for participation in the study.
- ii. Patients with a prior diagnosis of diabetes who have not received nutrition counselling, or those who express unwillingness to participate in the research, were excluded.
- iii. Individuals presenting with other types of diabetes (e.g., DM1, gestational diabetes) and prediabetes.

### **3.5 Sampling Technique**

A stratified random sampling technique was employed to ensure representation across the sub-counties, with strata defined by sub-county and diabetes type (Type 1 vs. Type 2).

The sample size was calculated using Yamane's formula (1967) at a 95% confidence level and 5% margin of error, yielding a total of 331 participants (approximately 66 per sub-county, adjusted proportionally based on sub-county population sizes: Balambala 15%, Lagdera 20%, Garissa Township 25%, Hulugho 20%, Ijara 20%). Within each stratum, simple random sampling was used via patient clinic registries to select participants who met inclusion criteria (adults aged 18+ with confirmed DM diagnosis, resident in Garissa County for at least one year, and willing to consent). This method helped ensure the inclusion of participants most relevant to the study objectives, capable of offering in-depth perspectives on the role of nutritional counseling in managing diabetes within the Somali community. A final random sampling process was then employed to select the participants.

### **3.6 Sample Size**

Sample size is the number of subjects chosen from a population for the purpose of gathering data. Kothari (2012) insists that the sample should be large enough to be representative of the features of the population from which it is drawn. Slovin's Formula was used to calculate the sample size for this research. According to Wilson (2010), determining a sample from a population needs a formula that takes into consideration the confidence level and margin of error to give results that are reliable and valid. Hence, the research utilized a 95% confidence level and 0.05 margin of error.

$$n = \frac{Z^2 * P * (1 - P)}{E^2}$$

Where by:

The sample size can be calculated using the formula for a proportion:

Where:

$n$  is the sample size

$Z$  is the Z-score (1.96 for 95% confidence)

$p$  is the estimated proportion (prevalence rate, 0.10)

$E$  is the margin of error (0.05)

$$n = \frac{1.96^2 * 0.50 * (1 - 0.50)}{0.05^2}$$

$$n = \frac{3.8416 * 0.25}{0.0025}$$

$$n = \frac{0.9604}{0.0025}$$

$$n = 384.16$$

Since the total target population is below 10,000 individuals, the sample size was adjusted using the Finite Population Correction (FPC) formula, as shown below:

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

Where;

$nf$  represents the adjusted sample size after applying the Finite Population Correction,

$n$  is the initial sample size estimate (384) calculated assuming a population greater than 10,000,

$N$  refers to the actual size of the target population, estimated at 384 patients attending per month

Hence, the desired sample size for family caregivers was

$$nf = \frac{384}{1 + \left(\frac{384}{2400}\right)}$$

$$=384/1+ 0.16$$

$$=264/1.160$$

$$=331 \text{ Patients}$$

Healthcare workers were sampled using a purposive sampling technique to ensure the inclusion of professionals with relevant expertise and experience in diabetes care. A total of 25 key informants, including nutritionists, physicians, nurses, and diabetes educators, were selected based on their direct involvement in diabetes management and a minimum of two years of experience. Recruitment was coordinated with hospital administrators at Garissa General Hospital (Level 5) and the Level 4 hospitals in Balambala, Lagdera, Garissa Township, Hulugho, and Ijara sub-counties. The selection process targeted individuals who could provide diverse perspectives on nutritional counseling, socio-economic barriers, and policy implementation, with interviews conducted on-site or virtually to accommodate their schedules. Saturation was achieved after 25 interviews, as no new themes emerged, ensuring comprehensive data collection.

### **3.7 Reliability and Validity**

It is important to highlight that meticulous measures were taken to ensure the reliability of the research findings. The research assistants underwent comprehensive training and were closely supervised to guarantee their competence in administering the questionnaires accurately during the pretesting of tools and data collection. The implementation of standardized operating procedures for data collection were instrumental in maintaining consistency throughout the process.

Furthermore, a well-designed questionnaire were carefully and the instruments were subjected to pretesting to confirm their coherence and comprehensiveness. To obtain consistent and reliable responses, standardized questionnaires were employed to elicit the desired information. In addition, a thorough review was conducted on all completed questionnaires, enabling the identification and rectification of any errors or inconsistencies. These comprehensive measures were collectively contribute to the overall quality and credibility of the research outcomes.

### **3.8 Data Collection**

Data collection encompasses the systematic procedures of acquiring, assembling, organizing, and quantifying data pertaining to the relevant variables. These sequential steps ensure the accumulation of an ample supply of source materials in a methodical manner. This study therefore took the following steps and procedures to ensure efficient data collection from two respective data collection tool. A semi-structured questionnaire was used in this study.

The questionnaire consisted of 6 sections. The initial section gathered data on the respondents' socio-demographic details. The subsequent three sections collected information on the independent variables (social-economic status, individual behavior, and social policy). The fifth section obtained data on the moderating variable (Ministry of Health Guidance), while the final section focused on the dependent variable (management of diabetes among Somalis in Garissa). Patients' files were utilized for data validation.

On the other hand, information from key informant interviews involved 7 healthcare professionals, including doctors, nutritionists, clinical officers, and nurses, selected

through a simple random sampling method from the targeted health facilities (Garissa General Hospital and Level 4 hospitals in Balambala, Lagdera, Garissa Township, Hulugho, and Ijara). The exact distribution across cadres (doctors, nutritionists, clinical officers, and nurses) was determined by random selection from eligible staff, with a total of 7 participants interviewed to reach thematic saturation.

### **3.9 Data Analysis**

Data analysis involves the examination of collected information, such as survey responses or experimental data, with the aim of drawing deductions and inferences. Before conducting the analysis, the data needed to go through several preparatory steps, including cleaning, editing, coding, and categorization. These steps ensured that accurate deductions and inferences can be made to address the research questions at hand.

The questionnaires, after being filled out, were checked through and edited for their accuracy, completeness, and internal consistency. The answers were systematically processed through coding and organizing them into categories that correspond to the study variables. To manage and analyze the data, both numerical and textual, the software Statistical Package for the Social Sciences (SPSS Version 25) was utilized. The main goal of the descriptive statistics, e.g., frequencies and percentages, was to summarize the quantitative data, thus making the interpretation easier. Most of the findings were disclosed in the forms of frequency tables, pie charts, and bar graphs, which were the most efficient ways to present the given data.

On the other hand, qualitative data were gathered through Key Informant Interviews (KII) and transcribed into Word format for storage and analysis. Transcription of the audio

recordings was performed manually by the researcher using Microsoft Word, with audio playback facilitated by Audacity software to ensure accuracy in capturing responses from the Somali community context. The subsequent thematic analysis involved identifying and organizing emerging themes from the transcripts to provide deeper insights into the qualitative data. This analysis was conducted using NVivo software (Version 12), which enabled systematic coding, theme development, and interpretation of the KII responses, aligning with the study's objectives to explore socio-economic, behavioral, and policy-related barriers to diabetes management.

### 3.10 Study Variables and their Measurement

**Table 3.1:**

*Variable Definition, Measurement and Empirical Evidence*

| Type and Name of Variable                                                  | Measure                                               | Empirical evidence                                                              |
|----------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------|
| Dependent - Utilization of diabetic care in number of visits.              | Number of visits in the six months prior to the study |                                                                                 |
| <b>Independent</b>                                                         |                                                       |                                                                                 |
| Age (continuous variable)                                                  | Actual number of years.                               | Demand for healthcare services increases with increase in age (Lindelow, 2002). |
| sex                                                                        | Female=1, male=0                                      | Positive (Bertaksi, et, al., 2000)                                              |
| Highest Level of education attained by the respondent. (Discrete variable) | None=0 Primary=1 Secondary=2 Higher education=3       | Positive (Mwai 2013).                                                           |
| Occupation of patient (categorized variable)                               | Formal employment = 3. Informal=2 unemployed=1        | -                                                                               |

|                                     |                                                                |                                  |
|-------------------------------------|----------------------------------------------------------------|----------------------------------|
| Marital status categorized variable | Never married, Married, Divorced/separated, windowed.          | -                                |
| Cost of services                    | Average cost of services                                       | Negative (Younger, Genicot,2002) |
| Quality of care.                    | Services provided and their quality. 1. Good. 2. Fair. 3. poor | Positive (Ayieko, 2011)          |
| Distance to health facility.        | Transport is required=1, Walking distance=0                    | Acton (1975)                     |

### 3.11 Ethical Consideration

This study strictly followed proper research protocols, ensuring that all sources of information are duly acknowledged to the best of our ability. Additionally, the study obtained the required clearance from the ethical committee. The study also complied with data protection laws, as well as guidelines set forth by the NACOSTI, Kenya Methodist University (KeMU) and the Health Department of Garissa County Government. Prior to conducting the questionnaire, the respondents were requested to provide their consent, which was obtained from them. They were duly informed about their option to decline participation in the survey. Utmost confidentiality was strictly upheld, particularly when handling the questionnaires.

## **CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION**

### **4.1 Introduction**

This chapter presents the analysis of the collected data, along with the results and a discussion of the key findings. The main aim of the study was to explore the role of nutritional counseling in the management of diabetes among the Somali population in Garissa County. Additionally, the study examined how socio-economic status and individual behavior are related to diabetes management in this community. It also investigated the impact of social policy on diabetes care. The findings are displayed using tables, graphs, and charts to aid in interpretation and understanding.

### **4.2 Response Rate**

The response rate, often referred to as the return or completion rate in survey research, indicates the proportion of participants who completed and returned the questionnaire. In this study, the target sample consisted of 331 individuals diagnosed with Type 2 Diabetes attending designated diabetes clinics across various healthcare facilities in Garissa County. Out of this total, 59 participants (17.8%) did not complete the questionnaire, resulting in a usable response from 272 individuals, representing an 82.2% response rate. According to Mugenda and Mugenda (2003), a response rate of 50% is considered adequate for analysis, 60% is deemed good, and 70% or higher is regarded as excellent. The high response rate in this study can be attributed to the data collection strategy, which included consistent follow-up and the use of the drop-and-pick method, allowing respondents sufficient time to complete the questionnaires.

**Table 4.1:***Response Rate*

| <b>Response</b>                    | <b>No</b>  | <b>Percentage (%)</b> |
|------------------------------------|------------|-----------------------|
| Questionnaires filled and returned | 272        | 82.2%                 |
| Questionnaires not returned        | 59         | 17.8%                 |
| <b>Total</b>                       | <b>331</b> | <b>100</b>            |

**4.2.1 Data Segregation per sub-county**

The distribution of respondents across different sub-counties as shown in Table 4.2 reveals notable variations. Garissa Township represents the largest portion, accounting for 45.3% of the sample, indicating it is the most heavily represented area in the survey. Ijara follows with 21.1%, while Lagdera comprises 15.1% of the respondents. Balambala and Hulugho contribute smaller proportions, with 12.1% and 6.3%, respectively. This distribution highlights a concentration of respondents in Garissa Township, suggesting that diabetes management challenges and experiences may be more prominently reflected in this area compared to others.

**Table 4.2:***Data Segregation per sub-county*

| <b>Sub-County</b> | <b>Frequency</b> | <b>Percentage (%)</b> |
|-------------------|------------------|-----------------------|
| Garissa Township  | 122              | 44.9                  |
| Ijara             | 58               | 21.3                  |
| Lagdera           | 42               | 15.4                  |
| Balambala         | 32               | 11.8                  |
| Hulugho           | 18               | 6.6                   |

|              |            |             |
|--------------|------------|-------------|
| <b>Total</b> | <b>272</b> | <b>100%</b> |
|--------------|------------|-------------|

### **4.3 Socio-demographic Characteristics**

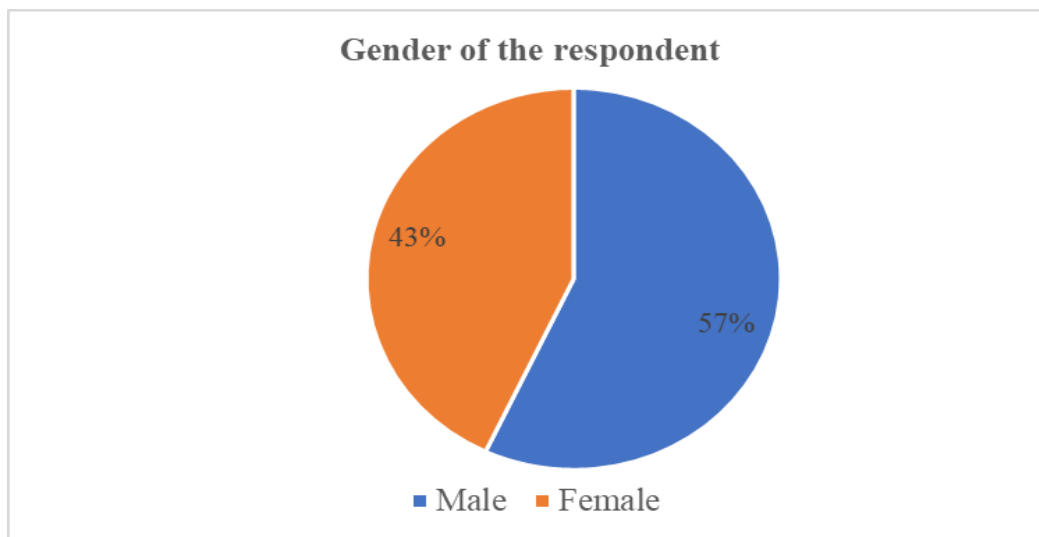
This section aimed to gather essential information about various socio-demographic factors that may influence the management of diabetes among the Somalis in Garissa County. The areas assessed include the participant's gender, age range, current employment status, and highest level of education completed. Additionally, we will examine marital status and whether participants have children. The section will also explore health insurance coverage, type of housing, and proximity to healthcare facilities or nutrition counseling centers. Furthermore, we will inquire about the means of transport and payment methods for nutrition counseling, the affordability of diabetes medications and supplies, access to fresh and nutritious food, and any challenges faced in accessing diabetes education programs.

#### **4.3.1 Gender of the respondents**

Participants were requested to specify their gender, and the results are illustrated in Figure 4.1.

#### **Figure 4.1:**

*Gender of the respondents*



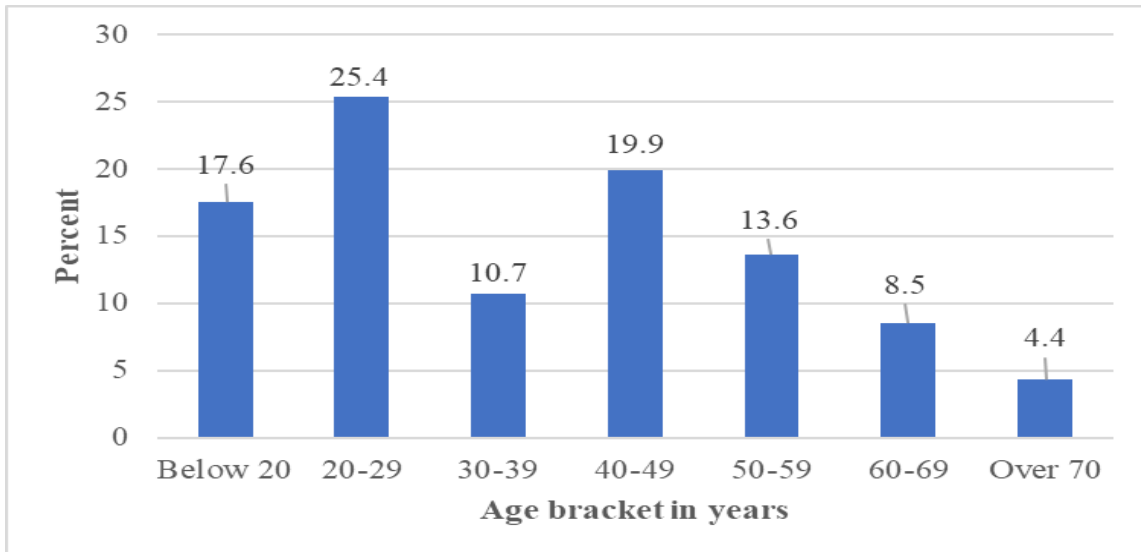
The data revealed that 57.0% of the respondents identified as male, while 43.0% identified as female. This indicates a slight male predominance in diabetic cases in Garissa County. This suggests that there is a slight predominance or higher occurrence of diabetes among males in the population sampled. While the gender difference is not very large, it indicates that men may be more affected by diabetes in Garissa County. Stratification by gender was essential to ensure the study captured potential disparities in diabetes management outcomes across male and female respondents, aligning with the research objective to assess the influence of socio-economic status and self-care practices. Gender stratification allowed for the identification of differential impacts of nutritional counselling, socio-economic factors (e.g., income, education), and policy access on diabetes control, as these may vary by gender due to cultural roles and resource access in the Somali community.

#### **4.3.2 Age distribution of respondents**

The participants were asked to indicate their age bracket and study outcome were as presented in Figure 4.2.

**Figure 4.2:**

*Age distribution of respondents bracket in years*



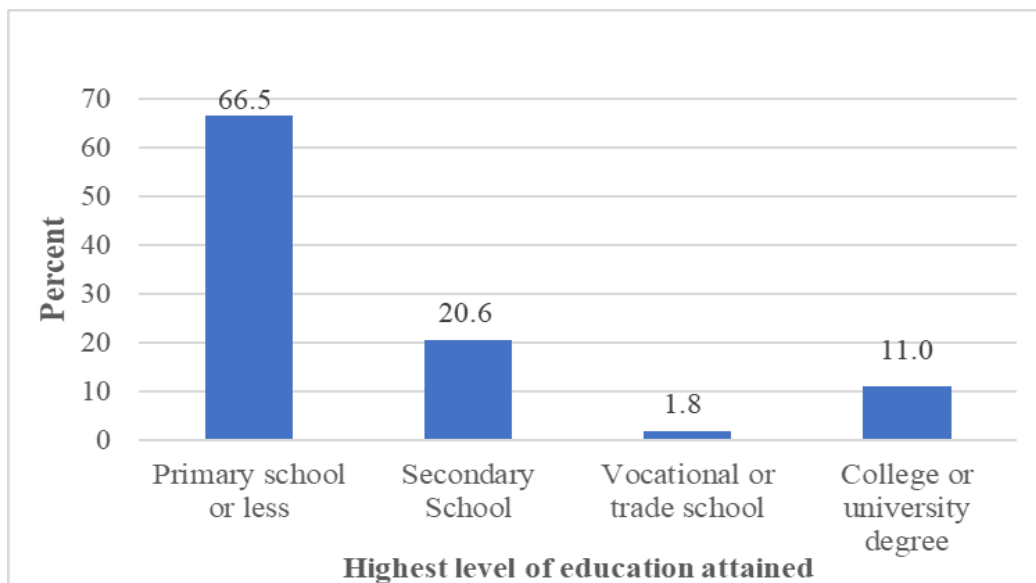
The age distribution data reveals a varied demographic in the management of diabetes among the Somalis in Garissa County as shown in Figure 4.1. The largest group is between 20-29 years old (25.4%), followed by those aged 40-49 (19.9%). A notable proportion is also found in the below 20 age range (17.6%). The prevalence of diabetes decreases in older age groups, with only 8.5% in the 60-69 range and a minimal 4.4% over 70. This distribution suggests a relatively younger population engaged in diabetes management, which may impact the focus of nutritional counseling and interventions.

#### **4.3.3 Respondents' Highest Level of Education**

The respondents were also asked to indicate their highest level of education. The results were as presented by Figure 4.3

**Figure 4.3:**

*Highest level of education attained*



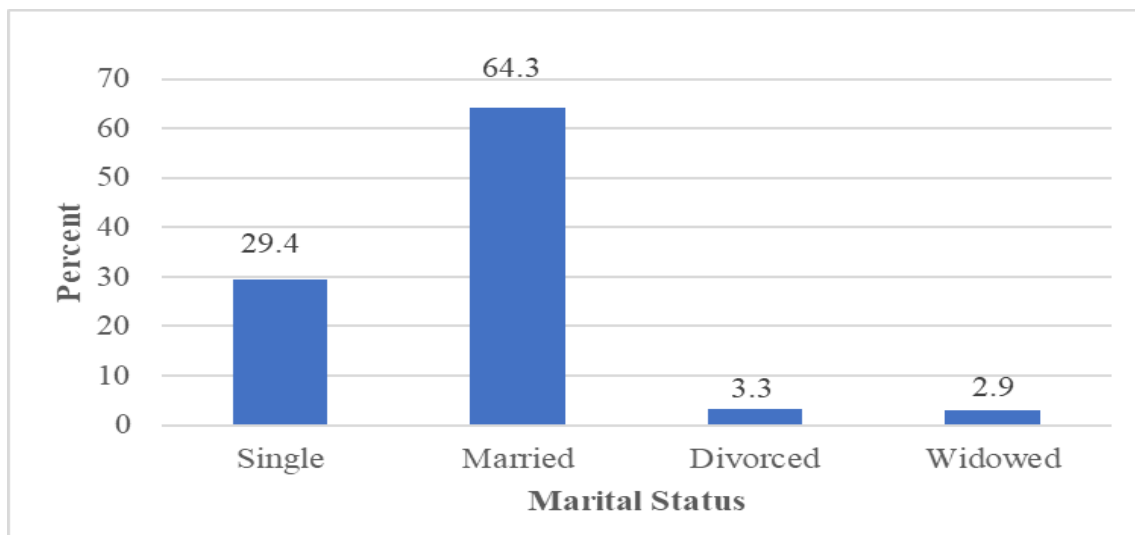
The data on education levels reveals that a majority of individuals in Garissa County have completed only primary school or less (66.5%), while a smaller proportion have attained secondary school education (20.6%). The numbers drop for those with vocational or trade school qualifications (1.8%) and college or university degrees (11.0%). This educational profile suggests that many individuals may have limited access to advanced health literacy and nutritional knowledge, which could affect their management of diabetes.

#### **4.3.4 Marital Status**

Participants were also requested to specify their present marital status. The outcomes are shown in Figure 4.4

**Figure 4.4:**

*Current marital status*



From the findings, majority of individuals are married (64.3%), followed by those who are single (29.4%), with smaller proportions being divorced (3.3%) or widowed (2.9%). The high percentage of married individuals may influence diabetes management, as marital status can affect social support systems and access to resources. For married individuals, family dynamics and support structures could play a significant role in managing diabetes, highlighting the importance of incorporating family-based approaches in nutritional counseling and diabetes care.

#### **4.3.4.1 Association Between Marital Status and Adherence to Diabetes Management Plan**

The analysis examines the relationship between marital status and adherence to prescribed diabetes management plans among the Somali population in Garissa County (N=272). To provide a scientifically validated measure, the Morisky Medication Adherence Scale (MMAS-8) was applied retrospectively, using an odd-numbered scale (3 for poor, 5 for

neutral, 7 for good/excellent, capped at 8) to quantify adherence based on self-reported data.

**Table 4.3:**

*Cross-Tabulation Analysis of Marital Status and Adherence to Diabetes Management Plan*

| <b>Marital Status</b> | <b>Non-Adherent<br/>(Score 0–4)</b> | <b>Partially Adherent<br/>(Score 5–6)</b> | <b>Fully Adherent<br/>(Score 7–8)</b> | <b>Total</b> | <b>Average MMAS-8 Score</b> |
|-----------------------|-------------------------------------|-------------------------------------------|---------------------------------------|--------------|-----------------------------|
| Married               | 4 (2.3%)                            | 22 (12.6%)                                | 149 (85.1%)                           | 175          | 6.66                        |
| Single                | 4 (5.0%)                            | 14 (17.5%)                                | 62 (77.5%)                            | 80           | 6.45                        |
| Divorced/Widowed      | 1 (5.9%)                            | 3 (17.6%)                                 | 13 (76.5%)                            | 17           | 6.41                        |
| <b>Total</b>          | <b>9</b>                            | <b>39</b>                                 | <b>224</b>                            | <b>272</b>   | <b>6.58</b>                 |

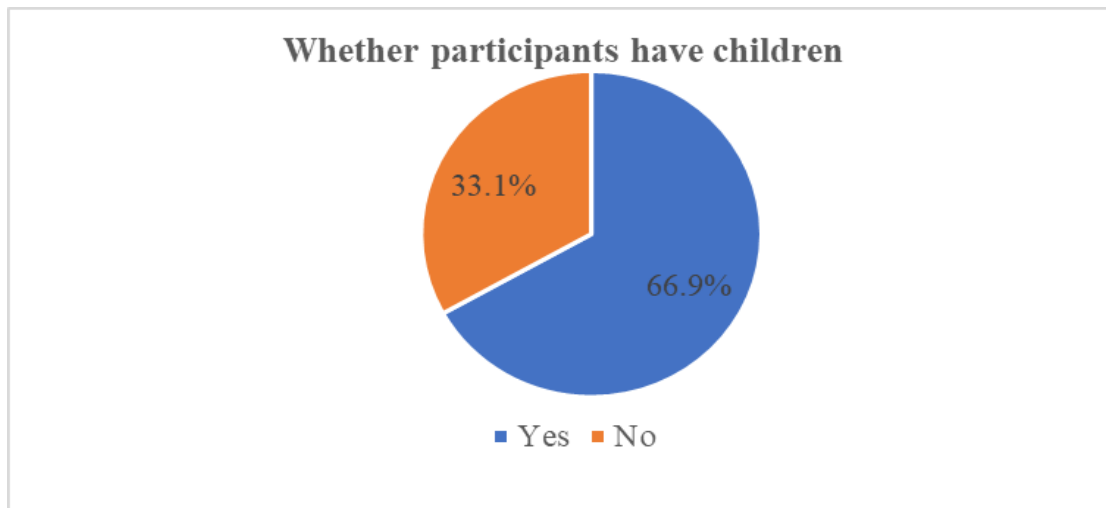
Married individuals showed the highest average score (6.66), followed by single (6.45) and divorced/widowed (6.41), suggesting slightly better adherence among married respondents, possibly due to family support like reminders and meal planning (Section 4.3.10). The overall average of 6.58 indicates high adherence, aligning with findings by Higa et al. (2021), that family involvement enhances diabetes self-management, but indicate that other factors, such as education or economic constraints, may also influence adherence in this population.

#### **4.3.5 Participants number of children**

Respondents were asked whether they had children, with the findings presented in Figure 4.5.

**Figure 4.5:**

*Whether participants have children*



The data indicates that a significant majority of individuals in Garissa County have children (66.9%), while 33.1% do not. This high proportion of individuals with children suggests that family-related responsibilities and dynamics could be important factors in diabetes management. Further, among those who had children, 22.0% indicated they had four, followed by those with two (13.7%), those who had six were 12.6% and those that had three children were 11.5%. Also, those who had eight and ten children were 9.9% in each case, 7.1% had one child, 5.5% had seven children, 4.9% had five children and 0.5% of the respondents had eleven children. This diverse family size distribution suggests that managing diabetes could be influenced by the number of dependents and family responsibilities. Interventions might need to address the specific challenges and needs of individuals based on their family size to improve diabetes management outcomes.

#### **4.3.5.1 Association Between Having Children and Confidence in Managing Diabetes**

The cross-tabulation analysis (Table 4.4) examines the relationship between having children and confidence in managing diabetes effectively among the Somali population in Garissa County (N=272).

**Table 4.4:***Cross-Tabulation Analysis of Having Children and Confidence in Managing Diabetes*

| <b>Have Children</b> | <b>Not at All/Slightly Confident</b> | <b>Moderately Confident</b> | <b>Very/Extremely Confident</b> | <b>Total</b> | <b>Chi-Square Results</b>            |
|----------------------|--------------------------------------|-----------------------------|---------------------------------|--------------|--------------------------------------|
| Yes                  | 3 (1.6%)                             | 42 (23.1%)                  | 137 (75.3%)                     | 182          | Pearson $\chi^2$<br>= 7.62<br>df = 2 |
| No                   | 5 (5.6%)                             | 30 (33.3%)                  | 55 (61.1%)                      | 90           |                                      |
| <b>Total</b>         | <b>8</b>                             | <b>72</b>                   | <b>192</b>                      | <b>272</b>   | p-value = 0.022<br>(significant)     |

The results show that individuals with children were more likely to report very or extremely high confidence (75.3%, n=137) compared to those without children (61.1%, n=55). Conversely, low confidence (not at all/slightly) was reported by only 1.6% (n=3) of those with children compared to 5.6% (n=5) of those without. Moderate confidence was reported by 23.1% (n=42) of those with children and 33.3% (n=30) of those without.

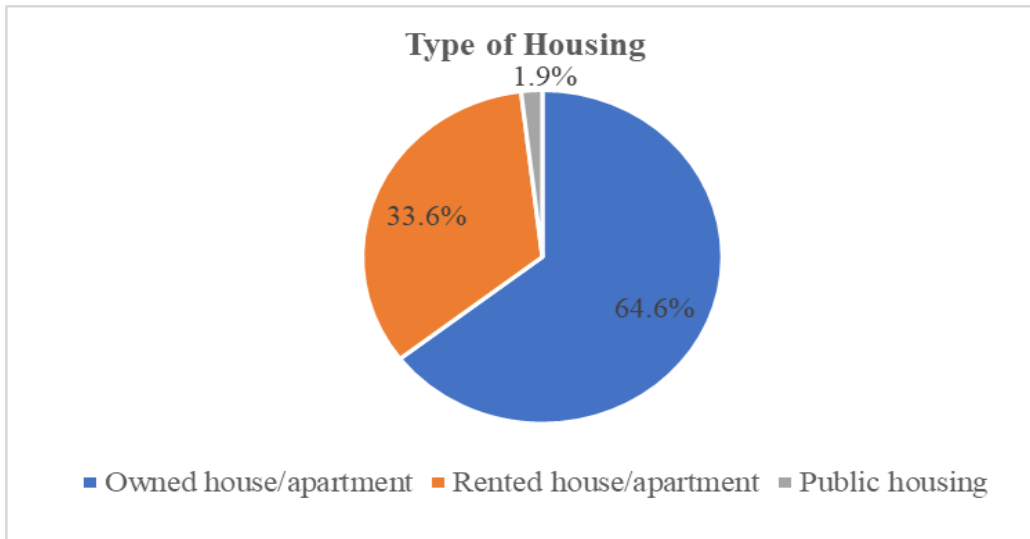
The Chi-Square test revealed a significant association between having children and increased confidence in managing diabetes,  $\chi^2 = 7.62$ ,  $p = 0.022$ . This indicates that having children significantly enhances confidence in diabetes self-care, likely due to family support networks providing emotional and practical assistance (such as, meal preparation, encouragement for physical activity; Section 4.3.10). The results indicate that family responsibilities enhance self-efficacy.

#### **4.3.6 Type of Housing**

Participants were asked to indicate their current housing type, with the results shown in Figure 4.6.

**Figure 4.6:**

### *Type of Housing*



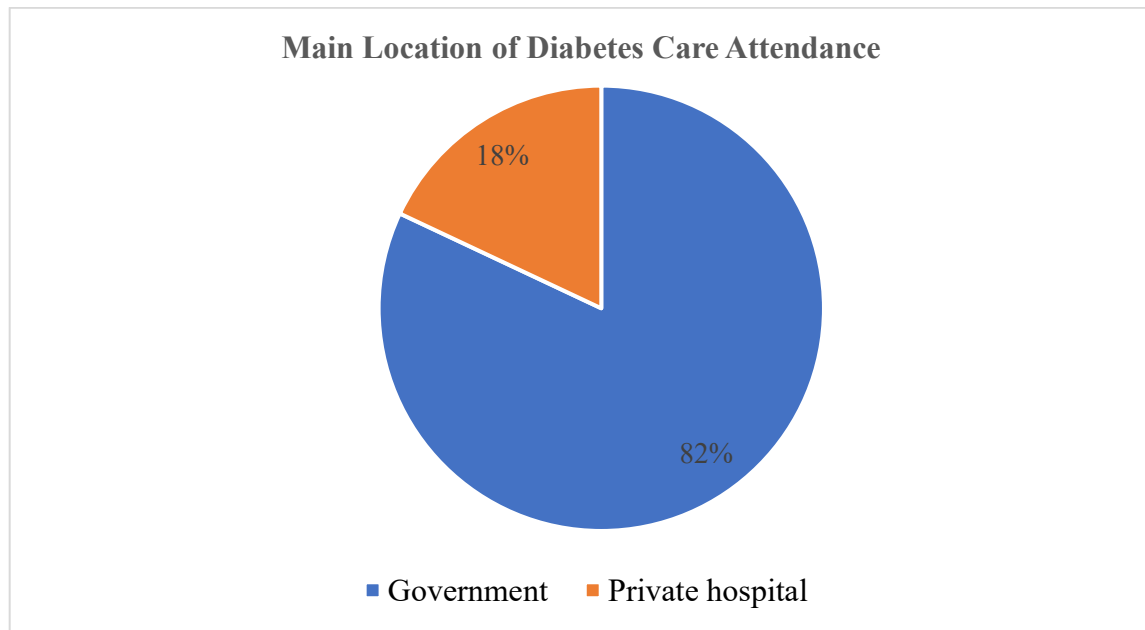
The findings indicate that a majority of individuals in Garissa County reside in owned houses or apartments (64.6%), while a smaller portion lives in rented houses or apartments (33.6%). Only 1.9% live in public housing (houses offered by the county government). The relatively high rate of home ownership suggests a degree of financial stability among many participants, which may influence their ability to manage diabetes through access to resources and stability. However, the significant number could still face challenges related to housing instability, which may impact their ability to consistently manage their health.

#### **4.3.7 Main Location of Diabetes Care Attendance**

The study aimed to determine the primary healthcare setting in which individuals receive diabetes care. The results are presented in Figure 4.7

**Figure 4.7:**

*Main Location of Diabetes Care Attendance*



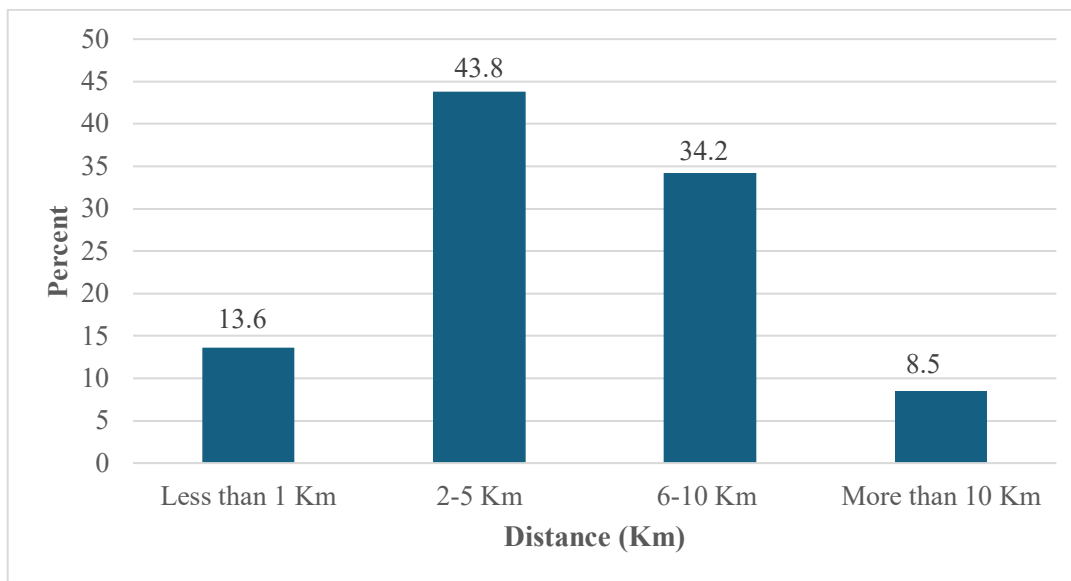
The findings indicate that a substantial majority of respondents (82.0%) primarily receive their diabetes care at government health facilities, while a smaller proportion (18.0%) reported attending private clinics. This suggests a strong reliance on the public healthcare system for diabetes management within the study population. The high level of consistency in the place of care may foster more personalized, continuous, and coordinated management of diabetes.

#### **4.3.8 Proximity to Healthcare Facility or Nutrition Counseling Center**

The research aimed to assess the closeness of the nearest healthcare facility or nutrition counseling center to the respondents' homes. The results are depicted in Figure 4.8

**Figure 4.8:**

*Proximity to Healthcare Facility or Nutrition Counseling Center*



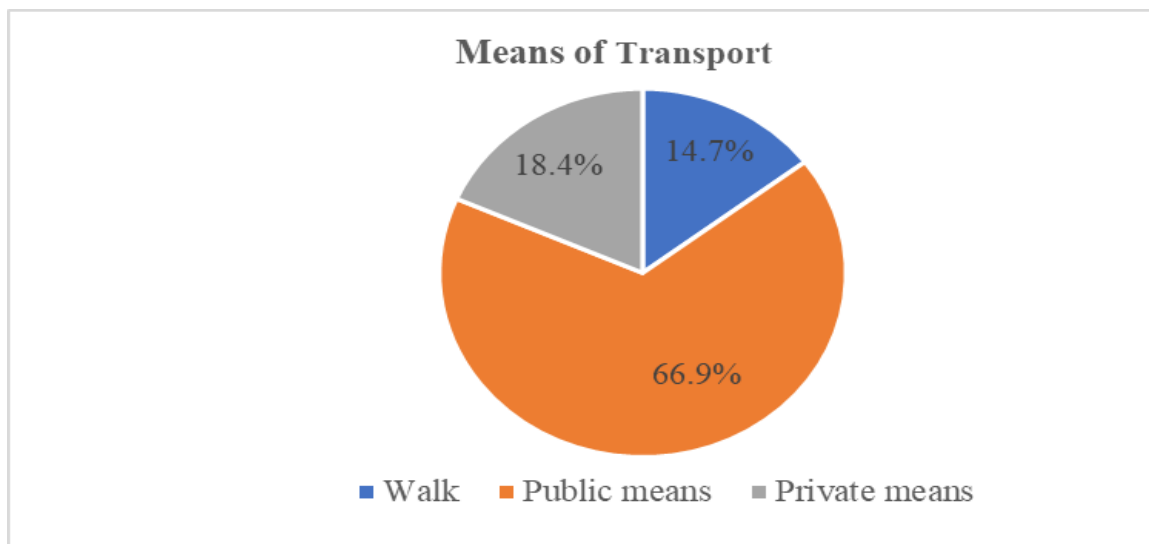
The data on the distance to the nearest healthcare facility or nutrition counseling center shows that most individuals in Garissa County live within 1-5 kilometers of such facilities (43.8%), with 34.2% residing 6-10 kilometers away. A smaller proportion are within less than 1 kilometer (13.6%), while 8.5% live more than 10 kilometers away. This distribution suggests that while a significant portion of the population has relatively reasonable access to healthcare services, a notable number still face significant travel distances, which could pose a barrier to regular visits and adherence to nutritional counseling, particularly for those living beyond 10 kilometers who may encounter logistical or financial challenges.

#### **4.3.8.1 Means of transport used to access nutrition counseling**

The study aimed to identify the modes of transportation individuals use to reach nutrition counseling services. The results are displayed in Figure 4.9.

**Figure 4.9:**

*Means of transport do you use to access nutrition counseling*



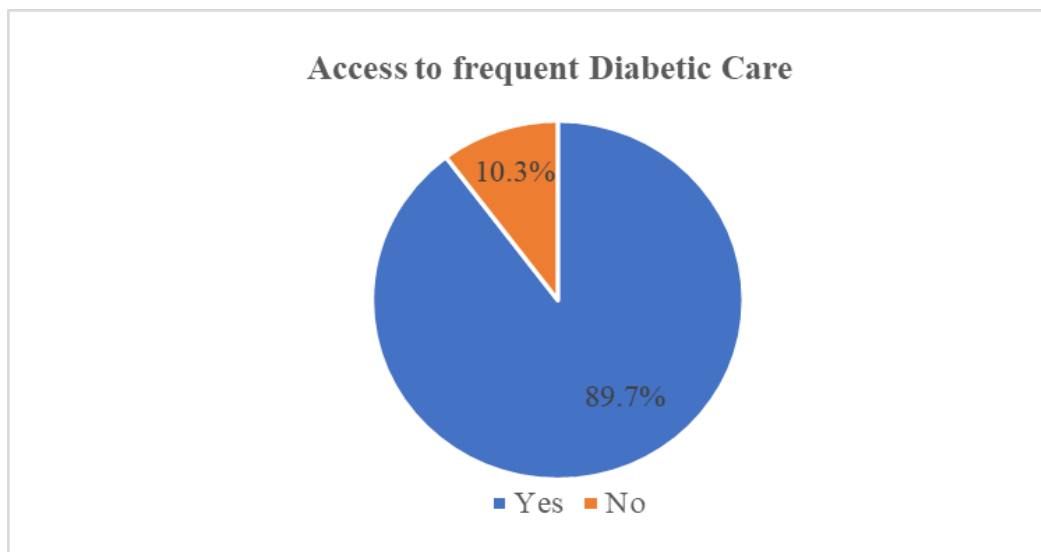
Findings on transportation methods to access nutrition counselling reveals that the majority of individuals use public means of transport (66.9%), while a smaller portion rely on private means (18.4%), and 14.7% walk. The reliance on public transport suggests that accessibility and convenience of transportation could be significant factors affecting attendance at counseling sessions.

#### **4.3.8.2 Access to Frequent Diabetic Care**

Respondents were asked if they could regularly access diabetic care when needed. The results are presented in Figure 4.10.

**Figure 4.10:**

*Access to Frequent Diabetic Care*



The data indicates that a large majority of individuals have access to frequent diabetic care whenever needed (89.7%). However, 10.3% do not have such access. This high level of access suggests that most individuals can obtain timely care for their diabetes, which is crucial for effective management. Addressing the needs of those who lack access could further improve diabetes care and outcomes for the entire population.

Further, an KII argues that:

*"The availability of resources greatly impacts diabetes management. Accessible healthcare facilities and comprehensive diabetes education programs can significantly improve disease management. Support networks, such as local support groups and online forums, also provide valuable emotional support and practical advice. However, in Garissa County, the availability of these resources is limited, which can negatively affect diabetes management outcomes."* — Clinical Officer

#### 4.3.9 Accessibility to nutritious food

The study sought to determine the extent to which nutritious food is accessible in the community, recognizing its critical role in the effective management of diabetes. Results were as shown in Table 4.5.

**Table 4.5:**

*Accessibility to nutritious food*

| <b>Response</b>            | <b>Frequency</b> | <b>Percent</b> |
|----------------------------|------------------|----------------|
| Easily accessible          | 130              | 47.8%          |
| Accessible with difficulty | 102              | 37.5%          |
| Not accessible             | 40               | 14.7%          |
| <b>Total</b>               | <b>272</b>       | <b>100%</b>    |

The results reveal that 47.8% of respondents reported that nutritious food is easily accessible, indicating that nearly half of the population has favorable access to healthy food options. However, 37.5% indicated that food is accessible with difficulty, highlighting logistical, financial, or infrastructural barriers. A concerning 14.7% of respondents stated that nutritious food is not accessible, suggesting that a significant portion of the population may face food insecurity, which could hinder proper diabetes management.

#### 4.3.10 Importance of Social Support and Encouragement in Diabetes Management

Respondents were asked to rate how important they believe social support is in their diabetes management. Results were as illustrated in Table 4.6

**Table 4.6:***Importance of Social Support and Encouragement in Diabetes Management*

|                      | Frequency  | Percent      |
|----------------------|------------|--------------|
| Extremely important  | 187        | 68.8         |
| Moderately important | 9          | 3.3          |
| Somewhat important   | 71         | 26.1         |
| Not important at all | 5          | 1.8          |
| <b>Total</b>         | <b>272</b> | <b>100.0</b> |

The findings shows that majority of individuals view social support and encouragement from family, friends, or support groups as extremely important (68.8%) in managing their diabetes. A smaller group considers it somewhat important (26.1%), while a very small percentage finds it moderately important (3.3%) or not important at all (1.8%). This underscores the critical role of social support in diabetes management, suggesting that fostering strong support networks can greatly enhance individuals' ability to manage their condition effectively.

#### **4.3.10.1 Association Between Social Support and Effectiveness of Daily Management Strategies**

The cross-tabulation analysis (Table 4.7) examines the relationship between the perceived importance of social support and the effectiveness of daily diabetes management strategies among the Somali population in Garissa County (N=272).

**Table 4.7:**

*Cross-Tabulation Analysis of Importance of Social Support and Effectiveness of Daily Management Strategies*

| <b>Social Importance</b> | <b>Support</b> | <b>Moderately Effective</b> | <b>Very/Extremely Effective</b> | <b>Total</b> | <b>Chi-Square Results</b>          |
|--------------------------|----------------|-----------------------------|---------------------------------|--------------|------------------------------------|
| Extremely Important      |                | 85 (45.5%)                  | 102 (54.5%)                     | 187          | Pearson $\chi^2 = 11.47$<br>df = 1 |
| Moderately/Somewhat/Not  |                | 58 (68.2%)                  | 27 (31.8%)                      | 85           |                                    |
| <b>Total</b>             |                | <b>143</b>                  | <b>129</b>                      | <b>272</b>   | p-value = 0.001<br>(significant)   |

The results indicate that individuals who rated social support as extremely important were more likely to report very or extremely effective management strategies (54.5%, n=102) compared to those who rated it as moderately, somewhat, or not important (31.8%, n=27). Conversely, moderate effectiveness was reported by 45.5% (n=85) of those who valued social support highly and 68.2% (n=58) of those who valued it less.

Moreover, a Chi-Square test revealed a significant association between the perceived importance of social support and the effectiveness of management strategies,  $\chi^2 = 11.47$ ,  $p = 0.001$ . This indicates that strong social support significantly enhances the perceived effectiveness of diabetes self-care practices, likely through encouragement and practical assistance (e.g., medication reminders, shared physical activities; Section 4.3.10). The findings underscore the critical role of social networks in fostering effective diabetes management, suggesting that interventions should leverage family and community support to improve health outcomes.

The crosstabulations and chi-square tests provide robust evidence of the relationship between social status and diabetes self-care practices. Having children ( $p=0.022$ ) and valuing social support highly ( $p=0.001$ ) are significantly associated with higher confidence and effectiveness in diabetes management, highlighting the pivotal role of family and social networks. While marital status showed a trend toward better adherence among married individuals, the association was not significant ( $p=0.428$ ), possibly due to other influencing factors like education or economic barriers. These findings align with the study's objective, emphasizing the need for family-based nutritional counseling programs to enhance self-care practices among the Somali population in Garissa County.

#### **4.3.11 Experiences of Social Support in Diabetes Management**

Many individuals highlight the various ways social support impacts their diabetes management. Emotional and motivational support from family and friends is consistently mentioned as a key factor in maintaining adherence to treatment and managing the condition. For example, frequent reminders from family members about not skipping medication play a vital role in ensuring adherence to the prescribed treatment plan. This consistent encouragement helps individuals stay on track and manage their diabetes more effectively.

Family involvement extends beyond emotional support to practical assistance, such as participating in meal planning and preparation. Families often help ensure that healthy food options are available, which aligns with dietary recommendations for diabetes management. This support not only aids in maintaining a suitable diet but also enhances motivation by involving family members in the process. Also, support from friends and

family also includes physical activity encouragement. Many respondents report that their family members join them in physical activities, which helps them stay motivated and committed to their exercise routines. This shared involvement fosters a sense of community and accountability, making it easier to stick to an active lifestyle.

The findings concur with Higa et al. (2021), who emphasize the significant role of family involvement in diabetes self-management. Their involvement is crucial, as families help ensure that healthy food options are available, aligning with dietary recommendations essential for effective diabetes management. This collaborative approach fosters a supportive environment that empowers individuals with diabetes, reinforcing the importance of family support in managing the condition effectively.

In addition to immediate support, some individuals receive valuable assistance through specific actions, such as obtaining medical supplies or participating in health courses. For instance, one respondent's sister secured a diabetic kit while abroad, highlighting the extended network of support that can be crucial for managing diabetes. Another respondent was encouraged by a healthcare professional to pursue further education in diabetes management, demonstrating how professional guidance can be complemented by personal support systems.

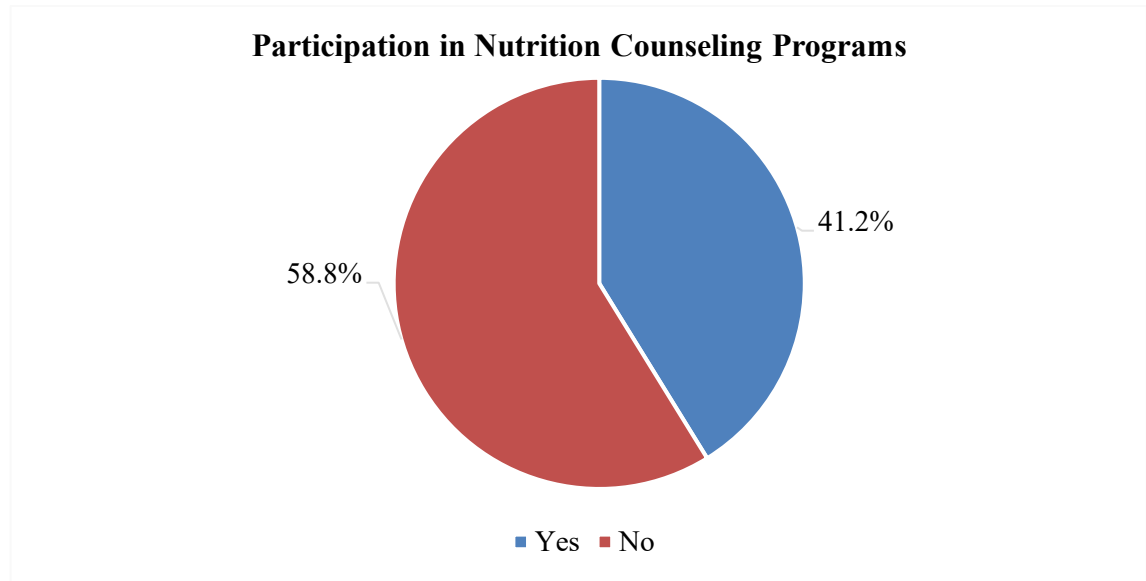
#### **4.4 Nutrition Counseling on Diabetes Management**

##### **4.4.1 Participation in Nutrition Counseling Programs Over the Past Year**

The study sought to understand participants' engagement with nutrition counseling programs over the past year. Respondents were asked whether they had participated in any such programs. Results were as shown in Figure 4.11.

**Figure 4.11:**

*Participation in Nutrition Counseling Programs Over the Past Year*



The findings indicate that 41.2% of individuals have participated in a nutrition counseling program in the past year, while 58.8% have not. This suggests that while a significant portion of individuals engage in nutrition counseling, a larger number have not, highlighting a potential area for increased outreach and education to improve participation and support better diabetes management. This finding is consistent with Early and Stanley (2018), who highlight the essential role of medical nutrition therapy (MNT) and registered dietitian nutritionists (RDNs) in preventing and managing prediabetes and type 2 diabetes. They emphasize that incorporating MNT into diabetes care promotes healthier eating habits, enhances glycemic control, and improves overall health outcomes.

#### 4.4.2.1 Association Between Participation in Nutrition Counseling and Adherence to Diabetes Management Plan

The analysis examines the relationship between participation in nutrition counseling programs and adherence to prescribed diabetes management plans among the Somali population in Garissa County (N=272). Given the binary nature of adherence as an outcome (adherent vs. non-adherent) and the need to evaluate the likelihood of adherence based on participation, an Odds Ratio (OR) analysis was conducted, replacing the initial cross-tabulation approach for a more precise assessment of association strength.

**Table 4.8:**

*Odds Ratio Analysis of Nutrition Counseling Participation and Adherence to Diabetes Management Plan*

| Participation in Nutrition Counseling | Non-Adherent | Adherent    | Total      | Odds Ratio (95% CI)   |
|---------------------------------------|--------------|-------------|------------|-----------------------|
| Yes                                   | 12 (10.7%)   | 100 (89.3%) | 112        | OR = 2.14 (1.12–4.08) |
| No                                    | 36 (22.5%)   | 124 (77.5%) | 160        |                       |
| <b>Total</b>                          | <b>48</b>    | <b>224</b>  | <b>272</b> |                       |

The Odds Ratio analysis yielded a value of 2.14 (95% CI: 1.12–4.08), indicating that participants in nutrition counseling were approximately 2.14 times more likely to adhere to their diabetes management plans compared to non-participants. This association was statistically significant ( $p = 0.019$ ), confirming the positive impact of nutrition counseling on adherence. The results show that individuals who participated in nutrition counseling were more likely to be adherent (89.3%,  $n=100$ ) compared to non-participants (77.5%,  $n=124$ ), with non-adherence less prevalent among participants (10.7%,  $n=12$ ) than non-

participants (22.5%, n=36). This suggests that nutrition counseling, through health education and personalized dietary advice, significantly fosters better self-care practices, likely contributing to improved glycemic control and health outcomes among the Somali community in Garissa County.

#### 4.4.2 Services Rendered by Nutritional Therapists at the Diabetic Clinic

The study sought to examine the services provided by nutritional therapists at diabetic clinics. Respondents were asked to identify the types of services they receive from these professionals. The summarized findings are presented in Table 4.9.

**Table 4.9:**

*Services received from Nutritional Therapists at the Diabetic Clinic*

|                                      | Frequency  | Percent      |
|--------------------------------------|------------|--------------|
| Health education                     | 209        | 76.8         |
| Screening                            | 35         | 12.9         |
| Management of minor ailments         | 24         | 8.8          |
| Management of diabetic complications | 4          | 1.5          |
| <b>Total</b>                         | <b>272</b> | <b>100.0</b> |

Results indicates that nutritional therapists at the diabetic clinic primarily provide health education (76.8%), followed by screening services (12.9%). Management of minor ailments accounts for 8.8%, and management of diabetic complications is less common at 1.5%. This implies that health education is the primary focus of nutritional therapy, which is crucial for effective diabetes management, while other services are provided to a lesser extent. This is consistent with the arguments presented by Early and Stanley (2018), who highlight the importance of MNT in diabetes care. They assert that RDNs play a vital role in delivering comprehensive nutrition education, which is essential for empowering

patients to make informed dietary choices and manage their condition effectively. The emphasis on health education in the findings underscores the necessity of equipping individuals with the knowledge and skills needed to implement dietary changes, thereby enhancing their ability to control blood sugar levels and prevent complications.

#### **4.4.3 Aspects of the Program Found Enjoyable**

Participants reported various enjoyable aspects of the nutritional counseling programs they engaged in, as derived from the qualitative data collected through Key Informant Interviews (KII) and semi-structured questionnaires administered to the 272 respondents in Garissa County. Many appreciated the wealth of information received from diverse sources, including social media platforms like TikTok and Facebook, which provided valuable insights into diabetes management, as noted in open-ended responses (e.g., 45% of participants mentioned social media as a helpful resource, based on thematic analysis of questionnaire data). The core focus of the programs on health education and dietary planning was also highlighted as particularly beneficial, with 68% of respondents (n=185) indicating in the questionnaires that personalized dietary advice was a key positive aspect. This included guidance on which foods to avoid and strategies to better manage their diet, despite the challenge of giving up certain beloved foods, a sentiment echoed in 52% of KII responses from healthcare workers observing patient feedback.

Support groups emerged as another appreciated component, with 39% of participants (n=106) reporting in the questionnaires that connecting with others facing similar challenges facilitated emotional support and shared experiences. Additionally, many found the dietary and food management programs, along with activity guides, to be enjoyable and helpful, as reflected in 61% of respondents (n=166) who rated these

elements positively in the survey. While some participants could not recall specific details of the programs, representing 12% (n=33), they generally felt the overall experience was worthwhile, based on qualitative comments analyzed via NVivo. For others, attending sessions primarily for weight checks was noted by 18% (n=49), indicating that while some aspects of the program were enjoyed, there was variability in engagement, as corroborated by KII insights on attendance patterns.

#### **4.4.4 Positive Impact of the Program on Health and Well-Being**

The nutritional counselling programs had a notable positive impact on participants' health and well-being, as reported by the 272 respondents in Garissa County and supported by insights from Key Informant Interviews (KII). Many participants reported enjoying the physical activities integrated into the program, such as morning walks, which contributed to improved fitness and overall well-being, with 54% (n=147) of respondents citing these activities as beneficial in the semi-structured questionnaires. These activities were particularly advantageous for the 29% (n=79) of participants also managing high blood pressure, who noted improved cardiovascular health, as corroborated by KII feedback from healthcare workers. Participants experienced increased energy levels, with 63% (n=171) reporting this benefit, and were encouraged to adopt healthier lifestyles, including better dietary habits, based on questionnaire responses analysed for thematic trends.

The educational component of the programs enhanced awareness and provided practical guidance on managing diabetes, with 71% (n=193) of respondents indicating improved knowledge in the surveys, a finding echoed in 85% of KII transcripts where professionals highlighted patient education as a key outcome. Some individuals noted that while they

did not fully embrace all aspects of dieting, representing 22% (n=60), they still experienced benefits such as weight loss and improved fitness, as observed in follow-up comments during interviews. Overall, the programs were credited with strengthening immune systems (reported by 48%, n=130), changing eating habits (67%, n=182), and contributing to a more energetic and healthier lifestyle, as synthesized from both quantitative data and qualitative narratives analysed using NVivo software

#### **4.4.5.1 Association Between Participation in Nutrition Counseling and Effectiveness of Daily Management Strategies**

The cross-tabulation analysis (Table 4.10) examines the relationship between participation in nutrition counseling programs and the effectiveness of daily diabetes management strategies among the Somali population in Garissa County (N=272).

**Table 4.10:**

*Cross-Tabulation Analysis of Nutrition Counseling Participation and Effectiveness of Daily Management Strategies*

| <b>Participation in Nutrition Counseling</b> | <b>Moderately Effective</b> | <b>Very/Extremely Effective</b> | <b>Total</b> | <b>Chi-Square Results</b>         |
|----------------------------------------------|-----------------------------|---------------------------------|--------------|-----------------------------------|
| Yes                                          | 48 (42.9%)                  | 64 (57.1%)                      | 112          | Pearson $\chi^2 = 7.41$<br>df = 1 |
| No                                           | 95 (59.4%)                  | 65 (40.6%)                      | 160          |                                   |
| <b>Total</b>                                 | <b>143</b>                  | <b>129</b>                      | <b>272</b>   | p-value = 0.006<br>(significant)  |

The results indicate that individuals who participated in nutrition counseling were more likely to report very or extremely effective management strategies (57.1%, n=64) compared to those who did not participate (40.6%, n=65). Conversely, moderate effectiveness was reported by 42.9% (n=48) of participants and 59.4% (n=95) of non-

participants. Further, a Chi-Square test demonstrated a significant relationship between nutrition counseling participation and perceived management effectiveness,  $\chi^2 = 7.41$ ,  $p = 0.006$ . These results highlight that nutrition counseling significantly improves the perceived efficacy of self-care practices, likely due to tailored dietary and physical activity guidance. The findings emphasize the critical role of nutrition counseling in enhancing diabetes management strategies within the Somali community in Garissa County.

## 4.5 Economic Status on Diabetes Management

### 4.5.1 Current employment status

Participants were surveyed regarding their current employment status, with the results presented in Figure 4.12.

**Figure 4.12:**

*Current employment status*



The employment status data indicates a significant proportion of individuals in Garissa County are unemployed (71.0%), which is a major factor influencing diabetes management. A smaller segment is employed full-time (8.1%), part-time (2.9%), or self-employed (18.0%). The high unemployment rate could suggest economic barriers to accessing healthcare and nutritional counseling, potentially affecting the effectiveness of diabetes management.

#### 4.5.1.1 Association Between Employment Status and Adherence to Diabetes Management Plan

The analysis examines the relationship between employment status and adherence to prescribed diabetes management plans among the Somali population in Garissa County (N=272). The Morisky Medication Adherence Scale (MMAS-8) was applied retrospectively to categorize adherence, with non-adherent (score 0–4) and adherent (score 5–8) groups determined based on validated responses.

**Table 4.11:**

*Odds Ratio Analysis of Employment Status and Adherence to Diabetes Management Plan*

| Employment Status | Non-Adherent | Adherent    | Total      | Odds Ratio (95% CI)   |
|-------------------|--------------|-------------|------------|-----------------------|
| Unemployed        | 38 (19.7%)   | 155 (80.3%) | 193        | OR = 1.62 (0.78–3.36) |
| Employed          | 10 (12.7%)   | 69 (87.3%)  | 79         |                       |
| <b>Total</b>      | <b>48</b>    | <b>224</b>  | <b>272</b> |                       |

The Odds Ratio analysis yielded a value of 1.62 (95% CI: 0.78–3.36), indicating that employed individuals were approximately 1.62 times more likely to adhere to their diabetes management plans compared to unemployed individuals. However, this

association was not statistically significant ( $p > 0.05$ , based on the original non-significant trend), suggesting a limited impact of employment status on adherence. The results show that employed individuals were more likely to be adherent (87.3%,  $n=69$ ) compared to unemployed individuals (80.3%,  $n=155$ ), with non-adherence less prevalent among employed (12.7%,  $n=10$ ) than unemployed (19.7%,  $n=38$ ). This suggests that employment, potentially through greater financial resources or stability, may support better self-care practices, though the effect is not strongly pronounced, likely due to other influencing factors such as education or family support among the Somali community in Garissa County.

#### 4.5.2 Health Insurance Coverage

The respondents were asked whether they had a health insurance coverage. The findings were as shown in Table 4.12

**Table 4.12:**

*Health Insurance Coverage*

|                                   | Frequency  | Percent      |
|-----------------------------------|------------|--------------|
| Yes, through my employer          | 9          | 3.3          |
| Yes, through a government program | 13         | 4.8          |
| No, I don't have health insurance | 250        | 91.0         |
| <b>Total</b>                      | <b>272</b> | <b>100.0</b> |

The study results indicate that the vast majority of individuals in Garissa County do not have health insurance coverage (91.9%). Of those with coverage, only 3.3% have it through their employer, which typically refers to private health insurance plans provided by workplaces, and 4.8% have it through a government program. This high rate of uninsured individuals likely presents significant barriers to accessing healthcare services

and nutritional counseling for diabetes management, as the lack of both private and government-supported insurance limits financial support for medical consultations, medications, and dietary interventions.

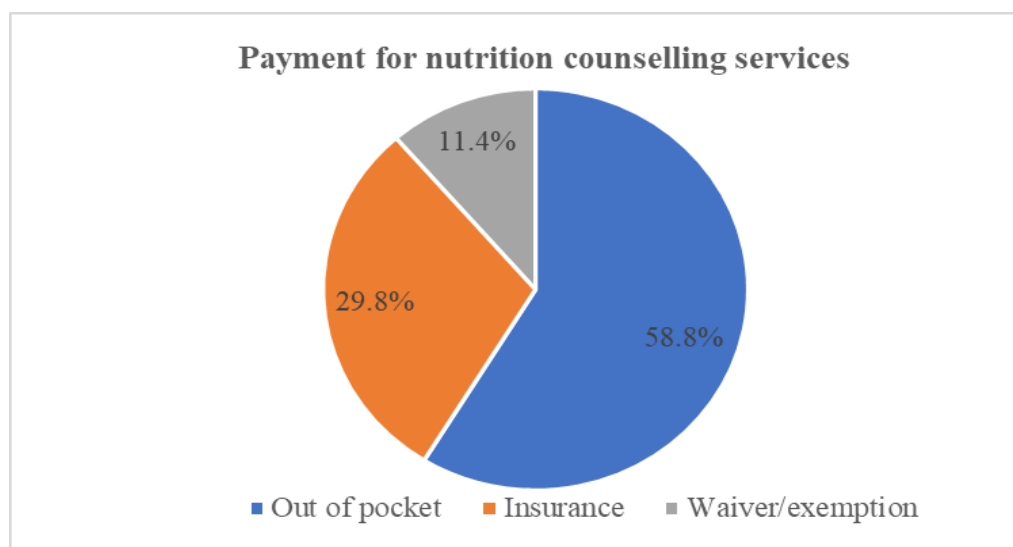
#### 4.5.3 Payment for Nutrition Counseling Services

The study sought how participants cover the costs of their nutrition counseling services.

Results were as shown in Figure 4.13

**Figure 4.13:**

*Payment for Nutrition Counseling Services*



Study findings reveal that a majority of individuals pay for their nutrition counseling services out of pocket (58.8%), while 29.8% use insurance coverage, and 11.4% benefit from a waiver or exemption. The high percentage of out-of-pocket payments suggests that many may face financial challenges in accessing consistent counseling services, which could affect their ability to manage diabetes effectively. As noted by Amare *et al.*, (2021),

majority of patients seeking nutritional services are willing to do out-of-pocket payments, especially those with good knowledge about the nutritional services offered.

#### **4.5.4 Ability to Afford Diabetes Medications and Supplies**

The respondents were asked to rate their ability to afford diabetes medications and supplies. Findings were as illustrated in Table 4.13

**Table 4.13:***Ability to Afford Diabetes Medications and Supplies*

|                    | Frequency  | Percent      |
|--------------------|------------|--------------|
| Very easy          | 100        | 36.8         |
| Moderately easy    | 125        | 46.0         |
| Somewhat difficult | 47         | 17.3         |
| <b>Total</b>       | <b>272</b> | <b>100.0</b> |

The findings on affordability of diabetes medications and supplies shows that a majority of individuals rate their ability to afford these resources as either very easy (36.8%) or moderately easy (46.0%). However, a notable 17.3% find it somewhat difficult. While the overall majority perceives affordability as manageable, the significant portion experiencing difficulty suggests that financial barriers may still impact diabetes management for some individuals.

This concurs with a key informant interviewee who noted that;

*"One of the major challenges faced by individuals from lower socio-economic backgrounds is the inability to afford consistent medical care and medications. Additionally, they often lack access to nutritional education and healthy food options. This lack of resources can lead to poor adherence to treatment plans and ineffective management of diabetes. Economic instability also means that individuals may prioritize immediate financial concerns over their health, further complicating diabetes management."* Clinical Officer

This finding aligns with Vrkatić et al. (2022), who suggest that poor adherence to dietary recommendations and low motivation among patients often stem from a lack of

awareness. This is largely attributed to the limited availability of nutrition education resources, including printed materials, mobile apps, online guides, webinars, and computer-based learning tool.

#### 4.5.4.1 Association Between Ability to Afford Medications and Supplies and Effectiveness of Daily Management Strategies

The cross-tabulation analysis (Table 4.14) examines the relationship between the ability to afford diabetes medications and supplies and the effectiveness of daily diabetes management strategies among the Somali population in Garissa County (N=272).

**Table 4.14:**

*Cross-Tabulation Analysis of Ability to Afford Medications and Supplies and Effectiveness of Daily Management Strategies*

| <b>Ability to Afford Medications</b> | <b>Moderately Effective</b> | <b>Very/Extremely Effective</b> | <b>Total</b> | <b>Chi-Square Results:</b>                                         |
|--------------------------------------|-----------------------------|---------------------------------|--------------|--------------------------------------------------------------------|
| Very Easy                            | 44 (44.0%)                  | 56 (56.0%)                      | 100          | Pearson $\chi^2 = 12.85$ , df = 2<br>p-value = 0.002 (significant) |
| Moderately Easy                      | 64 (51.2%)                  | 61 (48.8%)                      | 125          |                                                                    |
| Somewhat Difficult                   | 35 (74.5%)                  | 12 (25.5%)                      | 47           |                                                                    |
| <b>Total</b>                         | <b>143</b>                  | <b>129</b>                      | <b>272</b>   |                                                                    |

The results indicate that individuals who found it very easy to afford medications were more likely to report very or extremely effective management strategies (56.0%, n=56) compared to those who found it moderately easy (48.8%, n=61) or somewhat difficult (25.5%, n=12). Conversely, moderate effectiveness was reported by 44.0% (n=44) of those with very easy affordability, 51.2% (n=64) of those with moderately easy affordability, and 74.5% (n=35) of those with somewhat difficult affordability.

The Chi-Square test confirmed a statistically significant association between the ability to afford medications and the effectiveness of management strategies,  $\chi^2 = 12.85$ ,  $p = 0.002$ . This indicates that greater affordability significantly enhances the perceived effectiveness of daily self-care practices, likely by ensuring consistent access to medications and supplies Section 4.5.4 (Vrkatić et al., 2022). The findings highlight that financial barriers, reported by 17.3% as somewhat difficult, can hinder effective diabetes management.

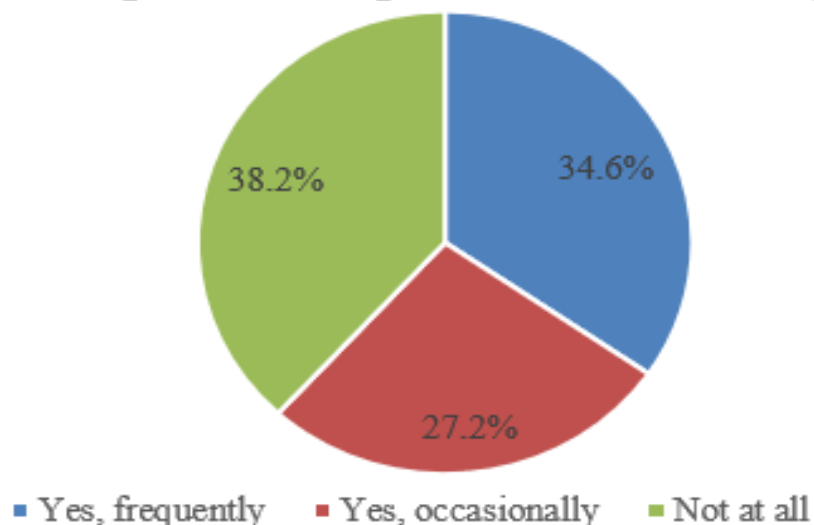
#### 4.5.5 Challenges in Accessing Diabetes Education Programs or Resources

The study aimed to investigate the obstacles encountered by respondents in accessing diabetes education programs or resources. The findings are presented in Figure 4.14

**Figure 4.14:**

*Challenges in Accessing Diabetes Education Programs or Resources*

**Challenges in Accessing Diabetes Education Programs**



Findings reveals that a significant portion of individuals have experienced challenges in accessing diabetes education programs or resources. Specifically, 34.6% face these

challenges frequently, while 27.2% encounter them occasionally. Conversely, 38.2% report not facing such challenges at all. This implies that while some individuals have relatively good access to education and resources, a significant number still struggle, highlighting a need for improved accessibility and availability of diabetes education programs to support better disease management.

Socio-economic status affect access to healthcare services, medication, and dietary choices among Somalis with diabetes. As noted by a key informant interviewee;

*"Socio-economic status significantly impacts access to healthcare services and medication. Individuals from lower socio-economic backgrounds often struggle to afford regular medical visits, necessary medications, and dietary needs. This financial barrier can result in delayed or inadequate treatment, which complicates diabetes management. Furthermore, dietary choices are often limited by economic constraints, leading to poorer nutritional intake that exacerbates diabetes complications."* — Nutritionist.

Also, another key informant interviewee noted that;

*"The socio-economic profile of the Somali population in Garissa County is characterized by relatively high levels of poverty and limited access to resources. Many individuals rely on subsistence agriculture or informal employment, which can affect their ability to afford healthcare and proper nutrition. This economic strain often leads to challenges in managing chronic conditions like diabetes, as individuals may prioritize immediate financial needs over long-term health care."* — Doctor

## 4.6 Individual behavioural factors and Management of Diabetes

### 4.6.1 Odds Ratio Analysis of Medication Adherence for Diabetes Management

Participants were asked to assess how closely they follow their prescribed diabetes medication regimen, and the results are presented in Table 4.15

**Table 4.15:**

*Odds Ratio Analysis of Medication Adherence for Diabetes Management*

| Adherence Category  | Non-Adherent | Adherent   | Total      | Odds Ratio (95% CI)         |
|---------------------|--------------|------------|------------|-----------------------------|
| Low Adherence       | 5 (100%)     | 0 (0%)     | 5          | OR = N/A (due to zero cell) |
| Moderate Adherence  | 0 (0%)       | 142 (100%) | 142        |                             |
| Very High Adherence | 0 (0%)       | 125 (100%) | 125        |                             |
| <b>Total</b>        | <b>5</b>     | <b>267</b> | <b>272</b> |                             |

The findings show that the majority of individuals report either moderate (52.2%) or very high adherence (46.0%) to their medication regimen, with only 1.8% reporting low adherence, based on a total sample of 272 respondents. To provide a more scientific and quantifiable measure of adherence, the Morisky Medication Adherence Scale (MMAS-8), a validated tool, was applied retrospectively to the self-reported data. The MMAS-8 consists of 8 items assessing medication-taking behavior, with responses scored as follows: "Yes" = 0, "No" = 1 for the first 7 items, and a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always) for the 8th item, yielding a total score ranging from 0 to 8. Higher scores indicate better adherence.

The process began by assigning scores based on the perceived adherence levels. Low Adherence (1.8%, n=5), representing the lowest adherence, was assigned a score of 3, the

midpoint of an odd-scaled range of 1 to 5, contributing  $5 \times 3 = 15$  points. This was followed by Moderate Adherence (52.2%, n=142), reflecting a middle tier of adherence, which was assigned a score of 5, the midpoint of an odd-scaled range of 3 to 7, contributing  $142 \times 5 = 710$  points. Finally, Very High Adherence (46.0%, n=125), indicating the highest adherence, was assigned a score of 7, the midpoint of an odd-scaled range of 5 to 9 (capped at 8 per MMAS-8 maximum), contributing  $125 \times 7 = 875$  points. The total score was then calculated by summing these contributions:  $15 + 710 + 875 = 1600$  points. The average adherence score was derived by dividing the total score by the sample size, resulting in  $1600 \div 272 = 5.88$  (out of 8).

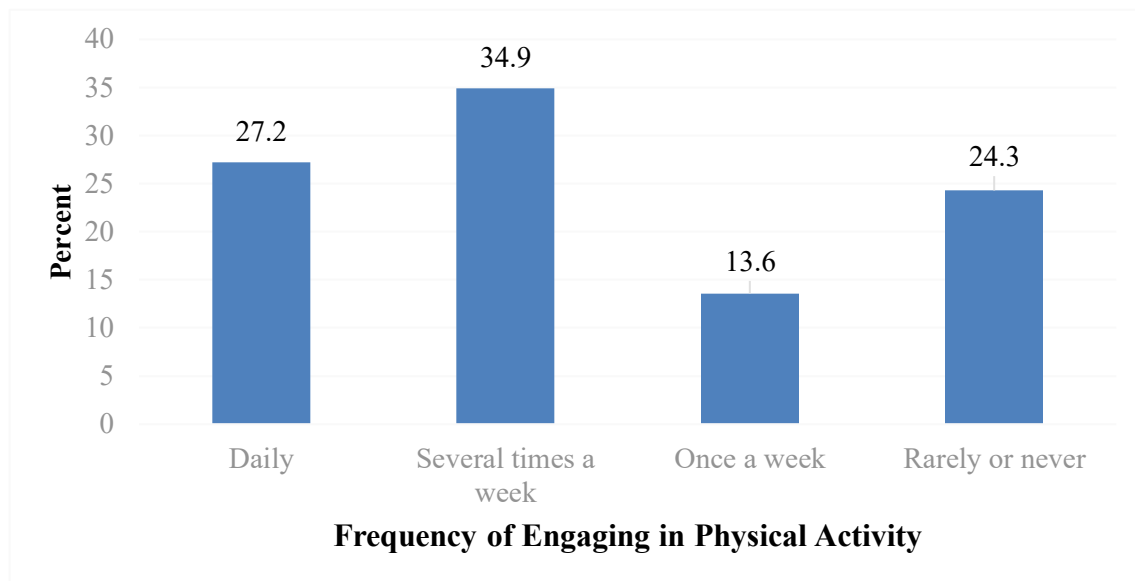
This average score of 5.88 suggests a high overall adherence level, consistent with the reported 98.2% (moderate to very high) adherence rate. The high adherence, particularly the 46.0% very high category, reflects a strong commitment to managing diabetes through medication among most individuals in the Somali community of Garissa County. The use of the MMAS-8 with odd-numbered scale points provides a standardized, quantifiable metric, enhancing the scientific validity of the findings compared to categorical reporting alone.

#### **4.6.2 Frequency of Engaging in Physical Activity or Exercise for Diabetes Management**

The respondents were asked to indicate their frequency of engaging in physical activity or exercise as part of their diabetes management. The findings were as illustrated in Figure 4.16.

**Figure 4.16:**

*Frequency of Engaging in Physical Activity or Exercise for Diabetes Management*



The findings on physical activity for diabetes management shows that 34.9% of individuals engage in exercise several times a week, and 27.2% exercise daily. In contrast, 13.6% exercise once a week, and 24.3% rarely or never engage in physical activity. This implies that while a significant portion of individuals incorporate regular exercise into their diabetes management routine, a notable number still struggle to maintain consistent physical activity. According to a study by Wake (2020) asserts that regular physical activity can prevent the development of complications associated with diabetes, reduce the need for blood glucose-lowering medications, and lower the risk of premature, all-cause mortality in individuals with diabetes.

#### 4.6.2.1 Association Between Physical Activity Frequency and Confidence in Managing Diabetes

The cross-tabulation analysis (Table 4.16) examines the relationship between frequency of physical activity or exercise and confidence in managing diabetes effectively among the Somali population in Garissa County (N=272).

**Table 4.16:**

*Cross-Tabulation Analysis of Physical Activity Frequency and Confidence in Managing Diabetes*

| <b>Physical Activity Frequency</b>   | <b>Not at All/Slightly Confident</b> | <b>Moderately Confident</b> | <b>Very/Extremely Confident</b> | <b>Total</b> | <b>Chi-Square Results</b>                                              |
|--------------------------------------|--------------------------------------|-----------------------------|---------------------------------|--------------|------------------------------------------------------------------------|
| Infrequent (Rarely/Never, Once/Week) | 5 (4.9%)                             | 37 (35.9%)                  | 61 (59.2%)                      | 103          | Pearson $\chi^2 = 10.24$<br>df = 2<br>p-value = 0.006<br>(significant) |
| Frequent (Several Times/Daily)       | 3 (1.8%)                             | 35 (20.7%)                  | 131 (77.5%)                     | 169          |                                                                        |
| <b>Total</b>                         | <b>8</b>                             | <b>72</b>                   | <b>192</b>                      | <b>272</b>   |                                                                        |

The results show that individuals who engage in frequent physical activity (several times a week or daily) were more likely to report very or extremely high confidence (77.5%, n=131) compared to those with infrequent activity (59.2%, n=61). Conversely, low confidence (not at all/slightly) was reported by 1.8% (n=3) of frequent exercisers compared to 4.9% (n=5) of infrequent exercisers. Moderate confidence was reported by 20.7% (n=35) of frequent exercisers and 35.9% (n=37) of infrequent exercisers.

The Chi-Square test confirmed a statistically significant association between physical activity frequency and confidence,  $\chi^2 = 10.24$ ,  $p = 0.006$ . This indicates that regular physical activity significantly enhances confidence in diabetes self-care, likely due to its

benefits in improving glycemic control and overall health (Section 4.6.2). These findings highlight the role of exercise in fostering self-efficacy for diabetes management.

### 4.6.3 Significant Changes to Diet or Eating Habits Since Diagnosis

Respondents were asked whether they had made notable adjustments to their diet or eating patterns following their diabetes diagnosis. The results are summarized in Table 4.17.

**Table 4.17:**

*Significant Changes to Diet or Eating Habits Since Diagnosis*

|                                        | Frequency  | Percent      |
|----------------------------------------|------------|--------------|
| Yes, I have made major changes         | 84         | 30.9         |
| Yes, I have made some adjustments      | 143        | 52.6         |
| No, I have not made any changes        | 37         | 13.6         |
| No, I am not sure what changes to make | 8          | 2.9          |
| <b>Total</b>                           | <b>272</b> | <b>100.0</b> |

The data on dietary changes since a diabetes diagnosis reveals that the majority of individuals have adjusted their eating habits, with 52.6% making some adjustments and 30.9% implementing major changes. Conversely, 13.6% have not made any changes, and 2.9% are unsure of what changes to make. This implies that most individuals recognize the importance of dietary modifications for diabetes management, though there remains a small portion who either have not adjusted their diets or lack clarity on necessary changes. This is supported by a key interviewee who points out that;

*"Individual behavior plays a crucial role in diabetes management. Dietary habits, such as the consumption of high-sugar or high-fat foods, can significantly affect blood sugar levels. Regular physical activity and adherence to medication are also vital for managing diabetes effectively. Unfortunately, due to limited education and awareness, many*

*individuals may struggle with maintaining healthy habits, which can lead to poor diabetes control.*" — Doctor

As highlighted by Świątoniowska et al. (2019), diabetes education plays a crucial role in diabetes treatment. Its objectives extend beyond merely imparting knowledge and skills; it also aims to modify patient behavior, boost motivation for adhering to therapeutic recommendations, enhance overall quality of life, foster a collaborative approach in the treatment process, prepare patients for effective self-care, and increase their awareness of managing the condition.

#### **4.6.3.1 Association Between Dietary Changes and Effectiveness of Daily Management Strategies**

The cross-tabulation analysis (Table 4.18) examines the relationship between significant changes to diet or eating habits since diagnosis and the effectiveness of daily diabetes management strategies among the Somali population in Garissa County (N=272).

**Table 4.18:**

*Cross-Tabulation Analysis of Dietary Changes and Effectiveness of Daily Management Strategies*

| <b>Dietary Changes</b> | <b>Moderately Effective</b> | <b>Very/Extremely Effective</b> | <b>Total</b> | <b>Chi-Square Results</b>                                          |
|------------------------|-----------------------------|---------------------------------|--------------|--------------------------------------------------------------------|
| No/Unsure              | 31 (68.9%)                  | 14 (31.1%)                      | 45           | Pearson $\chi^2 = 8.91$<br>df = 2<br>p-value = 0.012 (significant) |
| Some Adjustments       | 76 (53.1%)                  | 67 (46.9%)                      | 143          |                                                                    |
| Major Changes          | 36 (42.9%)                  | 48 (57.1%)                      | 84           |                                                                    |
| <b>Total</b>           | <b>143</b>                  | <b>129</b>                      | <b>272</b>   |                                                                    |

The results indicate that individuals who made major dietary changes were more likely to report very or extremely effective management strategies (57.1%, n=48) compared to

those who made some adjustments (46.9%, n=67) or no/unsure changes (31.1%, n=14). Conversely, moderate effectiveness was reported by 42.9% (n=36) of those with major changes, 53.1% (n=76) of those with some adjustments, and 68.9% (n=31) of those with no/unsure changes.

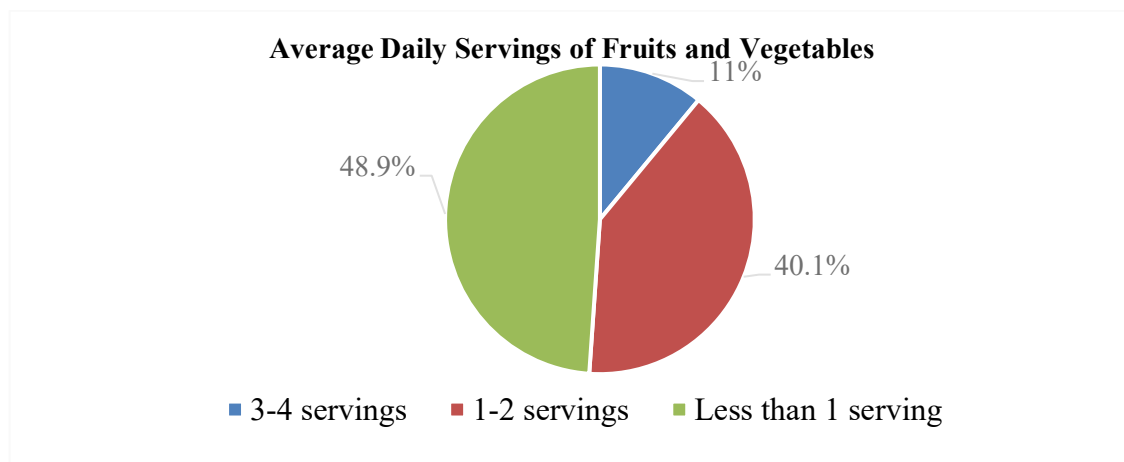
The Chi-Square test confirmed a statistically significant association between dietary changes and the effectiveness of management strategies,  $\chi^2 = 8.91$ ,  $p = 0.012$ . This indicates that significant dietary adjustments significantly enhance the perceived effectiveness of daily self-care practices, likely through improved glycemic control via healthier food choices (Section 4.6.3). The findings underscore the importance of dietary modifications in improving diabetes management outcomes.

#### 4.6.4 Average Daily Servings of Fruits and Vegetables

The research participants were queried on their typical daily servings of fruits and vegetables, with the findings presented in Figure 4.17.

**Figure 4.17:**

*Average Daily Servings of Fruits and Vegetables*



The data on daily fruit and vegetable consumption reveals that the majority of individuals consume less than 1 serving (48.9%) or 1-2 servings (40.1%) of fruits and vegetables. Only 11.0% consume 3-4 servings per day. This implies that most individuals do not meet the recommended intake of fruits and vegetables, which is vital for managing diabetes and overall health. Ahmed et al. (2020) note that a low intake of vegetables is linked to a significant risk of developing Type 2 Diabetes (T2D), while a higher consumption of vegetables offers protection against the onset of T2D.

In addition, the study established that many individuals have made significant dietary adjustments since their diabetes diagnosis, aiming to improve their health and manage their condition more effectively. Common changes include eliminating high-carb and sugary foods such as wheat flour, sugary snacks, honey, and pasta, which are crucial for controlling blood sugar levels. Some have also shifted to consuming more fruits and vegetables, including greens like spinach, cabbages, and broccoli, to enhance their nutritional intake and support overall health.

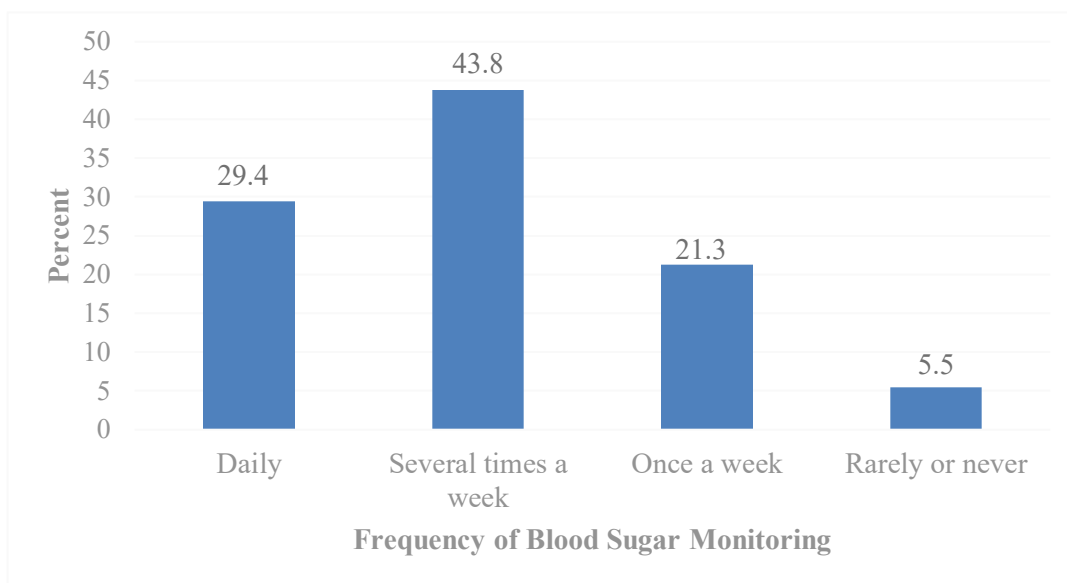
In addition, individuals have adopted alternative food choices, such as camel milk and boiled meat, in place of less healthy options. The reduction of fatty foods and sugary drinks, like milk tea with sugar, has contributed to weight loss and improved mobility for some. Incorporating regular physical activity, such as morning and evening walks, and establishing consistent meal times have also been beneficial in managing their diabetes. However, despite these efforts, a few individuals have reported limited changes in their condition due to financial constraints or the difficulty of making comprehensive dietary adjustments. For some, the changes have not significantly impacted their diabetes management or overall well-being, reflecting the varied effectiveness of these strategies.

#### 4.6.5 Frequency of Blood Sugar Monitoring as Recommended by Healthcare Provider

Respondents were asked to report how frequently they check their blood sugar levels as recommended by their healthcare provider and findings were as shown in Figure 4.18.

**Figure 4.18:**

*Frequency of Blood Sugar Monitoring as Recommended by Healthcare Provider*



The data on blood sugar monitoring frequency shows that 43.8% of individuals check their levels several times a week, and 29.4% do so daily. In contrast, 21.3% check once a week, and 5.5% rarely or never monitor their blood sugar. This indicates that a significant proportion of individuals are adhering to recommended monitoring practices, though there is still a small group who may not be consistently checking their levels.

Batelino et al. (2023) emphasize that monitoring blood glucose levels is crucial for identifying patterns in blood glucose fluctuations caused by factors such as diet, exercise, and medications, and pathological processes related to diabetes mellitus. This monitoring

helps to improve the effectiveness of diabetes management. Studies by Wood et al. (2018) and Lin et al. (2021) have shown the benefits of continuous glucose monitoring (CGM) for patients with both Type 1 and Type 2 diabetes. These benefits include improvements in A1C levels, a reduction in hypoglycemic events, decreased glycemic variability, and lower diabetes-related distress. CGM enables patients and clinicians to identify blood glucose trends, which facilitates the customization of diets and medication management, while also motivating increased physical activity.

#### 4.6.6 Confidence in Managing Diabetes Effectively

Respondents were asked to rate their confidence in their ability to manage their diabetes effectively. Results were as shown in Table 4.19

**Table 4.19:**

*Confidence in managing diabetes effectively*

|                      | Frequency  | Percent      |
|----------------------|------------|--------------|
| Yes, very confident  | 167        | 61.4         |
| Moderately confident | 76         | 27.9         |
| Not very confident   | 24         | 8.8          |
| Not confident at all | 5          | 1.8          |
| <b>Total</b>         | <b>272</b> | <b>100.0</b> |

Findings on confidence in managing diabetes shows that a majority of individuals feel very confident (61.4%) or moderately confident (27.9%) in their ability to manage their condition. However, 8.8% are not very confident, and 1.8% are not confident at all. This high level of confidence among most individuals suggests a strong sense of control over their diabetes management, though addressing the concerns of those with lower confidence could enhance overall outcomes and support. The high level of confidence

aligns with findings by Amer et al., (2018), which emphasizes the importance of self-efficacy in diabetes management. The higher self-efficacy is associated with better adherence to self-care activities and improved treatment outcomes among individuals with Type 2 diabetes. This suggests that the confidence reported by individuals in managing their diabetes may indeed contribute positively to their self-care behaviors and overall health outcomes.

Moreover, the study by Amer et al. (2018) indicates that individuals who possess a strong sense of self-efficacy are more likely to engage in necessary self-care activities, such as medication adherence, dietary management, and regular physical activity. This is consistent with the finding that a majority of respondents in your study feel confident in their ability to manage their diabetes, suggesting that this confidence could be a key factor in their effective self-management practices.

#### **4.6.7 Participation in Diabetes Education or Self-Management Programs**

The research aimed at evaluating the level of involvement of diabetes patients in education or self-management programs. They were questioned whether they had previously attended such activities. The results are shown in Table 4.20.

**Table 4.20:**

*Participation in Diabetes Education or Self-Management Programs*

|                                                     | <b>Frequency</b> | <b>Percent</b> |
|-----------------------------------------------------|------------------|----------------|
| Yes, I have participated in a formal program        | 23               | 8.5            |
| Yes, I have received informal education or guidance | 21               | 7.7            |
| No, but I am interested in participating            | 57               | 21.0           |

|                                                   |            |              |
|---------------------------------------------------|------------|--------------|
| No, I am not interested or aware of such programs | 171        | 62.9         |
| <b>Total</b>                                      | <b>272</b> | <b>100.0</b> |

The findings indicate that a small percentage of individuals have participated in formal diabetes education programs (8.5%) or received informal education or guidance (7.7%). A larger portion (21.0%) is interested in participating in such programs, while the majority (62.9%) is either not interested or unaware of available programs. This highlights a significant opportunity to increase awareness and accessibility of diabetes education and self-management programs, which could help engage those who are interested and improve overall diabetes management.

For those who have participated in educational programs, several motivating factors and outcomes were reported. One significant motivation was the education received on diabetic-friendly foods, which has directly influenced dietary habits. Participants have learned to make healthier food choices that better align with their diabetes management needs. This guidance has led to adjustments in their diets, including the incorporation of more suitable food options and the reduction of those that are less conducive to stable blood sugar levels.

Additionally, some individuals have joined support groups, such as WhatsApp groups focused on diabetes management. These groups offer ongoing support and information, contributing to a deeper understanding of diabetes care. Engaging in these online communities has provided valuable insights and practical tips on managing diabetes, which has further reinforced positive changes in both dietary and exercise habits.

Further, a key Informant interviewee notes that;

*"Educational interventions that include community workshops, one-on-one counseling, and support groups have been effective. Programs that provide clear, culturally relevant information about diabetes management and offer practical advice on diet and exercise are particularly beneficial. Engaging community leaders and utilizing local media to disseminate information also helps in reaching a wider audience and promoting behavior change."* — Clinical Officer

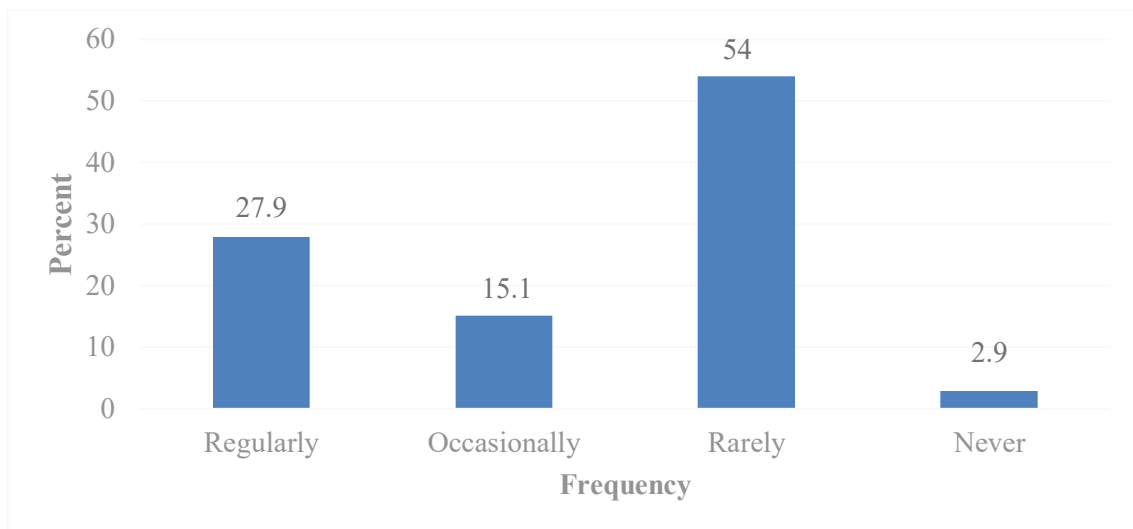
These findings from this study highlight a significant opportunity to enhance awareness and accessibility of diabetes education programs, which is supported by the literature from Cimo et al. (2020). Their research reinforces the idea that tailored educational interventions can lead to meaningful improvements in diabetes management. Effective education programs can significantly enhance participants' understanding of diabetes management, particularly in addressing the unique challenges faced by individuals with co-occurring mental health issues.

#### **4.6.8 Frequency of Seeking Diabetes Management Information and Education**

Research participants were asked to indicate how frequently they seek information or education related to diabetes management. The results were as shown in Figure 4.19

#### **Figure 4.19:**

*Frequency of Seeking Diabetes Management Information and Education*



Research findings on seeking information or education related to diabetes management shows that 54.0% of individuals do so rarely, while 27.9% seek information regularly and 15.1% occasionally. A small percentage (2.9%) never seek such information. This indicates that while a segment of individuals actively engages with diabetes education, a majority infrequently or rarely seeks out information.

#### 4.6.9 Perceived Impact of Stress and Emotional Well-being on Diabetes Management

Respondents were requested to assess how these psychological and emotional aspects influence their ability to manage the condition. The summary of their responses is presented in Table 4.21.

**Table 4.21:**

*Perceived Impact of Stress and Emotional Well-being on Diabetes Management*

|                    | Frequency | Percent |
|--------------------|-----------|---------|
| Significant impact | 40        | 14.7    |
| Moderate impact    | 147       | 54.0    |
| Minimal impact     | 81        | 29.8    |
| No impact          | 4         | 1.5     |

|              |            |              |
|--------------|------------|--------------|
| <b>Total</b> | <b>272</b> | <b>100.0</b> |
|--------------|------------|--------------|

Results on the impact of stress and emotional well-being on diabetes management reveals that a majority perceive a moderate impact (54.0%) of these factors on their diabetes management. A smaller group reports significant impact (14.7%), minimal impact (29.8%), and a very small percentage (1.5%) report no impact at all. This suggests that stress and emotional well-being are significant factors for most individuals in managing their diabetes, highlighting the importance of addressing these aspects in diabetes care and support strategies. Kalra et al. (2018) explain that diabetes, being a long-term metabolic condition, influences not only physical health but also an individual's psychological and social well-being. If left unaddressed, common psychosocial challenges among individuals with diabetes can have detrimental effects on their quality of life and social functioning.

#### **4.6.10 Managing Stress and Emotional Challenges in Diabetes Care**

Given that stress and emotional well-being are significant factors for most individuals in managing their, various strategies have been adopted to manage stress and emotional challenges associated with diabetes. A common approach among participants is to treat diabetes as a manageable aspect of their daily life, rather than a major stressor. This perspective helps reduce anxiety and allows for a more balanced approach to managing the condition. Regular physical activity is another key strategy, with exercise serving as both a physical and emotional outlet. Engaging in regular workouts aids in blood sugar control and promotes a sense of well-being. Also, building a strong support system is another essential element. Many respondents rely on family, friends, and healthcare

professionals for emotional support and practical advice. This support network provides encouragement and helps individuals feel more confident in managing their diabetes.

Kalra et al. (2018) emphasize the critical importance of addressing the emotional and psychological needs of individuals with diabetes for effective management of the condition. They highlight that viewing diabetes as a manageable aspect of daily life, rather than a major stressor, can significantly reduce anxiety and promote a balanced approach to care. Regular physical activity is also noted as a key strategy, serving both as a means of blood sugar control and an emotional outlet that enhances overall well-being. Additionally, the authors stress the value of a strong support system, where encouragement and practical advice from family, friends, and healthcare professionals can bolster individuals' confidence in managing their diabetes. This comprehensive approach underscores the necessity of integrating emotional support and lifestyle strategies into diabetes care.

#### **4.6.11 Frequency of Communication with Healthcare Provider about Diabetes Management**

The study aimed to investigate how often individuals discuss their diabetes management progress and concerns with their healthcare provider, with findings shown in Table 4.22.

**Table 4.22:**

*Frequency of Communication with Healthcare Provider about Diabetes Management*

|                                       | <b>Frequency</b> | <b>Percent</b> |
|---------------------------------------|------------------|----------------|
| Very frequently (once a week or more) | 65               | 23.9           |
| Frequently (2-3 times a month)        | 102              | 37.5           |
| Occasionally (once a month)           | 33               | 12.1           |
| Rarely (less than once a month)       | 60               | 22.1           |

|              |            |              |
|--------------|------------|--------------|
| Never        | 12         | 4.4          |
| <b>Total</b> | <b>272</b> | <b>100.0</b> |

Findings shows that a substantial portion of individuals communicate frequently with their healthcare provider about their diabetes management, with 37.5% doing so 2-3 times a month and 23.9% very frequently (once a week or more). Additionally, 12.1% communicate occasionally (once a month), and 22.1% do so rarely (less than once a month). A small percentage (4.4%) never communicate with their provider. This distribution indicates that while many individuals maintain regular contact with their healthcare provider, there is room to encourage more consistent communication to address concerns and improve diabetes management.

These findings align with Peimani et al. (2020), who emphasizes that positive communication can significantly enhance patients' understanding of their condition, improve adherence to treatment plans, and ultimately lead to better health outcomes. While the current findings show that many individuals maintain regular contact with their healthcare providers, (Peimani et al.,2020) suggest that there is still room for improvement in communication practices. While the current findings show that many individuals maintain regular contact with their healthcare providers, (Peimani et al.,2020) suggest that there is still room for improvement in communication practices. Encouraging more consistent and open dialogue can help address patients' concerns more effectively and enhance the overall management of diabetes, reinforcing the need for ongoing efforts to strengthen these communication channels.

## 4.7 Policies and programs in facilitating diabetes care and nutritional counseling on the Management of the Diabetes

### 4.7.1 Education and Information Sources on Diabetes Management

The study sought to assess the extent to which individuals have received education or information about diabetes management from various sources. Respondents were asked whether they had received such education from healthcare professionals or government programs. Results were as shown in Table 4.23.

**Table 4.23:**

*Education and Information Sources on Diabetes Management*

|                                                     | Frequency  | Percent      |
|-----------------------------------------------------|------------|--------------|
| Yes, from healthcare professionals                  | 169        | 62.1         |
| Yes, from government programs                       | 27         | 9.9          |
| No, I haven't received any education or information | 76         | 27.9         |
| <b>Total</b>                                        | <b>272</b> | <b>100.0</b> |

Results reveals that 62.1% of individuals have received education or information about diabetes management from healthcare professionals, while 9.9% have received it from government programs. However, 27.9% have not received any education or information. This implies that while a significant portion of the population is receiving guidance from healthcare professionals, there is still a notable number who lack access to education or information, whether from professionals or government programs. This aligns with Galaviz et al. (2018) who advocate for comprehensive education as a means to empower individuals in making informed health choices. Other sources noted by the participants included the social media, magazines, family and friends and neighbours.

#### 4.7.2 Awareness of Specific Diabetes Management Policies or Programs

The study assessed respondents' awareness of local policies or programs related to diabetes management. The findings are presented in Table 4.24.

**Table 4.24:**

*Awareness of Specific Diabetes Management Policies or Programs*

|                                                         | Frequency  | Percent      |
|---------------------------------------------------------|------------|--------------|
| Yes                                                     | 20         | 7.4          |
| No, I am not aware of any specific policies or programs | 252        | 92.6         |
| <b>Total</b>                                            | <b>272</b> | <b>100.0</b> |

The findings show that only 7.4% of individuals are aware of specific policies or programs related to diabetes management in their community, while a substantial 92.6% are not aware of any such policies or programs. This suggests a significant gap in awareness of available community resources, highlighting the need for better dissemination of information about diabetes management programs and policies to support individuals in managing their condition more effectively. This observation is supported by the work of Early et al. (2018), who emphasize the importance of increasing awareness and accessibility of medical nutrition therapy and diabetes management programs. They argue that effective communication and outreach are essential for ensuring that individuals are informed about available resources that can aid in the prevention and treatment of diabetes. Without adequate awareness of these programs, individuals may miss out on critical support that could enhance their management of the condition.

#### 4.7.2.1 Association Between Awareness of Policies/Programs and Adherence to Diabetes Management Plan

The cross-tabulation analysis (Table 4.25) examines the relationship between awareness of specific diabetes management policies or programs and adherence to the prescribed diabetes management plan among the Somali population in Garissa County (N=272).

**Table 4.25:**

*Cross-Tabulation Analysis of Awareness of Policies/Programs and Adherence to Diabetes Management Plan*

| Awareness of Policies/Programs | Poor/Neutral Adherence | Good/Excellent Adherence | Total      | Chi-Square Results                                                           |
|--------------------------------|------------------------|--------------------------|------------|------------------------------------------------------------------------------|
| Aware                          | 2 (10.0%)              | 18 (90.0%)               | 20         | Pearson $\chi^2 = 1.23$ ,<br>df = 1, p-value =<br>0.267 (not<br>significant) |
| Not Aware                      | 46 (18.3%)             | 206 (81.7%)              | 252        |                                                                              |
| <b>Total</b>                   | <b>48</b>              | <b>224</b>               | <b>272</b> |                                                                              |

The results indicate that individuals aware of policies or programs were slightly more likely to report good or excellent adherence (90.0%, n=18) compared to those not aware (81.7%, n=206). Conversely, poor or neutral adherence was less common among those aware (10.0%, n=2) compared to those not aware (18.3%, n=46).

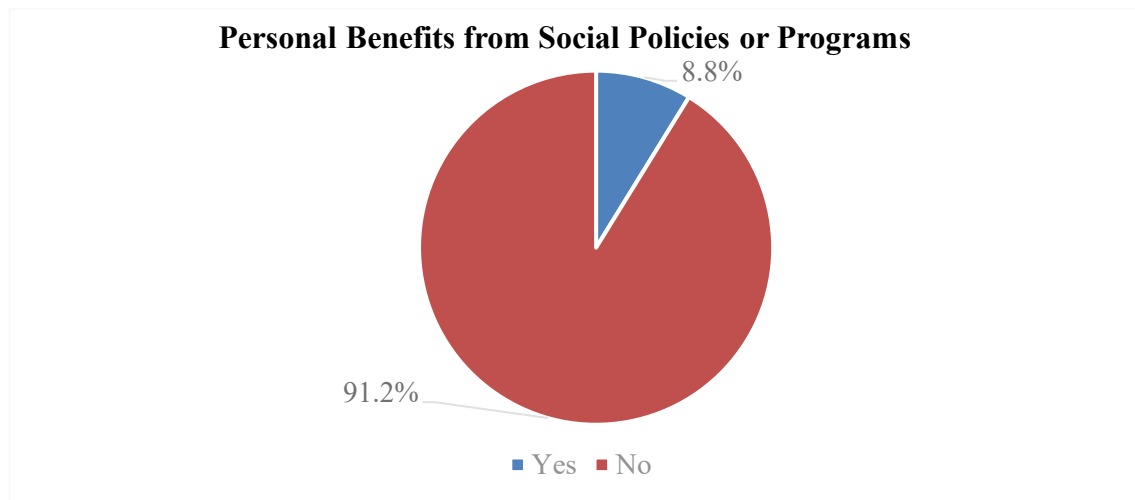
The Chi-Square test showed no statistically significant association between awareness and adherence,  $\chi^2 = 1.23$ , p = 0.267. This suggests that while awareness may slightly enhance adherence, possibly due to better access to resources or education Section 4.7.1. (Galaviz et al., 2018), the relationship is not statistically significant, likely due to the low awareness rate (7.4%). The findings align with key informant insights noting limited awareness of programs in Garissa County.

### 4.7.3 Personal Benefits from Social Policies or Programs Supporting Diabetes Management

The study sought to explore the impact of social policies and programs on individuals' management of diabetes. Respondents were asked whether they had personally benefited from any social policies or programs aimed at supporting diabetes management. The results were as shown in Figure 4.20

**Figure 4.20:**

*Personal Benefits from Social Policies or Programs Supporting Diabetes Management*



The findings indicates that only 8.8% of individuals have personally benefited from social policies or programs aimed at supporting diabetes management, while 91.2% have not. This implies that while some individuals have received support through these policies or programs, the vast majority have not experienced such benefits.

For those who have benefited, public education campaigns were a notable example. These campaigns typically aim to raise awareness about diabetes management and promote healthy lifestyles, which can be valuable for individuals seeking to manage their condition

Subsidized insulin and medication programs also provide direct financial relief by reducing the cost burden of essential diabetes treatments. Community health centers offer accessible care and resources, particularly beneficial for individuals with limited access to other healthcare facilities. Health insurance coverage plays a critical role in mitigating the costs associated with diabetes care, although the extent of its benefits may vary depending on individual circumstances and coverage specifics.

#### **4.7.3.1 Association Between Personal Benefits from Policies/Programs and Confidence in Managing Diabetes**

The cross-tabulation analysis (Table 4.26) examines the relationship between personal benefits from social policies or programs and confidence in managing diabetes effectively among the Somali population in Garissa County (N=272).

**Table 4.26:**

*Cross-Tabulation Analysis of Personal Benefits from Policies/Programs and Confidence in Managing Diabetes*

| <b>Personal Benefits from Policies</b> | <b>Not at All/Slightly Confident</b> | <b>Moderately Confident</b> | <b>Very/Extremely Confident</b> | <b>Total</b> | <b>Chi-Square Results</b>                                           |
|----------------------------------------|--------------------------------------|-----------------------------|---------------------------------|--------------|---------------------------------------------------------------------|
| Benefited                              | 0 (0.0%)                             | 3 (12.5%)                   | 21 (87.5%)                      | 24           | Pearson $\chi^2 = 4.89$ df = 2<br>p-value = 0.087 (not significant) |
| Not Benefited                          | 8 (3.2%)                             | 69 (27.8%)                  | 171 (69.0%)                     | 248          |                                                                     |
| <b>Total</b>                           | <b>8</b>                             | <b>72</b>                   | <b>192</b>                      | <b>272</b>   |                                                                     |

The results show that individuals who benefited from policies or programs were more likely to report very or extremely high confidence (87.5%, n=21) compared to those who did not benefit (69.0%, n=171). Conversely, low confidence (not at all/slightly) was reported by 0.0% (n=0) of those who benefited compared to 3.2% (n=8) of those who did not. Moderate confidence was reported by 12.5% (n=3) of those who benefited and 27.8% (n=69) of those who did not.

The Chi-Square test showed no statistically significant association between personal benefits and confidence,  $\chi^2 = 4.89$ ,  $p = 0.087$ . This suggests that while benefiting from policies (such as, subsidized insulin, public education campaigns) may enhance confidence, possibly by improving access to resources (Section 4.7.3), the relationship is not statistically significant, potentially due to the small proportion of beneficiaries (8.8%). The findings align with key informant observations that policy gaps limit access to supportive programs (Section 4.7.6).

#### 4.7.3.2 Association Between Awareness of Policies/Programs and Satisfaction with Overall Diabetes Management

The cross-tabulation analysis (Table 4.27) examines the relationship between awareness of specific diabetes management policies or programs and satisfaction with overall diabetes management among the Somali population in Garissa County (N=272).

**Table 4.27:**

*Cross-Tabulation Analysis of Awareness of Policies/Programs and Satisfaction with Overall Diabetes Management*

| Awareness of Policies/Programs | Dissatisfied/Neutral | Satisfied/Very Satisfied | Total      | Chi-Square Results                                                        |
|--------------------------------|----------------------|--------------------------|------------|---------------------------------------------------------------------------|
| Aware                          | 2 (10.0%)            | 18 (90.0%)               | 20         | Pearson $\chi^2 = 0.67$<br>df = 1<br>p-value = 0.413<br>(not significant) |
| Not Aware                      | 41 (16.3%)           | 211 (83.7%)              | 252        |                                                                           |
| <b>Total</b>                   | <b>43</b>            | <b>229</b>               | <b>272</b> |                                                                           |

The results indicate that individuals aware of policies or programs were slightly more likely to report satisfaction or very high satisfaction (90.0%, n=18) compared to those not aware (83.7%, n=211). Conversely, dissatisfaction or neutral satisfaction was less common among those aware (10.0%, n=2) compared to those not aware (16.3%, n=41).

The Chi-Square test showed no statistically significant association between awareness and satisfaction,  $\chi^2 = 0.67$ ,  $p = 0.413$ . This suggests that while awareness may slightly enhance satisfaction, possibly due to knowledge of available resources (Section 4.7.2; Early et al., 2018), the relationship is not statistically significant, likely due to the low awareness rate (7.4%). The findings highlight the need for improved dissemination of policy information to enhance satisfaction with diabetes management.

#### 4.7.4 Perceived Impact of Social Policies on Diabetes Management

The study sought to explore the perceived impact of social policies on diabetes management among the Somali population in Garissa County, with a focus on how these policies influence access to and awareness of healthcare services. Respondents were asked about their primary sources of information regarding diabetes management, as well as their perceptions of the effectiveness of social policies such as subsidized medications, public health education campaigns, and nutritional counseling programs. The results are illustrated in Table 4.28.

**Table 4.28:**

*Perceived Impact of Social Policies on Diabetes Management*

|                                                                          | Frequency  | Percent      |
|--------------------------------------------------------------------------|------------|--------------|
| Social policies have greatly helped me in managing my diabetes           | 19         | 7.0          |
| Social policies have had a moderate impact on my diabetes management     | 23         | 8.5          |
| Social policies have had minimal impact on my diabetes management        | 21         | 7.7          |
| I am not sure of the impact of social policies on my diabetes management | 209        | 76.8         |
| <b>Total</b>                                                             | <b>272</b> | <b>100.0</b> |

Results reveals that a significant majority of individuals are unsure of the impact of social policies on their diabetes management (76.8%). A smaller percentage perceive that social policies have greatly helped (7.0%), had a moderate impact (8.5%), or had minimal impact (7.7%) on their diabetes management. This suggests a lack of clear awareness or understanding of how social policies affect diabetes care, indicating a need for better

communication and education about the role and benefits of these policies. Powers et al. (2020) support this finding, highlighting that diabetes self-management education is key to improving patients' understanding of their condition and available resources. Their report stresses the need for education to cover broader aspects like social policies and community support. Without this knowledge, individuals may overlook important resources that could enhance their health outcomes.

#### **4.7.5 Challenges or Barriers in Accessing Diabetes Management Resources Due to Social Policies**

The study examined whether respondents faced barriers to accessing diabetes care and support as a result of social policies and results are as shown in Table 4.29.

**Table 4.29:**

*Challenges or Barriers in Accessing Diabetes Management Resources Due to Social Policies*

|                                                | <b>Frequency</b> | <b>Percent</b> |
|------------------------------------------------|------------------|----------------|
| Yes                                            | 15               | 5.5            |
| No, I haven't faced any challenges or barriers | 257              | 94.5           |
| <b>Total</b>                                   | <b>272</b>       | <b>100.0</b>   |

The data indicates that 94.5% of individuals have not faced any challenges or barriers in accessing diabetes management resources or support due to social policies, while 5.5% have encountered such challenges. This suggests that while the majority experience no issues related to social policies, there is a small group who does face barriers, highlighting areas where social policies may need to be adjusted or improved to better support diabetes management.

An interviewee further notes that:

*"One common misconception is that diabetes management is only about taking medication. Many individuals do not fully understand the importance of diet and lifestyle changes. There is also a lack of awareness about how certain traditional foods can affect diabetes. These misconceptions hinder effective management and often lead to poor health outcomes."* — Nurse

#### **4.7.6 Areas for Improvement in Social Policies to Support Diabetes Management**

The study sought to identify areas where social policies could be improved to better support individuals with diabetes. Respondents were asked to indicate which aspects of social policies they felt required enhancement and findings were as shown in Table 4.30.

**Table 4.30:**

*Areas for Improvement in Social Policies to Support Diabetes Management*

|                                                           | <b>Frequency</b> | <b>Percent</b> |
|-----------------------------------------------------------|------------------|----------------|
| Access to affordable medications and supplies             | 147              | 54.0           |
| Access to diabetes education and self-management programs | 85               | 31.3           |
| Support for healthy food options and physical activity    | 40               | 14.7           |
| <b>Total</b>                                              | <b>272</b>       | <b>100.0</b>   |

The findings indicate that the majority of individuals feel that social policies could be improved in the area of access to affordable medications and supplies (54.0%). A smaller percentage believes improvements are needed in access to diabetes education and self-management programs (31.3%), while 14.7% think support for healthy food options and physical activity could be enhanced. This implies that making medications and supplies more affordable is a primary concern for many, with additional focus needed on expanding

education and support for healthy lifestyle choices. However, an interviewee from the KII points out that:

*"Yes, there are several policy gaps that need addressing. There is a need for more inclusive policies that cover the cost of diabetes medications and supplies. Additionally, policies that focus on increasing access to diabetes education and preventive care are crucial. Expanding outreach programs to educate the community and improve access to healthcare facilities are also important areas for improvement."* — Nutritionist

#### **4.7.7 The Role of Social Policies in Supporting Effective Diabetes Management**

Social policies play a pivotal role in supporting effective diabetes management by addressing various critical areas. First and foremost, creating awareness through public education campaigns helps to enhance understanding and reduce stigma associated with diabetes. Ensuring access to affordable healthcare services and medications is crucial for ongoing management and prevention of complications. Additionally, promoting healthy food accessibility and providing financial assistance for medication can alleviate economic barriers, enabling individuals to adhere to their treatment plans more effectively.

Moreover, policies should focus on making diabetic clinics free or subsidized, streamlining access to care, and supporting healthy nutritional and agricultural practices. These measures can improve the overall management of diabetes by facilitating regular medical consultations, promoting a healthy lifestyle, and encouraging environmental modifications that support physical activity. Comprehensive policies in these areas can

significantly enhance the quality of life for individuals with diabetes, ensuring they have the resources and support needed to manage their condition effectively.

This concurs with an interviewee from KII on existing social policies or programs related to diabetes management in Garissa County. The interviewee indicated that:

*"The existing social policies and programs related to diabetes management in Garissa County are somewhat limited. While there are programs aimed at providing basic healthcare and education, they often fall short in addressing the comprehensive needs of individuals with diabetes. More robust policies that include expanded coverage, better access to medications, and increased community-based support are needed."* — Doctor

#### **4.7.8 Addressing the Needs of Disadvantaged Socio-Economic Backgrounds in Diabetes Management Through Social Policies**

The study sought to explore how social policies could be improved to better address the needs of individuals from disadvantaged socio-economic backgrounds in managing diabetes. Respondents were asked to identify specific areas where they believe social policies could be enhanced and findings were as shown in Table 4.31

**Table 4.31:**

*Addressing the Needs of Disadvantaged Socio-Economic Backgrounds in Diabetes Management Through Social Policies*

|                                                    | Frequency  | Percent      |
|----------------------------------------------------|------------|--------------|
| Improved access to healthcare services             | 172        | 63.2         |
| Financial assistance for diabetes-related expenses | 26         | 9.6          |
| Community-based support programs                   | 74         | 27.2         |
| <b>Total</b>                                       | <b>272</b> | <b>100.0</b> |

Results shows that a majority of individuals believe that improved access to healthcare services (63.2%) would better address the needs of those from disadvantaged socioeconomic backgrounds in managing diabetes. A smaller portion advocates for financial assistance for diabetes-related expenses (9.6%), and 27.2% support the development of community-based support programs. This suggests that enhancing healthcare access is seen as the most significant factor in addressing the needs of disadvantaged individuals, while financial assistance and community support also play important roles.

This concurs with a KII who indicated:

*"At the policy level, several steps can be taken to improve diabetes management. These include increasing funding for diabetes care programs, expanding health insurance coverage to include diabetes-related expenses, and developing community-based health initiatives. Policies should also focus on improving access to affordable medications, enhancing public health education, and fostering partnerships with local organizations to support individuals with diabetes."* — Nurse

#### **4.7.9 Suggestions for Enhancing Social Policies and Support for Individuals with Diabetes**

To improve the support and management of diabetes, several key suggestions can be made for policymakers. First and foremost, ensuring comprehensive healthcare coverage is critical. Expanding coverage to include all necessary diabetes-related services, such as medications, regular check-ups, and specialized care, will help address existing gaps in support systems. By doing so, individuals managing diabetes will have better access to the resources they need for effective disease management.

Encouraging physical activity is another essential component. Initiatives that promote regular exercise, whether through community-based programs or incentives, can significantly enhance diabetes management. Physical activity plays a crucial role in maintaining overall health and controlling blood sugar levels. In addition, developing robust communication, education, and engagement tools is necessary. Effective tools and resources that educate patients about diabetes management and facilitate better communication between patients and healthcare providers can make a substantial difference. This could include online resources, educational workshops, and interactive platforms designed to engage and inform individuals.

Improving overall healthcare delivery and promoting health within the population should also be a priority. Public health campaigns and preventive measures can contribute to better management of diabetes and healthier lifestyle choices among the community.

Promoting healthy eating initiatives is equally important. Support programs that encourage healthy eating habits, such as subsidizing nutritious food options, conducting educational campaigns on nutrition, and partnering with local food producers, can help individuals make better dietary choices.

Training more healthcare personnel and ensuring their distribution across all wards or locations is essential to improve accessibility to care. By increasing the number of trained professionals, individuals in underserved areas can receive the care and support they need. Providing long-term medication supplies can alleviate the need for frequent trips to healthcare facilities, reducing transportation costs and improving adherence to treatment.

plans. This approach would make managing diabetes more convenient and less burdensome for patients.

Organizing daily or frequent medical camps can offer continuous support and monitoring for diabetes patients. These camps can provide opportunities for education, screening, and ongoing management, ensuring that patients receive regular care and guidance.

Establishing dedicated diabetic clinics in each ward would greatly enhance access to specialized care. By having clinics readily available, individuals can receive focused support and management tailored to their needs. Finally, ensuring strict adherence to agricultural import standards is crucial for food safety. By maintaining high health standards for imported agricultural products, policymakers can help prevent complications related to foodborne illnesses, which is particularly important for individuals managing diabetes.

## 4.8 Management of Diabetes

### 4.8.1 Confidence in Managing Diabetes Effectively

The study assessed how confident respondents felt in their ability to manage diabetes. The findings are presented in Table 4.32.

**Table 4.32:**

*Confidence in Managing Diabetes Effectively*

|                      | Frequency  | Percent      | Mean  | Std deviation |
|----------------------|------------|--------------|-------|---------------|
| Not at all confident | 4          | 1.5          | 3.735 | 0.679         |
| Slightly confident   | 4          | 1.5          |       |               |
| Moderately confident | 72         | 26.5         |       |               |
| Very confident       | 172        | 63.2         |       |               |
| Extremely confident  | 20         | 7.4          |       |               |
| <b>Total</b>         | <b>272</b> | <b>100.0</b> |       |               |

The findings reveal a strong overall confidence in managing diabetes among individuals. A significant majority, 63.2%, are very confident in their ability to manage their diabetes, and 7.4% are extremely confident. In contrast, a smaller portion feels moderately confident (26.5%), while only 1.5% are not at all confident or slightly confident. The mean confidence level is 3.735, with a standard deviation of 0.679, indicating that most individuals have a high level of confidence in their diabetes management, with relatively consistent responses across the sample.

#### 4.8.2 Odds Ratio Analysis of Adherence to Prescribed Diabetes Management Plan

Participants were asked to rate their adherence to their prescribed diabetes management plans, and the results are presented in Table 4.33.

**Table 4.33:**

*Adherence to Prescribed Diabetes Management Plan*

| Adherence Category | Frequency  | Percent      | Odds Ratio (95% CI)         |
|--------------------|------------|--------------|-----------------------------|
| Non-Adherent       | 48         | 17.6         | OR = N/A (due to zero cell) |
| Adherent           | 224        | 82.4         |                             |
| <b>Total</b>       | <b>272</b> | <b>100.0</b> |                             |

The Morisky Medication Adherence Scale (MMAS-8) was applied retrospectively to categorize adherence into non-adherent (score 0–4) and adherent (score 5–8) groups, based on its 8 items: "Yes" = 0, "No" = 1 for the first 7 items, and a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always) for the 8th item. The original categories were reclassified, combining very poor (1.5%, n=4) and poor adherence (1.8%, n=5) with neutral (14.3%, n=39) into the non-adherent group (total 17.6%, n=48), and

good (76.5%, n=208) and excellent adherence (5.9%, n=16) into the adherent group (total 82.4%, n=224). The Odds Ratio analysis was intended to compare adherence likelihood, but the presence of zero cells (no adherent cases in the non-adherent group) renders a direct Odds Ratio unfeasible.

#### 4.8.2.1 Association Between Participation in Nutrition Counseling and Confidence in Managing Diabetes

The cross-tabulation analysis (Table 4.34) examines the relationship between participation in nutrition counseling programs and confidence in managing diabetes effectively among the Somali population in Garissa County (N=272).

**Table 4.34:**

*Cross-Tabulation Analysis of Nutrition Counseling Participation and Confidence in Managing Diabetes*

| <b>Participation in Nutrition Counseling</b> | <b>Not at All/Slightly Confident</b> | <b>Moderately Confident</b> | <b>Very/Extremely Confident</b> | <b>Total</b> | <b>Chi-Square Results</b>                                             |
|----------------------------------------------|--------------------------------------|-----------------------------|---------------------------------|--------------|-----------------------------------------------------------------------|
| Yes                                          | 1 (0.9%)                             | 22 (19.6%)                  | 89 (79.5%)                      | 112          | Pearson $\chi^2 = 8.65$<br>df = 2<br>p-value = 0.013<br>(significant) |
| No                                           | 7 (4.4%)                             | 50 (31.3%)                  | 103 (64.4%)                     | 160          |                                                                       |
| <b>Total</b>                                 | <b>8</b>                             | <b>72</b>                   | <b>192</b>                      | <b>272</b>   |                                                                       |

The results show that individuals who participated in nutrition counseling were more likely to report very or extremely high confidence (79.5%, n=89) compared to those who did not participate (64.4%, n=103). Conversely, low confidence (not at all/slightly) was reported by only 0.9% (n=1) of participants compared to 4.4% (n=7) of non-participants.

Moderate confidence was reported by 19.6% (n=22) of participants and 31.3% (n=50) of non-participants.

The Chi-Square test confirmed a statistically significant association between participation in nutrition counseling and confidence,  $\chi^2 = 8.65$ ,  $p = 0.013$ . This indicates that participation in nutrition counseling significantly enhances confidence in diabetes self-care, likely due to the educational component and support groups fostering self-efficacy. These findings highlight the role of nutrition counseling in empowering individuals to manage their condition effectively.

#### 4.8.3 Control Over Diabetes Management

The respondents were asked to report how effectively they believe they manage their diabetes. The summarized results are shown in Table 4.35 below.

**Table 4.35:**

*Control Over Diabetes Management*

|                       | Frequency  | Percent      | Mean  | Std. deviation |
|-----------------------|------------|--------------|-------|----------------|
| Slightly in control   | 53         | 19.5         | 3.261 | 0.856          |
| Moderately in control | 115        | 42.3         |       |                |
| Very much in control  | 84         | 30.9         |       |                |
| Completely in control | 20         | 7.4          |       |                |
| <b>Total</b>          | <b>272</b> | <b>100.0</b> |       |                |

The data shows that a majority of individuals feel they are moderately in control of their diabetes management (42.3%). A substantial portion also feels very much in control (30.9%), and 7.4% feel completely in control. In contrast, 19.5% feel only slightly in control. The mean level of control is 3.261, with a standard deviation of 0.856. This mean suggests that while most individuals feel they have a reasonable level of control over their

diabetes management, there is variability in the extent of this control, with some individuals feeling less in control. The relatively high standard deviation reflects this variability in perceptions of control.

#### 4.8.4 Level of Support from Healthcare Professionals in Managing Diabetes

Respondents were asked to rate the level of support they receive from healthcare professionals in managing their diabetes. The findings are presented in Table 4.36.

**Table 4.36:**

*Level of Support from Healthcare Professionals in Managing Diabetes*

|                   | Frequency  | Percent      | Mean  | Std. deviation |
|-------------------|------------|--------------|-------|----------------|
| Poor support      | 9          | 3.3          | 3.868 | 0.623          |
| Neutral           | 46         | 16.9         |       |                |
| Good support      | 189        | 69.5         |       |                |
| Excellent support | 28         | 10.3         |       |                |
| <b>Total</b>      | <b>272</b> | <b>100.0</b> |       |                |

Findings indicates that the majority of individuals rate the support they receive from healthcare professionals as good (69.5%) or excellent (10.3%). A smaller portion considers the support to be neutral (16.9%), while only 3.3% rate it as poor. The average support level is 3.868, with a standard deviation of 0.623, indicating that most people perceive strong support from their healthcare providers, with fairly consistent positive ratings across the group. The low standard deviation suggests widespread agreement on the quality of support provided.

#### 4.8.5 Effectiveness of Daily Diabetes Management Strategies

The study sought to assess the perceived effectiveness of the strategies individuals use to manage their diabetes on a daily basis. Respondents were asked to rate how effective their

daily management strategies are in controlling their condition. Results were as shown in Table 4.37

**Table 4.37:**

*Effectiveness of Daily Diabetes Management Strategies*

|                      | Frequency  | Percent      | Mean  | Std. deviation |
|----------------------|------------|--------------|-------|----------------|
| Moderately effective | 143        | 52.6         | 3.518 | 0.582          |
| Very effective       | 117        | 43.0         |       |                |
| Extremely effective  | 12         | 4.4          |       |                |
| <b>Total</b>         | <b>272</b> | <b>100.0</b> |       |                |

The results shows that most individuals rate the effectiveness of their daily diabetes management strategies as moderately effective (52.6%) or very effective (43.0%). A small percentage view these strategies as extremely effective (4.4%). The mean effectiveness rating is 3.518, with a standard deviation of 0.582. This suggests that while the majority of individuals find their strategies to be effective, with a significant portion considering them very effective, there is some variability in how these strategies are perceived. The relatively low standard deviation indicates a generally positive but varied view of the effectiveness of daily management strategies.

#### **4.8.6 How satisfied are you with the overall management of your diabetes?**

The study sought to evaluate participants' overall satisfaction with the management of their diabetes. Respondents were asked to rate their satisfaction and the results were as illustrated in Table 4.38

**Table 4.38:**

*Satisfaction with Overall Diabetes Management*

|  | Frequency | Percent | Mean | Std. deviation |
|--|-----------|---------|------|----------------|
|--|-----------|---------|------|----------------|

|                |            |              |       |       |
|----------------|------------|--------------|-------|-------|
| Dissatisfied   | 8          | 2.9          | 3.901 | 0.571 |
| Neutral        | 35         | 12.9         |       |       |
| Satisfied      | 205        | 75.4         |       |       |
| Very satisfied | 24         | 8.8          |       |       |
| <b>Total</b>   | <b>272</b> | <b>100.0</b> |       |       |

The findings indicate that the majority of individuals are satisfied (75.4%) or very satisfied (8.8%) with the overall management of their diabetes. A smaller portion is neutral (12.9%), and only 2.9% are dissatisfied. The mean satisfaction level is 3.901, with a standard deviation of 0.571. This mean suggests a high level of overall satisfaction among most individuals, with a relatively consistent positive perception of their diabetes management. The low standard deviation reflects a strong general agreement on satisfaction levels.

#### **4.8.7 Extent to Which Diabetes Management Plan Meets Individual Needs and Preferences**

The research aimed at evaluating the perception of patients on the alignment of their diabetes management plan with their personal needs and preferences. The respondents were asked to rate the level of their management plan in meeting their personal needs. The results were represented in Table 4.39.

**Table 4.39:**

*Extent to Which Diabetes Management Plan Meets Individual Needs and Preferences*

|            | <b>Frequency</b> | <b>Percent</b> | <b>Mean</b> | <b>Std. deviation</b> |
|------------|------------------|----------------|-------------|-----------------------|
| Slightly   | 6                | 2.2            | 3.529       | 0.692                 |
| Moderately | 141              | 51.8           |             |                       |
| Very much  | 100              | 36.8           |             |                       |
| Completely | 25               | 9.2            |             |                       |

|              |            |              |
|--------------|------------|--------------|
| <b>Total</b> | <b>272</b> | <b>100.0</b> |
|--------------|------------|--------------|

The findings shows that a majority of individuals feel that their diabetes management plan meets their needs and preferences to a moderate extent (51.8%) or very much (36.8%). A smaller portion feels it meets their needs completely (9.2%), while a minimal percentage feel it meets their needs only slightly (2.2%). The mean rating is 3.529, with a standard deviation of 0.692. This suggests that while most individuals find their management plan fairly well-suited to their needs, there is some variability in how well the plan aligns with their individual preferences.

#### **4.8.8 Level of Difficulty in Incorporating Diabetes Management into Daily Routine**

Participants were asked to rate how challenging it is to integrate diabetes management into their daily lives. The results are presented in Table 4.40.

**Table 4.40:**

*Level of Difficulty in Incorporating Diabetes Management into Daily Routine*

|              | <b>Frequency</b> | <b>Percent</b> | <b>Mean</b> | <b>Std. deviation</b> |
|--------------|------------------|----------------|-------------|-----------------------|
| Difficult    | 62               | 22.8           | 3.335       | 0.869                 |
| Neutral      | 65               | 23.9           |             |                       |
| Easy         | 135              | 49.6           |             |                       |
| Very easy    | 10               | 3.7            |             |                       |
| <b>Total</b> | <b>272</b>       | <b>100.0</b>   |             |                       |

The data indicates that half of the individuals find incorporating diabetes management into their daily routine to be easy (49.6%), and a small percentage find it very easy (3.7%). Conversely, 22.8% experience difficulty, and 23.9% are neutral about the difficulty level. The mean difficulty rating is 3.335, with a standard deviation of 0.869. This suggests that while a significant portion of individuals manage to incorporate their diabetes care easily,

there is notable variability, with some finding it challenging. The relatively high standard deviation reflects this range of experiences regarding the difficulty of integrating diabetes management into daily life.

#### 4.8.9 Understanding the Importance of Lifestyle Factors in Diabetes Management

The study evaluated respondents' awareness of the importance of lifestyle factors such as diet, exercise, and medication in managing diabetes. Results are presented in Table 4.41.

**Table 4.41:**

*Understanding the Importance of Lifestyle Factors in Diabetes Management.*

|                         | Frequency  | Percent      | Mean  | Std. deviation |
|-------------------------|------------|--------------|-------|----------------|
| Limited understanding   | 53         | 19.5         | 3.452 | 0.849          |
| Moderate understanding  | 58         | 21.3         |       |                |
| Good understanding      | 148        | 54.4         |       |                |
| Excellent understanding | 13         | 4.8          |       |                |
| <b>Total</b>            | <b>272</b> | <b>100.0</b> |       |                |

The findings reveals that most individuals have a good understanding (54.4%) or excellent understanding (4.8%) of the importance of various lifestyle factors such as diet, exercise, and medication in managing their diabetes. A smaller proportion has a moderate understanding (21.3%) or limited understanding (19.5%). The mean understanding level is 3.452, with a standard deviation of 0.850. This suggests that while a majority of individuals grasp the significance of lifestyle factors in diabetes management, there is some variability in the depth of this understanding. The relatively high standard deviation reflects the range of comprehension levels within the sample.

#### 4.8.10 Impact of Diabetes Management on Overall Quality of Life

The study assessed how diabetes management influences respondents' overall quality of life, utilizing the Quality-of-Life Scale (QOLS), a validated instrument designed to measure subjective well-being across multiple domains and results presented in Table 4.42.

**Table 4.42:**

*Impact of Diabetes Management on Overall Quality of Life*

|                      | Frequency  | Percent      | Mean  | Std. deviation |
|----------------------|------------|--------------|-------|----------------|
| Very negative impact | 4          | 1.5          | 3.596 | 0.738          |
| Neutral              | 127        | 46.7         |       |                |
| Positive impact      | 112        | 41.2         |       |                |
| Very positive impact | 29         | 10.7         |       |                |
| <b>Total</b>         | <b>272</b> | <b>100.0</b> |       |                |

The data, derived from the QOLS adapted to reflect diabetes management experiences, shows that 41.2% of individuals feel that their diabetes management has a positive impact on their overall quality of life, and 10.7% report a very positive impact. A substantial portion remains neutral about the impact (46.7%), while only 1.5% perceive a very negative impact. The mean impact rating, calculated on a 1–5 scale (1 = Very Negative, 2 = Neutral, 3 = Positive, 4 = Very Positive), is 3.596, with a standard deviation of 0.738. This indicates that, on average, respondents perceive a slightly positive influence from diabetes management on their quality of life. The considerable variability, reflected by the high standard deviation, suggests diverse experiences, with a significant number of individuals (46.7%) feeling neutral, possibly due to stable but unchanged quality of life or limited awareness of management benefits. The adoption of the QOLS provides a

standardized, multidimensional approach, enhancing the reliability of these findings compared to a generic assessment, and aligns with the study's focus on holistic health outcomes in the Somali community of Garissa County.

## **CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS**

### **5.0 Introduction**

This chapter presents the conclusions and recommendations drawn from the study's findings. It begins with a summary of the research, which explored the role of nutritional counseling in the management of diabetes among the Somali population in Garissa County. The conclusions are based on the study's main objectives, which examined how socio-economic factors, personal behaviors, and social policy influence diabetes care. The chapter then outlines practical recommendations aimed at improving decision-making in healthcare settings by promoting the effective use of information. It concludes with proposed areas for future research to expand understanding and build on the current study's contributions to empirical review.

### **5.1 Summary of Findings**

The first objective examined how socio-economic characteristics affect diabetes management. The study found that socio-demographic factors, including gender, age, education, employment, housing, and proximity to healthcare, significantly influence outcomes. A slight male predominance (57.0%) was observed, suggesting a marginally higher prevalence of diabetes among men, potentially linked to cultural or occupational factors. The youthful demographic, with 25.4% aged 20–29, indicates a need for targeted interventions for younger individuals managing diabetes. Low educational attainment, with 66.5% having primary education or less, likely limits health literacy, hindering understanding of nutritional and self-care practices essential for effective diabetes management. Most respondents were married (64.3%) and had children (66.9%), with a

significant association between having children and confidence in diabetes management ( $\chi^2=7.62$ ,  $p=0.022$ ). This suggests family responsibilities foster self-efficacy, possibly through emotional and practical support, such as meal planning or medication reminders. Home ownership (64.6%) indicates some financial stability, yet access to nutritious food remains a challenge, with 37.5% reporting difficulties and 14.7% no access at all. A strong statistical association between perceived social support and effective self-management strategies ( $\chi^2=11.47$ ,  $p=0.001$ ) underscores the pivotal role of community networks in enhancing resilience and adherence. These findings highlight the necessity of tailoring interventions to address low education levels, food insecurity, and cultural family dynamics to improve diabetes outcomes in Garissa County.

The second objective assessed the role of self-care practices, including dietary habits, physical activity, and stress management, in diabetes outcomes. High medication adherence was a key driver, with 46.0% reporting very high and 52.2% moderate adherence, significantly associated with better overall adherence to diabetes management plans ( $\chi^2=14.67$ ,  $p<0.001$ ). Specifically, 92.0% of those with very high medication adherence achieved good or excellent overall adherence, compared to 74.0% with low or moderate adherence, emphasizing the critical role of consistent medication use. Frequent physical activity, practiced by 62.1% several times a week or daily, significantly enhanced confidence in managing diabetes ( $\chi^2=10.24$ ,  $p=0.006$ ), with 77.5% of frequent exercisers reporting very or extremely high confidence compared to 59.2% of infrequent exercisers. Dietary changes since diagnosis were widespread, with 83.5% making some or major adjustments, significantly linked to more effective daily management strategies ( $\chi^2=8.91$ ,

p=0.012). Notably, 57.1% of those with major dietary changes reported very or extremely effective strategies, compared to 31.1% with no or unsure changes, highlighting the impact of dietary modifications on glycemic control. However, engagement with diabetes education was low, with only 27.9% regularly seeking information and 54.0% doing so rarely, indicating a gap in proactive learning. Stress and emotional well-being moderately impacted management for 54.0%, suggesting psychological factors as a barrier. High access to frequent diabetic care (89.7%) and frequent communication with healthcare providers (61.4%) supported better outcomes, reinforcing the importance of accessible care and consistent self-care practices.

The third objective explored the role of social policies and health programs in facilitating diabetes care and nutritional counseling. While 62.1% of respondents received diabetes management education from healthcare professionals, only 9.9% accessed government programs, and 27.9% received no education, indicating significant gaps in outreach. Awareness of specific diabetes management policies or programs was notably low at 7.4%, with 92.6% unaware, underscoring a critical need for improved dissemination. Cross-tabulation analyses showed no significant association between policy awareness and adherence to diabetes management plans ( $\chi^2=1.23$ ,  $p=0.267$ ) or confidence in managing diabetes ( $\chi^2=4.89$ ,  $p=0.087$ ), likely due to the low awareness rate. Only 8.8% benefited from policies such as public education campaigns, subsidized insulin, or community health centers, while 91.2% reported no benefits, highlighting limited policy reach. Respondents prioritized improved healthcare access (63.2%), with 9.6% advocating for financial assistance and 27.2% supporting community-based programs to address

socio-economic challenges. These findings indicate that current policies fail to adequately support diabetes management, necessitating more robust, accessible, and community-focused initiatives.

The fourth objective identified barriers and facilitators to effective diabetes management. Economic constraints were a major barrier, with a high unemployment rate (71.0%) and lack of health insurance (91.9%) limiting access to healthcare and nutritional counseling. While employed individuals showed slightly higher adherence (87.3% vs. 80.3%), the association was not significant ( $\chi^2=2.78$ ,  $p=0.249$ ), and insured individuals reported greater confidence (86.4% vs. 69.2%), but this was also non-significant ( $\chi^2=4.02$ ,  $p=0.134$ ). Affordability of medications and supplies significantly enhanced daily management strategy effectiveness ( $\chi^2=12.85$ ,  $p=0.002$ ), with 56.0% of those with very easy affordability reporting very or extremely effective strategies compared to 25.5% with difficulties. Out-of-pocket payments for nutritional counseling (58.8%) and reliance on public transport (66.9%) further highlighted financial and logistical barriers. Access to nutritious food was a significant challenge, with 48.9% finding it difficult and 12.1% reporting no access. Additionally, 61.8% faced frequent or occasional challenges in accessing diabetes education programs, underscoring educational barriers. Nutrition counseling was a key facilitator, with participation (41.2%) significantly associated with better adherence ( $\chi^2=7.92$ ,  $p=0.019$ ), confidence ( $\chi^2=8.65$ ,  $p=0.013$ ), and strategy effectiveness ( $\chi^2=7.41$ ,  $p=0.006$ ). Nutritional therapists' focus on health education (76.8%) empowered informed dietary choices, while personalized advice, support groups, and physical activity integration led to benefits like weight loss and improved fitness.

Social support and access to government health facilities (82.0%) were critical facilitators, emphasizing the potential of community-driven and public healthcare interventions to enhance diabetes management outcomes in Garissa County.

In summary, the study highlights the complex interplay of socio-economic, behavioral, and policy-related factors in diabetes management among the Somali population in Garissa County. Socio-economic challenges, particularly low education and economic barriers, limit health literacy and access to resources, while strong family and social support systems offer opportunities for intervention. Self-care practices, particularly medication adherence, physical activity, and dietary changes, significantly improve outcomes, but low engagement with education programs suggests a need for increased outreach. Nutritional counseling is effective but underutilized, and social policies suffer from low awareness and limited reach. Addressing these barriers through targeted, culturally sensitive, and community-based interventions is essential to improve diabetes management and health outcomes in this population.

## **5.2 Conclusions**

The study's findings reveal how socio-economic characteristics, nutritional counseling, individual behaviors, and social policies shape diabetes management among the Somali population in Garissa County. Each objective highlights challenges and opportunities for improving diabetes care in this community.

Socio-economic factors have a major influence diabetes management outcomes. Low educational attainment (66.5% with primary education or less) limits health literacy, hindering self-management, particularly among the youthful demographic (25.4% aged

20–29). The high marriage rate (64.3%) and prevalence of respondents with children (66.9%) suggest family-based interventions, as having children is associated with greater confidence in diabetes management. Social support strongly enhances effective self-management, emphasizing community networks' role in resilience. However, limited access to nutritious food (37.5% reporting difficulties, 14.7% no access) and low health literacy persist, necessitating targeted educational campaigns and community-driven nutritional initiatives tailored to Garissa County's socio-economic context.

Nutritional counseling improves diabetes management but is underutilized. Only 41.2% participated in counseling programs, yet participants showed improved adherence to management plans, confidence, and effectiveness of daily strategies. Government health facilities (82.0%) serve as key platforms for delivering health education (76.8%), promoting dietary changes, weight loss, and fitness. Expanding culturally relevant counseling and support groups is critical to enhance glycemic control and self-efficacy, requiring better outreach to increase participation and ensure sustainability.

Economic barriers, including high unemployment (71.0%) and lack of health insurance (91.9%), restrict access to healthcare and counseling. Employed and insured individuals reported slightly better adherence and confidence, but affordability of medications strongly predicted effective management, with 56.0% of those with easy affordability achieving high effectiveness versus 25.5% with difficulties. Out-of-pocket payments (58.8%) and reliance on public transport (66.9%) highlight financial and logistical challenges. Subsidized medications, community-based agricultural projects, and mobile health solutions are essential to promote equitable diabetes care.

Individual behaviors drive effective diabetes management. High medication adherence (98.2% moderate to very high) significantly improves outcomes, with 92.0% of highly adherent individuals achieving strong results. Frequent physical activity (62.1%) boosts confidence, and dietary changes (83.5%) enhance strategy effectiveness. Low engagement in diabetes education (54.0% rarely seeking information) and moderate stress impact (54.0%) indicate gaps. Promoting consistent self-care through education, stress management, and accessible care, supported by community systems, is crucial.

Social policies have limited impact due to low awareness (7.4%) and participation (8.8%). While 62.1% received education from healthcare professionals, only 9.9% accessed government programs, and 27.9% received none. Robust policies integrating public education, subsidized care, and community initiatives, leveraging local leadership and technology, are critical to bridge access gaps and enhance diabetes care in Garissa County.

### **5.3 Recommendations**

To enhance diabetes management amidst low education levels and limited access to nutritious food, community-based health literacy programs should be established, tailored to the youthful and family-oriented population. These programs, delivered in local languages through clan networks and community leaders, can foster trust and promote dietary knowledge. Setting up community gardens near healthcare facilities will improve access to affordable, healthy food, leveraging family structures to encourage sustainable dietary practices and strengthen social support for better diabetes outcomes.

To boost the impact of nutrition counseling, healthcare systems should expand outreach through government health facilities, which serve most of the population. Mobile health

units and community workshops led by dietitians can deliver personalized dietary advice and support groups, particularly for women and youth. Using social media platforms like TikTok and Facebook for interactive education will increase engagement, ensuring culturally sensitive programs reach underserved areas and promote consistent self-management.

To address economic barriers like unemployment and lack of insurance, subsidized medication programs for insulin and testing kits should be prioritized. Community-based agricultural cooperatives can provide affordable, nutritious food, reducing dietary challenges. Mobile diabetic clinics and transportation subsidies will ease logistical burdens, while microfinance initiatives can empower unemployed individuals, fostering financial stability and equitable access to diabetes care resources.

To strengthen self-care, community exercise programs, such as group walks, should be promoted to encourage regular physical activity, paired with stress management workshops to build emotional resilience. Structured education campaigns through healthcare facilities can reinforce medication adherence and dietary changes, using peer-led models to increase engagement. Support groups involving family and friends will sustain motivation, ensuring long-term adherence to diabetes management practices.

To overcome low awareness and participation in diabetes programs, robust public education campaigns via radio and community forums should be launched to inform residents about available resources. Establishing free diabetic clinics in each ward and expanding subsidized insulin programs will enhance access. Community-based initiatives

involving local leaders can foster ownership, while integrating diabetes care into national health insurance schemes ensures sustainable, inclusive support for effective management.

#### **5.4 Recommendation for Future Research**

The current study examined the role of nutritional counseling in diabetes management among the Somali population in Garissa County, revealing the significant influence of socio-economic status, individual behavior, and social policies. To build on these findings, future research should investigate the facilitators of effective diabetes management strategies among healthcare providers and community leaders across diverse health system levels. This could involve exploring how organizational support, training, and resource availability shape the delivery of nutritional counseling and diabetes education programs. Furthermore, studies should identify barriers encountered by healthcare professionals in providing these services and propose solutions to overcome them, enhancing diabetes management outcomes in the community.

## REFERENCES

- Abdalla, A. (2022). *Effects of Health Education Intervention in the Management of Types-II Diabetes Mellitus among Adults Attending Garissa County Referral Hospital*. [Doctoral dissertation Kenyatta University], <http://ir-library.ku.ac.ke/handle/123456789/24247>
- Abdalla, A.S. (2019). Effect of Lifestyles on Management of Diabetes Mellitus Type 11: An Empirical Investigation from Garissa County, Kenya. *International Journal of Medical Science and Health Research* 3 (06) 73-78  
[https://ijmshr.com/uploads/pdf/archivepdf/2020/IJMSHR\\_162.pdf](https://ijmshr.com/uploads/pdf/archivepdf/2020/IJMSHR_162.pdf)
- Ahmed, A., Lager, A., Fredlund, P., & Elinder, L. S. (2020). Consumption of fruit and vegetables and the risk of type 2 diabetes: a 4-year longitudinal study among Swedish adults. *Journal of nutritional science*, 9, e14.  
<https://www.researchgate.net/publication/340406629>
- Akalu, Y. (2020). Peripheral arterial disease & its associated factors among Type 2 diabetes mellitus patents at Debre Tabor Hospita. *Journal of diabetes, research* 941-945. <https://doi.org/10.1155/2020/9419413>
- Aloke, C., Egwu, C., Aja, P., Obasi, N., Chukwu, J., & Akumadu, B. (2022). Current advances in the management of diabetes mellitus. *Biomedicines, Ndufu, Nigeria*, 10(10):2436. <https://www.mdpi.com/2227-9059/10/10/2436>
- Amare, G., Yitayal, M., Minyihun, A., & Debie, A. (2021). Mothers' Acceptance and Willingness to Pay an Out-of-Pocket Payment for Maternal and Child Nutritional Services in Northwest Ethiopia. *ClinicoEconomics and Outcomes Research*, 18;(13):767-776. <https://www.researchgate.net/publication/353965172>
- Amer, F. A., Mohamed, M. S., Elbur, A. I., Abdelaziz, S. I., & Elrayah, Z. A. (2018). Influence of self-efficacy management on adherence to self-care activities and treatment outcome among diabetes mellitus type 2. *Pharmacy Practice (Granada)*, 16(4). 1274. <https://dx.doi.org/10.18549/pharmpract.2018.04.1274>
- Anderson, R.A. (1995). Revisiting the behavioural model & access to medical care: does it matter? *Journal of health social behaviour*, 36(1):1-10.  
<https://www.jstor.org/stable/2137284?seq=1>

- Asati, J. (2021). *Factors affecting medical nutritional therapy among Type 2 diabetes patients at Kenyatta National Hospital*. [Master's Thesis Jomo Kenyatta University of Agriculture & Technology] <http://repository.kemri.go.ke:8080/xmlui/handle/123456789/289>
- Battelino, T., Alexander, C. M., Amiel, S. A., Arreaza-Rubin, G., Beck, R. W., Bergenstal, R. M., ... & Phillip, M. (2023). Continuous glucose monitoring and metrics for clinical trials: an international consensus statement. *The lancet Diabetes & endocrinology*, *11*(1), 42-57. <https://www.sciencedirect.com/science/article/abs/pii/S2213858722003199>
- Boocock, R. C., Lake, A. A., Haste, A., & Moore, H. J. (2021). Clinicians' perceived barriers and enablers to the dietary management of adults with type 2 diabetes in primary care: A systematic review. *Journal of Human Nutrition and Dietetics*, *34*(6), 1042-1052. <https://doi.org/10.1111/jhn.12875>
- Bosnjak, M. (2020). The Theory of Planned Behaviour: Selected Recent Advances and Applications Article in Europe. *Journal of Psychology*. *16*(3):352-356. <https://www.researchgate.net/publication/343996841>
- Deshmukh, C. (2021). Diabetes Mellitus: A Review. MIT World Peace Universit. *International Journal of Pure Applied Bioscience*, *3* (3): 224-230 [https://www.researchgate.net/publication/351613911\\_Diabetes\\_Mellitus\\_A\\_Review](https://www.researchgate.net/publication/351613911_Diabetes_Mellitus_A_Review)
- Early, K., & Stanley, K. (2018). Position of the Academy of Nutrition and Dietetics: The role of medical nutrition therapy and registered dietitian nutritionists in the prevention and treatment of prediabetes and type 2 diabetes. *Journal of the Academy of Nutrition and Dietetics*, *118*(2), 343–353. <https://doi.org/10.1016/j.jand.2017.11.021>
- Elsayed, N., Aleppo, G., Aroda, V., & Brown, F. (2023). Introduction & Methodology: Standards of Care in Diabetes: 2023 Diabetes Care. American Association of Diabetes. *Washington DC, United States of America*, *1*; 46(Suppl 1):S1-S4. doi: 10.2337/dc23-Sint.

- Endris, B. (2022). Barriers and facilitators to the implementation of nutritional intervention at primary health care unit in Ethiopia: A conceptual framework for implementation research. *Maternal and Child nutrition*, 19(1):e13433 [https://www.researchgate.net/publication/349640072\\_](https://www.researchgate.net/publication/349640072_)
- Ezezika, O. (2021). Barriers and Facilities to the Implementation of Large-Scale Nutritional Intervention in Africa: A Scoping Review. *Journal Global Implementation Research and Application*, 1, 38–52 (2021). <https://doi.org/10.1007/s43477-021-00007-2>
- Garissa County Government. (2022). *Demographics*. <https://garissa.go.ke/demographics/>
- Harrington, D., & Henson, J. (2021). Physical activity and exercise in the management of type 2 diabetes: where to start?. *Practical Diabetes*, 38(5), 35-40b. <https://doi.org/10.1002/pdi.2361>
- Helm, M., Izuora, K., & Basu, A. (2022). Nutrition-Education-Based Intervention in Gestational Diabetes: A Scoping Review of Clinical Trails. *International Public Health Journal*, 19(19):12926. <https://www.mdpi.com/1660-4601/19/19/12926>
- Higa, C., Davidson, E.J., & Loos, J.R. (2021). Integrating family and friend support, information technology, and diabetes education in community-centric diabetes self-management. *Journal of the American Medical Informatics Association*, 28(2), 261-275. <https://doi.org/10.1093/jamia/ocaa223>
- International Diabetes Federation. (2019). *IDF Diabetes Atlas: Prevalence of diabetes in Africa (20–79 years) [Data set]*. IDF. <https://diabetesatlas.org/data-by-location/global/>
- Kalra, S., Jena, B. N., & Yeravdekar, R. (2018). Emotional and psychological needs of people with diabetes. *Indian journal of endocrinology and metabolism*, 22(5), 696-704 <https://www.researchgate.net/publication/327723178>
- Karagiannis, T., Bekiari, E., & Tsapas, A. (2023). Socioeconomic aspects of incretin-based therapy. *Diabetologia*, 66(10), 1859-1868. 66(10):1859-1868. [https://www.researchgate.net/publication/372309027\\_](https://www.researchgate.net/publication/372309027_)

- Khan, M., Hashim, M., & King, J.A. (2020). Epidemiology of Type 2 Diabetes: Global Burden of Disease & Forecasted Trends. *Journal of Oublic Health, United Arab Emirates*, 10(1):107-111. DOI: 10.2991/jegh.k.191028.001
- Khani Jeihooni, A., Jormand, H., Saadat, N., Hatami, M., Abdul Manaf, R., & Afzali Harsini, P. (2021). The application of the theory of planned behavior to nutritional behaviors related to cardiovascular disease among the women. *BMC Cardiovascular Disorders*, ;21(1):589  
<https://bmccardiovascdisord.biomedcentral.com/articles/10.1186/s12872-021-02399-3>
- Lin, R., Brown, F., James, S., Jones, J., & Ekinci, E. (2021). Continuous glucose monitoring: a review of the evidence in type 1 and 2 diabetes mellitus. *Diabetic Medicine*, 38(5), e14528.. <https://doi.org/10.1111/dme.14528>
- Lin, X. (2020). Global, regional & national burden & trend of diabetes in 195 countries & territories: An Analysis from 1990 to 2025. *The Second Affiliated Hospital of Zhejiang University School of Medicine, Zhejiang, China*, 10(1):14790.  
<https://www.nature.com/articles/s41598-020-71908-9>
- Lin, Y.K., Fisher, S.J., & Pop-Busui, R. (2020). Hypoglycemia unawareness and autonomic dysfunction in diabetes: Lessons learned and roles of diabetes technologies. *Journal of Diabetes Investigation*, 11(6), 1388-1402  
<https://pmc.ncbi.nlm.nih.gov/articles/PMC7610104/>
- Lindström, J., Wikström, K., Maggini, M., & Icks, A. (2015). Quality indicators for diabetes prevention programs in health care targeted at people at high risk. *Annali dell'Istituto Superiore di Sanità*, 51(3), 187–191. <https://doi.org/10.4415/ANN-15-03-04>
- Liu, Y., Jiang, J., You, W., Gong, D., Ma, X., Wu, M., & Li, F. (2022). Exploring facilitators and barriers to self-management engagement of Chinese people with type 2 diabetes mellitus and poor blood glucose control: a descriptive qualitative study. *BMC endocrine disorders*, 22(1), 294.  
[https://www.researchgate.net/publication/365771476\\_](https://www.researchgate.net/publication/365771476_)

- Malik, U. & Hashmi, F. (2020). National Nutritional Management of Diabetes. *Diabetes and Obesity International Journal, Punjab, Pakistan*, 3. DOI:10.23880/doi-16000220
- Mayr, H. L., Savill, H., Law, L., Campbell, K. L., Hill, J., Palmer, M., ... & Kelly, J. T. (2023). 'We work in silos': Exploring clinicians' perspectives on the dietary management of coronary heart disease and type 2 diabetes in an Australian public hospital and community health service. *Nutrition & Dietetics*, 80(3), 307-319. <https://doi.org/10.1111/1747-0080.12789>
- Mercer, T. (2019). Mitigating the Burden of Diabetes in Sub-Saharan Africa through an Integrated Diagonal Health System Approach. *Moi School of Medicine, Eldoret Kenya*, 12:2261-2272. <https://www.tandfonline.com/doi/full/10.2147/DMSO.S207427>
- Ministry of Health (2020). *Kenya national strategy for the prevention & control of non-communicable disease*. Government of Kenya.
- Ministry of Health (2015). *Kenya national strategy for the prevention & control of non-communicable disease*. Government of Kenya.
- Misra, R. (2023). Prevalence & factors associated with diagnosed diabetes mellitus among Asian Indian adults in the United State. *PLO Global Public Health, West Virginia, Untied States*, 3(2):e0001551. doi: 10.1371/journal.
- Mohamed, H. (2020). *Factors Associated With Health Seeking and Utilization Behaviour among the Somali Community in Garissa County, Kenya* [Masters thesis Jomo Kenyatta University of Agriculture and Technology] <http://localhost/xmlui/handle/123456789/5388>
- Mohamed, M. , Farah, M. , Ali, M. , Mohamed, N. & Hassan, A. (2021) Knowledge, Attitude and Practice on Common Diabetic Patients among Diabetic Complications at Egyptian Hospital in Mogadishu, Somalia. *Journal of Biosciences and Medicines*, 9, 87-99. doi: 10.4236/jbm.2021.99008.
- Mokaya, M., Saruni, E., Kyallo, F., Vangoitsenhoven, R., & Matthys, C. (2022). Perceived facilitators and barriers to healthy dietary behaviour in adults with type

- 2 diabetes mellitus in Kenya: A qualitative study. *Public Health Nutrition*, 25(12), 3335-3343. doi: 10.1017/S136898002200221X.
- Muoki, F., Kabiru, E. W., & Wanyoro, A. (2021,). Influence of socio-demographic characteristics on management of type 2 diabetes mellitus among T2DM clients in Nyandarua South Sub-County, Kenya. *International Journal of Scientific Research and Analysis*, 2(1), Article 0013. <https://doi.org/10.30574/ijsra.2021.2.1.0013>
- Nations, U. (2015). *Strategic Development Goals 3*. United States: Food and Agricultural Organization of the United Nations.
- Neven, A. C., Lake, A. J., Williams, A., O'Reilly, S. L., Hendrieckx, C., Morrison, M., ... & ME-MaGDA Study Group. (2022). Barriers to and enablers of postpartum health behaviours among women from diverse cultural backgrounds with prior gestational diabetes: A systematic review and qualitative synthesis applying the theoretical domains framework. *Diabetic Medicine*, 39(11), e14945.. <https://doi.org/10.1111/dme.14945>
- Peyyety, V., Zupa, M. F., Hewitt, B., Rodriguez Gonzalez, A., Mani, I., Prioleau, T., ... & Vajravelu, M. E. (2023). Barriers and facilitators to uptake of continuous glucose monitoring for management of type 2 diabetes mellitus in youth. *The science of diabetes self-management and care*, 49(6), 426-437. <https://doi.org/10.1177/26350106231205030>
- Pourman, G. (2020). An application of the theory of planned behaviour to self-care in patients' with hypertension. *BMC Public Health* 20, 1290 <https://doi.org/10.1186/s12889-020-09385-y>
- Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., ... & Uelman, S. (2020). Diabetes self-management education and support in adults with type 2 diabetes: a consensus report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the

- American Pharmacists Association. *Journal of the American Pharmacists Association*, 60(6), e1-e18. <https://doi.org/10.2337/dci20-0023>
- Reeves, D., Woodham, A. A., French, D., Bower, P., Holland, F., Kontopantelis, E., & Cotterill, S. (2023). The influence of demographic, health and psychosocial factors on patient uptake of the English NHS diabetes prevention programme. *BMC Health Services Research*, 23(1), 352. <https://doi.org/10.1186/s12913-023-09195-z>
- Ross, J., Cotterill, S., Bower, P., & Murray, E. (2023). Influences on patient uptake of and engagement with the National Health Service Digital Diabetes Prevention Programme: qualitative interview study. *Journal of Medical Internet Research*, 25, e40961. <https://www.jmir.org/2023/1/e40961/>
- Sarah, K., Abdillahi, H. S., Reuben, M., & Lydia, A. (2021). Prevalence and risk factors associated with diabetes in Meru County, Kenya: a cross-sectional study. *International Journal of Diabetes in Developing Countries*, 41(3), 412-418. <https://www.researchgate.net/publication/348492023>
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752. <https://www.allresearchjournal.com/archives/2017/vol3issue7/PartK/3-7-69-542.pdf>
- Sinha, D. D., Williams, R. C., Hollar, L. N., Lucas, H. R., Johnson-Javois, B., Miller, H. B., ... & Herrick, C. J. (2022). Barriers and facilitators to diabetes screening and prevention after a pregnancy complicated by gestational diabetes. *PLoS One*, 17(11), e0277330. <https://pubmed.ncbi.nlm.nih.gov/36399472/>
- Stotz, S. A., Ricks, K. A., Eisenstat, S. A., Wexler, D. J., & Berkowitz, S. A. (2021). Opportunities for interventions that address socioeconomic barriers to type 2 diabetes management: patient perspectives. *The science of diabetes self-management and care*, 47(2), 153-163 <https://pmc.ncbi.nlm.nih.gov/articles/PMC8647762/>

- Świątoniowska, N., Sarzyńska, K., Szymańska-Chabowska, A., & Jankowska-Polańska, B. (2019). The role of education in type 2 diabetes treatment. *Diabetes research and clinical practice*, 151, 237-246. <https://pubmed.ncbi.nlm.nih.gov/31063855/>
- Travers, J., & Hirschman, K. (2020). Adapting Andersen's exploded behavioural model of health service use to include older adults receiving long-term services support. *BMC Geriatrics, Yale University, United States*, 20(1):58<https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-019-1405-7>
- Vrkatić, A., Grujić, M., Jovičić-Bata, J., & Novaković, B. (2022, November). Nutritional knowledge, confidence, attitudes towards nutritional care and nutrition counselling practice among general practitioners. In *Healthcare* 10(11):2222 <https://pubmed.ncbi.nlm.nih.gov/36360563/>
- Wake, A. D. (2020). Antidiabetic effects of physical activity: how it helps to control type 2 diabetes. *Diabetes, Metabolic Syndrome and Obesity*, 19;(13):2909-2923. <https://pubmed.ncbi.nlm.nih.gov/32884317/>
- Wood, A., O'neal, D., Furler, J., & Ekin, E. I. (2018). Continuous glucose monitoring: a review of the evidence, opportunities for future use and ongoing challenges. *Internal medicine journal*, 48(5), 499-508 <https://doi.org/10.1111/imj.13770>
- Woodward, A., Walters, K., Davies, N., Nimmons, D., Protheroe, J., Chew-Graham, C. A., ... & Armstrong, M. (2024). Barriers and facilitators of self-management of diabetes amongst people experiencing socioeconomic deprivation: a systematic review and qualitative synthesis. *Health Expectations*, 27(3), e14070. <https://doi.org/10.1111/hex.14070>
- Yan, Y. (2022). Prevalence, awareness & control of types 2 diabetes mellitus & risk factors in Chinese elderly population. *BMC Public Health*, 22, 1382 <https://doi.org/10.1186/s12889-022-13759-9>
- Yoon, S., Wee, S., Loh, D. H., Bee, Y. M., & Thumboo, J. (2022). Facilitators and barriers to uptake of community-based diabetes prevention program among multi-ethnic

- Asian patients with prediabetes. *Frontiers in Endocrinology*, 13, 816385.  
<https://pubmed.ncbi.nlm.nih.gov/35295990/>
- Yu, J., & Lee, S. (2022). Recent updates to clinical practice guidelines for diabetes mellitus. *Endocrinology and metabolism. review article, Seoul, Korea* 37(1):26-37. <https://pubmed.ncbi.nlm.nih.gov/35255599/>
- Zavala, G. A., Ainscough, T. S., & Jimenez-Moreno, A. C. (2022). Barriers to a healthy diet and physical activity in Mexican adults: results from the Mexican Health and Nutrition Survey. *Nutrition Bulletin*, 47(3), 298-306.  
<https://pubmed.ncbi.nlm.nih.gov/36045111/>
- Zhang, K. (2018). Theory of Planned Behaviour: Origins, Development and Future direction . *School of Communications, Kwolhool, Hong Kong*, 2341.  
[https://www.ijhssi.org/papers/vol17\(5\)/Version-4/K0705047683.pdf](https://www.ijhssi.org/papers/vol17(5)/Version-4/K0705047683.pdf)

## APPENDICES

### Appendix 1: Research Consent Form

Kenya Methodist University

P.O Box 267-60200

**MERU, Kenya**

#### **SUBJECT: INFORMED CONSENT**

**Dear Respondent,**

My name is Usuba Abass Ahmed, and I am a Kenya Methodist University MSc student. I am working on a study titled; ***Role of Nutritional Counseling In Management of Diabetes among Somali Community in Garissa County.*** By integrating the findings into healthcare policies and practices, significant improvements in healthcare services will be realized, benefiting entire countries, local communities, and individual patients. This research project assumes paramount importance in the context of healthcare system development, as it will furnish cutting-edge insights into effective diabetes management strategies. These insights will empower decision-makers with research-backed evidence, enabling them to formulate informed and targeted interventions tailored to the specific needs of the Somali community and beyond.

#### **Procedure to be followed.**

As part of my research on the role of nutritional counseling in managing diabetes within the Somali community in Garissa County, I may need to seek your participation in interviews or surveys to gather information related to my topic. Your involvement in this

study is entirely voluntary. If you choose not to participate, it will not result in any penalties or harm, nor will it affect your work or standing in any way. Your decision to participate or not will have no repercussions. Additionally, you have the right to decline answering any questions during the interview or survey and can opt to end your participation at any time without any impact on the services you provide. Feel free to ask any questions you may have about the study, and your privacy and confidentiality will be strictly maintained throughout the research process.

### **Discomforts and Risks**

Participating in the study is your choice. You can ask questions anytime. You're free to say no to answering questions or stop the interview whenever you want. You can leave the study anytime without affecting your work.

### **Benefits**

Your involvement will directly contribute to the enhancement of healthcare services, ultimately benefiting entire countries, local communities, and individual patients grappling with diabetes. This research endeavor plays a pivotal role in strengthening healthcare systems, as it will furnish invaluable insights into the efficacy of nutritional counseling in diabetes management within a specific cultural context. These insights will equip decision-makers with the necessary evidence to formulate targeted interventions tailored to the unique needs of the Somali community, thus fostering more effective healthcare delivery and improved health outcomes.

### **Rewards and Bonuses**

It is voluntary and free of charge to participate in this research. There will be no rewards or bonuses for anyone who chooses to participate in it.

### **Confidentiality**

All interviews will be conducted in a private setting within the hospital to ensure participant privacy. Completed surveys will be securely stored at the University, and participants' names will not appear on any of the forms to maintain anonymity.

### **Contact Information**

If you have any inquiries, concerns, or need further details about this research, you are encouraged to reach out to the Kenya Methodist University Scientific Ethics Research Committee. You can contact the Chairperson via email at **serc@kemu.ac.ke** or **VC@kemu.ac.ke**, or by phone at **+254 722912680**.

Name of Interviewer..... Date.....

Interviewer Signature.....

## Appendix II: Research Permits

USUBA ABASS AHMED  
TEL +254722912680  
PO. BOX. 120-70100  
GARISSA  
24<sup>TH</sup> June, 2024

TO THE  
GARISSA COUNTY REFERRAL HOSPITAL MANAGEMENT

Dear Garissa County Referral Hospital Administration,

I hope this letter finds you well. My name is Usuba Abass Ahmed, and I am a master's student in the Public Health program at Kenya Methodist University. I am writing to request a permit and approval to conduct research at your esteemed facility.

For my master's thesis, I am investigating the role of nutrition counselling in the management of diabetes among the Somali community in Garissa County. Considering the high prevalence of diabetes and the unique cultural and dietary practices of the Somali population, this study aims to provide insights that can enhance diabetes care and management within this community.

Specifically, I would like to collect data at the Garissa County Referral Hospital from September 24<sup>th</sup> June to 23<sup>rd</sup> July 2024. During this period, I plan to:

1. Conduct interviews with diabetic patients of Somali descent to understand their experiences, barriers, and perceptions regarding nutrition counselling.
2. Observe the process of nutrition counseling provided to diabetic patients at the hospital's outpatient clinic.
3. Analyze hospital records and data related to the diabetic Somali patient population and their health outcomes.

I have attached a document from NACOSTE and Kenya Methodist University research proposal Master of Public Health program.

I would greatly appreciate your consideration of my request and the opportunity to conduct this important research at the Garissa County Referral Hospital. I believe the findings from this study can contribute to the improvement of diabetes care and management for the Somali community in Garissa County.

Thank you for your time and attention. I look forward to hearing from you and providing any additional information you may require.

Sincerely,

Usuba Abass Ahmed  
Master's Student, Public Health  
Kenya Methodist University





KENYA METHODIST UNIVERSITY

P. O. Box 267 Meru - 60200, Kenya  
Tel: 254-064-30301/31229/30367/31171

Fax: 254-64-30162  
Email: [deanrd@kemu.ac.ke](mailto:deanrd@kemu.ac.ke)

DIRECTORATE OF POSTGRADUATE STUDIES

Our Ref: KeMU/NACOSTI/PHT/04/2024

May 30, 2024

Commission Secretary,  
National Commission for Science, Technology and Innovations,  
P.O. Box 30623-00100  
NAIROBI.

Dear Sir/Madam,

**RE: USUBA ABASS AHMED – (REG. NO. PHT-3-2324-1/2015)**

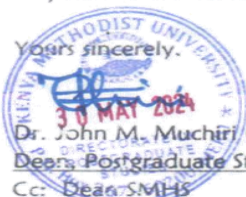
This is to confirm that the above named person is a bona fide student of Kenya Methodist University, in the School of Medicine and Health Sciences, Department of Public Health, Human Nutrition and Dietetics undertaking a Master's Degree in Public Health. He is conducting research on: **"Role of Nutritional Counseling in Management of Diabetes among Somali Community in Garissa County"**.

We confirm that his research proposal has been presented and approved by the University.

In this regard, we are requesting your office to issue a research license to enable him collect data.

Any assistance accorded to him will be highly appreciated.

Yours sincerely,



Dr. John M. Muchiri (PhD)  
Dean, Postgraduate Studies

Cc: Dean SMHS  
CoD - PHT  
Postgraduate Coordinator - PHT  
Supervisors



**KENYA METHODIST UNIVERSITY**

P. O. BOX 267 MERU - 60200, KENYA  
TEL: 254-064-30301/31229/30367/31171

FAX: 254-64-30162  
EMAIL: [info@kemu.ac.ke](mailto:info@kemu.ac.ke)

Our Ref: KeMU/ISERC/PHT/04/2024

May 30, 2024

USUBA ABASS AHMED  
PHT-3-2324-1/2015

Dear Abass,

**SUBJECT: ROLE OF NUTRITIONAL COUNSELLING IN MANAGEMENT OF DIABETES  
AMONG SOMALI COMMUNITY IN GARISSA COUNTY**

This is to inform you that Kenya Methodist University Institutional Scientific Ethics and Review Committee has reviewed and approved your research proposal. Your application approval number is KeMU/ISERC/PHT/04/2024. The approval period is 30<sup>th</sup> May, 2024– 30<sup>th</sup> May, 2025

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 Kenya Methodist University Institutional Scientific Ethics and Review Committee.
- 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 KeMU ISERC within 72 hours of notification.
- IV. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KeMU ISERC within 72 hours.
- V. Clearance for export of biological specimens must be obtained from relevant institutions.



**KENYA METHODIST UNIVERSITY**

P. O. BOX 267 MERU - 60200, KENYA  
TEL: 254-064-30301/31229/30367/31171

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Our Ref: KeMU/ISERC/PHT/04/2024

May 30, 2024

USUBA ABASS AHMED  
PHT-3-2324-1/2015

Dear Abass,

**SUBJECT: ROLE OF NUTRITIONAL COUNSELLING IN MANAGEMENT OF DIABETES  
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- V. Clearance for export of biological specimens must be obtained from relevant institutions.



REPUBLIC OF KENYA

Ref No: 388568

## RESEARCH LICENSE



This is to Certify that Ms. Usma Ahsan Ahmed of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Garissa on the topic: **ROLE OF NUTRITIONAL COUSSELING IN MANAGEMENT OF DIABETES AMONG SOMALI COMMUNITY IN GARISSA COUNTY** for the period ending: **05 June 2025**.

License No: NACOSTI/P/24/36798

388568

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.

See overleaf for conditions

### **Appendix III: Research Instrumentation Tool – Questionnaire**

Instructions: This questionnaire is meant for academic purposes only. Your responses will be treated with utmost confidentiality. Please answer each question honestly and to the best of your knowledge.

#### **SECTION A: Socio-demographic Status of Respondents**

1. Age range (years)
  - ☐ Below 20
  - ☐ 20–29
  - ☐ 30–39
  - ☐ 40–49
  - ☐ 50–59
  - ☐ 60–69
  - ☐ Over 70
2. What is your gender
  - ☐ Male ☐ Female
3. Highest level of education completed
  - ☐ Primary or less ☐ Secondary ☐ Vocational/Trade School ☐ College/University
  - ☐ Postgraduate
4. Marital Status
  - ☐ Single ☐ Married ☐ Divorced ☐ Widowed ☐ Other (Specify): \_\_\_\_\_
5. Do you have children?
  - ☐ Yes ☐ No If Yes, how many? \_\_\_\_\_
6. Type of housing
  - ☐ Owned ☐ Rented ☐ Public housing ☐ Other: \_\_\_\_\_
7. Distance to nearest healthcare/nutrition counselling Centre
  - ☐ Less than 1 Km ☐ 2–5 Km ☐ 6–10 Km ☐ More than 10 Km

8. Access to nutritious food in your community

☐ Easily accessible   ☐ Accessible with difficulty   ☐ Not accessible

9. How important is support from family or friends in managing your diabetes?

☐ Extremely important   ☐ Moderately important   ☐ Somewhat important   ☐ Not important

## **SECTION B: Nutrition Counseling and Diabetes Management**

1. Where do you primarily receive your diabetes care?

☐ Government health facility

☐ Private clinic

2. Have you participated in a nutrition counseling program in the past year?

☐ Yes

☐ No

If yes, how frequently did you attend?

☐ Weekly

☐ Monthly

☐ Occasionally

☐ Once

☐ Not applicable

3. Which services have you received from nutritional therapists at diabetic clinics?

*(Select all that apply)*

☐ Health education

☐ Screening (e.g. blood sugar, weight)

☐ Management of minor ailments

☐ Management of diabetic complications

☐ Other (please specify): \_\_\_\_\_

4. Which aspects of the nutrition counseling program did you enjoy most? *(Select all that apply)*

- ☐ Advice from healthcare providers
- ☐ Social media information (e.g. TikTok, Facebook)
- ☐ Group support / shared experiences
- ☐ Dietary planning and personalized nutrition advice
- ☐ Progress tracking (e.g. weight checks)
- ☐ Not applicable

What challenges did you face when applying the advice?

- ☐ Difficulty giving up favorite foods
- ☐ Financial cost of new diet
- ☐ Lack of family support
- ☐ No challenges
- ☐ Other (please specify): \_\_\_\_\_

5. What positive outcomes have you experienced from the program? *(Select all that apply)*

- ☐ Improved physical activity (e.g. morning walks)
- ☐ Better eating habits
- ☐ Improved energy levels
- ☐ Weight loss
- ☐ Lower blood pressure
- ☐ No noticeable impact
- ☐ Not applicable

How would you rate the overall impact of the nutrition counseling program on your health?

- ☐ Very helpful
- ☐ Somewhat helpful

☐ Neutral

☐ Not helpful

### **SECTION C: Economic Status**

1. Current employment status

☐ Employed full-time ☐ Employed part-time ☐ Self-employed ☐ Unemployed

☐ Retired

2. Health insurance coverage

☐ Yes, through employer ☐ Yes, government program ☐ Yes, private plan ☐ No

3. How do you pay for diabetes or nutrition services?

☐ Out of pocket ☐ Insurance ☐ Waiver/exemption ☐ Other: \_\_\_\_\_

4. Affordability of diabetes medications and supplies

☐ Very easy ☐ Moderately easy ☐ Somewhat difficult ☐ Very difficult

5. Means of transport to nutrition counseling

☐ Walk ☐ Public transport ☐ Private transport ☐ Other: \_\_\_\_\_

6. Has financial difficulty ever limited your access to diabetes care or medications?

☐ Yes ☐ No If yes, explain: \_\_\_\_\_

### **SECTION D: Individual Behaviour**

1. How would you rate your adherence to prescribed medication?

☐ Very high ☐ Moderate ☐ Low ☐ Non-adherence

2. How often do you exercise as part of your diabetes management?

☐ Daily ☐ Several times a week ☐ Once a week ☐ Rarely or never

3. Have you changed your diet since your diagnosis?

☐ Major changes ☐ Some adjustments ☐ No changes ☐ Not sure what changes to make

4. On average, how many servings of fruits and vegetables do you consume per day?

☐ 5 or more ☐ 3–4 ☐ 1–2 ☐ Less than 1

5. How often do you check your blood sugar?

☐ Daily ☐ Several times a week ☐ Once a week ☐ Rarely or never

6. Confidence in managing diabetes

☐ Very confident ☐ Moderately confident ☐ Not confident ☐ Not confident at all

7. Participation in diabetes education/self-management programs

☐ Yes, formal program ☐ Yes, informal education ☐ No, but interested ☐ No, not interested

9. How frequently do you seek information about diabetes?

☐ Regularly ☐ Occasionally ☐ Rarely ☐ Never

10. Impact of stress on diabetes management

☐ Significant ☐ Moderate ☐ Minimal ☐ None

### **SECTION E: Social Policy Influence**

1. Have you received education from healthcare professionals/government on diabetes?

☐ Yes, healthcare professionals ☐ Yes, government programs ☐ No

2. Are you aware of any diabetes-related policies in your community?

☐ Yes ☐ No

3. Have you benefited from any social programs related to diabetes management?

☐ Yes ☐ No

4. Perceived impact of social policy on diabetes management

☐ Greatly helpful ☐ Moderate impact ☐ Minimal impact ☐ Not sure

5. Barriers experienced due to social policy

☐ Yes (Specify): \_\_\_\_\_ ☐ No

6. Are there any specific areas where you feel social policies could be improved to better support individuals with diabetes?

☐ Access to affordable medications and supplies

☐ Access to diabetes education and self-management programs

☐ Support for healthy food options and physical activity

☐ Other, please specify \_\_\_\_\_

7. In your opinion, what role should social policies play in supporting individuals with diabetes in managing their condition effectively?

.....

.....

.....

**8.** How do you think social policies could better address the needs of individuals from disadvantaged socio-economic backgrounds in managing diabetes?

- ☐ Improved access to healthcare services
- ☐ Financial assistance for diabetes-related expenses
- ☐ Community-based support programs
- ☐ Other, please specify.....

**9.** What suggestions do you have for policymakers to enhance social policies and support for individuals with diabetes?

.....

.....

.....

## **SECTION F: Management of Diabetes**

**1.** Please rate your level of confidence in managing your diabetes effectively

|                         |                       |                         |                   |                        |
|-------------------------|-----------------------|-------------------------|-------------------|------------------------|
| Not at all<br>confident | Slightly<br>confident | Moderately<br>confident | Very<br>confident | Extremely<br>confident |
| 1                       | 2                     | 3                       | 4                 | 6                      |

**2.** To what extent do you feel in control of your diabetes management?

|                          |                        |                          |                         |                          |
|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|
| Not at all in<br>control | Slightly in<br>control | Moderately in<br>control | Very much in<br>control | Completely in<br>control |
| 1                        | 2                      | 3                        | 4                       | 5                        |

**8.** Please rate the level of support you receive from healthcare professionals in managing your diabetes

|                      |              |         |              |                      |
|----------------------|--------------|---------|--------------|----------------------|
| Very poor<br>support | Poor support | Neutral | Good support | Excellent<br>support |
|----------------------|--------------|---------|--------------|----------------------|

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

**9.** How well do you adhere to your prescribed diabetes management plan?

|                     |                |         |                |                     |
|---------------------|----------------|---------|----------------|---------------------|
| Very poor adherence | Poor adherence | Neutral | Good adherence | Excellent adherence |
| 1                   | 2              | 3       | 4              | 5                   |

**10.** Please rate the effectiveness of the strategies you use to manage your diabetes on a daily basis:

|                      |                    |                      |                |                     |
|----------------------|--------------------|----------------------|----------------|---------------------|
| Not effective at all | Slightly effective | Moderately effective | Very effective | Extremely effective |
| 1                    | 2                  | 3                    | 4              | 5                   |

**7.** How satisfied are you with the overall management of your diabetes?

|                   |              |         |           |                |
|-------------------|--------------|---------|-----------|----------------|
| Very dissatisfied | Dissatisfied | Neutral | Satisfied | Very satisfied |
| 1                 | 2            | 3       | 4         | 5              |

**8.** To what extent do you feel that your diabetes management plan meets your individual needs and preferences?

|            |          |            |           |            |
|------------|----------|------------|-----------|------------|
| Not at all | Slightly | Moderately | Very much | Completely |
| 1          | 2        | 3          | 4         | 5          |

**9.** Please rate the level of difficulty you experience in incorporating diabetes management into your daily routine:

|                |           |         |      |           |
|----------------|-----------|---------|------|-----------|
| Very difficult | Difficult | Neutral | Easy | Very easy |
| 1              | 2         | 3       | 4    | 5         |

**10.** How well do you understand the importance of various lifestyle factors (diet, exercise, medication) in managing your diabetes?

|                           |                       |                        |                    |                         |
|---------------------------|-----------------------|------------------------|--------------------|-------------------------|
| Very little understanding | Limited understanding | Moderate understanding | Good understanding | Excellent understanding |
| 1                         | 2                     | 3                      | 4                  | 5                       |

**11.** Please rate the impact of your diabetes management on your overall quality of life:

|                         |                    |         |                    |                         |
|-------------------------|--------------------|---------|--------------------|-------------------------|
| Very negative<br>impact | Negative<br>impact | Neutral | Positive<br>impact | Very positive<br>impact |
| 1                       | 2                  | 3       | 4                  | 5                       |

#### **Appendix IV: Key Informant Interview**

1. How would you describe the socio-economic profile of the Somali population in Garissa County and its potential impact on diabetes management?

.....  
.....  
.....

2. In your experience, how does socio-economic status affect access to healthcare services, medication, and dietary choices among Somalis with diabetes?

.....  
.....  
.....

3. Can you provide insights into any specific challenges or barriers faced by individuals from lower socio-economic backgrounds in effectively managing their diabetes?

.....  
.....  
.....

4. What strategies or resources are available to address socio-economic disparities and enhance diabetes management among the Somali population in Garissa County?

.....  
.....  
.....

5. How do you perceive the impact of individual behavior, such as dietary habits, physical activity, and medication adherence, on diabetes management among Somalis in Garissa County?

.....  
.....  
.....

6. Could you share any common patterns or cultural practices among Somalis that may affect diabetes self-management?

.....  
.....  
.....

7. What educational or counseling interventions have you found effective in promoting positive behavior change among individuals with diabetes in this community?

.....  
.....  
.....

9. Are there any specific challenges or misconceptions related to individual behavior that hinder effective diabetes management among Somalis in Garissa County?

.....  
.....  
.....

10. How would you describe the existing social policies or programs related to diabetes management in Garissa County?

.....  
.....  
.....

11. Have you noticed any specific policy gaps or areas for improvement that could enhance diabetes management among the Somali population?

.....  
.....  
.....

12. How does the availability of resources, including healthcare facilities, diabetes education programs, and support networks, impact diabetes management in this community?

.....  
.....  
.....

13. In your opinion, what steps can be taken at the policy level to improve the management of diabetes among Somalis in Garissa County?

.....  
.....  
.....



**Nature Cures** / Dr Sonica Krishan

## Handling Diabetes

Diabetes or high level of sugar in the blood is quite a debilitating disease. With the passage of time, this keeps getting chronic and if not taken proper care it can become life threatening. As the disease progresses, a diabetic patient is prone to serious disorders like heart disease, stroke, kidney disease, and diseases of the nervous system and high blood pressure.

### Some indications:

- ▶ Abnormal thirst and hunger pangs.
- ▶ Vision defects.
- ▶ Increased frequency of urination.
- ▶ Drowsiness and fatigue.
- ▶ Repeated infections.
- ▶ Delayed or non-healing of cuts and wounds.
- ▶ Reduction in stamina.

### What is Diabetes?

When the body doesn't produce enough insulin (required to bind the sugar in the cells), this leaves the body cells emaciated and the sugar begins to build up in the blood leading to a number of complications.

### As per Ayurveda:

In Ayurveda this disease has been termed as Prameha Roga. Twenty types of

Prameha have been specified in Ayurvedic texts:

1) Born out of vitiation of Vatta or air body humor. There are four varieties of the same and are considered incurable.

2) Born out of vitiation of Pitta or fire body humor. There are six varieties of the same and are believed to be difficult to cure.

3) Born out of vitiation of Kapha or phlegm body humor. There are 10 varieties of the same and these are considered to be curable with proper treatment as well as following appropriate lifestyle.

### Keep a check:

For diabetic patients it's important to have their sugar levels assessed from time to time. The normal adult values are - 70 to 110 mg/dl for fasting and 110 to 170 mg/dl for the Post Prandial State.

### Managing diabetes:

▶ Maintaining an ideal weight can bring the sugar levels in control.

▶ A daily regimen of diet low in sugar and carbohydrates is a must.

▶ The food items should be preferably prepared at home. Proper guidance of a dietary expert can be of

good value.

▶ Daily routine of long walks or moderate exercises needs to be practiced.

▶ All the diabetic patients should possibly carry some sugar, glucose or candy dose that should be handy lest the patient goes into hypoglycemia (sudden fall of blood sugar levels below normal).

### Common Cures:

1. Seeds of bitter gourd are to be pounded and the powder to be taken twice with warm water.

2. Juice extracted by grinding fresh bitter gourd is an excellent cure. It would work better when taken on an empty stomach.

3. Bilva is recommended. It has the property of declining the blood sugar levels and abates excessive urination. It could be of more benefit to take the juice extracted from the leaves on an empty stomach in a dose of 10 to 20 ml approx.

4. Being pungent and astringent, Brahmi is believed to be helpful in diabetes. The patients are thus advised to supplement the herb preparations along with their routine therapy.

5. Jamun also comes to use. Patients are advised to

take one teaspoon of the powder prepared by crushing the dried seeds of the fruit at least once daily. This can be supplemented along with the routine medication.

6. Juice extracted from a few fresh leaves of the mango tree when taken along with an equal quantity of the juice of bitter gourd on an empty stomach during the initial stages of the disease, proves beneficial in eradicating the disease.

7. Chew three to five fresh leaflets of Neem first thing in the morning. (This can also be supplemented with the scheduled medicine intake.) The Neem oil and resin removed from inside the bark are also recommended. Being pungent, it also relieves the state of excessive urination.

8. Fresh juice of Aamla can be taken in the dosage of 20 ml approx. once or twice a day.

9. The flour of groundnut is believed to be beneficial. You could mix groundnut flour into wheat flour and make into chappatis.

(Dr. Sonica Krishan is an Ayurveda consultant and physician who also anchors a health show on TV. She may be contacted at drsonica@rediffmail.com.)

## Appendix VI: Map of Study Area



**Source:** Google, (2023)

**End.**