EFFECT OF DIABETES FOOT CARE EDUCATION ON PREVENTIVE PRACTICES AMONG PATIENTS ATTENDING EMBU AND KERUGOYA LEVEL FIVE HOSPITALS, KENYA

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DECLARATION AND APPROVAL

Declaration

This thesis is my original work and has not been presented for an award of diploma or conferment of a degree in any other university or institution

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Recommendation

This thesis has been examined, passed and submitted with our approval as University supervisors.

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DEDICATION

I dedicate this thesis to Almighty God, whose grace and guidance have sustained me throughout this journey. Additionally, it is dedicated to my supportive siblings (Sr Felistus & Linah), and my sons (Benedict & Kelvin) who stood by me with encouragement and prayers.

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ABSTRACT

Diabetic foot disease, often known as ulceration (DFU) is a common complication among patients with Diabetes Mellitus(DM). An estimated 2 million amputations occur each year due to diabetic foot complications. In Kenya, the incidence of diabetic foot illness was 9.04% in 2020. Diabetic foot care (DFC) practice has the potential of reducing DFUs by 75%. Effective DFC practice requires that the patients have the requisite knowledge. Therefore, the purpose of this study was to determine the effect of diabetic foot care education on preventive practices among diabetes patients attending Embu and Kerugoya level five Hospitals-Diabetes clinics. The two facilities were purposely selected based on the previous data supporting poor foot care practices. A Randomized Controlled Trial (RCT) design involving three phases: Baseline survey, intervention and evaluation phase was adopted. Systematic random sampling strategy was used to select 230 participants for the study. A research administered questionnaire was used to collect quantitative data while focus group discussion (FGD) guide to collect qualitative data. Pre-testing of these instrument was done at Chuka level five hospital. During the baseline survey quantitative and qualitative data was collected using questionnaire and four (4) FGD-each with 10 participants respectively. In the intervention phase, the study population was divided into an intervention and control group. Structured foot care education was provided to patients in the intervention group in groups of 25 patients after every one month for a period of three months. The patients in the control group received normal services. In the evaluation phase, data was collected using the same tool as was used in the baseline survey for both the control and the intervention group. Statistical package for social sciences(SPSS) version 29.0 was utilized for the analysis of quantitative data while a thematic analysis of the qualitative data will be conducted with NVIVO version 14 software. Ethical approval was obtained from Chuka University and the National Commission for Science, Technology and Innovation (NACOSTI), with additional permissions from relevant hospitals. Informed consent was obtained from all participants, with confidentiality and anonymity strictly maintained. Data was securely stored and used solely for research purposes. Baseline results in both group generally revealed majority had inadequate foot care knowledge (n=111, 48%), poor foot care behavior (n=172, 75%) and low self-efficacy (n=132, 58%). FGD findings highlighted key barriers to diabetic foot care, including limited education, high healthcare costs, and staff shortages, while also identifying peer support, flexible clinic schedules, and friendly staff as key enablers. Following the educational program, only slight changes were observed in the control group; however, the intervention group showed marked improvements, with statistically significant differences in mean scores between the two groups in knowledge ($\Delta = 2.21$; 95% CI: 1.27–1.14; $p < 0.001$), behavior ($\Delta = 1.02$; 95% CI: 1.09–0.96; $p < 0.001$), and self-efficacy ($\Delta = 1.63$; 95% CI: 1.76–1.50). Thus, the structured diabetic foot care (DFC) education intervention significantly enhanced knowledge, behavior, and self-efficacy among participants in the intervention group. These results confirm that a structured, culturally appropriate, and interactive educational approach is an effective strategy to empower patients, encourage preventive practices, and lower the risk of diabetic foot complications. Consequently, the study recommends that nurses incorporate structured foot care education sessions into routine diabetes clinic visits. Future research should explore its long-term impact on foot ulcers, hospitalizations, and amputations

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LIST OF ABBREVIATIONS AND ACRONYMS

ADA	American Diabetes Association
AOR	Adjusted Odds Ratio
ADCES	Association of Diabetic Care and Education Specialist
BMI	Body Mass Index
CI	Confidence Interval
CHVs	Community Health Volunteers
DFC	Diabetic Foot Care
DM	Diabetes Mellitus
DFU	Diabetes Foot Ulcer
DF	Diabetes Foot
DFD	Diabetic Foot Disease
DPN	Diabetic Peripheral Neuropathy
DFCSES	Diabetic Foot Care Self-Efficacy scale
DFCE	Diabetes Foot Care Education
FGDs	Focused Group Discussions
HMIS	Health Management Information System
HBM	Health Belief Model
ICU	Intensive Care Unit
IWGDF	International Working Group on the Diabetic Foot
IDF	International Diabetes Federation
LOPS	Loss of Protective Sensation
LMICs	Low- and Middle-Income Countries
LEA	Lower Extremity Amputation
M & E	Monitoring and Evaluation
MoH	Ministry of Health
NACOSTI	National Commission for Science, Technology and Innovation
NCD	Non-Communicable Diseases
NHIF	National Hospital Insurance Fund
PN	Peripheral Neuropathy
PAD	Peripheral Artery Disease
RCTs	Randomized Controlled Trials

SPSS	Statistical Packages for Social Sciences
SCT	Social Cognitive Theory
SHA	Social Health Authority
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus

CHAPTER ONE
INTRODUCTION

1.1 Background Information

Diabetes Mellitus (DM) refers to a group of metabolic disorders characterized by chronic hyperglycemia due to defects in insulin secretion, insulin action, or both (Schleicher et al., 2022). Prolonged hyperglycemia is associated with various microvascular complications—such as neuropathy, nephropathy, and retinopathy—as well as macrovascular conditions, including coronary artery disease, cerebrovascular disease, and peripheral arterial disease (Saeedi et al., 2019). Among the most serious and common long-term complications of poorly managed diabetes is the development of diabetic foot ulcers (DFUs) (IDF, 2020).

Diabetes Foot Ulcers (DFUs) involve a range of complications including deep tissue injury, ulceration, and infection, often resulting from a combination of diabetic peripheral neuropathy (DPN) and peripheral arterial disease (PAD) (Wang et al., 2020). While the prevalence of diabetic foot complications varies globally, the pathogenesis often involves a similar set of factors—particularly the coexistence of DPN and PAD (Schaper et al., 2020). These conditions, when interacting with foot-specific issues (e.g., deformities, previous ulcerations) and patient-specific factors (e.g., cardiovascular disease, retinopathy, smoking, physical inactivity), significantly increase the risk of DFU and adverse outcomes such as infection, amputation, and mortality (McDermott et al., 2023).

Diabetes Peripheral Neuropathy (DPN) is defined as the presence of symptoms and/or signs of peripheral nerve dysfunction in individuals with diabetes after excluding other causes. It frequently presents as symmetrical polyneuropathy with or without pain and sensory disturbances and may be asymptomatic in up to 50% of cases (van Netten et al., 2020; Hicks & Selvin, 2019). PAD, on the other hand, is an obstructive vascular disease that leads to diminished blood flow in the limbs, often contributing to delayed wound healing, infection, and increased risk of amputation (van Netten et al., 2020). Peripheral Artery Disease (PAD) accounts for 50–70% of DFU cases and is a major determinant of poor outcomes in both Type 1 and Type 2 diabetes (Chamberlain et al., 2022).

Globally, an estimated 536.6 million adults were living with diabetes in 2021, and this figure is projected to rise to 783.2 million by 2045 (Ogurtsova et al., 2021). Of this population, around 130 million are at high risk of developing diabetic foot disease (DFD), 20 million already have DFD, and up to 2 million require amputations annually (Zhang et al., 2020). In Sub-Saharan Africa (SSA), the diabetic population was estimated at 19 million in 2019 and is expected to increase to 47 million by 2045 (IDF, 2020). Diabetic foot complications represent a significant public health challenge across Africa, often progressing to severe infections or gangrene, leading to extended hospital stays and high mortality rates (Abbas, 2020; Naemi et al., 2020). Notably, DPN has been identified as a major risk factor, with reported prevalence in countries such as Mali (70%), Ethiopia (45%), and Tanzania (91%) (Abbas & Boulton, 2020).

In Kenya, a study conducted at Mathari National Teaching and Referral Hospital found that 56.5% of patients were at moderate-to-high risk for diabetic foot complications (Nduati et al., 2022). This has been linked to low levels of foot self-care, inadequate foot assessment practices, and limited awareness of diabetic complications among both patients and healthcare providers (Metwally, 2022; Wanja et al., 2019; Mbisi & Ngari, 2020). In Kerugoya Referral Hospital, poor adherence to physical activity and dietary recommendations—both indicators of suboptimal glycemic control—was reported (Miriti & Muthoni, 2022). Similarly, in Level 5 hospitals in Embu and Meru, 45.1% to 51.2% of diabetic patients did not engage in proper foot care practices (Wanja et al., 2019).

Preventing diabetic foot ulcers (DFUs) and subsequent lower-limb amputations is essential for reducing the immense physical, emotional, and financial burden on both patients and healthcare systems. Studies have demonstrated that with the implementation of appropriate risk-reduction strategies, up to 75% of DFUs and 80% of amputations are preventable (van Netten et al., 2020; Ministry of Health, 2018). One key and cost-effective preventive measure is diabetic foot care (DFC) education. Effective DFC education enhances patient knowledge, encourages the adoption of preventive foot care behaviors, and strengthens self-efficacy, particularly among individuals with peripheral neuropathy who are at the highest risk for foot complications (Goodal et al., 2020; Meryl & Hiske, 2020). Additionally, well-informed patients are

more likely to recognize early warning signs and seek timely medical attention, thereby improving outcomes and reducing complications.

Van Netten, Woodburn, and Bus (2020) assert that preventing foot ulcers and amputations is essential to reducing the significant cost on patients, healthcare systems, and society at large. Additionally, Van Netten et al. (2020), argues that, with the right risk-controlling strategy, up to 75% of DFUs might be avoidable. Ministry of Health (MoH) guidelines on prevention of diabetic foot complication also argues that approximately 80% of amputations are preventable with the appropriate intervention (Ministry of Health, 2018). One such strategy is diabetic foot care (DFC) education (Goodal et al., 2020). Through diabetes education, people can learn about practical strategies for managing their condition and make the required lifestyle adjustments (Meryl & Hiske, 2020). Besides, diabetic foot care education is a valuable technique for improving understanding or adherence to foot care behaviors. It is especially beneficial for patients who are at risk, such as those who have peripheral neuropathy (van Netten, et al., 2020).

International and national guidelines—including those from the International Working Group on the Diabetic Foot (IWGDF) and the Kenyan Ministry of Health (MoH)—advocate for five key strategies to prevent DFUs: (1) identifying at-risk feet; (2) conducting regular foot examinations; (3) educating patients, families, and healthcare workers; (4) ensuring appropriate footwear; and (5) addressing modifiable risk factors (Nicolaas et al., 2020; MoH, 2018). In addition to the five principles, tight glycemic control has been highlighted as a critical preventive measure. Poor glycemic management is a primary contributor to both DPN and PAD, which are central to DFU pathogenesis. Therefore, maintaining optimal blood glucose levels is essential not only for overall diabetes management but also for preventing the onset and progression of foot complications (Miranda et al., 2021).

Given the continued high prevalence of diabetic foot complications—despite the availability of evidence-based prevention strategies—there is a growing need to prioritize patient-centered interventions, particularly in resource-limited settings like Kenya. Diabetic foot care (DFC) education is recognized as a low-cost, effective tool for enhancing self-care knowledge, promoting preventive behaviors, and improving

self-efficacy among individuals with diabetes (Goodal et al., 2020). In such contexts, where access to advanced care is limited, education remains the most feasible and impactful approach to reduce foot-related morbidity and mortality (Abbas & Boulton, 2022). However, there is limited empirical evidence demonstrating the effectiveness of structured DFC education in improving patient outcomes related to knowledge, behavior, and self-efficacy (Goodal et al., 2020). This study, therefore, seeks to address this gap by evaluating the effectiveness of a structured diabetic foot care education intervention on self-care knowledge, behavior, and self-efficacy among diabetic patients attending outpatient clinics in selected hospitals in Kenya.

The proposed intervention aligns with Sustainable Development Goal 3.4, which aims to reduce premature mortality from non-communicable diseases (NCDs) through prevention and treatment by 2030 (United Nations,2023). It also supports Kenya's journey toward Universal Health Coverage (UHC) by expanding access to promotive and preventive care—particularly for underserved populations who may lack access to specialist services (Ministry of Health [MoH], 2021). Moreover, this study is aligned with the priorities outlined in the Kenya National Strategic Plan for the Prevention and Control of NCDs 2021/22–2025/26, which emphasizes self-management, health education, and community-level interventions as key strategies for reducing NCD burden (MoH, 2021). The Kenya National Clinical Guidelines for the Management of Diabetes (2nd Edition, 2018) further highlight patient empowerment and behavior change communication as essential components in diabetic foot care and complication prevention.

1.2 Statement of the Problem

Patients with diabetes mellitus (DM) are at a significantly high risk of preventable morbidity and disability due to diabetic foot ulcerations (DFUs), a major microvascular complication of poorly controlled diabetes. Globally, DFUs contribute to substantial health burdens, with an estimated 20 million people affected and up to 2 million requiring amputations annually, many of which are avoidable. Effective diabetic foot care (DFC) education has been shown to improve patients' adherence to foot care practices, enhance self-efficacy, and reduce the risk of foot complications. However, despite existing international and national guidelines emphasizing education as a key preventive strategy, adherence to foot care practices remains low in many low-resource

settings. In Kenya, studies have reported poor foot care behaviors among diabetic patients, with non-adherence rates ranging between 45.1% and 51.2% in public hospitals, particularly in Embu and Meru counties. The underlying cause of this poor adherence is not clearly understood—whether it stems from a lack of awareness due to inadequate education or from the ineffectiveness of education in influencing behavior remains unclear. There is a paucity of empirical evidence to support the effectiveness of DFC education in this context. Therefore, this study seeks to determine the impact of structured diabetic foot care education on preventive practices among diabetic patients attending Embu and Kerugoya Level Five Hospitals.

1.3 Objectives of the Study

1.3.1 Broad Objectives

To evaluate the effect of a structured diabetic foot care education intervention on foot care knowledge, self-care behaviors, and self-efficacy among patients with Diabetes Mellitus attending Embu and Kerugoya Level 5 Hospitals over a 6-months period.

1.3.2 Specific Objectives

i. To determine levels of diabetic foot care knowledge among diabetic patient attending Embu and Kerugoya Level 5 hospitals
ii. To assess diabetic foot care behavior level among diabetic patient attending Embu and Kerugoya Level 5 hospitals
iii. To determine levels of diabetic foot care self-efficacy among patient attending Embu and Kerugoya Level 5 hospitals
iv. To identify factors influencing diabetic foot prevention practices among patient attending Embu and Kerugoya Level hospitals
v. To evaluate the effect of DFC education on foot care knowledge among patients attending Embu and Kerugoya Level 5 hospitals
vi. To evaluate the effect of DFC education on diabetic foot care skills among patient attending Embu and Kerugoya Level 5 hospitals
vii. To evaluate the effect of DFC education on diabetic foot self-efficacy among patient attending Embu and Kerugoya Level 5 hospitals

1.4 Research Questions and Hypothesis

1.4.1 Research Questions

i. What is the levels of diabetic foot care knowledge among diabetic patient attending Embu and Kerugoya Level 5 hospitals?
ii. What is the foot care skills level among diabetic patient attending Embu and Kerugoya Level 5 hospitals?
iii. What is levels of diabetic foot care self-efficacy among patient attending Embu and Kerugoya Level 5 hospitals
iv. What factors influence diabetic foot prevention practices among patient attending Embu and Kerugoya Level hospitals

1.4.2 Hypothesis of the Study

Ho1: There is no statistically significant relationship between the DFC education intervention and diabetic foot care knowledge among patient attending Embu and Kerugoya Level 5 hospitals

Ho2: There is no statistically significant relationship between the DFC education intervention and diabetic foot care skills among patient attending Embu and Kerugoya Level 5 hospitals

Ho3: There is no statistically significant relationship between the DFC education intervention and diabetic foot self- efficacy among patient attending Embu and Kerugoya Level 5 hospitals

1.6 Significance of the Study

This study provides crucial evidence on the effectiveness of structured diabetic foot care (DFC) education in improving foot care knowledge, self-care practices, and self-efficacy among patients with diabetes mellitus. The findings have implications for clinical practice, policy development, and healthcare management. For healthcare providers, integrating structured DFC education into routine outpatient care can significantly reduce the incidence of diabetic foot ulcers (DFUs), thus lowering preventable hospital admissions, amputations, and associated costs. Hospital administrators can benefit from reduced pressure on staff and resources, as fewer patients require advanced care for foot complications. At the policy level, the results support the development and implementation of national guidelines that institutionalize

diabetic foot assessments and patient education in both hospital and community-based diabetes management programs. The Ministry of Health and other stakeholders can use this evidence to prioritize DFC education as a cost-effective preventive strategy. For patients, the intervention empowers them with the knowledge and skills to engage in effective self-care, improving their quality of life and reducing the risk of long-term disability. Lastly, this study contributes to the body of knowledge in medical-surgical nursing and chronic disease management, offering a foundation for future research and practice in low-resource settings.

1.7 Scope of the Study

The study was conducted at Embu and Kerugoya Level 5 Hospitals in Kenya. The target population comprised patients diagnosed with either Type I or Type II Diabetes Mellitus who were attending the diabetic clinics at the selected facilities. A randomized controlled trial (RCT) design was employed to evaluate the effectiveness of a structured diabetic foot care education intervention. The study was implemented in three phases: a baseline (pre-intervention) survey, the intervention phase, and a post-intervention evaluation. Baseline data were collected using researcher-administered structured questionnaires and focus group discussions (FGDs) to assess participants' knowledge, self-care behavior, and self-efficacy regarding diabetic foot care. Following the implementation of the education intervention, post-intervention data were collected using the same structured questionnaires to allow for comparison and analysis of changes over time. The entire study was carried out over a period of six months, allowing sufficient time for intervention delivery and outcome measurement.

1.8 Operational Definition of Terms

Appropriate footwear:	Refers to protective, well-fitted shoes that are specifically designed to minimize foot trauma, evenly distribute plantar pressure, and accommodate foot deformities.
Diabetic foot care education:	Refers to a structured, evidence-based instructional approach aimed at enhancing the knowledge, behaviors, and self-efficacy of individuals with diabetes in preventing foot complications
Diabetic foot:	This refers to infection, ulceration or generation of the foot's tissues in a person with a history of diabetes mellitus, neuropathy, and/or peripheral artery disease.
Effects:	This refers to consequences of diabetic foot care education on individual foot care knowledge, self efficacy and self care skills
Foot care knowledge:	An individual's acquired knowledge of diabetic foot ulcer preventive strategies, such as glycemic control, identifying the at-risk foot and regularly inspecting and examining it, attending regular diabetic foot care educational programs, wearing appropriate footwear on a regular basis, and treating ulceration risk factors
Glycemic control:	An individual responsibility to exercise frequently, adhere to diabetes diet and take medication as prescribed
Preventive practices:	Individual effort to make an attempt to stop DFU from developing. These are; managing blood sugar levels, routinely checking and examining the feet, wearing the proper footwear, and addressing ulceration risk factors
Patient:	Every person with diabetes mellitus, whether type 1 or type 2
Regular inspection and examination of the foot:	An individual effort to have feet checked by a health care provider on a regular basis and physically examine their foot for deformities, abundant callus, pre-ulcerative signs (such as blisters, fissures, and hemorrhage), limited joint

	mobility, foot pain when walking or at rest, numbness or claudication, abnormal skin color, temperature, or oedema, and good foot hygiene. Report any of these observations appropriately
Self-efficacy:	Refers to a diabetic patient's confidence in their ability to carry out behaviors that help prevent foot complications, such as achieving glycemic control, regular foot inspection, appropriate foot wear, and proper foot ulcer risk management
Self-efficacy indicators:	Are measurable aspects or dimensions that reflect a diabetic patient's belief in their ability to successfully perform specific behaviors aimed at preventing foot complications. These indicators are typically observed through Bandura's three key domains:Magnitude, strength and generality
Magnitude:	The level of difficulty of foot care tasks a patient believes they can perform.
Strength:	The degree of confidence in consistently performing foot care behaviors.
Generality:	The extent to which this confidence applies across different situations and environments
Treatment of risk factors for ulceration:	Taking personal responsibility for managing or getting professional help for any pre-ulcerative symptoms, such as a lot of callus, an ingrown toenail, or fungal infections on their foot

1.9 Expected Study Output

i. A thesis on the effect of diabetes foot care education on preventive practices among diabetes mellitus patients
ii. A policy brief written based on study findings
iii. Two publication on the effect of diabetes foot care education on preventive practices among diabetes mellitus patients were done in the refeered journals

iv. These outputs are intended to influence clinical practice, guide health policy, and promote further research in diabetic foot care prevention.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Diabetic Foot

Diabetic foot ulcers (DFUs) are among the most common and serious chronic complications of diabetes mellitus, posing a significant threat to patients' quality of life and accounting for high rates of morbidity, hospitalization, and mortality globally (van Netten et al., 2020). DFUs typically develop due to a combination of peripheral neuropathy, peripheral arterial disease (PAD), and local trauma, which together lead to skin breakdown, tissue damage, and delayed wound healing (van Netten et al., 2020). In Kenya, national guidelines associate diabetic foot complications with key risk factors such as sensory, motor, and autonomic neuropathy, ischemia, and structural deformities (Ministry of Health, 2018). Neuropathy, vascular insufficiency, and infection represent the three major pathophysiological mechanisms underlying the development of DFUs (Raja et al., 2023).

Peripheral neuropathy often presents as a symmetric polyneuropathy involving sensory, motor, and autonomic nerve fibers (Saeedi et al., 2019). Motor neuropathy contributes to foot deformities and biomechanical abnormalities that increase pressure points; sensory neuropathy results in the loss of protective sensation, making the foot vulnerable to unnoticed injuries; and autonomic neuropathy causes dryness and skin fissures due to reduced sweat gland function (Smith et al., 2022; Sidawy & Perler, 2019). These alterations contribute to skin breakdown and ulceration. PAD, on the other hand, compromises blood flow, making wounds ischemic and difficult to heal (Bereda, 2022). The interaction of PN and PAD significantly contributes to the pathogenesis of diabetic foot complications, including Charcot neuroarthropathy, ulcers, and infections, often culminating in limb amputations or death (Edmonds et al., 2021).

Globally, diabetic foot ulcers affect an estimated 18.6 million people each year and account for about 80% of diabetes-related lower limb amputations (Armstrong et al., 2023). The mortality rate associated with these complications is equally alarming. For instance, Armstrong et al. (2020) reported that five years after developing a diabetic foot ulcer, mortality rates reach 30%, rising to over 70% for individuals who undergo major amputations. A recent study by Senneville et al. (2023) found that 50% of diabetic

foot ulcers become infected, and 15–20% of these infections result in lower limb amputations. Hospitalization is required in up to 20% of cases.

In sub-Saharan Africa (SSA), the burden of diabetic foot ulcers is rising alongside the increasing prevalence of diabetes mellitus. Peripheral neuropathy remains the most common cause of foot complications, though PAD appears to be increasing due to lifestyle changes associated with urbanization (Abbas, 2020; Abbas & Boulton, 2022). These complications pose a major public health concern, often leading to gangrene, sepsis, prolonged hospitalization, and high mortality. The consequences of diabetic foot complications are particularly severe in SSA, where limited access to specialized care and financial constraints further exacerbate outcomes. The resulting impact on life expectancy and healthcare expenditure is significant, placing additional strain on already under-resourced health systems (Naemi et al., 2020; Abbas & Boulton, 2022).

The complex etiology of diabetic foot ulcers makes treatment challenging and highlights the need for effective preventive strategies. Among these, patient education on foot care is recognized as the most cost-effective and feasible intervention, especially in low-resource settings. It plays a central role in promoting behavioral change and enhancing early detection of foot problems (Schaper et al., 2020; Evangelakou et al., 2022). When properly implemented, foot care education has the potential to significantly reduce the incidence of foot ulcers and amputations. According to the International Working Group on the Diabetic Foot (IWGDF), repeated, structured, and well-planned education is essential in preventing diabetic foot complications, especially in regions where advanced treatment options are limited (Schaper et al., 2020). The objective of diabetic foot care (DFC) education is to improve patients' knowledge of foot self-care, promote protective behaviors, and build self-efficacy—the confidence and motivation to consistently perform preventive behaviors.

Despite the known benefits of DFC education, several studies have reported significant gaps in foot care knowledge and practices. Manickum et al. (2021) found that knowledge and practice among individuals with diabetes ranged widely from inadequate to relatively sufficient, with many patients lacking even basic foot care awareness. Pourkazemi et al. (2020) reported similarly low levels of knowledge and poor self-care practices among diabetic patients in Iran. In Kenya, Mbisi and Ngari

(2020) found that only 45% of diabetic patients practiced proper foot care, while 42.7% had limited knowledge on the subject. These findings point to a pressing need for improved and targeted educational programs, especially in areas where access to podiatric or specialist care is minimal.

While the IWGDF emphasizes the importance of educating individuals about the signs and symptoms of pre-ulcerative foot conditions and the steps to take when issues arise (Bus et al., 2020), there is still insufficient evidence to support the effectiveness of education alone in reducing ulcer and amputation rates without the inclusion of other preventive interventions (Miranda, Da Ros, & Marfella, 2021). Nonetheless, studies have shown that individuals who gain knowledge, acquire practical foot care skills, and build self-efficacy are more likely to engage in preventive behaviors that reduce risk (Bus et al., 2020). The role of self-efficacy is particularly critical, as it determines whether patients can translate knowledge into consistent, long-term behavioral change.

This study was conducted to determine the baseline levels of diabetic foot care knowledge, behavior, and self-efficacy among patients attending outpatient clinics in Kenya. Following the identification of key gaps, a customized educational intervention was developed and implemented. The effectiveness of this structured intervention was subsequently evaluated. By addressing knowledge deficits and promoting evidence-based foot care practices, the study aimed to enhance self-efficacy and contribute to the reduction of diabetic foot complications, particularly within resource-limited settings.

2.2 Diabetes Foot Care Knowledge

International and national guidelines consistently recommend six core components for the prevention of diabetic foot ulcers (DFUs) (Miranda et al., 2021; Ministry of Health, 2018; Schaper et al., 2020). These components include: (1) optimal glycemic control; (2) early identification of at-risk feet; (3) regular inspection and examination of at-risk feet; (4) patient, caregiver, and healthcare provider education; (5) consistent use of appropriate footwear; and (6) treatment of modifiable risk factors for ulceration. Among these, diabetic foot care (DFC) education is considered one of the most effective interventions for improving patient knowledge and promoting preventive behaviors (Schaper et al., 2020). Despite this recognition, the International Working Group on the Diabetic Foot (IWGDF) notes that there remains limited global evidence on the

effectiveness of patient education alone in improving outcomes related to foot care and ulcer prevention (Bus et al., 2023).

Effective foot care education should equip individuals with diabetes with accessible, practical information to support self-care (Goodall et al., 2020). However, evidence on the actual impact of such education remains inconclusive. For instance, a systematic review by Norman et al. (2020) found that although several studies have investigated DFU prevention strategies, there is limited high-quality evidence demonstrating clear benefits of educational interventions. The delivery method of patient education also plays a critical role in its effectiveness. Heng et al. (2020) argue that collaborative, patient-centered approaches yield better knowledge retention and promote more consistent self-care behaviors compared to traditional didactic strategies. Unfortunately, the implementation of such collaborative models remains limited in many low- and middle-income countries (LMICs) due to systemic barriers including staff shortages, heavy clinical workloads, insufficient resources, and both patient and provider attitudes (Abdulrhim et al., 2021).

Despite the existence of policy guidelines on DFU prevention, several studies continue to report substantial knowledge gaps among people living with diabetes. For example, Pourkazemi et al. (2020) observed low levels of knowledge and awareness related to foot care and ulcer prevention among diabetic patients. Similarly, Alshammari et al. (2022) demonstrated that structured foot care education significantly improved patient awareness and practices. In response to these persistent gaps, the present study was undertaken to assess baseline knowledge levels, identify deficiencies, and develop a structured, patient-centered educational module tailored to the needs of diabetic patients. Following this, a randomized controlled intervention was conducted to evaluate the effectiveness of the education program in enhancing patients' knowledge and understanding of diabetic foot prevention.

2.3 Diabetes Foot Self-Care Behavior

Foot self-care is recognized as one of the most critical self-management practices in the prevention of diabetic foot ulcers (DFUs) (Mekonen & Demssie, 2022). However, effective engagement in preventive behaviors is largely dependent on adequate patient education. As Coffey et al. (2019) emphasize, patients cannot be expected to participate

in appropriate foot care practices without receiving the necessary knowledge and guidance. Diabetic foot care (DFC) education, therefore, plays a pivotal role in enabling individuals with diabetes to adopt and sustain self-care behaviors. In support of this, Wilson et al. (2022) argue that focused behavioral instruction for individuals identified as at-risk is essential in preventing the onset of DFUs, especially given the delays in seeking care that often follow ulceration.

To be effective, such education must cover critical aspects of foot care, including awareness of foot deformities, loss of protective sensation (LOPS), peripheral arterial disease (PAD), the importance of daily foot inspection, the use of appropriate footwear, and proper skin and nail care practices (American Diabetes Association, 2022). Structured and targeted instruction in foot-specific self-care has been shown to improve preventive behavior in patients at risk of DFU (van Netten et al., 2020). As such, preventive foot care education represents a viable and practical strategy for mitigating the risk of diabetic foot complications (Oluchi et al., 2023).

In both international and Kenyan clinical guidelines, DFC education is positioned as a central component of comprehensive diabetic foot prevention protocols (Ministry of Health, 2018; Schaper et al., 2020). Despite this, the body of high-quality evidence supporting its effectiveness—particularly in influencing foot care behaviors—remains limited (Goodall et al., 2020). Furthermore, studies suggest that education alone, when not complemented by additional preventive interventions, may not be sufficient to significantly reduce the incidence of DFUs and related amputations (Goodall et al., 2020).

Multiple studies have highlighted persistent gaps in foot care practices, often attributed to a lack of education and access to preventive services. For instance, a study conducted in Indonesia by Sari et al. (2020) revealed that poor foot care behaviors were largely due to patients not receiving adequate information about foot care management. Similarly, research by Jin et al. (2020) in a Beijing endocrinology clinic found that patients exhibited moderate to poor knowledge and behaviors related to foot care. Several barriers were identified in these studies, including the limited provision of foot care education to patients without existing ulcers, difficulties in accessing healthcare providers for timely appointments, and overall gaps in preventive outreach (Fayfman et

al., 2020). These findings point to a lack of proactive educational programs targeting individuals at low or moderate risk—those who could benefit most from early intervention to prevent initial complications.

Emerging evidence supports the role of well-structured educational interventions in preventing diabetic foot complications. Oluchi et al. (2023) report that carefully designed foot care programs can significantly reduce the burden of diabetic foot illness. According to Heng et al. (2020), successful interventions must actively engage patients in their own care, fostering internal motivation and promoting long-term behavioral change. Moreover, effective programs should consider individual patient factors such as gender, culture, health literacy, and socio-economic context (Bus et al., 2020). In resource-limited settings, traditional educational models—which rely heavily on didactic information delivery—have shown limited effectiveness in improving self-care behaviors (Heng et al., 2020). Therefore, the study sought to develop a customized education modules based on the baseline survey and other local and international guidelines and evaluate its impacts on health related habits such as foot care practices.

2.4 Diabetic Foot Care Self-efficacy

Self-efficacy, a central construct in Albert Bandura's Social Cognitive Theory, refers to an individual's belief in their capacity to execute specific behaviors and achieve desired outcomes (Bandura, 1982). It significantly influences motivation, cognitive patterns, emotional responses, and behavioral choices (Bandura, 1997). In essence, individuals' perceptions of their ability to perform specific tasks play a critical role in determining the types of behaviors they engage in, the effort they invest, their persistence in the face of challenges, and their emotional regulation throughout the process.

Within the context of diabetes management, self-efficacy is particularly crucial, as it directly impacts the performance of daily self-care activities, including foot care. Educational interventions designed to enhance self-efficacy have been shown to encourage more proactive and consistent foot self-care behaviors, which are essential in preventing diabetic foot complications (Ikura et al., 2021). Juarez et al. (2021) found a positive correlation between diabetes self-management education, improved self-care practices, and enhanced self-efficacy, further supporting the importance of education in behavior change.

Studies have consistently indicated that individuals with high self-efficacy are more likely to engage in preventive practices and demonstrate better adherence to self-care routines, thereby reducing the risk of complications and improving overall quality of life (Lee et al., 2019). For instance, a study conducted in Indonesia by Huda et al. (2021) reported that self-efficacy-focused education significantly reinforced patients' confidence and competence in performing foot care, which in turn contributed to reduced risk of foot injuries.

Bandura (1977) identifies four principal sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological/emotional states. These components serve as the foundation of self-efficacy-enhancing interventions. Mastery experiences stem from an individual's previous successful encounters with a task, while vicarious experiences are gained through observing others succeed in similar situations (Waddington, 2023). In diabetes education, demonstrating foot care techniques can provide both mastery and vicarious experiences, enhancing patients' belief in their ability to perform such tasks effectively. Verbal persuasion—encouragement and feedback from healthcare professionals—can further reinforce positive behavior, while the interpretation of physiological and affective responses also influences confidence in self-care capabilities (Waddington, 2023).

When nurses model proper foot care practices and patients emulate these actions, learning is facilitated through observational modeling—an approach supported by Bandura's concept of social learning (Bandura, 1989). Huda et al. (2019) also noted that verbal encouragement from healthcare providers plays a significant role in shaping and sustaining foot care behaviors. Juwita et al. (2023) emphasize that incorporating all four sources of efficacy is critical for building the confidence necessary to achieve behavior change objectives within educational interventions.

Moreover, enhancing self-efficacy through educational strategies such as goal setting, peer modeling, repeated skill practice, documentation of self-management activities, and the use of positive reinforcement has been shown to be effective (Juwita et al., 2023). Given that self-efficacy is a major determinant of health-related behavior, particularly among individuals with diabetes, its promotion must be a central objective of any patient education program (Delshad et al., 2023). Poor foot care behaviors are

often indicative of a failure to address self-efficacy within educational interventions, and inadequate self-efficacy is likely to contribute to the development and recurrence of diabetic foot ulcers.

This concern is substantiated by Fu et al. (2019), who, in a systematic review and meta-analysis, reported a pooled annual recurrence rate of 22.1% for diabetic foot ulcers, indicating persistent self-care challenges despite existing education efforts. Similarly, Yıldırım et al. (2022), in a meta-analysis of nine studies and a systematic review of twenty-six, found that while diabetic foot education improved knowledge and behavior, it often did not result in significant improvements in self-efficacy. These findings underscore the need for more targeted and evidence-based educational interventions.

One of the reasons for this persistent gap in self-efficacy outcomes may be the continued reliance on traditional, didactic forms of education, which are insufficient to equip patients with the necessary skills and confidence to manage their condition effectively (Heng et al., 2020). In contrast, the Association of Diabetes Care and Education Specialists [ADCES] (2021) advocates for a person-centered, strengths-based approach that considers the individual's broader context, including personal relationships, cultural background, and daily life circumstances. To address gaps in diabetic foot care (DFC) education, this study assessed baseline knowledge, needs, and self-efficacy among diabetic patients. Findings informed the development of a context-specific, evidence-based educational module, which was implemented and evaluated through a randomized controlled trial.

2.5 Factors Influencing Diabetic Foot Care Practices

Diabetes-related foot ulcers (DFUs) are among the most common and debilitating complications of diabetes mellitus, significantly increasing the risk of infection, hospitalization, lower-extremity amputation, and mortality (McDermott et al., 2023). The American Diabetes Association (2019) identifies foot ulcers and subsequent amputations as major contributors to morbidity and mortality among individuals with diabetes. These complications are typically associated with multiple interacting risk factors, including previous ulcers or amputations, foot deformities, diabetic neuropathy, and peripheral artery disease (PAD) (Bus et al., 2023; ADA, 2019; Miranda et al., 2021).

The prevention of diabetic foot complications relies on early identification and management of these risk factors, as well as sustained patient and caregiver education (Miranda et al., 2021). Schaper et al. (2020) emphasize that structured patient education is one of the most effective strategies for preventing diabetic foot-related complications. Consistent with this, both international and national guidelines underscore the importance of health education in diabetic foot care (DFC), citing evidence that up to 75–80% of diabetes-related foot complications can be prevented through effective educational interventions (Ministry of Health, 2018; Schaper et al., 2020; Miranda et al., 2021).

Despite this evidence, several barriers continue to hinder the effective implementation of foot care education and practice. These challenges include patient-related factors such as limited knowledge, low self-efficacy, and inadequate foot care skills (McPherson et al., 2022; Sari et al., 2020; Qin et al., 2020), as well as systemic obstacles such as limited access to care and financial constraints (Fayfman et al., 2020). However, studies have demonstrated that well-designed foot care education interventions can mitigate many of these barriers and significantly reduce the risk of diabetic foot complications (Schaper et al., 2020). Pourkazemi et al. (2020) reported that improved understanding and consistent practice of foot care reduced the likelihood of ulceration and amputation. Similarly, Toygar et al. (2020) identified self-efficacy as a critical determinant in translating education into preventive self-care behavior.

Further research has revealed the complexity of these barriers. Coffey et al. (2019), in a qualitative study, found that many at-risk individuals feel powerless to prevent DFUs due to limited awareness, lack of perceived need for self-care, and negative perceptions about therapeutic footwear. Other contributing factors include decreased motivation to seek care, financial burden due to lack of insurance coverage, and insufficient communication or support from healthcare providers (Dawkins et al., 2021; Tan et al., 2022). Delshad et al. (2023) and Zhu et al. (2023) also highlighted the role of low self-efficacy, with patients demonstrating weak self-concept, perceived loss of control, and low perceived risk of complications. Pouwer et al. (2023) further noted that cognitive and physical limitations, absence of symptoms, and unprofessional communication styles from providers also undermine preventive foot care practices.

Van Netten et al. (2020) advocate for a paradigm shift from stratified healthcare approaches to personalized care in diabetic foot disease, arguing that addressing barriers in isolation is insufficient. Instead, integrated, evidence-based, and patient-centered strategies tailored to individual needs are required. Within this framework, diabetic foot care education remains a central strategy for reducing the burden of lower limb complications (Heng et al., 2020). However, conventional, didactic approaches in routine clinical settings have shown limited effectiveness in promoting long-term knowledge retention and behavioral change when compared to more interactive and participatory models (Heng et al., 2020).

In light of these insights, the present study aimed to evaluate the specific barriers affecting foot care preventive practices among diabetic patients, develop a culturally relevant and evidence-informed education module, and assess its impact through a structured intervention. This approach sought to address the persistent gaps in patient education and self-efficacy, with the goal of promoting sustainable behavior change and reducing the risk of diabetic foot complications in the local context.

2.6 Theoretical Framework

Figure 1 presents the conceptual framework guiding this study, developed through the integration of the Health Belief Model (HBM) and Social Cognitive Theory (SCT**)**. This logic model demonstrates the pathway from theoretical constructs to the design of the intervention, outlining how specific inputs and activities are expected to influence behavior change and health outcomes among individuals with diabetes. The framework highlights key constructs from both models—HBM (perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy) and SCT (self-efficacy, behavioral capability, observational learning, reinforcement, and environment)—to explain and support the mechanisms through which diabetic foot care education may enhance preventive behaviors and improve patient outcomes (Rosenstock, 1974; Bandura, 1986). This integrated model provides a structured approach to understanding how the intervention components are expected to lead to improved foot self-care practices and a reduction in diabetic foot complications.

Theoretical framework

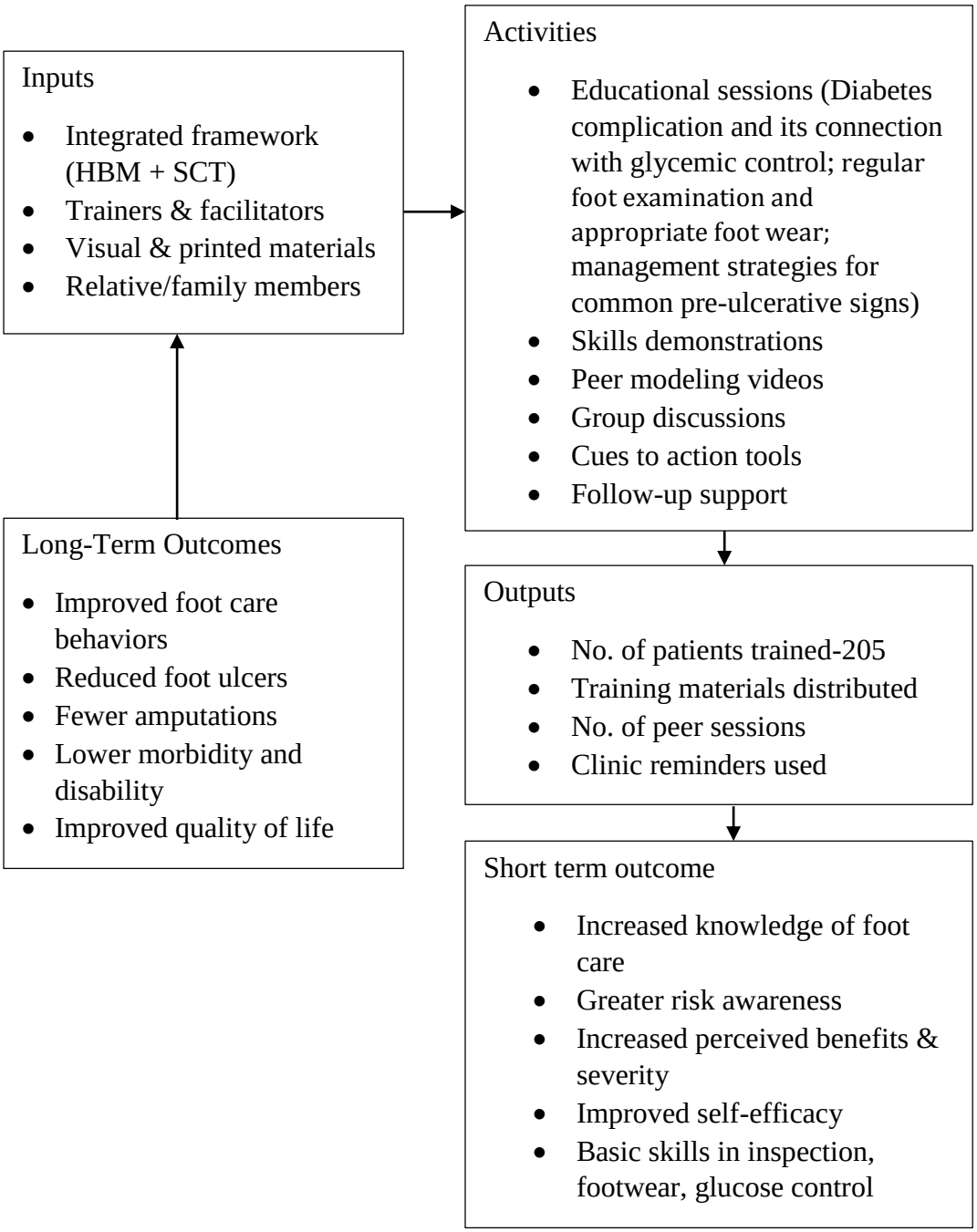

Figure 1: Theoretical Framework Showing Logic Model for DFC Health Education Intervention

Effective Prevention of diabetic foot complications requires more than just clinical care—it demands a well-structured, theory-informed approach to behavior change. In this context, health education plays a pivotal role in empowering individuals with diabetes to adopt and sustain preventive foot care behaviors. To maximize its impact,

health education interventions must be guided by robust theoretical models that explain both why people choose to engage in health behaviors and how they acquire and maintain these behaviors over time. This study integrated two well-established behavioral theories—the Health Belief Model (HBM) and Bandura's Social Cognitive Theory (SCT)—to form a conceptual framework that informs the design, implementation, and evaluation of a diabetes foot care education intervention. The integration of these theories provided a multidimensional understanding of health behavior, combining cognitive, emotional, and social determinants that influence an individual's ability to prevent diabetic foot complications.

The Health Belief Model (HBM) offered a lens through which patients' health beliefs—such as perceived susceptibility to foot ulcers, perceived severity of diabetic foot complications, and perceived benefits versus barriers to foot care—can be understood and addressed through educational strategies. Additionally, HBM includes the concept of cues to action, which highlights the importance of external triggers such as health education messages or reminders that motivate patients to take preventive action. Most importantly, the model recognizes self-efficacy as a key determinant of whether a person will initiate and sustain behavior change.

However, while the HBM explains the motivation to act, it offers limited guidance on how individuals develop the skills and confidence necessary to carry out and maintain the desired health behaviors. This is where Bandura's Social Cognitive Theory (SCT) becomes essential. SCT emphasizes the role of self-efficacy, behavioral capability, observational learning, and environmental influences in shaping and sustaining behavior. These constructs help guide the practical components of health education, such as skills training, peer modeling, supportive environments, and positive reinforcement. By combining HBM and SCT, the conceptual addressed both the motivational determinants (why a person would want to change) and the behavioral and environmental enablers (how they can successfully change). This integrated approach ensured that the health education intervention was comprehensive, patient-centered, and evidence-based—capable of addressing the multiple factors that affect diabetes foot care behavior.

In the context of this study, the integrated conceptual framework served as a foundational guide for the development of a targeted health education intervention aimed at promoting diabetes foot care prevention. It informed the design of activities that aim to increase patients' awareness of their individual risk of developing foot complications, thereby enhancing their perception of susceptibility and the seriousness of potential outcomes resulting from poor foot care practices. The framework also emphasized the need to communicate the effectiveness and value of preventive measures such as regular foot inspection, glycemic control, and the use of appropriate footwear.

Additionally, the intervention was structured to identify and address both personal and systemic barriers that may hinder the adoption of foot care practices. By equipping individuals with relevant knowledge and hands-on skills, the program enhances their behavioral capability in managing foot health. Central to the framework is the promotion of self-efficacy, which was cultivated through guided practice, positive feedback, and peer or community-based support. Furthermore, the intervention was designed to facilitate sustained behavioral change by leveraging environmental reinforcements and engaging community resources that support ongoing self-care efforts. This approach ensures that the educational intervention is comprehensive, patient-centered, and grounded in behavioral theory, thereby increasing its potential effectiveness in preventing diabetic foot complications.

While the integration of HBM and SCT offers a comprehensive framework for understanding and influencing behavior change, this approach may be limited by its reliance on individual-level cognitive factors, potentially underemphasizing broader structural or systemic barriers—such as poverty, healthcare access, and cultural norms—that also impact diabetic foot care practices. Additionally, overlapping constructs like self-efficacy in both models may create conceptual redundancy, complicating the clarity of intervention pathways.

2.7 Conceptual Framework

The conceptual framework for this study is presented in the figure 2 below

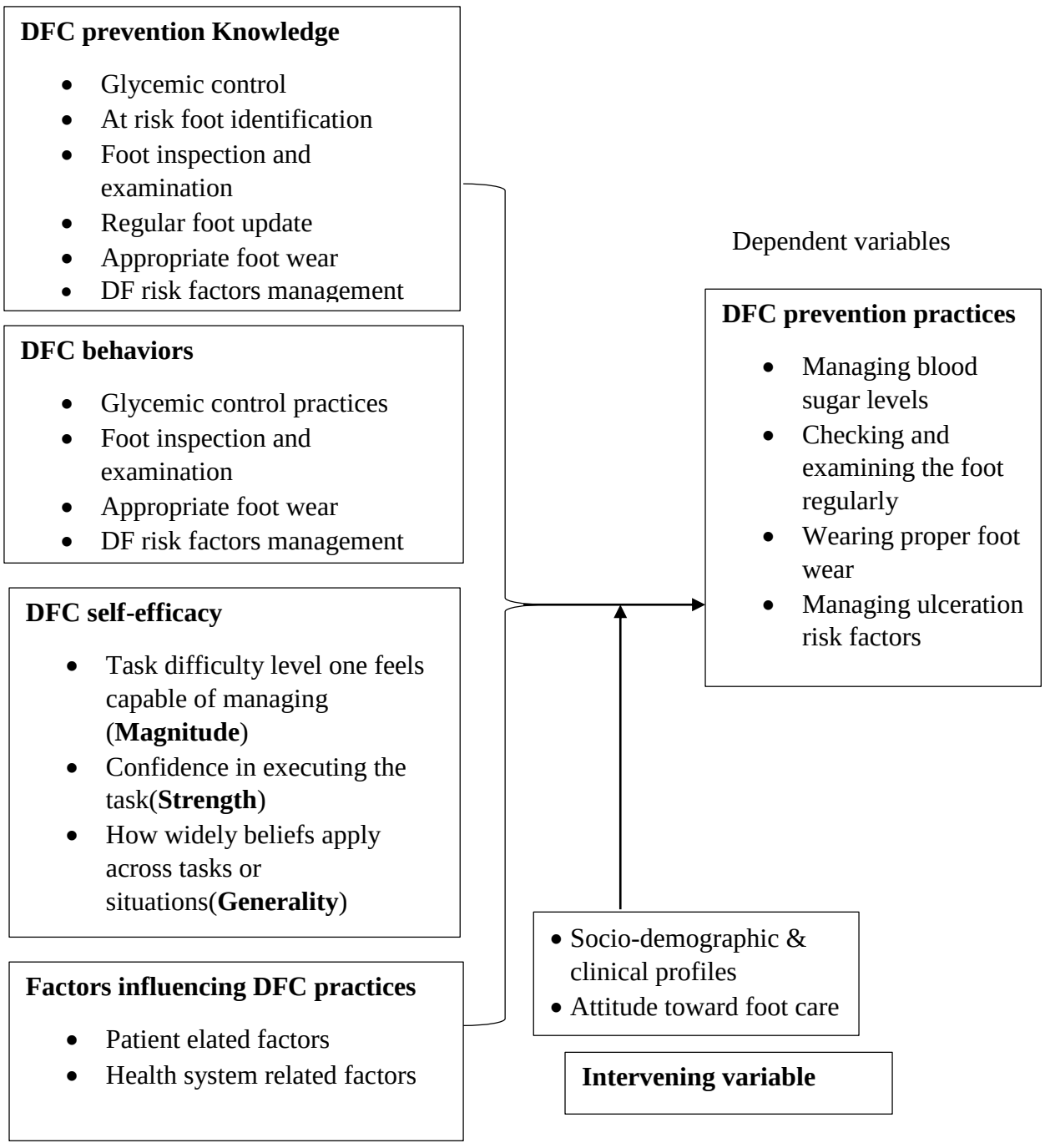

Figure 2: Conceptual Framework

The prevention of diabetic foot complications is a multifaceted process influenced by several interrelated variables, including knowledge, self-efficacy, behaviors, and contextual factors. At the foundation of diabetic foot care (DFC) is the individual's knowledge concerning key preventive domains such as glycemic control, foot risk

identification, foot inspection and examination, appropriate footwear use, and the management of diabetic foot (DF) risk factors. This knowledge serves as the primary independent variable and forms the basis upon which individuals recognize the importance of and strategies for preventing foot-related complications. However, knowledge alone is insufficient to ensure effective preventive practices. It must be internalized and supported by DFC self-efficacy, which refers to an individual's belief in their capability to execute specific foot care behaviors. Self-efficacy is multidimensional, encompassing the magnitude (range of behaviors a person believes they can perform), strength (confidence in performing those behaviors), and generality (belief in their ability to apply the behaviors across various situations). Higher levels of self-efficacy are associated with greater motivation and persistence in adopting health-promoting behaviors, including those related to foot care.

The interaction between knowledge and self-efficacy significantly influences DFC behaviors—the actual practices individuals undertake, such as regular blood glucose monitoring, foot inspections, proper footwear use, and the management of foot-related risk factors. These behaviors represent the intermediate processes that mediate the relationship between knowledge/self-efficacy and the ultimate outcome: DFC preventive practices. Preventive practices refer to the sustained and consistent execution of protective health behaviors, including glycemic control, routine foot inspection, the use of appropriate footwear, and the proactive management of ulceration risks. The progression from knowledge to preventive practice is further shaped by various intervening factors, including socio-demographic and clinical characteristics (e.g., age, education level, duration of diabetes, comorbidities) as well as attitudinal dispositions toward foot care. These factors can either facilitate or hinder the acquisition of knowledge, development of self-efficacy, and execution of preventive behaviors.

In summary, DFC preventive practices are the product of a dynamic interplay among several variables. Knowledge and self-efficacy function as foundational elements that shape DFC behaviors, which in turn translate into preventive practices. This pathway is moderated by individual attitudes, socio-demographic and clinical profiles. Therefore, comprehensive interventions aimed at improving diabetic foot care should not only focus on enhancing patient knowledge but also strengthen self-efficacy and address contextual enablers and barriers to behavior change.

CHAPTER THREE
METHODOLOGY

3.1 Study Area

The study was carried out in the diabetic outpatient clinic in Embu and Kerugoya Level 5 Teaching and Referal hospitals. Embu hospital is located 120 KM from Nairobi and 1km from Embu town along the Nairobi-Meru highway. It is located in municipality location of Embu west subcounty. Its global positioning coordinates are 0.5239 ^{0} S, 37.4525 ^{0} E, along Nairobi-Meru Highway. This hospital serves residents of Embu County and also referral cases from the neighbouring counties of Tharaka Nithi, Kirinyaga, Kitui and Machakos. The hospital has a 618 bed capacity serving specialized and general cases. Specialized units include ICU, and Renal units. The hospital attends to 29, 393 outpatients 10,599 inpatients and 5,340 deliveries annualy. There are 15 specialists 32 general practitioners and 230 nurses among other staff working in the facility. The diabetic clinic operates daily Monday to Friday,from 8am to 5pm and serves about 439 patients monthly.

Kerugoya hospital is located 8 KM from Kutus and situated within Kerugoya town along the Kutus-Kerugoya highway. It is located in municipality location of Kirinyaga central subcounty. Its global positioning coordinates are 0°31'15.3"S 37°17'43.6"E. This hospital serves residents of Kirinyaga County and also referral cases from the neighbouring counties, such as Nyeri, Muranga, Embu. The hospital has a 254 bed capacity serving specialized and general cases. Specialized units include ICU, and Renal units. The hospital attends to 12,528 outpatients, 3,504 inpatients and 3,180 deliveries annualy. There are 13 specialists, 25 general practitioners and 174 nurses among other staff working in the facility.The diabetic clinic operates daily Monday to Friday, from 8am to 5pm and serves about 289 patients monthly. These two facilities were picked as the study area because of the previous studies done in Embu and Kerugoya hospital respectively which indicated poor foot care practices (Mbisi,et al., 2019; Miriti & Muthoni, 2022).

3.2 Study Design

This study employed a Randomized Controlled Trial (RCT) design to evaluate the effectiveness of a structured health education intervention on improving diabetic foot care (DFC) knowledge, preventive behaviors, and self-efficacy among individuals

living with diabetes. The RCT design was selected due to its methodological rigor and its capacity to establish causal relationships between an intervention and observed outcomes. It is widely regarded as the gold standard in both clinical and behavioral health research, particularly when the objective is to assess the efficacy of educational or therapeutic interventions (Dawadi et al., 2021).

The rationale for selecting an RCT was twofold. First, the intervention was designed to influence modifiable factors such as knowledge, self-efficacy, and preventive behaviors—outcomes that are sensitive to both behavioral change theories and educational exposure. The intervention was informed by the Health Belief Model (HBM) and Bandura's Social Cognitive Theory (SCT), which emphasize the role of perceived risk, self-efficacy, and outcome expectancies in motivating health behavior change. To robustly test the impact of this theory-driven intervention, a randomized design was deemed most appropriate, as it allows for the isolation of the intervention effect by minimizing selection bias and controlling for both known and unknown confounding variables.

Second, the use of random allocation to intervention and control groups ensured the equitable distribution of baseline characteristics across groups. This enhances the internal validity of the study by reducing the likelihood that observed differences in outcomes are due to pre-existing group differences rather than the intervention itself (Alsan & Finkelstein, 2021). By comparing the outcomes of participants who received the health education intervention with those receiving standard care, the study aimed to generate high-quality evidence on the effectiveness of educational strategies for promoting diabetic foot care.

3.3 Population of the Study

This study was conducted among patients diagnosed with Type I and Type II Diabetes Mellitus attending outpatient diabetic clinics at Embu Level 5 Teaching and Referral Hospital and Kerugoya Level 5 Teaching and Referral Hospital, both located in Kenya. These two hospitals serve as major referral centers for diabetes care in their respective counties and provide routine outpatient diabetes management, including medical consultation, education, and complication screening. According to data extracted from the respective health records registers at Embu and Kerugoya Level 5 Hospitals (2023),

Embu Level 5 Hospital recorded an average annual clinic attendance of approximately 954 diabetic patients in 2023, reflecting an 8% increase from the previous year. Similarly, Kerugoya Level 5 Hospital reported an average of about 683 diabetic patients, representing a 6% increase compared to 2022. These upward trends underscore the growing burden of diabetes in the region and highlight the pressing need for preventive education and behavioral interventions aimed at minimizing diabetes-related complications, particularly diabetic foot ulcers (DFUs) (Embu Level 5 Hospital Health Records, 2023; Kerugoya Level 5 Hospital Health Records, 2023).

The sample size was determined using Chan's formula, guided by a clinically significant difference of 0.2 units and a standard deviation of 0.5 units. Based on these parameters, the calculated minimum sample size was 200 participants. To account for a potential attrition rate of 15%, an additional 30 participants were included, resulting in a final sample size of 230. Using systematic random sampling, this sample was drawn proportionally from the diabetic clinic populations of the respective hospitals, ensuring representative coverage of the target population

The study was conducted in three distinct phases: the baseline survey, the intervention phase, and the post-intervention (evaluation) phase. Each phase was systematically structured to address specific research objectives and was implemented sequentially to ensure coherence in study execution. Participants were assigned to either the intervention or control group using a predetermined allocation strategy, and their engagement in each phase was guided accordingly. This phased approach enabled the assessment of both baseline characteristics and the impact of the intervention over time.

3.3.1 Baseline Survey

The baseline survey constituted the initial phase of the study and was designed to collect pre-intervention data from participants attending diabetic clinics at Embu Level 5 Hospital and Kerugoya Level 5 Teaching and Referral Hospital. A total of 230 participants were recruited during this phase. The sample size was determined using Chan's formula (2003), as described in Section 3.4.1, based on a clinically significant difference of 0.2 units and a standard deviation of 0.5 units. After adjusting for a 15% attrition rate, the final sample size of 230 was achieved to ensure adequate statistical power for detecting differences between the intervention and control groups.

The baseline survey served as a needs assessment to establish participants' initial levels of knowledge, behaviors, and self-efficacy related to diabetic foot care (DFC). Data collection was conducted using a structured and validated questionnaire, which covered key domains including glycemic control practices, frequency and technique of foot inspection, footwear selection, and risk factor management. The survey also assessed participants' confidence in performing foot care tasks, along with perceived barriers and facilitators to proper foot care.

This phase provided a comprehensive profile of the study population's pre-intervention status and established a reference point for evaluating changes following the implementation of the health education intervention. The data obtained informed both the development and evaluation of the subsequent intervention phase.

3.3.1.1 Inclusion Criteria

Participants were eligible for inclusion in the study if they met the following criteria:

i. Diagnosed with diabetes mellitus and registered at the diabetic clinic of either Embu Level 5 Hospital or Kerugoya Level 5 Teaching and Referral Hospital.
ii. Provided informed consent to participate in the study.
iii. Had no active diabetic foot ulcer at the time of recruitment.

3.3.1.2 Exclusion Criteria

Participants were excluded from the study if they met any of the following conditions:

i. Not registered at the diabetic clinics of the selected health facilities.
ii. Unable or unwilling to provide informed consent.
iii. Presented with an active diabetic foot ulcer at the time of the baseline survey.

3.3.2 Intervention Phase

The intervention phase represented a critical component of the study, designed to address the knowledge, behavioral, and self-efficacy gaps identified during the baseline survey. This phase involved the development and implementation of a structured, evidence-based health education program specifically tailored to diabetic foot care (DFC). The content of the intervention was informed by the findings from the initial needs assessment and aligned with internationally recognized guidelines—such as those from the International Working Group on the Diabetic Foot (IWGDF)—as well as

national diabetes management protocols outlined by Kenya's Ministry of Health. This alignment ensured that the intervention was both contextually appropriate and scientifically robust.

The educational program was developed to be comprehensive, patient-centered, and responsive to the specific needs of the target population. Key components of the curriculum focused on enhancing participants' understanding of diabetes-related complications, particularly the association between poor glycemic control and the risk of neuropathy, vascular impairment, and diabetic foot ulcers (DFUs). Educational sessions emphasized the pathophysiology of diabetic foot complications, including how prolonged hyperglycemia leads to nerve and blood vessel damage, contributing to reduced sensation and impaired wound healing.

Participants were trained on essential self-care practices aimed at preventing foot complications. These included daily foot inspection techniques, recognition of early warning signs such as redness, blisters, swelling, or skin discoloration, and the importance of timely reporting of abnormalities. Proper hygiene practices and care for common pre-ulcerative conditions—such as calluses, fungal infections, and dry skin—were also addressed. The program further provided guidance on appropriate footwear selection, emphasizing the need for protective, well-fitting shoes to reduce injury and pressure points, while discouraging walking barefoot or using inappropriate footwear.

The intervention was delivered to 115 participants who had been randomly assigned to the intervention group. Educational sessions were conducted during regular clinic visits and utilized a multimodal approach, including health talks, visual demonstrations, printed materials, interactive discussions, and practical skills training. The sessions incorporated behavior change strategies grounded in the Health Belief Model (HBM) and Bandura's Social Cognitive Theory (SCT), emphasizing perceived susceptibility, benefits of action, reduction of perceived barriers, and enhancement of self-efficacy through modeling and reinforcement.

Conversely, the control group, comprising an equal number of 115 participants, continued to receive standard care at the diabetic outpatient clinics in Kerugoya Level 5 Hospitals. Routine care typically involved general foot care advice provided by

healthcare professionals but did not include structured educational content, demonstrations, or targeted behavioral interventions. No additional materials or education sessions were offered to this group during the study period.

This distinction between the intervention and control groups facilitated a controlled comparison, enabling a rigorous assessment of the effectiveness of the educational intervention in improving diabetic foot care knowledge, practices, and self-management behaviors relative to standard clinical care.

3.3.3 Evaluation Phase

The third and final phase of the study comprised the evaluation phase, which aimed to assess the overall effectiveness of the diabetic foot care (DFC) educational intervention. This phase involved a systematic post-intervention assessment, comparing outcome measures between the intervention group, which received the structured health education program, and the control group, which continued with routine clinical care.

The evaluation focused on three key domains: knowledge, behavior, and self-efficacy related to diabetic foot care. First, participants' knowledge of diabetic foot care was assessed by examining their understanding of essential concepts, including glycemic control, identification of risk factors, proper foot inspection techniques, appropriate footwear selection, and the management of early warning signs. These post-intervention knowledge scores were compared to baseline data to evaluate the extent of knowledge improvement resulting from the intervention.

Second, foot care behaviors were examined to determine whether participants had adopted and maintained recommended self-care practices. Specifically, the assessment focused on the frequency of daily foot inspections, consistency in blood glucose monitoring, adherence to appropriate footwear use, and overall foot hygiene management. This analysis was conducted to evaluate whether the intervention group exhibited meaningful improvements in self-care behavior compared to the control group.

Third, the evaluation assessed self-efficacy in foot care using validated self-efficacy measurement tools. This involved examining three dimensions of self-efficacy:

magnitude (the level of difficulty of tasks participants felt confident performing), strength (the consistency of maintaining foot care routines under varying conditions), and generality (the ability to apply foot care skills across different situations).

Overall, the evaluation phase provided a robust framework for determining the effectiveness of the structured health education intervention in improving diabetic foot care outcomes. The data generated during this phase offered evidence not only of the intervention's impact but also of its relevance, applicability, and potential for broader implementation in similar healthcare settings. Furthermore, the findings informed recommendations for enhancing diabetic foot care education programs and guiding future research in this area.

3.4 Sample Size Determination and Sampling Procedure

3.4.1 Sample Size Determination

The sample size was determined using Chan (2003) formula for calculating sample size for controlled interventional studies:

$$m = \frac{2c}{\delta^2} + 1$$

Where

m=sample size per group

δ = standardized effect size

c = 7.9 for 80% power

According to chan's (2003), a clinical significance of 0.2 units with an SD of 0.5 units of a normal distribution is acceptable for controlled trials. The researcher considered 20percent clinical significance with an SD of 0.5 on the change of foot care knowledge, behavior and self-efficacy among the individual with diabetes mellitus.

Therefore:

$$m = \frac{2 \times 7.9}{0.4^2} + 1$$

m= 99.75= 100

Hence 100 X 2 = 200 participants for the two facilities

Since this is a longitudinal study, 15 % of the participants was added to cater for attrition as advised by Cramer, et al.,(2016) bringing the final total sample to 230 participants in both facilities

3.4.2 Sampling Procedure

The study was conducted at Embu Level 5 and Kerugoya Level 5 Teaching and Referral Hospitals, both of which were purposively selected as study sites. This selection was informed by previous research indicating suboptimal diabetic foot care (DFC) practices among patients attending outpatient diabetic clinics in these facilities. Additionally, both hospitals function as major referral centers within their respective counties and provide specialized diabetic care services, making them appropriate settings for evaluating the impact of a structured foot care intervention.

To enhance representativeness and reduce potential selection bias, a stratified random sampling approach was adopted. The two hospitals were treated as separate strata—Stratum A representing Embu and Stratum B representing Kerugoya. Within each stratum, systematic random sampling was employed to select participants. This method was chosen due to its ability to ensure equal probability of selection while maintaining operational feasibility in busy outpatient clinic settings. Systematic sampling is particularly advantageous in field-based healthcare research where patient flow is continuous, as it allows for an orderly and replicable selection process without compromising randomness.

Based on the known diabetic clinic populations and the predetermined sample size of 115 participants per hospital (as described in Section 3.4.1), sampling intervals were calculated. For Embu Level 5 Hospital, which had approximately 954 registered diabetic patients, the sampling interval was determined to be 9 ($954 \div 115 \approx 8.2$). For Kerugoya Level 5 Hospital, with a diabetic clinic population of approximately 683 patients, the interval was calculated as 6 ($683 \div 115 \approx 5.9$). Participant selection commenced on the first day of data collection, beginning with a randomly selected starting point among eligible patients attending the clinic. Thereafter, every 9th eligible patient in Embu and every 6th eligible patient in Kerugoya was recruited into the study until the required sample size was attained in each facility.

In addition to the quantitative sample, a subset of 40 participants was purposively selected to participate in qualitative focus group discussions (FGDs). This subgroup was drawn from the pool of eligible study participants who met the inclusion criteria and had lived with either type I or type II diabetes mellitus for a duration exceeding five

years. The purposive sampling strategy for the qualitative component was intended to capture in-depth perspectives, lived experiences, and perceived barriers related to diabetic foot care, particularly from individuals with long-term exposure to diabetic management services.

This multi-stage sampling approach—comprising purposive site selection, stratified random sampling, systematic participant selection, and purposive sampling for qualitative inquiry—was adopted to strengthen the methodological rigor, enhance the internal validity of the study, and ensure that both the quantitative and qualitative components were grounded in a representative and contextually relevant participant population.

3.5 Research Instrument

The study utilized various data collection tools depending on type of data and phase of the study

3.5.1 Baseline Survey

In Phase I, quantitative data were collected using two types of researcher-developed questionnaires. A semi-structured questionnaire was used to gather data on socio-demographic and clinical characteristics. A Likert-scale questionnaire assessed participants' levels of knowledge, foot care behavior, and self-efficacy in diabetic foot (DF) care. Both tools were pretested for clarity, reliability, and contextual relevance, and were administered in person during routine clinic visits by trained research assistants fluent in both English and Kiswahili to ensure accurate comprehension and response accuracy.

To assess participants’ knowledge of diabetic foot care (DFC), a set of items was developed and rated using a five-point Likert scale. Participants were asked to indicate their level of agreement with each knowledge-related statement, with response options ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). This scaling method enabled the measurement of the intensity of agreement, thereby capturing variations in the depth of participants’ knowledge regarding key aspects of DFC.

For analytical clarity and to facilitate interpretation, the Likert scale responses were categorized into three levels of knowledge. A mean score of less than 2.5 was interpreted as indicating poor knowledge, reflecting general disagreement with correct knowledge statements. Scores between 2.5 and 3.49 were categorized as satisfactory knowledge, suggesting partial understanding or uncertainty regarding recommended foot care practices. A mean score of 3.5 or higher was considered to represent good knowledge, indicating strong agreement with evidence-based DFC concepts. This classification allowed for the summarization of knowledge patterns within the study population and provided a baseline for evaluating changes following the educational intervention.

Following the assessment of knowledge, the study evaluated participants' diabetic foot care (DFC) behaviors using a structured 22-item questionnaire. This tool was designed to capture the extent to which individuals engaged in essential self-care practices related to diabetic foot prevention. Each item was scored using a Likert-type scale ranging from 0 to 3, with response options tailored to specific behavioral actions such as frequency of foot inspection, adherence to glycemic control, use of appropriate footwear, and management of predisposing risk factors.

Due to inconsistencies in the scaling of individual items—where the meaning of scores varied across behavioral domains—a cumulative or mean score was deemed inappropriate, as it could obscure the true patterns of participant behavior. Instead, the study adopted a response-based classification method, which analyzed the distribution of responses for each item individually. This approach allowed for a more nuanced and contextually grounded interpretation of behavior.

Responses were categorized into three behavioral levels: low behavior (scores of 0 or 1), moderate behavior (score of 2), and good behavior (score of 3). For each item, the dominant response among participants determined the overall classification. If the majority of respondents selected 0 or 1, the behavior was considered poor, indicating infrequent or absent engagement in the recommended practice. A majority response of 2 reflected moderate behavior, suggesting occasional or inconsistent practice. Conversely, if the majority selected 3, the behavior was classified as good, indicating regular and consistent adherence to diabetic foot care recommendations.

This analytic strategy prioritized response frequency over aggregated scores, thereby providing a more accurate and representative depiction of actual foot care behaviors. The behavioral domains assessed included key areas such as blood glucose monitoring, daily foot inspection, proper hygiene, footwear selection, and proactive management of risk factors. Diabetic foot care behavior was thus conceptualized in terms of how consistently participants performed these preventive actions in their day-to-day diabetes self-management routines.

In addition to assessing knowledge and behavior, the study measured participants' self-efficacy in diabetic foot care (DFC) using items grounded in Bandura's (1997) theoretical framework, which conceptualizes self-efficacy across three core dimensions: magnitude, strength, and generality. These dimensions reflect, respectively, the perceived difficulty of foot care tasks, the individual's belief in their ability to perform these tasks consistently, and their capacity to apply self-care practices across various situations, including under pressure or in the face of barriers.

Participants rated their responses on a five-point Likert scale ranging from 1 (indicating the lowest perceived level of self-efficacy) to 5 (indicating the highest level). This scale allowed for the quantification of individual confidence in performing preventive DFC behaviors. Self-efficacy was measured in relation to critical self-care domains, including the ability to perform routine foot inspections, maintain glycemic control, select appropriate footwear, and respond effectively to potential complications.

For analysis, mean scores were computed across relevant items, and responses were categorized into three self-efficacy levels to facilitate interpretation and comparison. A mean score of less than 2.5 was interpreted as low self-efficacy, indicating a lack of confidence in the ability to perform foot care tasks consistently. Scores between 2.5 and 3.49 were classified as moderate self-efficacy, suggesting some degree of confidence. A mean score of 3.5 or above reflected high self-efficacy, denoting strong confidence and perceived competence in engaging with DFC tasks consistently, even under difficult conditions.

This categorization framework enabled the identification of patterns in self-efficacy across the study population, providing a foundation for evaluating changes following

the educational intervention. By aligning the measurement with Bandura's established theoretical model, the study ensured conceptual validity and a robust assessment of participants' psychological readiness to implement diabetic foot self-care behaviors.

To explore participants' perceptions, lived experiences, and contextual factors influencing diabetic foot care (DFC) behaviors, qualitative data were collected through Focus Group Discussions (FGDs) conducted at both Embu and Kerugoya Level 5 Hospitals. This qualitative approach allowed for an in-depth examination of beliefs, attitudes, perceived barriers, and facilitators related to preventive foot care—insights that may not be fully captured through structured quantitative instruments.

Each FGD consisted of ten participants, in accordance with qualitative research guidelines which recommend a manageable group size to ensure active participation and maintain discussion quality (Jennifer, 2019). FGDs offer a structured yet flexible platform for gathering rich, descriptive data by encouraging interaction among participants around a specific topic. As noted by Jennifer (2019), this method is particularly effective in generating diverse perspectives, especially on sensitive or complex health issues, within a supportive and moderated environment.

The FGDs were conducted only after the completion of the quantitative data collection phase. This sequencing was intentional, as it allowed the qualitative component to build upon insights drawn from the questionnaire responses and facilitated a more comprehensive understanding of diabetic foot care practices within the same study population. The discussions were guided by a semi-structured FGD guide aligned with the study objectives and were moderated by trained facilitators to ensure depth and relevance of responses

3.5.2 Intervention Phase

In this phase, no data was collected, since it involved development and implementation of education modules based on the need identified in phase one and conducting the education program

3.5.3 Evaluation Phase

In this phase, the same tools used in phase one (baseline survey) was utilized to gather data with the aim of assessing the effect of the health education intervention on foot care behavior, knowledge, and self-efficacy.

3.6 Pre-testing of the Study Tool

Prior to the main data collection phase, the researcher conducted a pretest study to assess the clarity, reliability, and validity of the data collection instruments, specifically the structured questionnaire. The pretest was carried out at Chuka Level Five Hospital in Tharaka Nithi County. This facility was deliberately chosen because it shares similar demographic, clinical, and operational characteristics with the two primary study sites—Embu and Kerugoya Level Five Teaching and Referral Hospitals—thereby making it a suitable proxy for testing the research tools without compromising the integrity of the main study population. A total of 23 participants, representing 10% of the total calculated sample size, were involved in the pretest. These participants were selected using similar criteria as those intended for the main study to ensure consistency in testing the questionnaire's appropriateness and applicability.

The pretest allowed the researcher to evaluate several key aspects of the instrument, including the comprehensibility of questions, the logical flow, the time taken to complete the questionnaire, and the relevance of the items to the study objectives. Feedback gathered from the pretest was instrumental in identifying ambiguities, redundant or unclear questions, and missing constructs. Consequently, necessary revisions and refinements were made, including rephrasing of certain questions for clarity, inclusion of additional items to better capture specific domains (such as foot care practices and self-efficacy), and elimination of irrelevant or confusing items. This step was essential in enhancing the quality and reliability of the data collection instruments, ensuring that they were both contextually appropriate and capable of yielding valid data during the actual study.

3.6.1 Validity of the Instrument

In this study, rigorous procedures were undertaken to ensure both face validity and content validity of the data collection instruments prior to their deployment in the field. To achieve this, a panel of three subject-matter experts in diabetes care was purposively

selected to evaluate the relevance, clarity, and comprehensiveness of the questionnaire items in relation to the constructs under investigation—namely diabetic foot care knowledge, self-care behavior, and self-efficacy.

The panel included a consultant physician with specialization in diabetes management, based at the diabetic outpatient clinic; a senior nurse with extensive experience in diabetic foot care and patient education; and a medical-surgical nursing lecturer from Chuka University with expertise in chronic disease management and research methodology. These experts were tasked with critically reviewing the instrument to assess its alignment with clinical standards and theoretical constructs. They examined each item for appropriateness of content, accuracy of terminology, logical flow, and clarity of language, as well as the extent to which the questions were likely to be understood by the target population.

Additionally, the panel assessed the instrument for potential omissions, redundancies, and ambiguities that could compromise construct validity or lead to misinterpretation. Based on their feedback, several revisions were made to enhance the precision and contextual relevance of the tool. This included refining item wording for better clarity, restructuring sections to improve flow, and incorporating additional items identified as essential for a comprehensive assessment of diabetic foot care practices.

The revised version of the instrument was finalized following incorporation of all expert recommendations. This validation process ensured that the data collection tools were both conceptually robust and culturally appropriate, thereby enhancing the credibility, accuracy, and applicability of the study findings among the diabetic patient population included in the research.

3.6.2 Reliability of the Instrument

To assess the reliability of the data collection instruments employed in this study, the test–retest method was applied during the pretesting phase conducted at Chuka Level 5 Hospital. This process involved administering the same set of questionnaires to the same group of participants—representing 10% of the total sample size—at two different time intervals, spaced two weeks apart. The objective of this procedure was to evaluate both the stability over time and the internal consistency of the instruments used to measure

key constructs related to diabetic foot care: knowledge, self-care behavior, and self-efficacy.

Reliability was further quantified using Cronbach's Alpha, a statistical coefficient that assesses the degree of interrelatedness among items within a scale, thereby indicating the consistency with which the instrument measures a given construct. According to Park (2021), a Cronbach's Alpha value of 0.70 or above is generally considered acceptable for demonstrating internal consistency.

In this study, the Diabetic Foot Care Knowledge section of the instrument, comprising 23 items, produced a Cronbach's Alpha coefficient of 0.744**,** reflecting satisfactory reliability in assessing participants' understanding of core preventive foot care concepts such as glycemic control, foot inspection, and proper footwear use. The Diabetic Foot Self-Care Behavior scale, consisting of 22 items addressing actual patient practices, demonstrated a high level of internal consistency with a Cronbach's Alpha of 0.907, suggesting that the items were strongly correlated in capturing self-reported adherence to foot care practices. The Diabetic Foot Care Self-Efficacy scale, which included 12 items designed to assess individuals' confidence in performing various foot care activities across different contexts, recorded the highest reliability with a Cronbach's Alpha of 0.926**.** This result indicates excellent internal consistency and supports the scale's robustness in capturing the multidimensional nature of self-efficacy as conceptualized by Bandura, including magnitude, strength, and generality.

All three instruments exceeded the minimum reliability threshold, with two surpassing the 0.90 benchmark, thereby confirming the tools' suitability and reliability for use in the study. These findings affirm that the instruments were appropriate for consistently capturing data across the baseline, intervention, and post-intervention phases of the research.

3.7 Data Collection Procedure

The study participants were all diabetes mellitus patient who met inclusion criteria in both facilities. It involved three major phases. In phase one, baseline survey (phase one), which was carried out to assess level of DF care knowledge, behavior and self-efficacy. Additionally, factors influencing diabetes foot care practices were evaluated.

Questionnaires, and FGDs were used to collect the data. Intervention phase (phase two) involved developing the education modules and educating the patients on DF care practices. In evaluation phase (phase three), the effectiveness of education program was evaluated using the same Questionnaires used in phase one.

3.7.1 Baseline Survey

Data collection was conducted at the diabetic outpatient clinics of Embu and Kerugoya Level 5 Teaching and Referral Hospitals. Prior to commencing the process, the researcher formally informed the respective clinic in-charges about the study objectives and the planned data collection activities. Upon arrival at the clinics, the researcher introduced themselves to the patients, providing a brief overview of the study purpose and outlining the procedures involved in their potential participation.

As part of routine clinical care, all patients underwent comprehensive foot examinations to assess their risk of developing diabetic foot ulcers (see Appendix 5). After receiving care, eligible patients were individually approached and invited to participate in the study. Informed written consent was obtained prior to their inclusion in the research.

Quantitative data were collected using a researcher-administered structured questionnaire through face-to-face interviews. This approach was chosen to accommodate participants with varying literacy levels and to enhance accuracy in data collection. The questionnaire was administered only after patients had completed their clinical appointments to ensure they were in a stable physical and psychological condition. Each interview lasted approximately 45 to 60 minutes, depending on the participant's pace and clarity of responses.

To complement the quantitative findings and explore deeper insights into patients' perceptions, experiences, and contextual factors influencing diabetic foot care practices, Focus Group Discussions (FGDs) were conducted. A total of four FGDs were held—two per health facility—each involving 10 purposively selected participants who met the inclusion criteria. The discussions took place in quiet, private spaces within the respective facilities (typically in the diabetes clinic boardrooms), which provided a conducive environment for open dialogue and confidentiality.

Each FGD was moderated by a trained facilitator using a pre-developed discussion guide, while a note-taker documented key discussion points, participant interactions, and non-verbal cues. Sessions were audio-recorded with prior informed consent, and discussions were conducted in the local language to ensure participants could express themselves freely. Each session lasted approximately 60 to 90 minutes, depending on the depth of discussion. Audio recordings were subsequently transcribed verbatim and translated into English for analysis.

Thematic saturation was achieved after conducting two FGDs at each facility, with no new themes, ideas, or perspectives emerging in the final sessions. Saturation was confirmed through careful review of transcripts and field notes following each discussion. This iterative process also allowed the research team to refine probing strategies as the discussions progressed, ensuring that all relevant thematic areas were adequately explored across the groups.

3.7.2 Intervention

This phase involved education modules development and educating the patient on diabetes foot care

3.7.2.1 Development of Health Education Modules

The development of the diabetes foot care education modules followed a structured and evidence-informed approach. Instructional content was primarily derived from two authoritative sources: The International Working Group on the Diabetic Foot (IWGDF) Guidelines and the Kenya Ministry of Health Guidelines on Diabetes Management. These guidelines provided the scientific and clinical foundation for creating accurate, comprehensive, and up-to-date educational content that addresses the critical aspects of diabetic foot care prevention and management. To ensure accessibility and comprehension by the target population, the content extracted from these guidelines was carefully simplified and adapted into user-friendly language. Technical terminologies and clinical jargon were translated into practical, culturally relevant, and patient-centered messages that could be easily understood by individuals with varying levels of health literacy.

The baseline survey conducted in the first phase of the study played a pivotal role in shaping the final structure and scope of the modules. Findings from the survey revealed specific knowledge gaps, behavioral limitations, and areas of low self-efficacy among the participants regarding diabetic foot care practices. These insights guided the researcher in tailoring the module content to directly address the identified needs. As a result, emphasis was placed on areas such as the importance of glycemic control, daily foot inspection techniques, selection of appropriate footwear, and the identification and management of early signs of foot complications.

The teaching modules were further structured to facilitate interactive learning, using both visual aids and demonstration techniques to enhance patient engagement and retention of knowledge. The instructional materials also incorporated problem-solving strategies, real-life scenarios, and practical tips to support behavior change and reinforce self-efficacy. All educational sessions were delivered in a manner that was linguistically and contextually appropriate, with content translated into local languages where necessary. The final modules were reviewed and refined to ensure alignment with best practices in health education and adult learning principles. A sample of the educational modules developed for this study is presented in Appendix 5.

3.7.2.2 Participants' Placement in the Intervention and Control groups

In order to maintain clarity, consistency, and logistical feasibility during the implementation of the educational intervention, participants were grouped based on the health facility from which they received diabetic care services. Specifically, patients receiving care at Embu Level 5 Hospital were assigned to the intervention group, while those attending the diabetic outpatient clinic at Kerugoya Level 5 Hospital were assigned to the control group.

This allocation was purposively determined based on facility-specific patient volumes and operational considerations. According to data obtained from the Health Management Information System (HMIS), Embu Hospital consistently reports a higher number of registered diabetic patients compared to Kerugoya Hospital. Embu recorded approximately 954 diabetic patients, while Kerugoya had 683 patients enrolled in their outpatient diabetic clinics at the time of study planning. This difference in population size supported the selection of Embu Hospital as the most suitable site for implementing

the health education intervention, ensuring that a sufficiently large and diverse group of participants could be engaged to test the effectiveness of the diabetic foot care education modules.

Furthermore, assigning entire facilities as intervention or control sites helped minimize cross-contamination or spillover effects between participants who may otherwise share waiting areas, educational sessions, or information during routine clinic visits. By restricting the intervention to one facility, the researcher could maintain the integrity of the randomized controlled trial design, ensuring that any improvements in diabetic foot care knowledge, behavior, or self-efficacy observed in the intervention group could be more confidently attributed to the structured education program rather than external interactions.

This grouping also enhanced the practical management of data collection and follow-up procedures, allowing the research team to coordinate baseline assessments, education sessions, and post-intervention evaluations more effectively within the operational routines of each facility. It streamlined communication, minimized disruptions, and ensured consistency in implementation across all participating healthcare units

3.7.2.3 Health Education on Foot Care Practices

The intervention group received a structured diabetes foot care education program over a period of three months (January to march,2025) within the hospital compound. The education sessions were developed based on international and local diabetes foot care guidelines and adapted to the local context in terms of language, cultural relevance, and resource availability. Key components of the education sessions included: Session 1: Understanding diabetes complication and its connection with glycemic control; Session 2: Understanding regular foot examination and appropriate foot wear and Session 3: Understanding management strategies for common pre-ulcerative signs and recap of DFC education session

The sessions were delivered by the researcher in collaboration with two trained research assistance in small group formats (25participants) at the clinic. Each participant attended monthly sessions (3 sessions in total), each lasting approximately 60–90

minutes. Sessions incorporated visual aids, printed materials, practical demonstrations, and group discussions to enhance engagement and retention. Attendance was monitored through a session register. Participants were also encouraged to share challenges and experiences, fostering peer support and reinforcing learning. The patients in the control group, on the other hand, were given the routine management as usual without health education.

3.7.2.4 Post-Intervention Follow Up

Following the intervention, a three-month (April to June,2025) follow-up period was conducted without any additional formal education sessions. The purpose of this phase was to: Evaluate the retention and application of the foot care knowledge and skills acquired during the education period, assess behavioral changes and self-efficacy over time without continued direct support and measure the sustainability of intervention effects under routine living conditions. During the follow-up period: participants continued with routine diabetes clinic care, no new educational content was introduced. Participants were contacted monthly via brief phone check-ins or clinic reminders to encourage continued engagement and track adherence to recommended practices (without reinforcing educational content). At the end of the follow-up phase, post-intervention assessments were conducted using the same tools applied at baseline to compare changes in foot care knowledge, self-care behaviors, and self-efficacy. Participants in the control group continued to receive standard routine diabetes care as provided by the health facility, without exposure to the structured education program. Post-assessments were also conducted at the same time points for comparison.

3.7.3 Evaluation Phase

The evaluation phase represented the final stage of the study and was conducted three months following the completion of the diabetes foot care educational intervention**.** This phase was crucial in determining both the immediate effectiveness and the short-term sustainability of the intervention's impact on diabetic foot care outcomes among participants. It provided an opportunity to assess how well the participants had retained the knowledge imparted during the intervention, whether positive behavioral changes had been maintained in daily foot care routines, and the extent to which participants had developed confidence in managing their foot health independently.

The evaluation phase of the study was guided by three core objectives, each aimed at examining the impact of the health education intervention on diabetic foot care outcomes. First, it sought to determine the extent to which participants retained the knowledge acquired during the educational sessions. This involved assessing their understanding of key concepts related to diabetic foot care, including glycemic control, foot inspection techniques, identification of risk factors, and appropriate footwear selection. Second, the evaluation aimed to assess the durability of behavior change following the intervention. This entailed analyzing whether participants had integrated the recommended foot care practices into their daily routines, such as regular foot inspection, proper hygiene, and protective footwear use—indicating a sustained shift in self-care habits.

Third, the evaluation focused on measuring changes in self-efficacy, specifically the participants' confidence in their ability to independently manage foot care over time and across various situations. This involved exploring their perceived capability to initiate, maintain, and adapt foot care behaviors, even when faced with challenges such as limited resources or competing health priorities. Together, these objectives provided a comprehensive assessment of the intervention's effectiveness, both in terms of knowledge transfer and behavioral empowerment, offering valuable insight into its potential for long-term impact in diabetic foot care management.

Additionally, this phase sought to compare post-intervention outcomes between the intervention group (Embu Hospital) and the control group (Kerugoya Hospital)**,** thereby offering a basis for attributing observed improvements specifically to the educational program rather than external influences. To ensure consistency, the same standardized data collection tools that were used during the baseline survey—covering knowledge, behavior, and self-efficacy—were re-administered during this phase. These tools had already undergone reliability and validity testing and were deemed suitable for measuring changes over time within and across both groups.

Data collection was conducted at the same health facilities where participants had been enrolled for the study. This approach enhanced participant follow-up, minimized logistical barriers, and helped reduce attrition by allowing participants to respond in familiar and convenient settings. The data collected provided critical insights into the

effectiveness and lasting impact of the diabetic foot care educational modules and informed the final conclusions and recommendations of the study

3.8 Data Analysis

Data analysis were done only in phase one and three since no data collected in phase two.

3.8.1 Data Analysis in Baseline Survey

Quantitative data underwent a rigorous manual cleaning process to ensure completeness, accuracy, and consistency. Data collection tools were reviewed for validity, and only those that met the set standards were coded and entered into the system for analysis. Quantitative data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 29. Descriptive statistics—such as frequencies, means, and percentages—were employed to summarize key variables and describe the demographic and clinical characteristics of participants. To test for associations between variables, inferential statistics were applied, including regression analysis and Pearson's Chi-square tests, using a 95% confidence interval to determine statistical significance.

For qualitative data, thematic analysis was conducted using NVivo version 14, following Braun and Clarke's (2006) six-phase framework. Audio-recorded interviews were first transcribed verbatim and translated into English where necessary. The researcher then familiarized themselves with the transcripts through multiple readings, during which initial impressions and notes were recorded. This was followed by systematic coding of the data to identify significant patterns and categories. Preliminary themes were generated, reviewed, and refined to accurately reflect the data and align with the research objectives. These final themes were then clearly defined and analyzed to produce a coherent narrative. The entire process culminated in the development of an interpretative report that captured participants' perspectives on diabetic foot care practices and influencing factors.

3.8.2 Data Analysis in the Evaluation Phase

The same data analysis procedures applied in Phase One (baseline survey) were also adopted in this phase of the study to ensure consistency and comparability of findings.

In addition to the descriptive and inferential statistical methods previously used, an unpaired t-test was conducted to examine the association between the diabetic foot care education intervention and participants' levels of knowledge, practical skills, and self-efficacy. This test enabled the researcher to assess the statistical significance of differences observed between the intervention and control groups. A comprehensive data analysis plan outlining these procedures is presented in Table 1 below.

Table 1: Data Analysis Plan

Objective	Indicators	Type of data	Method of analysis
Phase one: Baseline Survey			
To determine level of diabetic foot care knowledge among diabetic patient attending Embu and Kerugoya level 5 hospitals	Level of knowledge scores	Continuous	Frequencies, percentages, and means
To assess level of diabetic foot care skills among diabetic patient attending Embu and Kerugoya level 5 hospitals	Level of foot care practices scores	Continuous	Frequencies, percentages, and means
To determine level of diabetic foot care self-efficacy among patient attending Embu and Kerugoya level 5 hospitals	Level of self-efficacy scores	Continuous	Frequencies, percentages and means
To assess factors influencing foot care practices among patient attending Embu and Kerugoya level 5 hospitals	Themes	categorical	Thematic, analysis
Phase three: Post-intervention Evaluation			
To evaluate the effect of DFC education on diabetic foot care knowledge among patients attending Embu and Kerugoya level levels 5 hospitals	Differences between before and after intervention	Continuous	unpaired t- test
To evaluate the effect of DFC education on diabetic foot care skills among patient attending Embu and Kerugoya level 5 hospitals	Differences between before and after intervention	Continuous	unpaired t- test
To evaluate the effect of DFC education on diabetic foot self-efficacy among patient attending Embu and Kerugoya level 5 hospitals	Differences between before and after intervention	Continuous	unpaired t- test

3.9 Ethical Consideration

This study was conducted in full compliance with established ethical principles governing research involving human participants. Ethical approval was obtained from the Ethics and Research Committee of Chuka University (appendix 6), which reviewed and approved the study protocol to ensure that it met ethical and methodological standards. Additionally, authorization to conduct the study was secured from the National Commission for Science, Technology, and Innovation (NACOSTI)—Kenya's national body mandated to regulate scientific research (Appendix 7). Further permissions were formally granted by the respective hospital administrations at Embu Level 5 Hospital (appendix 8), Kerugoya Level 5 Teaching and Referral Hospital (Appendix 9), and Chuka Level 5 Hospital, the latter serving as the site for pretesting the research instruments.

Prior to the commencement of data collection, all prospective participants were individually approached and provided with comprehensive information regarding the study. This included details about the aim and objectives of the research, the procedures involved, expected duration of participation, potential risks and benefits, and measures undertaken to ensure data protection, privacy, and confidentiality. Participants were also informed of their voluntary participation, the right to refuse or withdraw from the study at any point without penalty or loss of healthcare benefits, and the confidential treatment of all responses.

To ensure informed consent, participants were given adequate time to ask questions and seek clarification before signing a written informed consent form (appendix1). For those with limited literacy, the consent form was read aloud, and thumbprint consent was obtained in the presence of a witness. This process was designed to respect participant autonomy while ensuring ethical inclusivity.

To protect participants' identities, anonymous codes were used on all questionnaires and data sheets in place of names. During Focus Group Discussions (FGDs), participants were referred to by pseudonyms or identification numbers, and sessions were conducted in quiet, private rooms within the health facilities to reduce interruptions and uphold confidentiality. Only authorized members of the research team had access to the audio recordings, transcripts, and completed questionnaires. All

physical data were securely locked, and digital data were password-protected to prevent unauthorized access.

Furthermore, participants were reassured that their responses would be used solely for academic purposes and that the findings would be presented in aggregate form to prevent individual identification. Debriefing was offered after participation to allow participants to ask questions or share concerns related to the study experience. These ethical safeguards were implemented to uphold the principles of respect for persons, beneficence, and justice, in line with international research ethics guidelines such as the Declaration of Helsinki and the Belmont Report. Overall, strict adherence to ethical standards ensured the dignity, rights, and welfare of all participants were maintained throughout the study.

CHAPTER FOUR

RESULTS

4.1 Baseline Quantitative Findings in Embu Level 5 Hospital

4.1.1 Questionnaire Response Rate

Data collection was conducted using researcher-administered questionnaires among Diabetes Mellitus patients attending diabetes clinic at Embu and Kerugoya Level 5 hospitals, which allowed for direct interaction with participants, clarification of any ambiguities, and ensured that all questions were answered appropriately. A total of 230 questionnaires were administered, and all were completed and returned, resulting in a 100% response rate.

The use of researcher-administered tools is known to improve response rates due to personal engagement and the ability to motivate respondents (Rebecca , et al., 2022). Furthermore, the 100% response rate achieved in this study significantly enhances the validity of the findings by minimizing non-response bias. According to Ali et al., 2021, a response rates above 70% are considered acceptable in health research, making this rate particularly robust.

4.1.2. Socio-demographic of the Respondents in Embu Level 5 Hospital

Table 2 outlines the socio-demographic characteristics of respondents at Embu Level 5 Hospital who participated in the study. A total of 115 individuals were surveyed, representing a diverse cross-section of the patient population. Ages ranged from 8 to 85 years, with a mean of 54, indicating a predominantly middle-aged and older cohort. The sample comprised mostly female respondents (67%), reflecting potential gendered patterns in health-seeking behavior. A substantial proportion (75%) resided in rural areas, underscoring the rural-urban divide in healthcare access. Marital status showed that 56% were married, suggesting the presence of familial or spousal support. Regarding education, 43% had reached secondary level, while 35% had completed primary, indicating varying health literacy. Informal employment was the main livelihood for 57%, and 32% were unemployed, highlighting socio-economic vulnerabilities. Most participants were Protestants (62%), followed by Catholics (36%), with religion potentially influencing health beliefs. These variables provide essential context for understanding participants' engagement with diabetic foot care and informing targeted interventions.

Table 2: Socio-demographic Characteristics of Respondents in Embu level 5 Hospital

Variable	Category	Frequency	Percentage
Age	0-10	1	1%
	11-20	8	7%
	21-30	7	6%
	31-40	8	7%
	41-50	16	14%
	51-60	29	25%
	61-70	28	24%
	71-80	14	12%
	81-90	5	4%
Sex	Male	38	33%
	Female	77	67%
Marital Status	Never Married	25	22%
	Married	65	56%
	Separated	25	22%
Levelof Education	Tertiary	18	16%
	Secondary	50	43%
	Primary	40	35%
	No Formal Education	7	6%
Source of Income	Unemployed	37	32%
	Informally employed	66	57%
	formally Employed	12	11%
Religion	Catholic	42	36%
	Protestant	71	62%
	Muslim	2	2%
Residence	Rural	86	75%
	Urban	29	25%

The study included 115 respondents from Embu Level 5 Hospital, with a mean age of 54 years (range: 8–85). Older adults dominated the sample, particularly those aged 51–60 (25%) and 61–70 (24%), highlighting the hospital's significant middle-aged and elderly clientele. Females constituted 67% of participants, while males comprised 33%. Over half (56%) were married, with 22% never married and 22% separated, possibly reflecting socio-economic influences on family structure.

Most participants had formal education—43% had secondary, 35% primary, and 16% tertiary education—while 6% had no schooling, indicating disparities that may affect health literacy. Employment status revealed that 57% were informally employed, 32% unemployed, and 11% formally employed, pointing to economic vulnerability that may hinder access to care.

Protestants made up 62% of respondents, followed by Catholics (36%) and Muslims (2%), consistent with national religious trends that can influence health behaviors. Lastly, 75% of respondents resided in rural areas, underscoring Embu Level 5 Hospital's role as a referral center for surrounding rural communities with limited healthcare access.

4.1.3 Clinical Characteristics of the Respondents in Embu Level 5 Hospital

Table 3 summarizes the clinical characteristics of the respondents attending Embu Level 5 Hospital. The majority of the participants (85%) had been diagnosed with Type 2 Diabetes Mellitus, while only 15% had Type 1. The duration of diabetes varied, with most respondents (65%) having lived with the condition for less than 10 years. Oral antidiabetic agents were the most commonly used form of treatment (56%), followed by injectable therapy and combination therapy. Notably, 45% of the respondents reported having at least one other comorbid condition in addition to diabetes. Regarding body mass index (BMI), almost half (49%) were classified as overweight (24.5–30 kg/m^2), and a small proportion (6%) were obese. Lifestyle factors such as smoking and alcohol consumption were relatively low, with the majority having never smoked (75%) or consumed alcohol (68%).

Table 3 summarizes the clinical characteristics of the 115 respondents from Embu Level 5 Hospital, highlighting trends in diabetes type, management, comorbidities, BMI, and lifestyle behaviors. Most respondents (85%) had Type 2 Diabetes Mellitus, while 15% had Type 1, reflecting broader trends in diabetes prevalence among adults in Kenya and globally.

A majority (65%) had lived with diabetes for 0–10 years, 27% for 11–20 years, and only 8% for over 20 years—possibly indicating improved diagnosis rates or higher mortality in long-term cases. Oral antidiabetic drugs were the most common treatment (56%), followed by insulin (26%), and combination therapy (18%), suggesting progression in disease severity for some patients.

Table 3: Clinical Characteristics of Respondents in Embu level 5 Hospital

Variable	Category	Frequency	Percentage
Type of Diabetes Mellitus	Type 1	17	15%
	Type 2	98	85%
Diabetes Mellitus Duration	0-10	75	65%
	11-20	31	27%
	21-30	8	7%
	31-40	1	1%
Diabetes Mellitus Treatment	Oral Antidiabetic	64	56%
	Injectable	30	26%
	Combined	21	18%
Any other disease	No	63	55%
	Yes	52	45%
BMI	Less than 18.5 Kg/m2	14	12%
	18.5-24.5 Kg/m2	38	33%
	24.5-30 Kg/m2	56	49%
	Above 30 Kg/m2	7	6%
Smoking Status	Currently Smoking	3	3%
	Past Smoker	26	22%
	Never Smoked	86	75%
Alcohol Status	Currently Using Alcohol	4	3%
	Taken Alcohol in the Past	33	29%
	Never took Alcohol	78	68%

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Comorbidities were reported by 45% of participants, emphasizing the need for integrated care. BMI analysis revealed that 49% were overweight, 6% obese, 33% had normal weight, and 12% were underweight—indicating the importance of weight management in diabetes care.

In terms of lifestyle behaviors, 75% had never smoked, 22% were former smokers, and 3% were current smokers. Similarly, 68% had never consumed alcohol, 29% were former users, and 3% current users. These patterns may reflect lifestyle modifications post-diagnosis or generally low substance use in the population

4.1.4 DFC Knowledge Level Among Respondents in Embu Level 5 Hospital

Table 4 presents the distribution of knowledge levels related to diabetic foot care (DFC) among respondents. The results are categorized into six thematic areas, each assessed across three levels of knowledge: Good, Satisfactory, and Poor. Overall, the majority of respondents demonstrated satisfactory knowledge (42%), while a considerable proportion (48%) exhibited poor knowledge on DFC. Only 10% had good knowledge across all domains. The lowest levels of knowledge were observed in areas such as foot inspection, risk identification, and appropriate foot care, highlighting critical gaps in DFC education. These findings underscore the need for intensified educational

Table 4: DFC Knowledge level among Respondents in Embu Level 5 Hospital

Domain	Items	Good N (%)	Satisf. N (%)	Poor N (%)
Glyc.Control	Maintain optimal bld sugar level	46 (40.0%)	59 (51.3%)	10 (8.7%)
	Adherence to diabetes diet	24 (20.9%)	56 (48.7%)	35 (30.4%)
	Role of exercise in bld sugar cont.	43 (37.4%)	43 (37.4%)	29 (25.2%)
	Medication adherence	33 (28.7%)	52 (45.2%)	30 (26.1%)
	Average	36 (31.3%)	53 (46.1%)	26 (22.6%)
At-Risk Foot Id	Routine risk factors screening	4 (3.5%)	58 (50.4%)	53 (46.1%)
	Regular medical check-up	4 (3.5%)	51 (44.3%)	60 (52.2%)
	Disclosing medical history	3 (2.6%)	41 (35.7%)	71 (61.7%)
	Average	4 (3.2%)	50 (43.5%)	61 (53.0%)
Foot I &E	Check for callus, edema, color	4 (3.5%)	51 (44.3%)	60 (52.2%)
	Check for bone & joint abnormalities	4 (3.5%)	34 (29.6%)	77 (67.0%)
	Check for foot hygiene	3 (2.6%)	48 (41.7%)	64 (55.7%)
	Importance of drying between toes	2 (1.7%)	40 (34.8%)	73 (63.5%)
	Physical limitation to DFC	5 (4.3%)	44 (38.3%)	66 (57.4%)
	Average	4 (3.2%)	43 (37.4%)	68 (59.1%)
Regular DFCE	Self-motivation to seek DFC information	2 (1.7%)	55 (47.8%)	58 (50.4%)
	Impor.of attending DFC program	4 (3.5%)	30 (26.1%)	81 (70.4%)
	In touch with DFC updates	4 (3.5%)	72 (62.6%)	39 (33.9%)

Table 4: DFC Knowledge level among Respondents in Embu Level 5 Hospital (Continued)

Domain	Items	Good N (%)	Satisf. N (%)	Poor N (%)
	Average	3 (2.6%)	52 (45.2%)	59 (51.3%)
Appr.FootWear	Use of socks& daily change	21 (18.3%)	25 (21.7%)	69 (60.0%)
	Avoid tight knee-high socks	9 (7.8%)	48 (41.7%)	58 (50.4%)
	Avoid walking barefoot	21 (18.3%)	44 (38.3%)	50 (43.5%)
	Useof custom made orthoses	11 (9.6%)	54 (47.0%)	50 (43.5%)
	Average	15 (13.0%)	43 (37.4%)	57 (49.6%)
Risk Factors Mnx	Avoid using hot water bottles/heaters	20 (17.4%)	40 (34.8%)	55 (47.8%)
	Avoid plasters/chemicals	11 (9.6%)	57 (49.6%)	47 (40.9%)
	Avoid emollients between toes	11 (9.6%)	48 (41.7%)	56 (48.7%)
	Consult med. prof. for foot issue	9 (7.8%)	40 (34.8%)	66 (57.4%)
	Average	13 (11.3%)	46 (40.0%)	56 (48.7%)
Overall Knowledge Level	—	12 (10.4%)	48 (41.7%)	55 (47.8%)

In the domain of glycemic control, 46% of respondents exhibited satisfactory knowledge, 31% had good knowledge, and 23% had poor knowledge. Specifically, 40% demonstrated good understanding of maintaining optimal blood sugar levels, while only 20.9% were knowledgeable about dietary adherence. Additionally, 37.4% understood the role of exercise in blood sugar regulation, and 28.7% had good knowledge of medication adherence. These findings suggest that while basic awareness of glycemic control exists, gaps remain in nuanced areas such as dietary habits and consistent treatment adherence.

Knowledge regarding identification of the at-risk foot was significantly lower. Only 4% had good knowledge, 43% satisfactory, and 53% poor. Over half (52.2%) lacked awareness of the importance of regular medical check-ups, and 61.7% were unaware of the need to disclose relevant medical history to healthcare providers. This highlights limited awareness of early warning signs and key risk factors for diabetic foot complications.

Similarly, knowledge of foot inspection and examination was poor. A large proportion (59%) had poor knowledge, and only 4% demonstrated good knowledge. Most respondents were unaware of the need for routine checks for conditions like calluses, oedema, and temperature changes. Notably, 63.5% did not understand the importance of drying between the toes, and 67% were unaware of how to detect bone or joint abnormalities. These findings reveal critical gaps in preventive self-care practices.

In the area of diabetic foot care (DFC) education, over half (51%) had poor knowledge, and only 3% showed good understanding. Although 62.6% had satisfactory knowledge of the importance of staying updated, most did not recognize the value of regular attendance at DFC programs (70.4% poor) or self-motivation in seeking information (50.4% poor). This suggests a passive approach to learning and engagement with preventive care.

The domain of appropriate foot care showed similar trends: 50% had poor knowledge, 37% satisfactory, and 13% good. Knowledge was lowest regarding proper sock use (60% poor) and avoiding tight knee-high socks (50.4% poor). While 18.3% knew to avoid walking barefoot, 43.5% lacked awareness of the need for custom footwear or orthoses. These gaps increase susceptibility to preventable foot injuries.

In risk factor management, 49% had poor knowledge, 40% satisfactory, and 11% good. Many were unaware of the risks of using hot water bottles or heaters (47.8% poor), and over half (57.4%) did not recognize the importance of consulting a healthcare provider when foot issues arise. A significant number also lacked knowledge about avoiding chemicals or plasters for corns (40.9% poor) and the dangers of applying emollients between the toes (48.7% poor). These findings suggest potentially harmful practices that raise the risk of injury and infection.

Overall, only 10% of respondents had good knowledge of DFC, 42% had satisfactory knowledge, and 48% had poor knowledge. Despite being in a clinical setting, most diabetic patients lacked essential foot care knowledge, placing them at high risk for complications such as ulcers, infections, and amputations. These widespread knowledge gaps underscore the urgent need for targeted education and training programs in both

hospital and community settings to improve outcomes and reduce the burden of diabetic foot complications.

4.1.5 DFC Self-care Behavior Among Respondents in Embu Level 5 Hospital

This section presents findings on self-reported diabetic foot care (DFC) behaviors among patients at Embu Level 5 Hospital. Behaviors were assessed across four domains: glycemic control, foot inspection and examination, appropriate footwear use, and risk factor management. Each item was rated based on the frequency or consistency of the behavior and categorized as good, moderate, or poor practice. Table 5 summarizes the frequencies and percentages of participants (N = 115) across each domain and item

Table 5: DFC Self-care Behavior Among Respondents in Embu Level 5 Hospital

Domain	Items	Good N (%)	Moderate N (%)	Poor N (%)
Glyc Control	Monitoring blood sugar level	8 (7.0%)	21 (18.3%)	86 (74.8%)
	Checking HbA1c level	12 (10.4%)	15 (13.0%)	88 (76.5%)
	Taking recommended diet	8 (7.0%)	62 (53.9%)	45 (39.1%)
	Adherence to prescribed medication	10 (8.7%)	65 (56.5%)	40 (34.8%)
	Frequency of physical exercise	6 (5.2%)	61 (53.0%)	48 (41.7%)
	Average (Domain)	9 (8%)	45 (39%)	61 (53%)
Reg.Foot I &E	Checking for foot hygiene	3 (2.6%)	49 (42.6%)	63 (54.8%)
	Attend. to diabetic foot screen,	1 (0.9%)	27 (23.5%)	87 (75.7%)
	Regular check for color & temp.	2 (1.7%)	17 (14.8%)	96 (83.5%)
	Regular check for pre-ulcer.signs	5 (4.3%)	24 (20.9%)	86 (74.8%)
	Reporting foot problems to healthcare worker	3 (2.6%)	15 (13.0%)	97 (84.3%)
	Average (Domain)	3 (3%)	26 (22%)	86 (75%)
Appr. Footwear	Wearing shoes with straps, Velcro, or lace-up closures	7 (6.1%)	38 (33.0%)	70 (60.9%)
	Wearing unfastened slippers	2 (1.7%)	22 (19.1%)	91 (79.1%)
	Wearing shoes with pointy toes	2 (1.7%)	22 (19.1%)	91 (79.1%)

Table 5: DFC Self-care Behavior Among Respondents in Embu Level 5 Hospital (Continued)

Domain	Items	Good N (%)	Moderate N (%)	Poor N (%)
	Checking shoes before putting on and after removing	3 (2.6%)	36 (31.3%)	76 (66.1%)
	Correct use and daily change of socks/stockings	3 (2.6%)	23 (20.0%)	89 (77.4%)
	Avoid walking barefoot	2 (1.7%)	11 (9.6%)	102 (88.7%)
	Average (Domain)	2 (3%)	25 (22%)	87 (76%)
Risk Factors Mnx	Using cream on your feet	58 (50.4%)	8 (7.0%)	49 (42.6%)
	Avoid emollient btn the toes	31 (27.0%)	9 (7.8%)	75 (65.2%)
	Nail trimming	14 (12.2%)	24 (20.9%)	77 (67.0%)
	Refrain from using hot water bottles or heaters	8 (7.0%)	19 (16.5%)	88 (76.5%)
	Avoid use of plasters or chemicals for corns or calluses	15 (13.0%)	24 (20.9%)	76 (66.1%)
	Treat blisters,cuts or burns with dry dressing	3 (2.6%)	30 (26.1%)	82 (71.3%)
	Average (Domain)	21 (18%)	19 (17%)	75 (65%)
Overall Self-Care Level	—	9 (8%)	29 (25%)	77 (67%)

The findings in the Table 5 indicate that the overall level of diabetic foot care (DFC) self-care behavior among respondents at Embu Level 5 Hospital was suboptimal. Out of the total 115 participants, only 8% demonstrated good self-care behavior, while 25% exhibited moderate behavior. A significant majority, 67%, reported poor self-care practices related to diabetic foot care.

When analyzed by specific domains, the glycemic control domain showed a moderate level of adherence among participants. Approximately 39% of respondents fell into the moderate category, while 8% had good practices and 53% had poor self-care behaviors. Notably, 74.8% of respondents reported poor adherence to blood sugar monitoring, and 76.5% did not regularly check their glycosylated hemoglobin levels. While medication adherence was relatively better (56.5% moderate), exercise and diet practices remained low, with 41.7% and 39.1% reporting poor adherence respectively.

The domain of foot inspection and examination revealed the lowest self-care performance. An overwhelming 75% of respondents were categorized as poor in this domain, while only 3% reported good practices. Over 80% of participants reported not regularly checking for skin temperature or color changes, and a similar proportion failed to report foot issues to healthcare professionals. Attendance at diabetic foot screening was also low, with 75.7% classified as poor.

Similarly, poor behaviors were prevalent in the use of appropriate footwear, with 76% of participants falling into the poor category and only 3% demonstrating good practices. A concerning 88.7% of respondents reported walking barefoot, a major risk factor for foot injuries and complications. Furthermore, more than 60% wore inappropriate footwear such as slippers or pointy shoes, and most did not regularly check the condition of their shoes or change socks daily.

In terms of risk factor management, performance was slightly better, with 18% of respondents showing good self-care and 17% reporting moderate behavior. However, the majority (65%) still fell into the poor category. While over half of the respondents used moisturizing creams, many engaged in risky behaviors such as applying emollient between the toes (65.2%), improper nail trimming (67%), and using hot water bottles or chemicals on their feet (76.5%).

These findings highlight a critical gap in the daily self-care practices of diabetic patients, particularly in foot inspection, proper footwear use, and safe foot care techniques. The consistently high percentage of poor practices across most domains suggests a lack of knowledge, skills, or access to foot care education. Without timely interventions, such deficiencies may increase the risk of diabetic foot ulcers, infections, and potential lower limb amputations. This underscores the urgent need for targeted diabetic foot care education programs, regular follow-up, and behavior change support for individuals living with diabetes.

4.1.6 DFC Self-Efficacy Among Respondents in Embu Level 5 Hospital

This section presents the findings on respondents' self-efficacy related to diabetic foot care (DFC), a crucial psychological component influencing adherence to recommended self-care practices. Self-efficacy reflects an individual's belief in their ability to execute

behaviors necessary to achieve specific health outcomes. In this study, self-efficacy was assessed across three core dimensions: perceived task difficulty, belief in one's ability, and ability to work under pressure. Each dimension comprised four items rated and categorized into high, moderate, or low levels of self-efficacy. The classification was based on the respondents' confidence and consistency in performing essential DFC-related behaviors, such as glycemic control, foot inspection, appropriate footwear use, and management of foot ulcer risk factors. A higher level of self-efficacy is associated with better engagement in preventive foot care behaviors, which can significantly reduce the risk of diabetic foot complications.

Across the self-efficacy dimension related to the perceived difficulty of tasks, only 18% of respondents demonstrated high self-efficacy in completing basic foot care tasks, such as controlling blood sugar, inspecting the feet, and managing risks. A larger proportion **(**44%**)** fell within the moderate category, while 38% reported low efficacy in carrying out these preventive actions. Notably, the area with the highest perceived challenge was the management of foot ulcer risk factors, where nearly 45% of respondents indicated low confidence in completing the related tasks.

In terms of belief in one's ability, the responses were similarly skewed toward the lower end. Just 9% of respondents expressed strong confidence in their ability to effectively perform the required behaviors in the four key areas. A majority (49%**)** rated themselves in the low category, particularly in relation to wearing appropriate footwear (56% low**)** and managing foot ulcer risks **(**62% low). These findings suggest a significant number of individuals lack conviction in their personal capacity to carry out essential self-care practices for preventing diabetic foot complications. Table 6 summarizes the distribution of responses, showing the frequency and proportion of individuals in each self-efficacy category for every domain.

Table 6: Self-Efficacy Among Respondents in Embu Level 5 Hospital

DFC self -efficacy domain	High N (%)	Moderate N (%)	Low N (%)
Task Difficulty			
Capability of achieving glycemic control	23 (20.0%)	51 (44.3%)	41 (35.7%)
Capability of doing regular foot inspection and examination	20 (17.4%)	56 (48.7%)	39 (33.9%)
Capability of achieving appropriate footwear	18 (15.7%)	52 (45.2%)	45 (39.1%)
Capability of managing foot ulcer risk factors	18 (15.7%)	45 (39.1%)	52 (45.2%)
Average (Domain)	20 (18%)	51 (44%)	44 (38%)
Belief in One's Ability			
Confidence in achieving glycemic control	17 (14.8%)	64 (55.7%)	34 (29.6%)
Confidence in doing regular foot inspection and examination	10 (8.7%)	51 (44.3%)	54 (47.0%)
Confidence in achieving appropriate footwear	12 (10.4%)	39 (33.9%)	64 (55.7%)
Confidence in managing foot ulcer risk factors	6 (5.2%)	38 (33.0%)	71 (61.7%)
Average (Domain)	11 (9%)	48 (42%)	56 (49%)
Being Able to Work Under Pressure			
Achieving glycemic control	9 (7.8%)	28 (24.3%)	78 (67.8%)
Achieving regular foot inspection and examination	33 (28.7%)	54 (47.0%)	28 (24.3%)
Achieving appropriate footwear	25 (21.7%)	56 (48.7%)	34 (29.6%)
Achieving proper foot ulcer risk factor management	4 (3.5%)	18 (15.7%)	93 (80.9%)
Average (Domain)	18 (16%)	39 (34%)	58 (50%)
Overall Level of DFC Self-Efficacy	16 (14%)	46 (40%)	53 (46%)

When assessed on their ability to maintain self-care practices under pressure, half of the respondents **(**50%**)** were categorized as having low self-efficacy. While some individuals showed moderate confidence levels **(**34%**),** only 16% indicated a high ability to continue managing DFC tasks in stressful or challenging situations. This was most pronounced in the areas of glycemic control (68% low**)** and risk factor management **(**81% low) when under pressure, suggesting that external barriers or internal stressors greatly impact adherence to preventive behaviors.

Overall, the cumulative self-efficacy score indicates that only 14% of the respondents possessed high self-efficacy across all three dimensions and four preventive care areas. Meanwhile, 40% had moderate self-efficacy, and 46% fell into the low category. These

findings suggest that while knowledge and skills may be present to some extent, a substantial portion of patients lack the psychological readiness or confidence to consistently implement foot care behaviors—especially when these behaviors are perceived as complex or are required under challenging conditions.

This gap in self-efficacy presents a critical barrier to effective diabetes management and underscores the need for targeted interventions that do more than educate. Effective programs must also work to strengthen patients' belief in their ability to perform preventive foot care actions across various contexts, including when tasks are perceived as difficult, confidence is low, or environmental pressures are present.

4.2 Baseline Quantitative Findings in Kerugoya Level 5 Hospital

4.2.1 Socio-demographic profile of the Respondents in Kerugoya Level 5 Hospital

Table 7 presents the socio-demographic characteristics of the respondents recruited from Kerugoya Level 5 Hospital. The table outlines the distribution of key variables including age, sex, marital status, level of education, source of income, religion, and place of residence. These background characteristics are essential for providing context to the respondents' social and economic profiles, which may influence their health behaviors, health-seeking patterns, and engagement in diabetic foot care (DFC) practices. Understanding these factors is crucial in interpreting patterns in knowledge, behavior, and self-efficacy related to DFC. A total of 115 respondents were surveyed, providing a representative snapshot of the population served by the facility. The inclusion of both rural and urban residents, individuals of different age brackets, and varying educational and economic backgrounds enhances the generalizability of the findings and supports the development of targeted interventions aimed at improving diabetic care outcomes in this setting.

Table 7: Socio-demographic Characteristics of Respondents in Kerugoya Hospital

Variable	Category	Frequency (n)	Percentage (%)
Age	0–10 years	4	4%
	11–20 years	7	6%
	21–30 years	11	10%
	31–40 years	5	4%
	41–50 years	13	11%
	51–60 years	18	16%
	61–70 years	30	26%
	71–80 years	23	20%
	81–90 years	4	3%
Sex	Male	38	33%
	Female	77	67%
Marital Status	Never Married	23	20%
	Married	76	66%
	Separated	16	14%
Level of Education	Tertiary	20	18%
	Secondary	58	50%
	Primary	36	31%
	No Formal Education	1	1%
Source of Income	Unemployed	21	18%
	Informally Employed	75	65%
	Formally Employed	19	17%
Religion	Catholic	44	38%
	Protestant	71	62%
	Muslim	0	0%
Residence	Rural	82	71%
	Urban	33	29%

The socio-demographic profile of the 115 respondents from Kerugoya Level 5 Hospital reflects a broad distribution across age groups, with a significant proportion representing older adults. The majority of respondents were aged 61–70 years **(**26%**),** followed by those aged 71–80 years **(**20%**)** and 51–60 years **(**16%**),** indicating that most participants were above 50 years of age. This is consistent with the typical age distribution for individuals living with diabetes mellitus, which is more prevalent among older adults. In contrast, younger age groups such as 0–10 years (4%**)** and 11–20 years (6%**)** were underrepresented, as expected in this clinical population.

In terms of sex distribution, females constituted the majority of the respondents, accounting for 67%**,** compared to 33% who were male. This pattern may reflect healthcare-seeking behavior differences, with women often more likely to attend regular

follow-up clinics, or a higher burden of diagnosed diabetes among females in this setting.

The marital status of the respondents showed that 66% were married, 20% had never married, and 14% were separated. Being married may be associated with greater support in managing chronic conditions, including diabetes, which can have implications for adherence to treatment and self-care behaviors such as diabetic foot care.

Education levels varied, with half of the respondents (50%**)** having attained secondary education, while 31% had primary education, and 18% had tertiary-level education. Only 1% reported having no formal education. These findings suggest that most respondents had at least basic literacy, which is an important factor in understanding and implementing health education and self-management strategies.

Regarding income sources, a majority of respondents **(**65%**)** were informally employed, while 17% were formally employed, and 18% were unemployed. The predominance of informal employment may reflect the rural-urban composition of the population and may impact patients' ability to afford regular treatment, appropriate footwear, or transportation to health facilities for regular foot assessments.

Religious affiliation was largely split between Protestants (62%**)** and Catholics **(**38%**),** with no respondents identifying as Muslim. Religion can play a role in health beliefs and practices, including the use of alternative remedies or adherence to prescribed medical regimens.

Most of the participants **(**71%**)** resided in rural areas, while 29% lived in urban settings. This rural majority suggests potential barriers to access, including fewer health facilities, lower health literacy, and limited availability of diabetic foot care services. It also underscores the need for outreach programs and decentralized services to improve diabetes management outcomes in rural populations.

Overall, the socio-demographic characteristics of the respondents from Kerugoya Hospital reflect a population that is predominantly older, female, married, moderately educated, and residing in rural areas. These factors are crucial in shaping their health-

seeking behavior, access to care, and capacity for diabetes self-management—including foot care practices.

4.2.2 Clinical Characteristics of the Respondents in Kerugoya Level 5 Hospital

Table 8 summarizes the clinical characteristics of respondents attending diabetic care services at Kerugoya Level 5 Hospital. The variables assessed include the type and duration of diabetes mellitus, treatment modalities, presence of comorbid conditions, body mass index (BMI), smoking history, and alcohol consumption. These clinical factors provide essential insights into the overall health status, disease progression, and management needs of the study population. Understanding these characteristics is crucial for contextualizing patient behavior in relation to diabetic foot care (DFC), as factors such as comorbidities, obesity, and duration of illness can significantly affect foot health and self-care capacity. For example, individuals with longer disease duration or multiple comorbidities may be at increased risk of developing diabetic foot complications due to neuropathy or vascular impairment. Similarly, lifestyle factors such as smoking and alcohol use can further exacerbate these risks. These findings serve as an important foundation for tailoring interventions that address not only clinical management but also patient education and risk mitigation strategies aimed at improving long-term diabetes and foot health outcomes in this population.

The majority of respondents in Kerugoya Hospital were living with Type 2 diabetes mellitus (79%), while 21% had Type 1 diabetes. This distribution aligns with global and regional trends, where Type 2 diabetes is more prevalent, especially among older populations.

In terms of disease duration, 60% of the respondents had been living with diabetes for less than 10 years, and 32% for 11 to 20 years. Only 8% had a disease duration beyond 20 years, and none had lived with diabetes for more than 30 years. This suggests a relatively recent diagnosis for the majority, which may influence their exposure to long-term complications and the development of diabetic foot conditions.

Table 8: Clinical Characteristics of Respondents in Kerugoya Hospital

Variable	Category	Frequency (n)	Percentage (%)
Type of Diabetes Mellitus	Type 1	24	21%
	Type 2	91	79%
Diabetes Mellitus Duration	0–10 years	69	60%
	11–20 years	37	32%
	21–30 years	9	8%
	31–40 years	0	0%
Diabetes Mellitus Treatment	Oral Antidiabetic	57	50%
	Injectables	24	21%
	Combined (Oral + Injectable)	34	29%
Any Other Disease	No	87	76%
	Yes	28	24%
Body Mass Index (BMI)	< 18.5 kg/m² (Underweight)	4	4%
	18.5–24.5 kg/m² (Normal)	50	43%
	24.5–30 kg/m² (Overweight)	56	49%
	> 30 kg/m² (Obese)	5	4%
Smoking Status	Currently Smoking	0	0%
	Past Smoker	14	12%
	Never Smoked	101	88%
Alcohol Intake Status	Currently Using Alcohol	1	1%
	Taken Alcohol in the Past	28	24%
	Never Took Alcohol	87	75%

Regarding treatment, 50% of the respondents were on oral antidiabetic medications alone, 21% were using injectable therapies, and 29% were on a combination of both. The significant proportion on combined therapy may reflect more advanced disease or the need for tighter glycemic control.

Comorbidity was relatively low, with 24% of respondents reporting another disease in addition to diabetes. While this suggests a generally healthy population, it is important to note that comorbidities often increase with disease duration and may be underreported.

Body Mass Index (BMI) data revealed that 49% of participants were overweight (24.5–30 kg/m²), 43% had normal weight, 4% were obese, and another 4% were underweight. The high prevalence of overweight individuals is notable and presents a risk factor for poor glycemic control and increased complications such as diabetic foot ulcers.

In terms of lifestyle behaviors, 88% of respondents had never smoked, while 12% were past smokers, and none reported current smoking. Similarly, 75% of respondents indicated they had never consumed alcohol, 24% reported past use, and only 1% were current alcohol users. These patterns suggest relatively low exposure to modifiable behavioral risk factors such as tobacco and alcohol use, which is favorable for both glycemic control and long-term diabetes outcomes. The absence of current smoking and minimal alcohol consumption may reflect increased health awareness among individuals managing chronic conditions or the impact of public health messaging.

Overall, the clinical profile of respondents at Kerugoya Hospital indicates a predominance of Type 2 diabetes, with a majority having relatively recent diagnoses. Moderate levels of overweight were observed, although the burden of comorbid conditions and harmful lifestyle behaviors was generally low. These characteristics provide an important context for understanding patients' individual risk of developing diabetic foot complications, as well as their potential responsiveness to targeted preventive interventions. Moreover, the relatively favorable behavioral profile suggests a window of opportunity for reinforcing positive health habits and delivering education that supports long-term self-care and complication prevention.

4.2.3 DFC Knowledge Level Among Respondents in Kerugoya Level 5 Hospital

Table 9 presents the findings on the level of knowledge regarding Diabetic Foot Care (DFC) among respondents at Kerugoya Level 5 Hospital. The knowledge assessment focused on six critical domains: glycemic control, identification of the at-risk foot, foot inspection and examination, regular DFC education, appropriate foot care, and risk factor management. Each domain encompassed a series of specific indicators designed to evaluate participants' understanding of recommended preventive practices. Respondents' knowledge was classified into three categories: good, satisfactory, and poor, enabling a structured analysis of competency levels across the various domains. This classification facilitates a comprehensive evaluation of the depth and breadth of

knowledge held by individuals living with diabetes. The analysis provides valuable insights into the extent to which patients comprehend and implement essential self-care practices aimed at mitigating the risk of diabetic foot complications. Furthermore, the findings underscore the presence of significant knowledge gaps in several areas, thereby highlighting the urgent need for structured, context-specific educational interventions. Such efforts are essential to improve patient outcomes and to support the broader public health objective of reducing diabetes-related morbidity and healthcare burden.

Table 9: DFC Knowledge level among Kerugoya Participants

Domain	Item	Poor *n (%)*	Satisfactory *n (%)*	Good *n (%)*
Glyc. Control	Maintain opt bld sugar level	28 (24%)	39 (34%)	48 (42%)
	Adherence to diabetes diet	2 (2%)	45 (39%)	68 (59%)
	Role of exercise in achiev. blood sugar control	2 (2%)	23 (20%)	90 (78%)
	Medication adherence	6 (5%)	16 (14%)	93 (81%)
	Average	9 (8%)	31 (27%)	75 (65%)
Identification of At-Risk Foot	Routine risk factors screening	39 (34%)	63 (55%)	13 (11%)
	Regular medical check-up	62 (54%)	48 (42%)	5 (4%)
	Disclosing med. hx to prof.	63 (55%)	43 (37%)	9 (8%)
	Average	55 (48%)	51 (44%)	9 (8%)
Inspection & Examination	Check for callus, edema, skin color & temperature	65 (57%)	42 (37%)	8 (7%)
	Check for bone/joint abnor.	60 (52%)	50 (43%)	5 (4%)
	Checking for foot hygiene	67 (58%)	45 (39%)	3 (3%)
	Import.of drying bt the toes	64 (56%)	42 (37%)	9 (8%)
	Physical limit. to foot care	72 (63%)	39 (34%)	4 (3%)
	Average	66 (57%)	43 (38%)	6 (5%)
Regular DFC Education	Self-motivation to seek DFC information	66 (57%)	45 (39%)	4 (3%)
	Importance of attending DFC programs	73 (63%)	36 (31%)	6 (5%)

Table 9: DFC Knowledge level among Kerugoya Participants (Continued)

Domain	Item	Poor *n (%)*	Satisfactory *n (%)*	Good *n (%)*
	Being in touch with updates	82 (71%)	30 (26%)	3 (3%)
	Average	74 (64%)	37 (32%)	4 (4%)
Appropriate Foot Care	Correct use of socks and changing them daily	58 (50%)	40 (35%)	17 (15%)
	Avoid tight knee-high socks	60 (52%)	37 (32%)	18 (16%)
	Avoid walking barefoot	53 (46%)	48 (42%)	14 (12%)
	Use of custom shoes, insoles, or toe orthoses	57 (50%)	46 (40%)	12 (10%)
	Average	57 (50%)	43 (37%)	15 (13%)
Risk Factors Management	Refrain from hot water bottles or heaters	75 (65%)	35 (30%)	5 (5%)
	Avoid using chemicals to remove corns or callus	71 (62%)	42 (37%)	2 (2%)
	Avoid emollient bt toes	68 (59%)	43 (37%)	4 (3%)
	Consult health prof.for foot problems	82 (71%)	30 (26%)	3 (3%)
	Average	74 (64%)	37 (32%)	4 (4%)
Overall Level of Knowledge		56 (49%)	40 (35%)	19 (16%)

The results reveal varied levels of knowledge across the six domains assessed. Overall, 49% (n = 56) of participants demonstrated poor knowledge of diabetic foot care, 35% (n = 40) had satisfactory knowledge, and only 16% (n = 19) exhibited good knowledge. In the glycemic control domain, which included maintaining optimal blood sugar, adherence to diet and medication, and the role of exercise, the respondents performed relatively well. A majority (65%) had good knowledge, while 27% had satisfactory understanding, and only 8% had poor knowledge. Notably, over three-quarters of respondents (78%) were aware of the role of exercise in blood sugar control, and 81% understood the importance of medication adherence.

In contrast, knowledge regarding the identification of the at-risk foot was comparatively low. Nearly half (48%) of respondents had poor knowledge in this domain, with only 8% scoring good. Most struggled with understanding the importance of regular medical check-ups and disclosing medical history, indicating a gap in early risk identification.

The inspection and examination of the foot domain also reflected knowledge deficiencies. A substantial 57% demonstrated poor knowledge, especially regarding checking for skin changes, foot hygiene, and physical limitations. Only 5% had good knowledge in this critical preventive area. Knowledge of regular DFC education was also low. The majority (64%) of respondents scored poorly, and only 4% scored well. Most respondents were unaware of the importance of staying updated on foot care information or attending educational programs, suggesting limited access to or engagement with continuous diabetic education. When it came to appropriate foot care, half (50%) of the participants had poor knowledge. Respondents were particularly unaware of the importance of using custom-made footwear or avoiding barefoot walking, both essential in preventing foot injuries.

The risk factors management domain had the poorest performance, with 64% scoring in the poor category. Most respondents lacked knowledge on avoiding hot objects for warming feet, using plasters or chemicals on corns, and the importance of consulting health professionals when foot problems arise. Only 4% of respondents had good knowledge in this area, which is concerning considering the role of these factors in ulcer development. Overall, these results indicate a critical gap in DFC knowledge among respondents in Kerugoya Hospital. While knowledge of glycemic control was relatively strong, significant deficiencies exist in areas directly related to foot assessment and prevention of complications. This highlights the urgent need for structured diabetic foot care education and targeted health promotion to improve patients' understanding and management of foot-related risks.

4.2.4 DFC Behavior Level Among Respondents in Kerugoya Level 5 Hospital

Table 10 presents findings on Diabetic Foot Care (DFC) self-care behavior among respondents at Kerugoya Hospital. The assessment covered four key domains of preventive foot care: glycemic control, regular foot inspection and examination, appropriate use of footwear, and risk factor management. These domains reflect core aspects of daily diabetic self-management behavior. Each domain was analyzed based on participant responses, categorized as poor, moderate, or good practice levels. The results provide insight into the extent to which patients engage in behaviors that can help prevent foot-related complications, including ulcers and amputations. Percentages were calculated from a total sample size of 115 respondents.

Table 10: DFC Self-care Behavior Among Respondent in Kerugoya hospital

Domain	Item	Poor *n (%)*	Moderate *n (%)*	Good *n (%)*
Glycemic Control	Maintaining optimal blood sugar level	71 (62%)	42 (37%)	2 (1%)
	Glycosylated haemoglobin level	82 (71%)	33 (29%)	0 (0%)
	Adherence to diabetes diet	88 (77%)	27 (23%)	0 (0%)
	Medication adherence	94 (82%)	20 (17%)	1 (1%)
	Role of exercise in achieving blood sugar control	86 (75%)	29 (25%)	1 (1%)
	Average	84 (73%)	30 (26%)	1 (1%)
Foot Insp.& Exam.	Checking for foot hygiene	93 (81%)	21 (18%)	1 (1%)
	Attending DF screening	92 (80%)	22 (19%)	1 (1%)
	Regular check for color/temp.	105 (91%)	9 (8%)	1 (1%)
	Checking for pre-ulcer. signs	106 (92%)	8 (7%)	1 (1%)
	Reporting foot problems to healthcare workers	59 (51%)	49 (43%)	7 (6%)
	Average	91 (79%)	22 (19%)	2 (2%)
Appropriate Use of Footwear	Wearing shoes with straps, Velcro, or lace-ups	100 (87%)	15 (13%)	0 (0%)
	Wearing unfastened slippers	105 (91%)	10 (9%)	0 (0%)
	Wearing shoes with pointy toes	107 (93%)	8 (7%)	0 (0%)
	Checking shoes before wearing them and taking them off	106 (92%)	8 (7%)	1 (1%)
	Proper use of socks and stockings	107 (93%)	7 (6%)	1 (1%)
	Avoid walking barefoot	111 (97%)	3 (3%)	1 (1%)
	Average	106 (92%)	7 (7%)	1 (1%)
Risk Factor Management	Using moisturizing cream on your feet	66 (57%)	3 (3%)	46 (40%)
	Avoid emollient between toes	82 (71%)	4 (3%)	27 (23%)
	Nail trimming	107 (93%)	8 (7%)	0 (0%)
	Avoid hot water bottles/heat.	109 (95%)	6 (5%)	0 (0%)
	Avoid use- plast/chem. for corns/callus	111 (97%)	4 (3%)	0 (0%)
	Treat blisters with dry dressing	110 (96%)	4 (3%)	1 (1%)
	Average	98 (85%)	5 (4%)	12 (11%)
Overall Self-care Behav.		95 (83%)	16 (14%)	4 (3%)

The results indicate a generally low level of diabetic foot care (DFC) self-care behavior among the respondents. Overall, 83% (n = 95) of participants demonstrated poor self-care behavior, while only 3% (n = 4) had good self-care practices.

Within the glycemic control domain, a substantial majority reported poor behavior in maintaining optimal blood sugar levels (62%), glycosylated hemoglobin monitoring (71%), adherence to diabetes diet (77%), and prescribed medication adherence (82%). Physical activity was also poorly practiced, with 75% of respondents failing to engage in regular exercise. On average, 73% of respondents fell under poor behavior in this domain, suggesting suboptimal blood glucose self-monitoring routines.

In the foot inspection and examination domain, 79% of respondents exhibited poor behavior. For instance, 92% did not regularly check for pre-ulcerative signs and 91% failed to assess skin color and temperature. While about 51% reported foot problems to healthcare providers, other practices like hygiene checks and screening attendance were still inadequate. These findings reveal a lack of routine foot assessments, which are critical in early identification of foot complications.

The domain of appropriate footwear use showed the highest proportion of poor self-care, with 92% of respondents falling into this category. For example, 93% wore inappropriate shoes, such as those with pointy toes or without proper fastenings. Only 1% performed the correct practice of checking shoes before wearing them and avoiding walking barefoot. This emphasizes a significant gap in awareness and application of protective footwear practices.

Under risk factor management, 85% of participants had poor practices. While 40% reported using moisturizing cream appropriately, risky behaviors were still widespread, such as applying emollients between toes (71%) and using unsafe methods for treating corns or cuts (97% used plasters or chemicals). Nail trimming and avoiding hot water bottles also scored poorly.

The overall findings demonstrate that despite the clinical importance of foot care, a majority of the respondents did not adequately adhere to recommended DFC behaviors across all measured domains. This calls for targeted patient education and behavioral

interventions to enhance knowledge and promote practical self-care routines among diabetic patients at Kerugoya Hospital.

4.2.5 DFC Self-efficacy level Among Respondents in Kerugoya Level 5 Hospital

The analysis reflects Bandura's self-efficacy theory as measured across four domains of diabetic foot care (DFC): glycemic control, foot inspection, appropriate footwear use, and risk factor management—with focus on the general patterns of self-efficacy beliefs in terms of task difficulty, belief in one's ability, and performance under pressure.

Table 11: DFC Self -Efficacy Among Respondent in Kerugoya Hospital

Domain	Item	Low (n%)	Moderate (n%)	High (n%)
Task Difficulty	Capability of achieving Glyc. control	33 (29%)	35 (30%)	47 (41%)
	doing regular foot I and E	55 (48%)	54 (47%)	6 (5%)
	achieving appr.footwear	71 (62%)	42 (37%)	2 (1%)
	managing foot ulcers risk factors	84 (73%)	26 (23%)	5 (4%)
	Average	61 (53%)	39 (34%)	15 (13%)
Belief in One's Ability	Confidence in achieving glycemic control	55 (48%)	48 (42%)	12 (10%)
	doing regular foot inspection	79 (69%)	31 (27%)	5 (4%)
	achieving appropriate footwear	86 (75%)	25 (22%)	4 (3%)
	managing foot ulcer risk factors	90 (78%)	23 (20%)	2 (2%)
	Average	77 (67%)	32 (28%)	6 (5%)
Work Under Pressure	Achieving glycemic control	92 (80%)	19 (17%)	4 (3%)
	Achieving regular foot inspection and examination	95 (83%)	17 (15%)	3 (2%)
	Achieving appropriate footwear	106 (92%)	9 (8%)	0 (0%)
	Managing foot ulcer risk factors	107 (93%)	7 (6%)	1 (1%)
	Average	100 (87%)	13 (11%)	2 (2%)
	Overall DFC Self-Efficacy	79 (69%)	28 (24%)	8 (7%)

The findings in Table 11 reveal generally low levels of diabetic foot care (DFC) self-efficacy among respondents attending Kerugoya Hospital, with 69% (n = 79) of participants reporting overall low confidence in their ability to carry out recommended DFC behaviors.

In the task difficulty domain, which explores participants' perceived capability to accomplish various DFC tasks, 53% (n = 61) of respondents scored low. Specifically, 73% (n = 84) felt incapable of managing foot ulcer risk factors, while 62% (n = 71) lacked confidence in achieving proper footwear use. The highest perceived ability within this domain was in achieving glycemic control, with 41% (n = 47) reporting high self-efficacy.

The belief in one's ability domain—which assesses confidence in successfully completing DFC tasks—was also markedly low, with 67% (n = 77) of respondents scoring in the low category. Only 10% (n = 12) of participants reported high confidence in achieving glycemic control, while confidence in appropriate footwear use (3%) and managing foot ulcer risks (2%) remained particularly low. These results underscore a significant deficiency in the internal belief systems necessary for sustained behavior change among the majority of participants.

The domain evaluating the ability to perform under pressure was the most negatively rated, with 87% (n = 100) of respondents demonstrating low self-efficacy. Most respondents (93%, n = 107) felt unable to manage foot ulcer risks under pressure, and 92% (n = 106) could not maintain proper footwear practices when faced with challenging situations. Less than 3% of participants demonstrated high self-efficacy in any subdomain under pressure, indicating a clear struggle in sustaining preventive DFC behaviors during stress or discomfort.

Overall, only 7% (n = 8) of respondents demonstrated high DFC self-efficacy across all domains. These findings suggest that most individuals lack the confidence required to consistently perform critical foot care tasks, particularly when challenged by complex health demands or psychological stressors.

Low self-efficacy may significantly contribute to poor DFC behaviors and foot health outcomes among diabetic patients. Interventions to improve self-efficacy—through education, skill-building, and motivational support—are recommended to empower patients in adopting and maintaining effective diabetic foot care routines.

4.3 Baseline comparison for Embu Vs Kerugoya

4.3.1 DFC Knowledge Level Comparison- Embu vs Kerugoya

This comparative analysis evaluates the level of knowledge across six key Diabetic Foot Care (DFC) domains among respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital, each with a sample size of 115 participants. The domains assessed include glycemic control, identification of the at-risk foot, foot inspection and examination, regular DFC education, appropriate foot care, and risk factors management. The findings provide insights into the strengths and gaps in patient education within these critical areas, revealing variations in knowledge levels across the two sites. These results can inform the design and implementation of targeted educational interventions aimed at improving DFC outcomes in both healthcare settings.

Table 12: DFC Knowledge Level Comparison- Embu vs Kerugoya

Domain	Embu – Good n (%)	Embu – Satisfactory n (%)	Embu – Poor n (%)	Kerugoya – Good n (%)	Kerugoya – Satisfactory n (%)	Kerugoya – Poor n (%)
Glyc Control	36 (31.3%)	53 (46.1%)	26 (22.6%)	75 (65.2%)	31 (27.0%)	9 (7.8%)
Identif. of At-Risk Foot	4 (3.5%)	50 (43.5%)	61 (53.0%)	9 (7.8%)	51 (44.3%)	55 (47.8%)
Foot I & E	4 (3.5%)	43 (37.4%)	68 (59.1%)	6 (5.2%)	43 (37.4%)	66 (57.4%)
Regular DFC Educ.	3 (2.6%)	52 (45.2%)	60 (52.2%)	4 (3.5%)	37 (32.2%)	74 (64.3%)
Appropriate Foot Care	15 (13.0%)	43 (37.4%)	57 (49.6%)	15 (13.0%)	43 (37.4%)	57 (49.6%)
Risk Factors Management	13 (11.3%)	46 (40.0%)	56 (48.7%)	4 (3.5%)	37 (32.2%)	74 (64.3%)
Overall Knowledge Level	12 (10.4%)	48 (41.7%)	55 (47.8%)	19 (16.5%)	40 (34.8%)	56 (48.7%)

A comparative analysis, as presented in table 12, was conducted to assess the level of knowledge on Diabetic Foot Care (DFC) among respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital. Each site had an equal sample size of 115 participants. The analysis was organized across six key DFC domains: glycemic control, identification of the at-risk foot, foot inspection and examination, regular DFC education, appropriate foot care, and risk factor management. Knowledge levels were categorized as good, satisfactory, or poor based on composite scores for each domain.

In the domain of glycemic control, Kerugoya respondents demonstrated significantly higher knowledge compared to their Embu counterparts. A substantial 65.2% of Kerugoya participants had good knowledge in this area, compared to 31.3% in Embu. Moreover, only 7.8% of Kerugoya participants fell into the poor category, while Embu recorded 22.6%. These findings suggest that Kerugoya participants were better informed on aspects such as maintaining optimal blood sugar levels, dietary adherence, the role of exercise, and medication compliance.

With regard to the identification of the at-risk foot, knowledge levels were generally low in both hospitals. Only 3.5% of Embu and 7.8% of Kerugoya respondents had good knowledge. While the proportion of respondents with satisfactory knowledge was similar across the two sites (43.5% in Embu and 44.3% in Kerugoya), a large percentage in both hospitals demonstrated poor knowledge (53.0% in Embu and 47.8% in Kerugoya). This indicates a shared deficiency in recognizing early risk factors that predispose diabetic patients to foot complications.

Similarly, in the domain of foot inspection and examination, both groups performed poorly. Only 3.5% of Embu respondents and 5.2% in Kerugoya were categorized as having good knowledge. The majority of respondents had poor knowledge: 59.1% in Embu and 57.4% in Kerugoya. These findings reflect a limited understanding of key self-examination practices such as checking for foot abnormalities, signs of infection, or hygiene concerns, which are essential for early detection and prevention of complications.

In terms of regular DFC education, which measured respondents' motivation to seek out information, awareness of DFC programs, and staying updated with best practices,

both sites showed low engagement. Only 2.6% of Embu respondents and 3.5% in Kerugoya had good knowledge. However, a larger proportion of respondents in Embu (45.2%) had satisfactory knowledge compared to Kerugoya (32.2%). More than half of the respondents in both hospitals had poor knowledge in this domain, with Kerugoya performing worse at 64.3% compared to 52.2% in Embu. These findings suggest limited exposure to or participation in structured DFC education across both facilities.

For the domain of appropriate foot care, the results were nearly identical between the two hospitals. Both Embu and Kerugoya recorded 13.0% of respondents with good knowledge and 37.4% with satisfactory knowledge. Poor knowledge was also consistent at 49.6% in both groups. This domain included items such as the use of appropriate footwear, avoiding walking barefoot, and changing socks regularly. The uniformity in these results points to a widespread knowledge gap in the implementation of basic, preventative foot care behaviors.

In contrast, the domain of risk factor management showed a notable difference between the two hospitals. Embu had higher levels of good knowledge (11.3%) compared to Kerugoya (3.5%), and also a higher proportion of respondents with satisfactory knowledge (40.0% in Embu versus 32.2% in Kerugoya). Kerugoya, on the other hand, had more participants with poor knowledge (64.3%) than Embu (48.7%). This domain assessed awareness of behaviors that increase foot-related complications, such as the use of hot water bottles, application of harmful chemicals on the feet, and applying emollients between the toes. The results suggest that while both groups have knowledge gaps in this area, patients in Embu may have received more guidance or warnings related to risky practices.

Finally, the overall level of DFC knowledge showed a relatively balanced distribution. Kerugoya had a slightly higher proportion of participants with good overall knowledge at 16.5%, compared to 10.4% in Embu. However, Embu had a larger percentage of respondents in the satisfactory category (41.7%) than Kerugoya (34.8%). The proportion of respondents with poor knowledge was nearly identical in both hospitals: 47.8% in Embu and 48.7% in Kerugoya. These findings indicate that although Kerugoya had more individuals with high knowledge levels, Embu had more respondents who possessed moderate understanding. Nonetheless, nearly half of all

participants in both settings exhibited poor overall knowledge, highlighting a substantial gap in diabetic foot care awareness that needs to be addressed.

4.3.2 DFC Behavior Level Comparison- Embu Vs Kerugoya

This section presents a comparative analysis of diabetic foot care (DFC) self-care behaviors among respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital, each with a sample size of 115 participants. The assessment focused on four key domains: glycemic control, foot inspection and examination, appropriate use of footwear, and risk factor management. Respondents' self-care behaviors were categorized as good, moderate, or poor based on their reported practices within each domain. The findings provide insight into behavioral patterns that may influence diabetic foot health and highlight areas requiring targeted intervention in both settings

Table 13: DFC Behavior Level Comparison- Embu vs Kerugoya

Domain	Embu – Good n (%)	Embu – Moderate n (%)	Embu – Poor n (%)	Kerugoya – Good n (%)	Kerugoya – Moderate n (%)	Kerugoya – Poor n (%)
Glycemic Control	9 (8%)	45 (39%)	61 (53%)	1 (1%)	30 (26%)	84 (73%)
Foot Inspection & Examination	3 (3%)	26 (22%)	86 (75%)	2 (2%)	22 (19%)	91 (79%)
Appropriate Use of Footwear	2 (3%)	25 (22%)	87 (76%)	1 (1%)	7 (7%)	106 (92%)
Risk Factor Management	21 (18%)	19 (17%)	75 (65%)	12 (11%)	5 (4%)	98 (85%)
Overall Self-Care Behavior	9 (8%)	29 (25%)	77 (67%)	4 (3%)	16 (14%)	95 (83%)

Table 13 presents a comparative summary of Diabetic Foot Care (DFC) self-care behaviors among respondents from Embu and Kerugoya Level 5 Hospitals. The analysis covers four critical domains: glycemic control, foot inspection and examination, appropriate use of footwear, and risk factor management, as well as the overall self-care behavior. Self-care practices were classified as good, moderate, or poor based on responses to key behavioral indicators within each domain.

In the domain of glycemic control, Embu respondents demonstrated better self-care behavior compared to their Kerugoya counterparts. Specifically, 8% of participants from Embu reported good glycemic control behaviors, whereas only 1% of those from Kerugoya fell in this category. Additionally, 39% of Embu respondents showed moderate behavior, and 53% were classified as poor. In contrast, a significantly higher 73% of Kerugoya respondents demonstrated poor glycemic control behaviors. These findings indicate that respondents in Embu were more likely to engage in self-monitoring of blood sugar, follow dietary recommendations, adhere to medication, and incorporate exercise into their daily routines—practices essential in preventing diabetic foot complications.

The results for foot inspection and examination behaviors were suboptimal in both facilities. Only 3% of respondents in Embu and 2% in Kerugoya exhibited good self-care practices in this domain. A striking 75% of Embu and 79% of Kerugoya respondents reported poor self-care behavior, highlighting a widespread lack of regular foot hygiene checks, skin assessments, and timely reporting of foot abnormalities. The low engagement in preventive foot examination practices presents a considerable risk for late detection of foot complications.

In terms of appropriate use of footwear, a similar pattern emerged. Only 3% of Embu respondents reported good practices, compared to just 1% in Kerugoya. Poor self-care behavior in this domain was more pronounced in Kerugoya (92%) than in Embu (76%). The high prevalence of poor footwear choices, including the use of ill-fitting shoes, walking barefoot, or failing to inspect footwear, underscores a critical gap in patient education and adherence to protective foot care practices.

For risk factor management, which includes behaviors such as the use of moisturizing creams (excluding interdigital spaces), proper nail trimming, and avoiding harmful practices like applying chemicals to corns or using hot water bottles, Embu respondents again performed better. Eighteen percent of Embu participants demonstrated good self-care behavior in this domain, compared to 11% in Kerugoya. Poor behavior was reported by 65% of Embu and 85% of Kerugoya respondents. This suggests a relatively higher awareness of harmful practices among Embu participants, although the overall level of adherence remains low in both settings.

The analysis of overall DFC self-care behavior revealed that 8% of respondents from Embu demonstrated good overall behavior, 25% were moderate, and 67% poor. Conversely, in Kerugoya, only 3% were categorized as having good behavior, 14% moderate, and a significantly higher 83% reported poor overall self-care behavior. These results clearly show that while self-care behavior is suboptimal in both hospitals, Kerugoya lags further behind Embu across all domains.

4.3.3 DFC Self-Efficacy Level Comparison- Embu Vs Kerugoya

This section presents a comparative analysis of self-efficacy levels related to diabetic foot care (DFC) among respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital, as summarized in Table 14. Self-efficacy was assessed across three key domains: task difficulty, belief in one's ability, and ability to work under pressure. Participants' responses were categorized as high, moderate, or low based on their confidence in performing specific DFC-related behaviors. This analysis provides insight into patients' perceived capability to engage in effective foot care practices, which is essential for preventing diabetic foot complications.

Table 14: DFC Self-Efficacy Level Comparison- Embu Vs Kerugoya

Domain	Embu High n (%)	Moderate n (%)	Low n (%)	Kerugoya High n (%)	Moderate n (%)	Low n (%)
Task Difficulty	20 (18%)	51 (44%)	44 (38%)	15 (13%)	39 (34%)	61 (53%)
Belief in One's Ability	11 (9%)	48 (42%)	56 (49%)	6 (5%)	32 (28%)	77 (67%)
Work Under Pressure	18 (16%)	39 (34%)	58 (50%)	2 (2%)	13 (11%)	100 (87%)
Overall Self-Efficacy Level	16 (14%)	46 (40%)	53 (46%)	8 (7%)	28 (24%)	79 (69%)

The analysis of self-efficacy in diabetic foot care (DFC) revealed notable differences between respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital across the three assessed domains: task difficulty, belief in one's ability, and ability to work under pressure.

In the task difficulty domain, a higher proportion of respondents from Embu (18%) reported high self-efficacy compared to Kerugoya (13%). Furthermore, 44% of Embu participants indicated moderate self-efficacy, while 38% reported low self-efficacy. In contrast, more than half of Kerugoya respondents (53%) reported low self-efficacy in this domain, suggesting a greater perceived challenge in performing DFC tasks among this group.

Regarding belief in one's ability, which reflects confidence in performing DFC-related behaviors, Embu respondents again demonstrated relatively better self-efficacy, with 9% reporting high and 42% reporting moderate levels. However, nearly half (49%) still reported low self-efficacy. In Kerugoya, the majority (67%) reported low self-efficacy, with only 5% indicating high confidence in their ability to manage DFC. This indicates a significant gap in confidence levels between the two facilities

The most substantial disparity was observed in the domain of working under pressure. Half (50%) of Embu respondents reported low self-efficacy, while 16% expressed high self-efficacy. In contrast, a striking 87% of Kerugoya participants reported low self-efficacy in this domain, with only 2% reporting high levels. This suggests that respondents in Kerugoya may struggle significantly more with maintaining DFC behaviors in stressful or demanding situations.

Overall, the composite self-efficacy score further highlights these trends. In Embu, 14% of respondents demonstrated high self-efficacy in DFC, 40% had moderate self-efficacy, and 46% were categorized as having low self-efficacy. Conversely, in Kerugoya, only 7% exhibited high self-efficacy, while 69% were classified as low. These findings suggest that while both populations exhibit challenges in self-efficacy related to DFC, the situation is more pronounced in Kerugoya, pointing to a critical need for targeted educational and behavioral interventions in this setting

4.4 Baseline Quantitative Data Inferential analysis

4.4.1 Association Between Socio-demographic Profile with DFC Knowledge Level of the Respondents

Table 15 presents the association between selected socio-demographic characteristics and the level of DFC knowledge among respondents from Embu and Kerugoya level

five participants. The analysis was conducted using the Chi-square (χ^2) test to determine whether statistically significant relationships exist between these variables. A significance level of $p < 0.05$ was adopted as the threshold for statistical significance. The variables examined include age, level of education, source of income, religion, sex, marital status, and place of residence. This analysis was essential in identifying the socio-demographic factors that may influence respondents' awareness and understanding of DFC within the study population.

Table 15: Association between socio-demographic profile with DFC knowledge level of the respondents

Variable	Category	Frequency (n)	χ^2	df	P-Value	Significance
Age	≤20 years	18	2.849	4	0.820	Not Significant
	21–40 years	34				
	41–60 years	74				
	61–80 years	95				
	>80 years	9				
Level of Education	Tertiary	38	13.457	3	0.004	Significant (*)
	Secondary	108				
	Primary	76				
	No Education	8				
Source of Income	Unemployed	58	9.124	2	0.002	Significant (*)
	Inf. Employment	141				
	F. Employment	31				
Religion	Catholic	86	1.577	2	0.970	Not Significant
	Protestant	142				
	Muslim	2				
Sex	Male	76	1.440	1	0.670	Not Significant
	Female	154				
Marriage	Never Married	49	3.110	2	0.750	Not Significant
	Married	140				
	Divorced	41				
Residence	Rural	168	11.119	1	0.001	Significant (*)
	Urban	62				

The association between respondents' socio-demographic characteristics and their level of knowledge regarding DFC was analyzed using the Chi-square (χ^2) test. The analysis was conducted among respondents from Embu and Kerugoya, with a significance level set at $p < 0.05$. The findings reveal varying degrees of association across the different socio-demographic variables.

There was no statistically significant association between age and DFC knowledge (χ^2 = 2.849, df = 4, p = 0.820). This suggests that respondents across all age categories—from those aged 20 years and below to those above 80 years—had relatively similar levels of knowledge. Therefore, age does not appear to be a determining factor in influencing knowledge about DFC in the study population.

A statistically significant association was observed between level of education and DFC knowledge (χ^2 = 13.457, df = 3, p = 0.004). Respondents with tertiary and secondary education demonstrated higher levels of knowledge compared to those with primary or no formal education. This finding highlights the critical role of education in enhancing awareness and understanding of health-related issues such as DFC. Education likely improves access to information, comprehension of medical concepts, and the ability to make informed health decisions.

The results also showed a significant association between source of income and knowledge of DFC (χ^2 = 9.124, df = 2, p = 0.002). Respondents engaged in formal and informal employment were more knowledgeable compared to those who were unemployed. Employment, particularly in the formal sector, may be linked to greater exposure to health education campaigns, access to healthcare services, and overall better socioeconomic conditions, which facilitate the acquisition of health knowledge.

Religion was not significantly associated with knowledge of DFC (χ^2 = 1.577, df = 2, p = 0.970), indicating that religious affiliation—whether Catholic, Protestant, or Muslim—did not influence respondents' knowledge levels. Similarly, sex did not show a significant association (χ^2 = 1.440, df = 1, p = 0.670), suggesting that both male and female respondents had comparable levels of awareness regarding DFC.

Marital status also did not significantly influence knowledge levels (χ^2 = 3.110, df = 2, p = 0.750), with married, never married, and divorced individuals exhibiting similar levels of understanding. These findings imply that personal life circumstances such as marital status and gender may not directly affect health knowledge in the context of DFC.

However, a strong and statistically significant association was found between place of residence and DFC knowledge ($\chi^2 = 11.119$, df = 1, p = 0.001). Respondents residing in urban areas demonstrated significantly higher knowledge levels compared to their rural counterparts. This could be attributed to better access to health facilities, educational institutions, media, and public health campaigns in urban areas, which play a critical role in disseminating health information.

In summary, the analysis indicates that education level, source of income, and place of residence are significant determinants of DFC knowledge among the study population. These findings suggest the need for targeted interventions, particularly in rural areas and among individuals with lower educational attainment or without stable sources of income, to improve knowledge and awareness about DFC.

4.4.2 Association Between Clinical Characteristics with DFC Knowledge Level of the Respondents

Table 16 presents the association between selected clinical characteristics of the respondents and their level of knowledge regarding diabetic foot care (DFC). The analysis was conducted using the Chi-square (χ^2) test, with a significance level set at $p < 0.05$. The variables examined include type and duration of diabetes mellitus, type of diabetic treatment, presence of comorbid conditions, body mass index (BMI), smoking status, and alcohol intake. This analysis aimed to determine whether these clinical factors had a statistically significant influence on respondents' awareness and understanding of DFC. Identifying such associations is critical in informing targeted educational interventions, as patients with certain clinical profiles may require more intensive or tailored foot care education. For instance, individuals with long-standing diabetes or multiple comorbidities may be at higher risk of complications and thus need enhanced preventive knowledge. This understanding helps in developing risk-based strategies to improve diabetic foot care outcomes.

Table 16: Association Between Clinical Characteristics with DFC Knowledge Level of the Respondents

Category	Variable	Frequency (n)	χ^2	df	P-Value	Significance
Type of Diabetes Mellitus	Type 1 DM	41	1.294	1	0.255	Not Significant
	Type 2 DM	189				
Duration of Diabetes	0–5 years	70	22.187	2	0.001	Significant (*)
	6–15 years	122				
	>16 years	38				
Diabetic Treatment Type	Oral antidiabetics	121	6.004	2	0.048	Significant (*)
	Injectables	53				
	Combined	56				
Presence of Comorbid Conditions	Yes	80	10.036	1	0.020	Significant (*)
	No	150				
Current BMI	<18.5 kg/m²	18	1.799	3	0.610	Not Significant
	18.5–24.5 kg/m²	87				
	24.5–30 kg/m²	112				
	>30 kg/m²	13				
Smoking Status	Currently smoking	3	1.890	2	0.570	Not Significant
	Past smoker	40				
	Never smoked	187				
Alcohol Intake	Currently using alcohol	5	1.152	2	0.980	Not Significant
	Taken in the past	60				
	Never took alcohol	165				

The analysis of clinical characteristics and their association with DFC knowledge revealed several key findings. There was no statistically significant association between the type of diabetes and knowledge levels ($\chi^2 = 1.294$, $p = 0.255$), indicating similar awareness among respondents with Type 1 and Type 2 diabetes. However, the duration of diabetes showed a significant association ($\chi^2 = 22.187$, $p = 0.001$), with higher knowledge observed among those who had lived with diabetes for 6–15 years. This suggests that experience over time may enhance understanding, although this trend may plateau or decline in those with prolonged disease duration.

A significant relationship was also observed between type of treatment and knowledge levels ($\chi^2 = 6.004$, $p = 0.048$). Respondents on combined oral and injectable therapies demonstrated better awareness, possibly due to more frequent interaction with healthcare providers and increased exposure to diabetes education. Similarly, individuals with comorbidities exhibited significantly higher knowledge ($\chi^2 = 10.036$, $p = 0.020$), likely reflecting more intensive disease management, greater healthcare contact, and enhanced access to relevant health information.

In contrast, body mass index ($\chi^2 = 1.799$, $p = 0.610$), smoking status ($\chi^2 = 1.890$, $p = 0.570$), and alcohol intake ($\chi^2 = 1.152$, $p = 0.980$) were not significantly associated with DFC knowledge. These findings suggest that clinical experience and structured healthcare engagement play a more critical role in shaping awareness than lifestyle or demographic factors alone. Continued, targeted education—particularly for patients with less complex treatment histories or recent diagnoses—may help close existing knowledge gaps.

4.4.3 Association Between Socio-Demographic Profile with DFC Behavior Level of the Respondents

Table 17 presents the association between selected socio-demographic characteristics of the respondents and their DFC behavior levels. The analysis was performed using the Chi-square (χ^2) test to determine whether statistically significant relationships existed between these variables. A p-value of less than 0.05 was considered statistically significant. The variables assessed included age, level of education, source of income, religion, sex, marital status, and place of residence. This analysis aimed to identify which socio-demographic factors were significantly associated with behavioral practices related to DFC among the study population.

Table 17: Association Between Socio-Demographic Profile with DFC Behavior Level of the Respondents

Variable	Category	Frequency (n)	χ^2	df	P-Value	Significance
Age	≤ 20 years	18	4.049	4	0.301	Not Significant
	21–40 years	34				
	41–60 years	74				
	61–80 years	95				
	> 80 years	9				
Level of Education	Tertiary	38	14.236	3	0.003	Significant (*)
	Secondary	108				
	Primary	76				
	No Education	8				
Source of Income	Unemployed	58	10.991	2	0.004	Significant (*)
	Informal Employment	141				
	Formal Employment	31				
Religion	Catholic	86	1.899	2	0.476	Not Significant
	Protestant	142				
	Muslim	2				
Sex	Male	76	0.983	1	0.276	Not Significant
	Female	154				
Marital Status	Never Married	49	2.142	2	0.353	Not Significant
	Married	140				
	Divorced	41				
Residence	Rural	168	9.728	1	0.002	Significant (*)
	Urban	62				

The association between respondents' socio-demographic characteristics and their DFC behavior levels was examined using the Chi-square (χ^2) test. A p-value less than 0.05 was considered statistically significant. The findings provide insight into which socio-demographic factors may influence how individuals engage in behaviors related to DFC.

The results revealed that age was not significantly associated with DFC behavior levels ($\chi^2 = 4.049$, df = 4, p = 0.301). This indicates that respondents across different age groups—from those aged 20 years and below to those over 80 years—demonstrated

relatively similar behavioral patterns in relation to DFC. Age did not appear to be a determining factor in influencing DFC-related behavioral practices in this population.

In contrast, there was a statistically significant association between level of education and DFC behavior ($\chi^2 = 14.236$, df = 3, p = 0.003). Respondents with higher levels of education, particularly those with tertiary and secondary education, were more likely to demonstrate positive DFC-related behaviors compared to those with only primary education or no formal education. This finding suggests that educational attainment enhances an individual's ability to understand and act upon health information, thereby influencing behavior positively.

Similarly, source of income was significantly associated with DFC behavior ($\chi^2 = 10.991$, df = 2, p = 0.004). Individuals engaged in formal or informal employment exhibited more appropriate DFC behaviors than those who were unemployed. Employment may contribute to better health behaviors by providing financial resources, social support, and access to health information or services, all of which may foster more proactive health practices.

On the other hand, religion did not show a significant relationship with DFC behavior levels ($\chi^2 = 1.899$, df = 2, p = 0.476). This suggests that religious affiliation—whether Catholic, Protestant, or Muslim—did not influence how individuals behaved in relation to DFC. Similarly, sex ($\chi^2 = 0.983$, df = 1, p = 0.276) and marital status ($\chi^2 = 2.142$, df = 2, p = 0.353) were not significantly associated with DFC behavior levels, indicating that gender and marital status did not meaningfully impact behavioral engagement with DFC among the respondents.

A statistically significant association was, however, observed with place of residence ($\chi^2 = 9.728$, df = 1, p = 0.002). Respondents living in urban areas were more likely to report positive DFC behaviors compared to those in rural settings. This could be attributed to greater access to healthcare facilities, health education, and public health messaging in urban areas, which can promote better health practices.

4.4.4 Association Between Clinical Characteristic with DFC Behavior Level of the Respondents

Table 18 presents the association between selected clinical characteristics of the respondents and their behavior towards Diabetic Foot Care (DFC). The Chi-square (χ^2) test was used to examine the relationships, with a p-value of less than 0.05 considered statistically significant. Variables assessed include the type and duration of diabetes, treatment modalities, comorbid conditions, body mass index (BMI), smoking status, and alcohol consumption. The analysis aimed to identify clinical predictors that influence DFC behavior among the respondents.

Table 18: Association Between Clinical Characteristic with DFC Behavior Level of the Respondents

Variable	Category	Frequency (n)	χ^2	df	P-Value	Significance
Type of DM	Type 1 DM	41	1.211	1	0.317	Not Significant
	Type 2 DM	189				
Duration with Diabetes	0–5 years	70	17.356	2	0.001	Significant (*)
	6–15 years	122				
	>16 years	38				
DM Treatment Type	Oral antidiabetic	121	7.182	2	0.020	Significant (*)
	Injectables	53				
	Combined	56				
Comorbidities	Yes	80	8.105	1	0.004	Significant (*)
	No	150				
Current BMI	<18.5 kg/m²	18	3.819	3	0.920	Not Significant
	18.5–24.5 kg/m²	87				
	24.5–30 kg/m²	112				
	>30 kg/m²	13				
Smoking Status	Cur.smoking	3	2.960	2	0.870	Not Significant
	Past smoker	40				
	Never smoked	187				
Alcohol Intake	Cur. using alcohol	5	2.074	2	0.640	Not Significant
	Taken in the past	60				
	Never took alcohol	165				

The findings from Table 19 indicate varying degrees of association between clinical factors and respondents' DFC behavior levels. There was no statistically significant association between the type of diabetes mellitus and DFC behavior ($\chi^2 = 1.211$, $p = 0.317$). This suggests that whether a respondent had Type 1 or Type 2 diabetes did not significantly affect how they engaged in DFC practices. DFC behavior appears to be consistent across the two groups.

In contrast, a statistically significant association was observed between the duration of diabetes and DFC behavior ($\chi^2 = 17.356$, $p = 0.001$). Respondents who had lived with diabetes for 6 to 15 years demonstrated better DFC behavior compared to those who had the disease for fewer than 5 years or more than 16 years. This finding may suggest that individuals acquire more awareness and establish consistent foot care routines over time, particularly during the mid-duration phase of disease management. However, a decline in behavior among those with longer durations (>16 years) could reflect factors such as fatigue with chronic disease management, complications, or declining physical ability.

A significant association was also found between the type of diabetic treatment and DFC behavior ($\chi^2 = 7.182$, $p = 0.020$). Respondents receiving a combination of oral antidiabetics and injectable demonstrated better DFC practices compared to those on monotherapy. This may be attributed to increased interaction with healthcare providers, more intensive disease management, or a greater perceived seriousness of their condition, leading to more cautious health behaviors.

Furthermore, the presence of comorbidities (other diseases) was significantly associated with DFC behavior ($\chi^2 = 8.105$, $p = 0.004$). Respondents with additional health conditions were more likely to engage in appropriate DFC practices than those without comorbidities. This could be due to increased exposure to healthcare systems, more frequent medical advice, and greater health consciousness among individuals managing multiple chronic conditions.

In contrast, no statistically significant associations were found between DFC behavior and BMI ($\chi^2 = 3.819$, $p = 0.920$), smoking status ($\chi^2 = 2.960$, $p = 0.870$), or alcohol consumption ($\chi^2 = 2.074$, $p = 0.640$). These findings suggest that lifestyle and biometric

indicators such as weight, smoking, and alcohol use did not significantly impact how respondents engaged in DFC behaviors. It is possible that while these factors are clinically relevant to diabetes management, they do not directly influence foot care routines or awareness

4.4.5 Association Between Sociodemographic Profile with DFC Self-Efficacy Level of the Respondents

Table 19 summarizes the association between respondents' socio-demographic characteristics and their self-efficacy in Diabetic Foot Care (DFC). The Chi-square (χ^2) test was used to assess significance across variables including age, education level, income source, religion, sex, marital status, and residence. Statistical significance was set at $p < 0.05$.

Table 19: Association Between Sociodemographic Profile With DFC Self-Efficacy Level of the Respondents

Variable	Category	Frequency (n)	χ^2	df	P-Value	Significance
Age	≤ 20 years	18	3.109	4	0.394	Not Significant
	21–40 years	34				
	41–60 years	74				
	61–80 years	95				
	> 80 years	9				
Level of Educ.	Tertiary	38	12.851	3	0.003	Significant (*)
	Secondary	108				
	Primary	76				
	No Education	8				
Source of Income	Unemployed	58	11.302	2	0.007	Significant (*)
	Informal Employment	141				
	Formal Employment	31				
Religion	Catholic	86	2.082	2	0.374	Not Significant
	Protestant	142				
	Muslim	2				
Sex	Male	76	0.624	1	0.276	Not Significant
	Female	154				
Marital Status	Never Married	49	2.649	2	0.253	Not Significant
	Married	140				
	Divorced	41				
Residence	Rural	168	7.952	1	0.012	Significant (*)
	Urban	62				

The analysis of socio-demographic characteristics in relation to DFC self-efficacy revealed several important findings. Age did not show a statistically significant association with self-efficacy levels ($\chi^2 = 3.109$, $p = 0.394$). This indicates that self-efficacy regarding diabetic foot care was relatively consistent across all age groups, from those aged 20 years and below to those above 80. This lack of variation suggests that age alone may not influence an individual's confidence or ability to manage DFC.

A significant association was found between level of education and DFC self-efficacy ($\chi^2 = 12.851$, $p = 0.003$). Respondents with higher levels of education, particularly those with tertiary or secondary education, demonstrated higher self-efficacy in managing foot care. This suggests that education may enhance an individual's understanding of foot care practices, their importance, and the confidence to perform them effectively.

Similarly, source of income was significantly associated with DFC self-efficacy ($\chi^2 = 11.302$, $p = 0.007$). Those with formal or informal employment were more likely to report higher self-efficacy compared to unemployed respondents. Employment may increase access to healthcare resources, education, and consistent interaction with healthcare professionals, all of which can contribute to greater self-confidence in managing one's condition.

Place of residence also showed a statistically significant association ($\chi^2 = 7.952$, $p = 0.012$), with urban dwellers exhibiting higher levels of DFC self-efficacy than rural counterparts. This may be attributed to greater access to healthcare services, educational materials, and support systems in urban settings, which can contribute to improved knowledge and self-management skills.

In contrast, religion ($\chi^2 = 2.082$, $p = 0.374$), sex ($\chi^2 = 0.624$, $p = 0.276$), and marital status ($\chi^2 = 2.649$, $p = 0.253$) did not show significant associations with DFC self-efficacy. These findings suggest that gender, marital status, or religious affiliation do not significantly influence individuals' confidence in managing diabetic foot care.

4.4.6 Association Between Clinical Characteristics with DFC Self-Efficacy Level of the Respondents

Table 20 presents the association between clinical characteristics of the respondents and their level of self-efficacy in Diabetic Foot Care (DFC). The Chi-square (χ^2) test was employed to determine whether significant relationships existed between variables such as type and duration of diabetes, treatment modalities, comorbid conditions, body mass index (BMI), smoking status, and alcohol intake. A p-value of less than 0.05 was considered statistically significant.

Table 20: Association between clinical characteristics with DFC Self-Efficacy level of the respondents

Variable	Category	Frequency (n)	χ^2	df	P-Value	Significance
Type of DM	Type 1 DM	41	0.970	1	0.326	Not Significant
	Type 2 DM	189				
DM duration	0–5 years	70	14.767	2	0.009	Significant (*)
	6–15 years	122				
	>16 years	38				
DM Treatment Type	Oral antidiabetic	121	9.112	2	0.032	Significant (*)
	Injectables	53				
	Combined	56				
Comorbidities	Yes	80	5.465	1	0.006	Significant (*)
	No	150				
Current BMI	<18.5 kg/m²	18	9.487	3	0.026	Significant (*)
	18.5–24.5 kg/m²	87				
	24.5–30 kg/m²	112				
	>30 kg/m²	13				
Smoking Status	Currently smoking	3	3.181	2	0.204	Not Significant
	Past smoker	40				
	Never smoked	187				
Alcohol Intake	Currently using alcohol	5	2.783	2	0.440	Not Significant
	Taken in the past	60				
	Never took alcohol	165				

The findings from Table 20 show several statistically significant associations between clinical characteristics and DFC self-efficacy among respondents. Firstly, no significant association was observed between the type of diabetes (Type 1 or Type 2) and self-efficacy ($\chi^2 = 0.970$, $p = 0.326$), indicating that the type of diabetes mellitus did not influence patients' confidence or ability in practicing proper foot care.

In contrast, a statistically significant relationship was found between the duration of diabetes and DFC self-efficacy ($\chi^2 = 14.767$, $p = 0.009$). Respondents who had lived with diabetes for 6–15 years were more likely to report higher self-efficacy compared to those with shorter (0–5 years) or longer (>16 years) durations. This suggests that individuals may build better coping skills and confidence in managing foot care as they gain experience over time, particularly during the middle years of disease management. Additionally, the type of diabetic treatment was significantly associated with self-efficacy ($\chi^2 = 9.112$, $p = 0.032$). Respondents receiving combined treatment (oral and injectables) were more likely to report higher self-efficacy, potentially due to more frequent interactions with healthcare providers and increased exposure to diabetes education and foot care advice.

The presence of comorbid conditions was also significantly associated with DFC self-efficacy ($\chi^2 = 5.465$, $p = 0.006$). Individuals who reported suffering from other chronic illnesses alongside diabetes demonstrated greater self-efficacy. This may be attributed to more regular monitoring, diversified care routines, and heightened health consciousness among those managing multiple conditions. Moreover, Body Mass Index (BMI) showed a significant association with self-efficacy ($\chi^2 = 9.487$, $p = 0.026$). Respondents in the normal BMI range (18.5–24.5 kg/m²) generally had higher levels of self-efficacy compared to underweight or obese individuals. This may reflect better general health, physical mobility, and lifestyle habits that support consistent foot care practices.

On the other hand, smoking status ($\chi^2 = 3.181$, $p = 0.204$) and alcohol intake ($\chi^2 = 2.783$, $p = 0.440$) were not significantly associated with DFC self-efficacy. These findings suggest that while these behaviors are risk factors for diabetes complications, they may not directly impact an individual's confidence in managing diabetic foot care.

4.5 Baseline Qualitative Findings

4.5.1 Overview of Participants Characteristics

This section presents qualitative findings from Focus Group Discussions (FGDs) with individuals living with diabetes at Embu and Kerugoya Level 5 Hospitals. The FGDs explored factors influencing diabetic foot care (DFC) practices, focusing on patient-related aspects—such as knowledge gaps, self-care behaviors, and self-efficacy—as

well as health system factors that support or hinder effective care. The qualitative approach enabled a deeper understanding of participants' beliefs, attitudes, and perceived barriers and facilitators, offering insights not readily captured through quantitative methods.

Forty participants took part in four FGDs (two per facility). They were purposively selected based on a minimum of five years living with diabetes and conveniently sampled from clinic attendees. Each session lasted 90 to 120 minutes, allowing for comprehensive discussion of key issues.Data were transcribed verbatim and analyzed thematically. Emerging themes were organized in line with study objectives, capturing both individual and systemic determinants of DFC. These are discussed in the following sections, supported by illustrative quotations.

Table 21 presents the distribution of socio-demographic and clinical characteristics of the 40 respondents, disaggregated by Focus Group Discussion (FGD). The participants were drawn from four FGDs conducted in two major health facilities: FGD 1 and FGD 2 at Embu Level 5 Hospital, and FGD 3 and FGD 4 at Kerugoya Level 5 Hospital. This stratification enabled a comparative understanding of respondent characteristics across the two counties. The age range of participants spanned from 19 to 84 years, indicating representation across various age groups, from young adults to elderly individuals living with diabetes. All four FGDs had a relatively wide age distribution, with Kerugoya groups (FGD 3 and 4) slightly skewed towards older age brackets. In terms of gender, females constituted the majority across all FGDs (67.5% overall), with the highest female representation in FGD 2 (80%). This aligns with existing evidence that women often participate more actively in community health forums and may have higher health-seeking behavior.

Table 21: Table Overview of Participants Characteristics

Characteristic	Category	FGD 1(n=10)	FGD 2(n=10)	FGD 3(n=10)	FGD 4(n=10)	Total (N = 40)
Age Range (years)		21–76	19–75	27–84	30–78	19–84
Gender	Male	5	2	3	3	13 (32.5%)
	Female	5	8	7	7	27 (67.5%)
Marital Status	Never Married	1	2	3	2	9 (22.5%)
	Married	5	6	5	7	23 (57.5%)
	S/D/W	4	2	2	1	8 (20.0%)
Education Level	Tertiary	2	4	2	1	9 (22.5%)
	Secondary	6	5	6	7	24 (60.0%)
	Primary	2	1	2	2	7 (17.5%)
Source of Income	Unemployed	1	3	0	0	4 (10.0%)
	Informal Employment	9	6	8	10	33 (82.5%)
	Formal Employment	0	1	2	0	3 (7.5%)
Residence	Rural	9	9	9	10	37 (92.5%)
	Urban	1	1	1	0	3 (7.5%)
Type of Diabetes	Type 1 DM	2	3	2	3	10 (25.0%)
	Type 2 DM	8	7	8	7	30 (75.0%)
Diabetes Duration	Range (years)	5–18	7–35	6–23	5–18	5–35

Regarding marital status, the majority of respondents were married (57.5%), followed by those who were never married (22.5%) and separated/divorced/widowed (20%). The proportion of married participants was relatively consistent across all groups, with FGD 4 recording the highest number of married individuals (70%). Education level varied, with the majority of participants having secondary education (60%), followed by tertiary education (22.5%) and primary education (17.5%). Notably, FGD 2 had the highest number of tertiary-educated individuals (40%), while FGD 4 had a greater concentration of participants with secondary education. The source of income showed that most participants (82.5%) were engaged in informal employment, such as farming, small-scale trade, or casual labor. Only a small fraction were in formal employment (7.5%), while 10% were unemployed. Notably, FGD 1 (Embu) had only one unemployed participant, whereas FGD 2 had three, suggesting slight variation in economic engagement across locations.

In terms of residence, a significant majority of respondents (92.5%) resided in rural areas, highlighting the predominantly rural catchment areas of the two hospitals. Only 3 participants (7.5%) were from urban settings, and they were evenly distributed across the first three FGDs. With respect to the type of diabetes, Type 2 diabetes mellitus (T2DM) was predominant, affecting 75% of participants, while 25% had Type 1 diabetes mellitus (T1DM). All FGDs reflected this trend, with a slightly higher number of Type 1 cases in FGD 2 and FGD 4. Finally, the duration of diabetes ranged from 5 to 35 years, indicating a mix of both recently diagnosed and long-term cases. FGD 2 had participants with the longest history of diabetes (up to 35 years), while other groups mostly included participants with 5 to 23 years of disease duration.

4.5.2 Thematic Analysis of the Focus Group Discussion

Based on the analysis, five major interrelated themes emerged: inadequate knowledge of diabetes foot care (DFC), poor DFC practices, low self-efficacy in DFC, and healthcare-related barriers and facilitators influencing DFC practices. Each of these primary themes encompassed several subthemes, as outlined below.

Theme 1: Inadequate DFC Knowledge Among Respondents in Embu and Kerugoya

Subtheme i: Poor understanding of DF causes and risk factors

Many participants demonstrated limited understanding of what causes diabetic foot complications and the associated risk factors. Their responses indicated that while they were aware of diabetes as a general condition, they lacked specific knowledge linking diabetes to foot-related issues such as poor blood circulation, nerve damage (neuropathy), or infection risk. Several participants attributed foot complications to external or mechanical causes such as walking long distances or wearing shoes too tight. Very few associated foot problems with uncontrolled blood sugar, peripheral neuropathy, or the long-term progression of diabetes. Some participants expressed surprise or confusion when asked about the link between diabetes and foot problems:

"I thought foot wounds just happen if you hit something or walk too far. I didn't know diabetes can cause them."-P2 G1 (Male,54years)

“I don’t know what causes diabetic wounds. Maybe it's from the shoes or when the skin gets dry.”-P3 G2(male, 25years)

Others had vague ideas or misinformation:

“Maybe the blood becomes hot in diabetes and causes problems in the legs.”-P3 G4 (female, 30years)

Several other participants attributed foot complications to non-biomedical factors such as, walking barefoot, exposure to cold, “Bad luck” or curses. For instance, one male participant noted:

“My neighbor lost a toe, but it was because he stepped on a thorn and it refused to heal… maybe it was bad luck.”-P3 G 1(male 44 years)

This limited awareness suggests that participants had not been adequately educated on the pathophysiology of diabetic foot and the importance of early risk identification. Most had not heard of peripheral neuropathy or ischemia as underlying causes. Their comments reflected a significant knowledge gap in understanding how foot ulcers and infections can develop even without visible injuries or pain, especially in the presence of long-standing diabetes.

Subtheme ii: Inadequate Knowledge of Preventive Measures

Most participants admitted they did not routinely inspect their feet, citing either lack of knowledge or the absence of symptoms as reasons.

"I have never checked my feet unless I feel pain. I didn’t know you should look at them every day."-P5 G 1(male 71years)

Another participant supported,

“I just wash and wear socks. I don’t see the need to look at my feet every day unless I feel pain.”- P 8 G 1(Female 54years)

In another FGD

"I thought only wounds need attention. If there's no cut or swelling, why should I check?"- P14 group 3(female 59years)

This reflected a reactive rather than proactive approach to foot care, stemming from limited knowledge on routine foot inspection

In another interview,

Majority reported unfamiliarity with some basic practices such as drying between toes, avoiding harsh chemicals, and trimming nails safely. Several admitted to sharing tools like nail clippers or using sharp objects to remove calluses.

One elderly male participant shared:

"Sometimes I use a razor blade to remove the hard skin on my feet. I didn't know it could be dangerous."-P28 G3 (Female,81years).

This demonstrated risky behaviors stemming from poor education on hygiene-related foot care.

Another interview

The majority of participants were unaware of the importance of wearing protective, well-fitting shoes. Many wore open sandals or walked barefoot at home, increasing their risk of injury.

A rural female participant said:

"Shoes are expensive. I only wear them when going out. At home, I walk barefoot."- P11 G2 (Female,70years)

Other participants reported

"I wear sandals because they are cheap and airy."-P32 G4(female, 48years) "Closed shoes make my feet sweat, so I avoid them."- P 24 G 3(female, 63years)

This theme was more pronounced in low-income groups (informal employment), showing how socioeconomic factors interact with knowledge gaps.

Theme 2: Poor DFC behavior Among Respondents in Embu and Kerugoya

Subtheme i: Irregular or No Foot Inspection and cleaning practices

Most of older adults or overweight participants reported difficulty bending or seeing the soles of their feet, which made regular inspection impractical.

"I can't bend like I used to. It's hard to see under my feet." P34 G3 (Female,74 years)

Some relied on family members, but this assistance was often inconsistent or unavailable.

"Most of the time am in the house with house help since my spouse passed on, however is too busy to attend to my personal needs"-P30 G3 (male 67years)

Another interview

Most participants reported irregular foot inspection or cleaning practices, especially when not experiencing symptoms.

"If I feel fine, I don't see the need to wash or check my feet every day."- P7G1 (male 47years)

"I wash during bathing, but I don't give special attention to my feet."- P16 G2 (female, 60years)

From these responses daily inspection and hygiene which is essential in preventing infection and detecting early foot issues were often neglected

Subtheme ii: Walking Barefoot or Wearing Unsafe Footwear

Several participants admitted walking barefoot indoors or wearing unsuitable shoes (e.g., open)

“At home, I prefer being barefoot to feel free.”-P14 G 2(Male,44years)
“I wear plastic shoes because they are cheap, even though they hurt sometimes.”(sandals, tight shoes)-P 18 G2 (female, 56years)

another interview

Many participants admitted to walking barefoot indoors, citing cultural habits and comfort. Others, especially in rural areas, also walked barefoot outside, especially within their homestead or during gardening.

"I don't feel comfortable wearing shoes in the house, and I’m used to walking around the compound barefoot." P33 G4 (male, 72years)

This behavior increases the risk of injury and ulcer formation, especially among patients with neuropathy.

In another FGDs

Several participants reported understanding of the appropriate foot wear however they cited several challenges which hinder them from the right behavior

A young unemployed lady from rural areas reported

“Those special shoes are too expensive. I have to use what is available at the market." P22 G2 (female,40years)

Another woman cited

“In our communities, walking barefoot indoors is normal and even seen as a sign of cleanliness or respect” ……..” *like at our home, everyone removes shoes at the door. It's our way”-P8G1 (Female, 55years)*

All these responses revealed that, there is widespread risky behavior such as walking barefoot, wearing unsuitable footwear etc which are influenced by low awareness, cultural norms, and economic barriers.

Subtheme iii: Poor Self-Management of Foot Issues

Many participants reported ignoring early signs of foot problems such as numbness, minor wounds, swelling, or changes in skin color. Some perceived these symptoms as "normal" or not serious enough to require attention.

An elderly lady comments,

"I thought the numbness was just because of old age or cold weather — I didn't know it could be a sign of something serious."P 35 G3(female,69years)

Other several participants reported, they frequently use home remedies like herbal ointments, hot water soaks, or self-medicating with over-the-counter creams without proper diagnosis.

"When I see a wound, I clean it with salt water or herbs from home. I don't always go to the hospital unless it gets worse."-P 11 G 2(Male, 49years).

Another interview,

"I didn't know that even a small cut could be dangerous. I waited until it was swollen before going to the clinic."-P35G4(Female, 66years)

All these responses revealed a troubling pattern of poor self-management of foot issues among people with diabetes, characterized by delayed responses, use of ineffective or harmful remedies, and lack of knowledge on warning signs which are compounded by barriers such as poor education, cultural norms, and financial limitations

Theme 3: Low DFC self-efficacy Among Respondents in Embu and Kerugoya

Participants in this study expressed various psychological and behavioral limitations in carrying out diabetes foot care practices. Based on Bandura's theory of self-efficacy, three core dimensions—magnitude, strength, and generality—were used to analyze these expressions. Many participants demonstrated low self-efficacy across all three

dimensions, which impacted their ability to perform consistent, safe, and preventive foot care behaviors

Subtheme i: Low Magnitude of Self-Efficacy in Diabetes Foot Care

This theme describes participants' lack of belief in their ability to perform more challenging or complex foot care tasks. According to Bandura (1997), the magnitude dimension of self-efficacy refers to the level of task difficulty an individual believes they can successfully perform. In this study, participants demonstrated confidence only in basic or low-effort tasks but lacked the self-belief to engage in physically demanding, technically difficult, or skill-intensive foot care activities.

Participants with physical limitations such as poor vision, back pain, or obesity expressed an inability to perform routine foot inspections or reach their feet comfortably, resulting in avoidance or dependence on others.

"I can't bend properly to check the bottom of my feet. So unless I feel pain, I won't know if something is wrong."- P22 G3(female,64years)

"My eyesight is not good. Even if I try to look, I can't see clearly. That's why I don't inspect my feet much."- P15 G2 (male,62years)

These responses reflect a low magnitude of self-efficacy, where participants lack belief in their ability to perform tasks that require effort, flexibility, or visual assessment.

Another interview,

Several participant reported tasks such as nail trimming, recognizing early signs of infection, or managing minor wounds were perceived as too difficult or risky, especially without professional supervision.

"I don't try to cut my nails. I'm scared I'll injure myself. I wait until I go to the clinic."- P27 G 3 (Female, 69years)

"If there's a wound, I don't touch it. I don't know what medicine to use or how to clean it. I'd ratherwait."-P3G1(male,68years)

This lack of confidence in handling moderate to high-difficulty tasks reveals a narrow efficacy range, where belief in personal ability stops short at more complex procedures essential for prevention.

Another FGD interview,

Some participants openly admitted avoiding recommended practices such as using mirrors to inspect their soles, applying moisturizers, or selecting protective footwear because these were unfamiliar or seemed complicated.

"They said I should use a mirror to check my soles, but I've never tried it. It looks confusing."- P20G2(female,55years)

"I don't know what kind of shoes are considered safe. I just wear what I have."- P17 G2(Female,58years)

Such statements show that participants limit their behaviors to low-difficulty tasks, reflecting low magnitude in their self-efficacy beliefs and narrowing their capacity for full diabetes foot care adherence.

Subtheme ii: Low Strength of Self-Efficacy in Diabetes Foot Care

Under this theme, participants' low confidence in their ability to consistently carry out diabetes foot care practices was clearly observed. The strength of self-efficacy refers to the degree of certainty with which individuals believe they can perform a task successfully, even when facing difficulties(Bandura,1997). Several participants demonstrated hesitancy, self-doubt, and avoidance behaviors, indicating weak self-efficacy strength in performing key foot care tasks.

For example, in one FGD interview,

Participants expressed fear of doing harm to themselves when attempting to trim nails or manage minor wounds. This fear reduced their confidence and led them to avoid or delay self-care:

"I don't feel confident cutting my toenails. I might cut too deep or cause bleeding, so I leave it until someone can help me." - *P38 G4 (female, 63years)*

"I'm afraid if I touch a wound it will get worse. I would rather wait and see if it heals by itself." –P39 G4 (male, 55years)

Such statements reflect low strength of belief in one's own capability, resulting in passive or dependent behaviors.

Another interview,

Several participants lacked confidence in their ability to recognize early signs of complications such as infections, swelling, or ulcers:

"Even if I check my feet, I don't know what I'm looking for. I might miss something important."- P16 G2 (Male 61years)

"I worry that I won't notice if something is wrong until it's too late." –P37 G4 (female, 61years)

These narratives demonstrate weak confidence in observational skills, which are critical to effective diabetes foot prevention.

Another FGD session,

Some participants reported starting foot care practices but quickly abandoning them due to lack of confidence or motivation:

"I was told to check my feet daily, and I tried for a few days, but I didn't feel like I was doing it right. So I stopped." –P29 G3 (male, 57years)

This reflects fragile self-efficacy strength, where even small uncertainties disrupt long-term behavioral adherence.

Subtheme iii: Low Generality of Self-Efficacy in Diabetes Foot Prevention

This theme reflected participants' confidence in performing certain foot care practices, but not others. According to Bandura's dimension of generality, self-efficacy can vary across different behaviors or situations. Majority of the participants often demonstrated confidence in routine or familiar tasks, such as washing their feet, but showed uncertainty or avoidance toward tasks perceived as more technical, risky, or unfamiliar, such as inspecting feet for signs of infection, choosing protective footwear, or trimming nails correctly.

For instance, in one interview,

Most participants reported engaging in basic hygiene practices like washing their feet, but this confidence did not extend to other critical areas of foot care. For example:

"I wash my feet every day after work, but I don't really know how to look for signs of infection or anything like that." –P 11 G 2 (male, 59years)

"Yes, I can clean my feet. That one I do. But checking for injuries? I don't know what to check exactly." –P 19 G2 (female 67years)

These narratives reflect a narrow scope of self-efficacy where confidence is limited to simple, habitual tasks but not generalized to other necessary preventive behaviors.

Another interview,

Participants frequently admitted to avoiding tasks they felt unsure about, particularly nail care and wound monitoring. This selective engagement illustrates low generality, where perceived competence in one domain does not carry over to other related behaviors:

"I've never cut my toenails by myself. I fear I might injure myself, so I wait for my daughter to do it." –P23 G 3 (female, 61years)

"They told us to wear special shoes, but I just use my normal ones. I wouldn't know where to start choosing the right ones." –P 2 G1(Female, 71years)

This tendency to avoid or delegate foot care tasks reflects a lack of generalization of self-efficacy across related behaviors, even when participants are otherwise engaged in their diabetes management.

Another interview session,

A pattern of fragmented self-care was noted in several narratives, where participants practiced some aspects of foot care but omitted others due to low confidence, lack of exposure, or fear of making mistakes:

"I clean my feet and apply Vaseline. But I've never looked under my feet. I don't know what to look for, and it's hard to reach." –P 6 G 1 (female, 63years)

This quote illustrates how confidence in general foot hygiene did not translate to inspection or monitoring—suggesting that self-efficacy was not broadly applied across the spectrum of recommended foot care behaviors.

In summary, Participants in this study expressed low self-efficacy across magnitude, strength, and generality dimensions, which collectively hindered their engagement in comprehensive foot care practices. Their confidence was limited to basic tasks, easily undermined by fear or confusion, and did not extend across all recommended behaviors. These findings highlight the need for foot care education interventions that are multifaceted, task-specific, and confidence-building—helping patients overcome both psychological and practical barriers to prevention.

Theme 4: Health Care–Related Barriers to Foot Care Practices Among Respondents in Embu and Kerugoya

Participants identified several systemic and healthcare-related barriers that hindered effective diabetes foot care (DFC). These included limited access to structured foot care education, persistent staff shortages, and the high cost of essential health services. These

factors collectively contributed to inadequate foot care knowledge, poor self-management, and delayed treatment-seeking behavior.

Subtheme i: lack of structured diabetes foot care education

Several participants reported that their health care visits focused on blood sugar control, and preventive foot care was rarely discussed. As one participant explained:

“During my clinic visits doctor and nurses mostly emphasis on medication and food intake, rarely do they talks about how to take care of my feet”-P38 G 4(Female 66 years)

In another FGD,

Majority reported, clinic visits were rushed, and education was minimal due to overcrowding.

"There are too many patients. The nurse just gives you medicine and tells you to come back after a month."…….."They don’t have time to explain things, especially about feet." P20 G2 (male 48years)

Another interview

Many participants indicated they had not encountered structured educational programs, brochures, or group sessions focusing on foot care.

"I have never seen a poster or handout about foot care in the clinic."-P21 G3 (female,32years)
"We don't have classes or sessions, only the check-up with the doctor."- P26 G3 (male 42years)

These responses illustrate the systemic gap in diabetes foot education delivery at the point of care as well as an absence of organized educational content within health facilities

In another FGD interview

Interaction was focused on patients' perception on limited exposure to foot care education;

Majority of the participants perceived that health workers were overwhelmed to offer detailed foot care education due long queues and limited consultation time

"The nurses are always in a hurry… they just check my sugar and move to the next person."-P5G1(Female, 49years)

From these FGDs, it was evident that there is deficit of knowledge specifically on routine foot inspection, ideal foot hygiene and foot care, as well as appropriate foot wear

Sub-theme ii: Staff shortage

Participants also highlighted several systemic challenges as well as facilitating factors within the health facilities that directly and indirectly affected their foot care practices. These constraints manifested in three interrelated aspects: persistent staff shortages, the unaffordability of essential diabetes-related services, and the absence of routine foot screening.

Many respondents described how understaffing at diabetes clinics led to hurried consultations, limited provider-patient interaction, and minimal time for preventive education.

"You can see how many patients come in a day. The nurses and doctors are few, so they don't have time to check everyone properly, especially things like feet."-P19 G2 (female 64years)

Other several participants reported the high patient volumes and limited staffing, foot care was not prioritized unless a visible or serious wound was reported.

"They only ask if you have pain, but they don't look at your feet unless you complain. There is no one to really guide us on foot care."-P35 G 4(male, 66years)

The shortage of trained personnel also meant that even when patients asked for guidance, there was little time or expertise available to offer detailed support.

Subtheme iii: Unaffordability of essential services

Many participants shared that financial constraints significantly affected their ability to seek timely and adequate care for foot-related problems. Costs associated with consultations, medications, recommended ointments/antiseptics or recommended footwear, and transport to health facilities were often beyond their means, especially for those in rural areas or with national insurance scheme -Social Health Authority(SHA).

For example, a significant number of participant expressed deep concern that the current health insurance (SHA) no longer covers essential outpatient services for diabetic care, unlike the former NHIF program. This has introduced significant financial burdens

A male participant reported,

"We used to get our drugs and foot check-ups through NHIF when we came for clinic. But now with SHA, we are told it doesn't cover outpatient diabetes care"-P32 G 4(male, 66years)

Another participant noted:

"Ever since they changed from NHIF to SHA, I have to buy my medications out-of-pocket. Even regular reviews for my foot are now expensive, and I sometimes skip them...."-P14 G2 (female,64yeas)

These responses reflected financial burden associated with the current health insurance

Another interview,

Many participants expressed long distances to clinics and high transport costs were major obstacles, especially in rural areas. Some participants wound delay or avoid clinic visits due to these challenges

"I live far from the health center. I can't go often, so I only go when it's very serious."-P1 G1 (female 73years)

Another participant with poor economic background cited transport fares as unaffordable

"Sometimes I choose between buying food and paying for the matatu to the hospital"-P 15 G2 (Female,68years)

Several other elderly participants expressed, during rainy seasons or droughts, roads became impassable or unsafe for them,

"When it rains, I can't go. The road is muddy and slippery, and I fear falling."-P21 G3 (female, 75years)

All these responses revealed that distance and transport challenges are major barriers to diabetes clinic attendance and contribute to poor foot care practices.

Another interview,

Many participants reported that foot checks were not part of their routine clinic visits. Most had never had their feet examined by a healthcare professional.

"They always check blood pressure and blood sugar, but no one looks at my feet unless I complain"-P5 G1 (Male, 56years)

Others expressed hopelessness, having learned not to expect comprehensive care during routine visits

"I stopped asking. They're too busy, and we wait for hours just to get our medication."-P 23 G3 (Female, 60years)

Theme 5: Health Care–Related Facilitators to Foot Care Practices Among Respondents in Embu and Kerugoya

Participants in this study described several aspects of the healthcare environment that positively influenced their diabetes foot care practices. Notably, three key facilitators emerged: the presence of peer support groups, the consistency of daily clinic operations, and the friendliness of healthcare staff. These factors appeared to encourage proactive health-seeking behavior, adherence to self-care routines, and improved awareness of foot care prevention

Subtheme i: Influence of Peer Support Groups

Many participants emphasized that their involvement in peer support groups had a direct impact on their understanding and practice of diabetes foot care. These groups offered a space for mutual learning, encouragement, and emotional support, especially for those who had limited formal education about foot care.

One participant stated,

"I didn't know about checking my feet every day until someone in the support group talked about how he almost lost his toe. Now, we always remind each other to check our feet and wear shoes."-P17 G 2(female,62years).

Another added,

"*In the group, we talk about everything—diet, wounds, sugar levels. Someone always brings up feet, and we all learn from each other."-P21 G3 (female 48years)*

These peer interactions served as informal yet powerful sources of education, promoting behavior change through relatable experiences and shared advice. The support groups helped to build confidence and accountability in practicing foot care routines, especially among participants who felt unsupported at home.

Sub theme ii: Accessible Daily Clinic Schedules

Many participants expressed appreciation for the availability of daily clinic services, describing it as a key facilitator that allowed them to remain engaged in diabetes care even when they missed scheduled appointments. For many, the flexibility of daily operations reduced anxiety and improved consistency in attending follow-ups, including seeking help for foot care concerns.

One participant explained:

"Sometimes I miss my clinic date because I have to take care of my grandchildren or there is no fare. But because the clinic is open every day, I just go when I get time. They still attend to me without any problem."-P5 G 1 (female, 72years)

Another participant shared a similar experience:

"There was a time I was sick and couldn't come on my appointment day. But when I got better, I came the next day, and the nurse still helped me. That makes it easy for us."-P 17 G 2(Female 58years).

These narratives highlight how daily clinic availability reduces barriers to continuity of care, especially in communities where patients face unpredictable personal, financial, or transport-related constraints. Participants appreciated the flexibility, noting that it gave them a sense of control over their care and encouraged them to seek services as soon as they were able—even outside the formal appointment schedule.

Subtheme iii: Friendly health care staff

Another prominent theme that emerged from participants' narratives was the consistently friendly and respectful attitude of healthcare staff**, e**ven in the face of visible staff shortages and high workloads. Participants described their appreciation for the compassionate care they received during clinic visits, noting that the welcoming environment and nonjudgmental interactions made it easier to seek help and comply with foot care advice.

One participant expressed:

"Sometimes the clinic is so full, and the nurses are moving up and down, but still they take time to talk to you well. They don't ignore you. They ask about your feet and explain things kindly."-P35 G 4 (female 45years)

Despite long queues and overcrowding, many respondents reported that healthcare workers remained approachable and empathetic, often going out of their way to check on patients or offer reassurance. This positive attitude created a sense of emotional safety and reduced patients' fear of being scolded or dismissed due to missed appointments, lack of understanding, or delays in seeking care.

Another participant noted:

"Even when they are tired or the clinic is full, they greet us well. They don't shout. If I have a problem with my foot, I just tell them, and they attend to me nicely."- P 21 G 39female 59years)

Participants consistently emphasized that the kindness and patience of staff encouraged them to return for regular care, including reporting minor foot injuries or asking questions they might otherwise hesitate to raise. In some cases, participants felt that the respectful approach of healthcare providers made them more confident and motivated to engage in self-care practices, including foot washing, inspection, and wearing protective shoes.

One elderly participant shared:

"I feel like the nurses understand us. They don't get angry when we ask many questions. Even if you forget what they told you last time, they still explain again."-P 23 G 3 (Female 74years)

All these approaches fostered a positive clinic atmosphere, increased patient comfort, and supported continued engagement with services, contributing to better adherence to preventive foot care practices.

4.6 Phase Two (Intervention)

4.6.1 Adoption and Modification of Diabetes Foot Care Education Modules

In the development of the Diabetes Foot Care Education (DFCE) modules for this intervention, a structured and systematic approach was taken to adopt and modify international and national guidelines—particularly the International Working Group on the Diabetic Foot (IWGDF, 2023) and the Kenya Ministry of Health (MoH) Guidelines on Diabetes Management (2018). The primary goal was to create an education program that is evidence-based, contextually relevant, culturally sensitive, and practically applicable within a low-resource Kenyan healthcare setting. The modules were carefully designed to address the multifaceted gaps identified in the baseline survey, which highlighted inadequate DFC knowledge, poor self-care behaviors, low DFC self-efficacy, and systemic barriers within the health care system that hinder effective diabetic foot care. Additionally, the content aimed to strengthen patient empowerment, promote preventative practices, and support capacity-building among healthcare providers to ensure sustainable impact.

Key Components Adopted and Modified

Glycemic Control and Foot Health

Both guidelines emphasize the role of optimal glycemic control in preventing neuropathy and peripheral vascular disease, which are primary contributors to foot complications. In the DFCE module:

Participants were educated on the link between blood sugar levels and foot health, including how hyperglycemia impairs wound healing and sensory perception.

Practical strategies were taught, including diet planning, adherence to medication, and blood glucose monitoring where feasible.

Discussions highlighted how poor glycemic control increases the risk of undetected injuries, infections, and ulcerations.

Identification of the At-Risk Foot: Adopted from**:-**IWGDF risk stratification tool; MoH NCD guidelines

Identifying individuals with high-risk feet is critical for targeted intervention.
The modules included training on risk identification through signs such as loss of sensation, deformities, previous ulcers, or amputations.
Demonstrations were done using monofilament tests and visual inspection techniques to show participants what healthcare providers look for.
Participants were empowered to perform self-checks and report changes early.
Inspection and Examination of the Foot: Adopted from:-IWGDF Standard Foot Exam; MoH Diabetes Guidelines
Routine foot inspection is a key preventive measure in DFU prevention.
The education sessions emphasized daily foot inspection, encouraging participants to examine both the soles and tops of feet, between toes, and heels for any signs of injury or infection.
Participants were taught how to use a mirror for hard-to-see areas or to seek help from family members.
A checklist was provided for self-monitoring common issues such as cracks, swelling, discoloration, and warmth.

Importance of Regular Foot Education: Adopted from:-IWGDF Recommendation on Repeated Education; MoH Community Strategy
Continuous education is necessary to reinforce learning and improve behavior change.
Modules stressed the need for regular foot care education—not just one-time information.
Participants were encouraged to attend group sessions and peer support meetings as part of continuity.

Appropriate Footwear: Adopted from: - IWGDF Footwear Guidelines; MoH Primary Care Recommendations

Footwear plays a central role in preventing trauma, especially in individuals with neuropathy.

Participants were taught how to select well-fitting, closed-toe shoes with soft soles.

Demonstrations included checking for seams, foreign objects, and tight points inside shoes.

Given financial limitations, cost-effective alternatives such as padded slippers or modifying existing shoes were discussed.

Footwear advice was linked to daily living—such as avoiding walking barefoot in the house or outdoors.

Risk Factor Management: Adopted from: - IWGDF Clinical Management Protocols; MoH National NCD Toolkit

Specific attention was given to the management of local foot risks, commonly neglected in low-resource settings.

Blisters: Participants were advised not to pop blisters, to keep them clean, dry, and covered, and to report them if they worsen.

Corns and Callus: Emphasis was placed on avoiding self-treatment (cutting or scraping) and instead using emery boards or filing stones safely, or seeking professional help.

Fungal Infections: Participants were taught how to identify signs (e.g., itchiness, cracking, discoloration) and the importance of keeping feet dry and clean. Use of simple antifungals or herbal remedies was discouraged unless advised by a healthcare provider.

Toenail Care: Instruction was provided on how to trim nails straight across to prevent ingrown toenails, and participants were warned against cutting cuticles or using sharp objects.

Cultural and Contextual Modifications

Although the above content was adopted from international and national sources, it was modified to suit the local context (Embu and Kerugoya participants), as follows:

Language and Delivery: Modules were delivered in Kiswahili and local dialects where necessary.

Interactive delivery using storytelling, role-play, demonstrations, and peer learning to foster engagement and retention

Economic Constraints: Advice on foot care and footwear was made affordable and practical, avoiding reliance on expensive medical-grade products.

The adoption and contextual modification of DFCE modules ensured that this intervention was evidence-based, relevant, and feasible within a resource-constrained Kenyan setting. By integrating key elements from the IWGDF and the Ministry of Health-Kenya guidelines—glycemic control, at-risk foot identification, daily inspection, foot hygiene, footwear use, and management of common risk factors—the modules aimed to reduce the incidence of diabetic foot complications and enhance participants' self-care capabilities. These modules formed the core content of the educational sessions implemented in the intervention phase and were supported by hands-on demonstrations, peer support, and follow-up reinforcement strategies.

4.6.2 Implementation of Diabetes Foot Care Education Program

The intervention phase of this study involved the implementation of a structured Diabetes Foot Care Education (DFCE) Program among selected patients with diabetes in two county referral hospitals in Kenya: Embu Level 5 Hospital (experimental group) and Kerugoya County Referral Hospital (control group). The primary objective was to evaluate the effect of a tailored foot care education intervention on diabetic patients' knowledge, self-care behavior, and self-efficacy, with the ultimate goal of enhancing foot ulcer prevention.

Intervention Group – Embu Level 5 Hospital

Patients in this group were exposed to the Diabetes Foot Care Education (DFCE) intervention, which was developed based on the International Working Group on the Diabetic Foot (IWGDF, 2023) and Kenya Ministry of Health (MoH, 2018) guidelines. The intervention was delivered through a structured, interactive educational program over a period of three months (January to march 2025) and consisted of three structured

educational sessions. Each session lasted approximately 60-90minutes and Sessions were conducted once per months to allow time for participants to practice learned skills between meetings and also get funds for their transport back to and from the facility.

The sessions were delivered in group format with 20–25 participants per group in a quiet outpatient diabetes education room at Embu level 5 hospital. The environment was equipped with audio-visual aids such as posters, charts, videos in local language. The sessions were led by the researcher assisted by researcher assistance trained on diabetes foot care. Facilitators used a structured lesson plan to ensure consistency and completeness of information. Each session focused on specific learning objectives

Session 1: Understanding diabetes complication and its connection with glycemic control. This involved acquiring knowledge on: what is diabetes mellitus and its two major types, how uncontrolled blood sugar levels affect nerves and blood vessel contributing to foot complication, what are the major complication of diabetes related to foot problems and how they present and importance of glycemic control in preventing both onset and progression of diabetes complication. It also involved learning best practices in achieving glycemic control such as: healthy eating and nutrition including intake of low glycemic index diet, limited intake of refined carbohydrates, sugary foods, and sweetened beverages, consistent intake of meals and snacks to prevent glucose spikes and dips and use of portion control and meal planning (such as the Plate Method or carbohydrate counting). Best physical activity practices were also learned such as engaging in at least 150 minutes per week of moderate-intensity aerobic activity and resistance training at least 2 days a week. Proper adherence to medication and self-monitoring of blood glucose such as keeping a blood sugar logbook to track readings, food, and physical activity also emphasized.

Session 2: Understanding regular foot examination and appropriate foot wear. This involved learning on: Importance of regular foot Exam-detecting early signs of foot injuries, infections, or deformities, helping to prevent complications like ulcers, gangrene, and amputation and early detection allows for timely treatment; Frequency of foot examination- daily self-examination, monthly or routine checks by family members if the patient has visual or mobility problems, at every clinic visit by a health professional and annual comprehensive foot exam by a doctor or nurse (more frequent

if high-risk); What to look for during foot exam- Skin condition (dryness, cracks, peeling skin),color changes (Redness, pale or bluish skin), swelling (one or both feet),open wounds/ulcer (Sores that don't heal),temperature difference (one foot warmer or colder),toenails (thickened, discolored, or ingrown nails), sensation (tingling, burning, or numbness) and blisters or calluses especially from friction or pressure; How to perform a daily foot exam-wash and dry feet thoroughly, especially between the toes, sit in a well-lit area, use a mirror or ask a family member to help check the sole, feel for lumps, bumps, or skin changes and moisturize dry skin—but not between the toes; Need to seek medical help- incases of new cuts, wounds, or blisters that are not healing, signs of infection (redness, pus, foul smell), change in color or shape of the foot, pain or numbness that gets worse. Skills on proper techniques for conducting daily foot inspection of clinical foot examination were also demonstrated

On appropriate foot wear a number of issues were addressed such as: Why foot wear matters, that is, inappropriate foot they can cause pressure points, blisters, or wounds; Features of appropriate footwear which should include, closed, supportive shoes with soft insoles, proper fit—neither tight nor loose, shoes of breathable materials (leather, mesh), roomy toe box shoes(enough space for toes); Socks and footwear hygiene -wear clean, dry cotton socks daily, avoid tight elastic bands or seams and never walk barefoot—even at home. Skills on how to assess to assess and choose proper foot wear and socks for individuals with different levels of foot risk was also learned

Session 3: Understanding management strategies for common pre-ulcerative signs and recap of DFC education session. This involved acquisition of knowledge on the meaning and effect of common pre-ulcerative signs such as corns and callus, blisters, fungal infection and key issues with nails such as thickened or discolored nails; Ingrown toenails or Fungal nail infections. Knowledge and skills on best management strategies were learned with clear demonstration on how to address the specific issues. Finally, a recap of the three session was done highlighting the key concepts and skills learned.

Control Group – Kerugoya County Referral Hospital

Participants in the control group continued to receive routine care as offered by the diabetes clinic. This included general diabetic counseling during clinic visits, with no specialized or structured foot care education intervention

4.6.3 Follow up of the Health Education Program

Follow up and supportive supervision are key to reinforce and strengthen the knowledge and skills gained during initial diabetes foot care education among diabetes patients. Several studies have demonstrated that foot-care education, when reinforced through structured follow-up—whether delivered face-to-face, telephonically, or via systematic supervision—significantly improves patients' self-efficacy, enhances behavioral adherence to preventive measures, and markedly reduces the incidence of diabetic foot ulceration and related complications (American Diabetes Association (ADA), 2024; Bus, et al., 2023; Hijazi, et al., 2025).

Follow-up activities formed an integral part of the Diabetes Foot Care Education (DFCE) program implementation in the experimental group (Embu Level 5 Hospital). The primary objective of the follow-up phase was to reinforce learning, sustain behavior change, address individual challenges, and track ongoing foot care practices post-education. These activities ensured continuity of care, promoted adherence to foot self-care practices, and supported improvements in knowledge, behavior, and self-efficacy identified during the intervention.

The follow-up phase aimed to; reinforce the concepts delivered during the DFCE sessions, support behavior adoption and habit formation related to foot care, identify and address barriers experienced by participants in applying foot care practices, monitor any emerging foot-related health concerns and provide early intervention or referral. sustain peer motivation and promote shared learning through community-based support.

The participants were followed up for three months as recommended by Ferreira , Carvalho, & Pereira , (2024). Follow-up activities included; monthly clinic review and phone follow-ups conducted by trained research assistance. Each participant in the intervention group was followed up at least once monthly for three months' post-intervention. Clinic follow up, reviewed the foot care diary (daily practices, inspection, hygiene), visual assessment of the feet (with consent), checking for signs of blisters, infections, calluses, or improper nail trimming, reinforcement of session content through short one-on-one education., answering questions and addressing patient concerns. Phone follow-ups were used incase participant didn't come for the clinic

review and included; discussion on foot care practices, reminders on daily foot checks and footwear use, encouragement to attend clinic visits for any foot-related concerns.

Another follow up activities included: use of foot care diary; each participant received a foot care diary during the final DFCE session and were encouraged to record information such as daily foot inspections and hygiene practices, footwear type used, any observed changes or injuries, blood sugar measurements if available. Then trained research assistance reviewed the diaries during follow-up and discussed progress with participants.

Peer support mechanisms was also employed where informal peer support groups were initiated at the facility level during clinic days. Participants shared experiences, challenges, and strategies for overcoming foot care barriers. Peer champions who had successfully implemented foot care practices served as motivators and role models.

Referral and clinical review: research assistance referred participants with suspected infections, ulcers, or nail disorders to the diabetes clinic for evaluation by nurses or clinicians. A referral log was maintained for follow-up and feedback from the clinical team. Early identification allowed for preventive management, reducing the risk of complications.

The follow-up phase was a critical component of the DFCE program, providing continuity and practical support to reinforce learning and behavior change. It enabled sustained engagement with foot care practices, early detection of risk factors, and promoted patient empowerment.

4.6.4 Monitoring and Evaluation of the Intervention and Control Groups

Monitoring and Evaluation (M&E) played a central role in ensuring the fidelity, effectiveness, and integrity of the intervention during the study period. It allowed for the systematic tracking of implementation progress, participant engagement, and any deviations from planned procedures in both the intervention group (Embu Level 5 Hospital) and the control group (Kerugoya County Referral Hospital). The M&E framework was aligned with the study objectives, with a focus on assessing how the

Diabetes Foot Care Education (DFCE) program influenced knowledge, behavior, and self-efficacy compared to routine care.

Monitoring of the Intervention Group (Embu Level 5 Hospital)

Session attendance and participation: A detailed attendance register was maintained for each session. Participants who missed sessions were followed up via telephone or community health volunteers (CHVs) to encourage full attendance. An attendance rate of at least 80% was targeted for inclusion in the final post-intervention analysis.

Session delivery monitoring: A session implementation checklist was used by facilitators and supervisors to ensure each session covered: the planned topic, key learning objectives, hands-on demonstrations, participant engagement activities (e.g., role plays, Q&A). Spot checks and supervisory visits by the principal investigator ensured fidelity to the DFCE module content and methodology.

Participant engagement evaluation: Short quizzes and interactive feedback sessions at the end of each session assessed: understanding of foot care concepts, ability to demonstrate self-inspection techniques, observation checklists were used to track active participation and skill acquisition.

Reinforcement Monitoring: Monthly follow-up was conducted as indicated above (section 4.11.3)

Documentation: A session logbook was maintained to record: Session dates, topics covered, facilitator name(s), participant attendance, feedback from participants and any challenges or deviations

Monitoring of the Control Group (Kerugoya Level Five Hospital)

Since participants in the control group received routine care only, monitoring focused on ensuring the absence of intervention contamination and maintaining consistent care standards across the study period.

Clinic visit tracking: Attendance records were reviewed to confirm that control group participants continued to attend routine diabetes clinics. No structured foot care education sessions were introduced during the study period in Kerugoya.

Surveillance for Contamination: Participants were asked whether they had accessed foot care information from external sources during the study period (e.g., family, media, other clinics). Research assistance were instructed not to deliver DFCE materials to participants in the control group to avoid contamination.

Routine Care Documentation: Clinical notes were reviewed to verify that routine diabetes management (e.g., blood sugar monitoring, medication review) was provided. No structured documentation of foot care education was present, aligning with the intended protocol for the control group.

Evaluation Procedures for Both Groups

Pre- and Post-Intervention Assessments: Baseline (pre-test) and endline (post-test) assessments were conducted for both groups. Data were collected using standardized, validated tools assessing: foot care knowledge, self-care behavior and self-efficacy in performing foot care tasks (see appendix 2)

The monitoring and evaluation of both groups ensured consistency, quality, and accountability throughout the intervention phase. In the experimental group, M&E facilitated structured delivery of the DFCE program and reinforced patient learning, while in the control group, it ensured the integrity of routine care without unintended exposure to the intervention. This rigorous M&E approach provided a strong foundation for valid comparison of outcomes between the two groups at the end of the study.

4.5.5 Description of Teaching Materials for Education Program

Effective diabetic foot care education requires well-designed, diverse, and contextually appropriate teaching materials to enhance understanding, retention, and practical application of knowledge. Given the complexity of diabetes management and the need for consistent foot care, resources must be tailored to varying literacy levels, cultural backgrounds, and learning preferences.

The materials outlined in Table 22 were used throughout the education program to support learning and promote sustained behavior change. These included printed resources, visual aids, demonstration tools, interactive elements, and culturally tailored content. Collectively, they reinforced key messages through repetition and multimodal delivery, encouraged hands-on practice, and fostered peer learning through discussions and group activities.

The integration of locally relevant imagery and culturally sensitive content further enhanced engagement and ensured relatability. Overall, these materials aimed to engage participants meaningfully, accommodate diverse learning styles, and address both general and context-specific challenges related to diabetic foot care.

Table 22: Description of Teaching Materials

Description
Printed Educational Materials such as: • Pamphlets/Brochures on basics of diabetes and its effects on the feet, daily foot care routine checklist, signs of foot complications, proper footwear and sock choices when to seek medical attention • Posters for clinic walls on visual guides showing proper foot washing, drying, moisturizing, warning signs of diabetic foot ulcers and Dos and Don'ts for diabetic foot care Visual Aids such as: • Charts or Flip Charts on anatomy of the foot and how diabetes affects it, stages of foot ulcers and risk categories for foot complications • Photo cards or illustrations on common foot problems (e.g., fungal infection, calluses, blisters, ulcers) and Examples of safe vs unsafe footwear Demonstration Tools such as • Sample foot care kits with Mild soap, non-medicated lotion, nail clippers, mirror (for inspecting soles), pumice stone and proper footwear and socks Interactive Tools such as: • Diabetic foot care calendars or checklists for tracking daily routines • Role-play or group discussions for practical learning and problem-solving Culturally Appropriate Materials such as • Use of locally relevant images, examples, and scenarios. • Including local beliefs and barriers in discussion materials.

4.7 Phase Three (Evaluation Phase) descriptive analysis

This section presents the findings of the diabetes foot care education intervention. It highlights the changes in participants' DFC knowledge, self-care behaviors, and self-efficacy following the intervention. Out of 230 participants enrolled in the study, a total

of 205 participant completed the post intervention assessment. That is, intervention group retained 102 out of 115 participants, while control group retained 103 out of 115 participants. The study recorded an attrition rate of 11%, which is considered acceptable and within the expected range for clinical research conducted in outpatient or chronic disease settings such as diabetes clinics. This aligns with a study by Szymczynska, et al., (2017) who found that in non-pharmacological trials (e.g., behavioral interventions), drop-out rates commonly range from 10–20%. Therefore, 11% dropout rate aligns well with expectations for structured educational or behavioral interventions and is unlikely to bias the results significantly.

4.7.1 Pre- and Post-Intervention Knowledge Level Comparison at Embu Level 5 Hospital.

This section presents a comparative analysis of patients' knowledge on various aspects of diabetic foot care before and after the educational intervention conducted at Embu Level Five Hospital. The analysis focuses on six key knowledge indicators, including awareness of foot hygiene, early signs of foot complications, appropriate footwear, risk factors, preventive practices, and when to seek medical attention. The findings reveal a consistent improvement across all six indicators following the intervention, reflecting the effectiveness of the educational program in enhancing patient understanding. Additionally, there was a marked increase in the overall level of knowledge, suggesting improved patient readiness for self-care and prevention of foot-related complications. These results highlight the potential value of structured education in improving health outcomes for individuals living with diabetes. The detailed results are presented in Table 23.

Table 23: DFC Knowledge Level Pre and Post -intervention Phases at Embu Hospital

	Post- Intervention			Pre-Intervention		
Variable	Poor	Satisf.	Good	Poor	Satisf.	Good
Glycemic Control	0	0	102(100%)	26(23%)	53(46%)	36(31%)
Identification of the Risk at Foot	0	0	102(100%)	61(53%)	50(43%)	4(4%)
Inspection and Examination of the foot	0	0	102(100%)	68(59%)	43(37%)	4(4%)
Regular DFC Education	0	0	102(100%)	60(52%)	52(45%)	3(3%)
Appropriate Foot Care	0	0	102(100%)	57(50%)	43(37%)	15(13%)
Risk Factors Management	0	0	102(100%)	56(49%)	46(40%)	13(11%)
Overall Level of Know	0	0	102(100%)	56(49%)		

On glycemic control, in the pre-intervention phase, only 46percent of respondents demonstrated a good understanding of glycemic control, while 23percent had satisfactory knowledge, and 31percent fell into the poor category. Post-intervention, there was a notable improvement, with 102 (100percent) of respondents achieving a "Good" level of knowledge in this domain. This indicates that the education session effectively enhanced patients' understanding of the importance of blood sugar regulation in foot care. On identification of the at-risk foot, before the intervention, 53percent of respondents had satisfactory knowledge, 43percent had good knowledge, and 4percent were rated as having poor knowledge. After the intervention, all respondents (100percent) reached the "Good" category, showing a complete elimination of knowledge gaps in identifying at-risk feet. This suggests that the intervention was highly effective in sensitizing patients to identify early warning signs and risk factors associated with foot complications.

On inspection and examination of the foot, knowledge in this area was relatively modest prior to the intervention, with 59percent having satisfactory knowledge and only 37percent rated as good. A small portion (4percent) still demonstrated poor knowledge. Following the intervention, this indicator also showed full improvement, with 100percent of respondents rated as having good knowledge. This suggests that the education sessions improved awareness of the importance and techniques of regular foot inspection.

Regarding regular diabetic foot care (DFC) education, in the pre-intervention phase, 52percent of respondents had satisfactory knowledge regarding the need for regular foot care education, 45 percent had good knowledge, and 3 percent had poor knowledge. After the intervention, all participants attained a good level of understanding. This improvement highlights the positive effect of the intervention in promoting continuous learning and proactive foot care behavior. On appropriate foot care, before the intervention, half of the respondents (50percent) had satisfactory knowledge, 37percent demonstrated good knowledge, while 13 percent were in the poor category. Post-intervention, all respondents were categorized as having good knowledge of proper foot care practices, indicating a successful shift in patient awareness and understanding of daily foot hygiene and protective measures. For risk factors management, pre-intervention results showed that 49percent had satisfactory knowledge and 40percent had good knowledge in managing foot-related risk factors, while 11percent had poor knowledge. Following the intervention, 100percent of participants were categorized under the “Good” knowledge level, showing a significant gain in understanding how to manage and minimize risks such as fungal infection, corns, callus and blisters on the foot

The overall knowledge score, derived from the composite mean of the six indicators, showed that only 49percent of respondents had satisfactory overall knowledge in the pre-intervention phase. None were categorized as having good knowledge at that stage. However, in the post-intervention phase,102 (100 percent) of the respondents attained a good level of overall knowledge. This substantial improvement underscores the effectiveness of the diabetes foot care education program in enhancing patients' comprehensive understanding of foot care practices.

4.7.2 Pre- and Post-Intervention Behavior Level Comparison at Embu Level 5 Hospital.

This section presents a comparative analysis of patients' behavioral practices in diabetic foot care, measured before and after the educational intervention. The data reveal substantial improvements across all measured domains, though some areas still show a need for continued reinforcement and follow-up. Results are shown in Table 29

Table 24:DFC Behaviour level pre and post-intervention phases at Embu Hospital

	Pre- Intervention			Post-Intervention		
Variable	Good	Moderate	Poor	Good	Moderate	Poor
Glycemic Control	9(8%)	45(39%)	61(53%)	33(32%)	59(68%)	0
Regular Foot inspection and Examination	3(3%)	26(22%)	86(75%)	38(37%)	64(63%)	0
Appropriate use of Footwear	2(3%)	25(22%)	86(76%)	35(34%)	67(66%)	0
Risk Factors Management	21(18%)	19(17%)	75(65%)	53(52%)	49(48%)	0
Overall Level of Behaviour	9(8%)	29(25%)	77(67%)	40(39%)	62(61%)	0

On Glycemic control, behavior before the intervention, the majority of respondents (53 percent) demonstrated poor behavioral practices related to glycemic control, with 39percent exhibiting moderate behavior and only 8percent falling under the “Good” category. Following the intervention, there was a notable behavioral shift, with the proportion of respondents demonstrating good glycemic control practices increasing to 32percent, and the remaining 68percent showing moderate behavior. Importantly, no respondents remained in the "Poor" category post-intervention, indicating significant positive change. Regarding regular foot inspection and examination, in the pre-intervention phase, only 3percent of respondents regularly inspected and examined their feet, while 22percent did so occasionally (moderate), and a large majority (75percent) never or rarely practiced this behavior (poor). After the intervention, 37 percent adopted regular inspection practices (good), and 63percent demonstrated moderate adherence. The complete elimination of poor behavior in this domain reflects a strong behavioral response to the educational program.

On appropriate use of footwear, prior to the intervention, the appropriate use of protective footwear was poor among 76percent of respondents, with only 3percent demonstrating good footwear practices. Post-intervention, the proportion of respondents engaging in proper footwear use increased to 34percent, while 66percent adopted moderate-level behaviors. The absence of poor behavior in this domain after the intervention points to improved self-care practices and a greater understanding of protective measures. For risk factors management, an improvement as well, with good behavior increasing from 18 percent to 52 percent after the intervention. While

65percent of participants previously exhibited poor risk management behaviors, this proportion dropped to 0percent and 48percent moved into the moderate category. This significant gain suggests that patients became more proactive in avoiding and managing potential foot injury risks.

On the overall level of behaviour, the composite behavior score based on the average across all four indicators revealed a marked overall improvement. Before the intervention, 67percent of respondents demonstrated poor foot care behavior, 25percent showed moderate behavior, and only 8percent were classified as having good behavioral practices. Post-intervention, the proportion of respondents in the "Good" category increased substantially to 39percent while 61percent exhibited moderate behavior. No respondents remained in the poor behavior category after the intervention.

4.7.3 Pre- and Post-Intervention Self-efficacy Level Comparison at Embu Level 5 Hospital.

This section presents a comparative analysis of respondents' self-efficacy regarding diabetic foot care before and after the educational intervention. Self-efficacy was assessed through three dimensions: perceived task difficulty, belief in one's ability, and ability to function under pressure. The results indicate a significant increase in self-efficacy levels across all dimensions following the intervention suggesting that the program effectively equipped patients with the confidence, belief, and psychological readiness to manage their condition proactively. The findings are presented in Table 25

Table 25:DFC Self -efficacy Level Pre and Post-intervention at Embu Hospital

	Pre- Intervention			Post-Intervention		
Variable	High	Moderate	Low	High	Moderate	Low
Task Difficulty	20(18%)	51(44%)	44(38%)	101(99%)	1(1%)	0
Belief in One's Ability	11(9%)	48(42%)	56(49%)	101(99%)	1(1%)	0
Being Able to Work Under Pressure	18(16%)	39(34%)	58(50%)	99(97%)	3(3%)	0
Overall Level of Self Efficacy	16(14%)	46(40%)	53(46%)	100(98%)	2(2%)	0

On task difficulty, in the pre-intervention phase, only 18 percent of respondents reported high self-efficacy in handling tasks related to diabetic foot care, while 44percent had moderate self-efficacy and 38percent reported low self-efficacy. Post-intervention, a dramatic shift occurred, with 99percent of participants indicating high self-efficacy and only 1percent reporting moderate levels. No respondents remained in the low self-efficacy category, suggesting a substantial boost in confidence and perceived ease of engaging in foot care tasks after the educational sessions.

For belief in one's ability, prior to the intervention, only 9percent of respondents believed strongly in their own ability to effectively manage diabetic foot care, while 42percent showed moderate belief and 49percent had low self-efficacy. After the intervention, this changed, with 99percent of participants reporting high confidence in their abilities, and just 1percent in the moderate range. This improvement illustrates a successful shift in patients' internal belief systems, empowering them to take greater personal responsibility for their care.

Regarding ability to work under pressure, before the intervention, 16percent of respondents felt capable of maintaining foot care routines under pressure, 34percent had moderate ability, and 50percent had low self-efficacy in such situations. After the intervention, 97percent reported high self-efficacy in managing their foot care under challenging circumstances, while 3percent remained in the moderate category. The complete elimination of low self-efficacy in this domain indicates improved emotional and practical resilience.

On the overall level of self-efficacy, the overall composite score reflected a similar trend. In the pre-intervention phase, only 14percent of respondents demonstrated high self-efficacy, 40percent showed moderate levels, and 46percent had low self-efficacy. Post-intervention, 98percent of respondents were categorized as having high self-efficacy, and only 2percent remained at the moderate level. This represents a profound transformation in the respondents' overall confidence to carry out and sustain diabetic foot care practices effectively.

4.7.4 Pre- and Post-Intervention Knowledge Level Comparison at Kerugoya Level 5 Hospital.

This section provides a comparative analysis of diabetic foot care knowledge among respondents before and after the educational intervention at Kerugoya Level Five Hospital. The results indicate a general improvement in knowledge across all measured dimensions, highlighting the effectiveness of the intervention in enhancing participants' understanding of key foot care practices. The observed gains suggest that structured educational programs can play a critical role in equipping patients with the necessary knowledge to prevent complications associated with diabetes. Furthermore, the data underscores the importance of continuous education in reinforcing positive self-care behaviors and promoting long-term health outcomes.

Table 26:DFC Knowledge Pre and Post-intervention at Kerugoya Hospital

	Pre- Intervention			Post-Intervention		
Variable	Poor	Satisf.	Good	Poor	Satisf.	Good
Glycemic Control	9(8%)	31(27%)	75(65%)	1(1%)	7(7%)	95(92%)
Identification of the Risk at Foot	55(48%)	51(44%)	9(8%)	14(13%)	74(72%)	15(14%)
Inspection and Examination of the foot	66(57%)	43(38%)	6(5%)	32(31%)	62(60%)	9(9%)
Regular DFC Education	74(64%)	37(32%)	4(4%)	43(42%)	51(49%)	9(9%)
Appropriate Foot Care	57(50%)	43(37%)	15(13%)	22(21%)	49(48%)	32(31%)
Risk Factors Management	74(64%)	37(32%)	4(4%)	27(26%)	49(48%)	27(26%)
Overall Level of Knowledge	56(49%)	40(35%)	19(16%)	23(22%)	49(48%)	31(30%)

On glycemic control, in the pre-intervention phase, 65percent of respondents demonstrated good knowledge of glycemic control, 27percent were rated as satisfactory, and 8percent as poor. Following the normal education intervention, the proportion of respondents with good knowledge increased to 92percent while those with poor knowledge decreased significantly to 1percent, and 7percentwere categorized as satisfactory. This improvement highlights the positive impact of education in reinforcing the importance of blood sugar regulation in foot care. For identification of the at-risk foot, before the intervention, this was the weakest area of knowledge, with

nearly half (48percent) of respondents categorized as poor, 44percent as satisfactory, and only 8percent demonstrating good knowledge. After the intervention, the majority of respondents (72percent) moved into the satisfactory category, and 14percent achieved good knowledge. While there was a reduction in poor knowledge to 13%, the relatively low shift into the "Good" category suggests that this area may require more targeted and reinforced instruction.

On inspection and examination of the foot, knowledge in this domain also improved post-intervention. Initially, 57percent of respondents had poor knowledge, 38percent had satisfactory knowledge, and only 5percent were classified as good. Post-intervention, the share of respondents with good knowledge increased slightly to 9percent, while those with satisfactory knowledge rose to 60percent and poor knowledge dropped to 31percent. This suggests a moderate improvement, although the relatively small shift into the "Good" category signals a need for continued emphasis on daily foot examination practices.

Regarding, the regular diabetic foot care (DFC) education, prior to the intervention, 64percent of participants had poor knowledge regarding the value of ongoing foot care education, 32percent had satisfactory knowledge, and only 4percent were classified as good. After the intervention, good knowledge rose to 9percent, satisfactory increased to 49percent, and poor knowledge decreased to 42percent. While the change indicates a positive trend, the persistence of a relatively high proportion of poor knowledge suggests that further reinforcement is necessary. For appropriate foot care, in the pre-intervention phase, half of the respondents (50percent) were categorized as having poor knowledge, 37percent satisfactory, and 13percent good. After the intervention, good knowledge more than doubled to 31percent, satisfactory knowledge increased to 48percent, and poor knowledge declined significantly to 21percent. This represents one of the more successful improvements among the indicators, reflecting greater understanding of daily foot hygiene, proper nail care, and protective behaviors.

On risk factors management, before the intervention, 64percent of respondents had poor knowledge of managing foot care risk factors, 32percent had satisfactory knowledge, and only 4percent demonstrated good knowledge. Following the intervention, there was a marked improvement: poor knowledge dropped to 26percent satisfactory knowledge

rose to 48percent, and good knowledge increased to 26percent. This indicates that the intervention effectively addressed gaps in understanding of risk factors management such nail care, fungal infection, blisters, corns and callus.

For the overall level of knowledge, the composite knowledge score shows a meaningful upward trend. In the pre-intervention phase, 49percent of respondents had poor overall knowledge, 35percent had satisfactory knowledge, and only 16percent had good knowledge. Post-intervention, good knowledge increased to 30percent, satisfactory knowledge rose to 48percent, and poor knowledge declined to 22percent. While this reflects a clear improvement in overall knowledge, the progress is more modest compared to Embu, indicating the potential need for a more tailored or sustained educational approach in Kerugoya.

4.7.5 Pre- and Post-Intervention Behavior Level Comparison at Kerugoya Level 5 Hospital

This section presents a comparative assessment of patient behaviors related to diabetic foot care before and after the educational intervention. The results reveal substantial improvement across all measured behavioral domains, although certain areas continue to show moderate adherence and require further behavioral reinforcement. Findings are shown in Table 27

Table 27:DFC Behaviour pre and post intervention at Kerugoya hospital

	Pre- Intervention			Post-Intervention		
Variable	Good	Moderate	Poor	Good	Moderate	Poor
Glycemic Control	1(1%)	30(26%)	84(73%)	81(79%)	19(18%)	3(3%)
Regular Foot inspection and Examination	2(2%)	22(19%)	91(79%)	11(11%)	72(70%)	20(19%)
Appropriate use of Footwear	1(1%)	7(7%)	106(92%)	14(14%)	49(47%)	40(39%)
Risk Factors Management	12(11%)	5(4%)	95(85%)	44(43%)	40(39%)	19(18%)
Overall Level of Behaviour	4(3%)	16(14%)	95(83%)	38(37%)	45(44%)	20(19%)

On glycemic control, before the intervention, a large majority of respondents (73percent) exhibited poor glycemic control behaviors, with only 1percent rated as good and 26percent as moderate. Following the intervention, there was a significant positive shift: 79percent of respondents adopted good behavioral practices, 18percent demonstrated moderate behavior, and only 3percent remained in the poor category. This dramatic improvement reflects the effectiveness of the educational intervention in promoting better self-monitoring and glycemic management.

For Regular Foot Inspection and Examination, prior to the intervention, 79percent of respondents did not practice regular foot inspection (poor), 19percent did so occasionally (moderate), and only 2percent inspected regularly (good). Post-intervention, good behavior increased to 11percent, and 70percent adopted moderate behavior. While poor behavior declined to 19percent, the relatively low uptake of regular (good) foot inspection suggests that this area still requires stronger emphasis and behavioral reinforcement.

Regarding appropriate use of footwear, this domain had the highest rate of poor behavior pre-intervention, with 92percent of respondents not using appropriate footwear, 7percent exhibiting moderate practices, and only 1percent practicing good footwear use. Post-intervention, there was notable progress: 14percent demonstrated good behavior, 47percent moved into the moderate category, and poor behavior dropped to 39percent. Although improvement is evident, the persistence of poor footwear practices among a significant portion of respondents indicates a need for more targeted education and possibly provision of proper footwear.

On risk factors management, Initially, 85percent of respondents had poor behavior in managing foot-related risk, while only 11percent practiced good behavior and 4percent moderate. After the intervention, the number of respondents practicing good risk factor management rose substantially to 43percent, with 39percent at moderate levels and 18percent remaining poor. This shows meaningful progress and improved patient responsiveness to the intervention in terms of risk reduction.

On the overall level of behaviour the majority of respondents (83percentg) were rated as having poor diabetic foot care behavior in the pre-intervention phase, 14percent were

moderate, and only 3percent exhibited good practices. After the intervention, good behavior increased significantly to 37percent, moderate behavior rose to 44percent, and poor behavior decreased to 19percent. This general trend suggests that the educational intervention had a substantial positive effect on behavior change, even though a considerable proportion of patients still fall within the moderate category and may benefit from ongoing support.

4.7.6 Pre- and Post-Intervention Self-Efficacy Level Comparison at Kerugoya Level 5 Hospital

The analysis below compares self-efficacy levels across three core domains: perceived task difficulty, belief in one's ability, and the ability to function under pressure. The results reflect modest improvements following the intervention, but also indicate persistent challenges in self-confidence and perceived behavioral control among many respondents.

Table 28:DFC Self-efficacy Pre and Post-intervention at Kerugoya hospital

	Pre- Intervention			Post-Intervention		
Variable	High	Moderate	Low	High	Moderate	Low
Task Difficulty	15(13%)	39(34%)	61(53%)	25(24%)	48(47%)	30(29%)
Belief in One’s Ability	6(5%)	32(28%)	77(67%)	11(10%)	51(50%)	41(40%)
Being Able to Work Under Pressure	2(2%)	13(11%)	100(87%)	3(3%)	33(32%)	67(65%)
Overall Level of Self Efficacy	8(7%)	28(24%)	79(69%)	13(12%)	44(43%)	46(45%)

On task difficulty, before the intervention, more than half of the respondents (53percent) reported low self-efficacy in handling tasks related to foot care, 34percent showed moderate self-efficacy, and only 13percent expressed high self-efficacy. Post-intervention, the proportion of participants with high self-efficacy increased to 24percent, while moderate self-efficacy rose to 47percent, and low self-efficacy declined to 29percent. While this shows a positive shift, nearly a third of respondents

still perceive foot care tasks as difficult, suggesting that ongoing support is needed to further boost confidence in task execution.

Regarding belief in one's ability, pre-intervention data show that only 5percent of participants believed strongly in their ability to care for their feet properly, while 28percent had moderate confidence and a majority (67percent) exhibited low self-efficacy. After the intervention, high self-efficacy improved to 10percent, moderate increased to 50percent, and low self-efficacy declined to 40percent. Although these changes indicate progress, the persistence of low belief in personal ability for nearly half of the respondents implies that deeper psychological or motivational barriers may still be in play.

On ability to work under pressure, this domain recorded the weakest self-efficacy scores in both phases. Initially, 87% of respondents reported low self-efficacy in managing foot care under stressful or time-constrained conditions, 11percent were moderate, and only 2percent showed high self-efficacy. Post-intervention, high self-efficacy rose marginally to 3percent, moderate increased to 32percent, and low decreased to 65percent. Despite the intervention, a large proportion of patients still feel incapable of maintaining foot care practices when faced with pressure, indicating a clear area for further behavioral and emotional support.

For the overall level of self-efficacy self-efficacy score, calculated from the three domains, highlights the general trend. Pre-intervention, 69percent of respondents fell under the low self-efficacy category, 24percent had moderate levels, and only 7percent exhibited high self-efficacy. After the intervention, high self-efficacy increased to 12percent, moderate rose to 43percent, and low decreased to 45percengt. Although the data show a positive shift, nearly half of the participants still have low overall self-efficacy, which may hinder consistent application of preventive foot care practices.

4.7.7 Post-Intervention Knowledge Comparison at Embu and Kerugoya Level 5 Hospitals

This table presents a comparative analysis of diabetic foot care (DFC) knowledge between patients attending Embu and Kerugoya Level Five Hospitals following the implementation of a targeted educational intervention. The data demonstrate that both

facilities experienced notable improvements in DFC knowledge post-intervention, indicating the overall effectiveness of the educational modules. However, a more nuanced comparison reveals that Embu recorded consistently high knowledge levels across all assessed domains, reflecting stronger retention and comprehension among its participants. In contrast, Kerugoya exhibited greater variability in knowledge outcomes, with scores ranging from satisfactory to good, and certain areas still showing relatively lower performance. These discrepancies may be attributed to contextual differences such as baseline knowledge levels, patient engagement, health literacy, and variations in how the intervention was delivered or received. The findings suggest that while the intervention had a positive overall effect, tailored strategies may be necessary to address localized challenges and ensure equitable knowledge acquisition. The detailed results of this comparative analysis are presented in Table 29.

Table 29: Comparison of DFC Knowledge Post intervention Between Embu and Kerugoya

		Embu			Kerugoya	
Variable	Poor	Satisf.	Good	Poor	Satisf.	Good
Glycemic Control	0	0	102(100%)	1(1%)	7(7%)	95(92%)
Identification of the Risk at Foot	0	0	102(100%)	14(13%)	74(72%)	15(14%)
Inspection and Examination of the foot	0	0	102(100%)	32(31%)	62(60%)	9(9%)
Regular DFC Education	0	0	102(100%)	43(42%)	51(49%)	9(9%)
Appropriate Foot Care	0	0	102(100%)	22(21%)	49(48%)	32(31%)
Risk Factors Management	0	0	102(100%)	27(26%)	49(48%)	27(26%)
Overall Level of Knowledge	0	0	102(100%)	23(22%)	49(48%)	31(30%)

Regarding glycemic control, at Embu, all respondents (100percent) demonstrated good knowledge of glycemic control after the intervention. In contrast, Kerugoya had 92percent in the good category, 7percent satisfactory, and 1percent still rated as poor. Although both facilities recorded strong outcomes, Embu achieved perfect knowledge scores in this domain, indicating a higher level of effectiveness in content delivery or retention. On identification of the at-risk foot, all respondents at Embu (100percent)

achieved good knowledge in identifying the at-risk foot, whereas in Kerugoya, only 14percent attained good knowledge, with the majority (72percent) in the satisfactory category and 13percent in the poor category. This reflects a significant contrast, suggesting that patients at Kerugoya may have faced challenges in understanding or internalizing this concept, and may benefit from enhanced focus on clinical signs and early risk indicators in future training.

On inspection and examination of the foot, Embu reported a perfect score with 100percent of respondents categorized as having good knowledge. In Kerugoya, only 9percent attained good knowledge, while 60percent were satisfactory and 31percent remained poor. This marked discrepancy highlights the superior impact of the intervention in Embu. For regular diabetic foot care education, in Embu, 100percent of participants had good knowledge about the need for regular foot care education. Meanwhile, in Kerugoya, 9percent demonstrated good knowledge, 49percent were satisfactory, and 42perceng remained in the poor category. This suggests that while awareness improved at Kerugoya, there is still a large knowledge gap regarding the value of continuous foot care education.

Regarding appropriate foot care, at Embu, the entire sample again demonstrated good knowledge (100percent), indicating strong comprehension of practices like proper washing, drying, and nail care. In Kerugoya, 31percent had good knowledge, 48percent were satisfactory, and 21percent had poor knowledge. While there was improvement, the results still indicate room for enhanced practical education and patient reinforcement at Kerugoya. For risk factors management, all Embu participants were rated as having good knowledge in managing foot-related risks post-intervention. In contrast, Kerugoya showed more modest outcomes: 26percent had good knowledge, 48percent satisfactory, and 26percent poor. This again shows a knowledge gap that could increase vulnerability to complications if not addressed.

On the overall level of knowledge, the composite post-intervention knowledge score further highlights the differences between the two hospitals. All respondents (100percent) in Embu were classified as having good overall knowledge, showing full effectiveness of the intervention. At Kerugoya, 30percent had good knowledge,

48percent were satisfactory, and 22percent remained poor. While improvements were evident, they were not as uniform or comprehensive as in Embu.

4.7.8 Post-Intervention Behavior Comparison at Embu and Kerugoya Level 5 Hospitals

This section presents a comparative analysis of diabetic foot care (DFC) behaviors among patients following the implementation of an educational intervention at Embu and Kerugoya Level Five Hospitals. The data demonstrate positive behavioral shifts at both sites, indicating improved adherence to recommended DFC practices. However, the magnitude and consistency of these improvements varied between the two hospitals, with Embu generally exhibiting more uniform progress across behavioral domains. These differences may be attributed to variations in patient engagement, baseline behavior, healthcare support, or contextual factors influencing the intervention's effectiveness. A detailed summary of the findings is provided in Table 30.

Table 30: Comparison of DFC Behaviour Post -intervention Between Embu and Kerugoya

	Embu			Kerugoya		
Variable	Good	Moderate	Poor	Good	Moderate	Poor
Glycemic Control	33(32%)	59(68%)	0	81(79%)	19(18%)	3(3%)
Regular Foot inspection and Examination	38(37%)	64(63%)	0	11(11%)	72(70%)	20(19%)
Appropriate use of Footwear	35(34%)	67(66%)	0	14(14%)	49(47%)	40(39%)
Risk Factors Management	53(52%)	49(48%)	0	44(43%)	40(39%)	19(18%)
Overall Level of Behaviour	40(39%)	62(61%)	0	38(37%)	45(44%)	20(19%)

For glycemic control behavior, at Embu, 32percent of respondents reported good behavioral practices in glycemic control, with 68percent categorized as moderate. No participants were classified under the poor category. At Kerugoya, however, a significantly higher proportion (79percent) demonstrated good behavior, while 18percent were moderate and 3percent poor. This suggests that, post-intervention,

Kerugoya outperformed Embu in glycemic control behavior, possibly due to stronger patient motivation or prior familiarity with self-monitoring practices.

On regular foot inspection and examination, Embu showed stronger outcomes in this domain, with 37percent of respondents regularly inspecting their feet (good behavior) and 63percent demonstrating moderate adherence. In contrast, only 11percent of Kerugoya respondents practiced regular inspection, with 70percent in the moderate category and 19percent still in the poor behavior group. This indicates a substantial behavioral gap, suggesting that foot inspection as a routine habit was better reinforced or adopted at Embu.

Regarding appropriate use of footwear, Embu performed better, with 34percent of respondents engaging in appropriate footwear use (good), and 66percent at the moderate level. At Kerugoya, only 14percent of respondents demonstrated good footwear behavior, 47percent were moderate, and 39percent remained poor. The high proportion of poor behavior at Kerugoya highlights a persistent challenge in translating footwear education into practice, possibly due to affordability, access, or cultural perceptions of appropriate footwear.

For risk factors management, in Embu, 52percent of participants effectively managed foot-related risks (good behavior), and 48percent were rated moderate. In Kerugoya, 43percent achieved good behavior, 39percent were moderate, and 18percent remained in the poor category. While both hospitals saw improvement, Embu had a higher share of respondents demonstrating proactive risk management, likely reflecting better understanding of injury prevention strategies and health-seeking behavior.

Looking at the overall behavioral score, Embu recorded 39percent of participants with good diabetic foot care behavior and 61percent with moderate behavior, with none remaining in the poor category. In Kerugoya, 37percent achieved good behavior, 44 percent moderate were moderate, and 19percent still demonstrated poor practices. This comparison shows Embu achieved more consistent behavioral improvement, while Kerugoya had greater variability and a residual group of patients with poor behavioral adherence.

4.7.9 Post-Intervention Self-Efficacy Comparison at Embu and Kerugoya Level 5 Hospitals

This section presents a comparative analysis of self-efficacy levels among patients at Embu and Kerugoya Level Five Hospitals following an educational intervention. The findings reveal marked differences in post-intervention self-efficacy, with Embu participants demonstrating significantly higher confidence across all domains than their counterparts at Kerugoya. Results are shown in Table 35

Table 31:Comparison of Self -efficacy in the Post intervention at Embu and Kerugoya

Variable	Embu High	Moderate	Low	Kerugoya High	Moderate	Low
Task Difficulty	101(99%)	1(1%)	0	25(24%)	48(47%)	30(29%)
Belief in One's Ability	101(99%)	1 (1%)	0	11(10%)	51(50%)	41(40%)
Being Able to Work Under Pressure	99(97%%)	3(3%)	0	3(3%)	33(32%)	67(65%)
Overall Level of Self Efficacy	100(98%)	2(2%)	0	13(12%)	44(43%)	46(45%)

At Embu, nearly all respondents (99 percent) reported high self-efficacy in handling tasks related to diabetic foot care, while only 1percent fell into the moderate category and none in the low. In Kerugoya, however, only 24percent demonstrated high self-efficacy, 47percent were moderate, and a notable 29percent still reported low self-efficacy. This suggests that patients at Embu felt significantly more capable of performing necessary foot care tasks with ease compared to those in Kerugoya. Regarding belief in one's ability, similarly, 99percent of respondents at Embu expressed strong belief in their personal ability to manage foot care, with only 1% falling into the moderate category. At Kerugoya, just 10percent showed high self-belief, while half (50percent) were moderate and 40percent still had low confidence in their capabilities. This stark contrast underscores the effectiveness of the intervention in building personal agency among Embu participants, and highlights a continuing challenge in empowering patients at Kerugoya.

Lastly on being able to work under pressure, this domain reflects respondents' confidence in maintaining foot care routines despite time pressure, stress, or other life challenges. In Embu, 97percent of patients reported high self-efficacy, 3percent were moderate, and none reported low. In Kerugoya, by contrast, only 3percent demonstrated high self-efficacy, while 32percent were moderate and a significant 65percent were still in the low category. These results indicate that the Embu intervention was far more successful in equipping patients with the resilience and problem-solving confidence necessary for consistent self-care.

The overall composite score for self -efficacy, further highlights the disparity between the two hospitals. In Embu, 98percent of respondents demonstrated high self-efficacy overall, with only 2% moderate and none rated as low. In Kerugoya, however, only 12percent were in the high self-efficacy category, 43percent were moderate, and 45percent remained in the low category. This means that nearly half of Kerugoya's respondents continued to lack confidence in their ability to carry out essential foot care behaviors, even after the intervention.

4.8 Phase Three (Evaluation Phase) Inferential Analysis

4.8.1 Knowledge Level for Embu Respondents Pre and Post Intervention

To evaluate changes in participants' knowledge of diabetic foot care (DFC), an independent samples t-test was conducted to compare mean knowledge scores between the pre-intervention and post-intervention groups. This analysis was appropriate given the use of independent samples in each group. Table 32 presents the descriptive statistics, summarizing the mean scores, standard deviations, and standard errors for both groups. To assess the statistical significance of the observed differences, inferential analysis was performed, as shown in Table 33. The results indicate whether the educational intervention led to a significant improvement in DFC knowledge levels among participants.

Table 32: Descritive Statistics-Knowledge level Pre and Post-Intervention Embu

Group	N	Mean	Standard Deviation	Standard Error Mean
Pre	115	2.6329	0.19248	0.01795
Post	102	4.3048	0.09325	0.00923

The pre-intervention group (N = 115) had a mean knowledge score of 2.6329 with a standard deviation of 0.19248, while the post-intervention group (N = 102) recorded a substantially higher mean score of 4.3048, with a lower standard deviation of 0.09325. This notable difference in means suggests a potential effect of the intervention on respondents' knowledge levels.

Table 33: Inferential statistics- Knowledge level Pre and Post-Intervention Embu

Test	Levene's Test for Equality of Variances	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference
Equal variances assumed	F = 35.617, p = 0.000	-79.794	215	0.000	-1.67185	0.02095	[-1.71315, -1.63056]
Equal variances not assumed (Welch's t-test)	–	-82.827	168.960	0.000	-1.67185	0.02018	[-1.71170, -1.63201]

Levene's Test for Equality of Variances yielded a statistically significant result (F = 35.617, p = .000), indicating that the assumption of homogeneity of variances was violated. As a result, the Welch's t-test, which does not assume equal variances, was used for more accurate inference.

The Welch's t-test showed a statistically significant difference between the two groups (t(168.960) = -82.827, p < .001). The mean difference in knowledge scores was -1.67185, with a standard error of 0.02018. The 95% confidence interval for the mean difference ranged from -1.71170 to -1.63201, indicating a precise and reliable estimate of the intervention's effect. The negative sign of the mean difference reflects higher scores in the post-intervention group compared to the pre-intervention group.

These findings demonstrate a statistically significant and meaningful improvement in diabetes foot care knowledge among respondents following the intervention. The magnitude of the difference, coupled with a highly significant p-value and narrow confidence interval, suggests that the intervention was effective in enhancing participants' understanding of DFC practices. Given the use of independent samples,

this improvement reflects group-level change and supports the potential value of scaling such educational programs in similar settings.

4.8.2 DFC Behavior Level for Embu Respondents Pre and Post Intervention

To assess changes in diabetic foot care (DFC) behavior following the educational intervention at Embu Level Five Hospital, descriptive and inferential statistical analyses were conducted. Descriptive statistics, presented in Table 34, summarize the mean behavior scores, standard deviations, and standard errors for the pre- and post-intervention groups. An independent samples t-test was then performed to determine whether the observed differences were statistically significant. The results of this analysis are shown in Table 35. These findings provide evidence on the effectiveness of the intervention in improving participants' DFC-related behavioral practices

Table 34: Descriptive Statistics-Behavior level Pre and Post-Intervention Embu

Group	N	Mean	Standard Deviation	Standard Error Mean
Pre	115	1.1968	0.33655	0.03138
Post	102	2.3944	0.13840	0.01370

The pre-intervention group (N = 115) reported a mean behavior score of 1.1968 (SD = 0.33655), while the post-intervention group (N = 102) had a markedly higher mean score of 2.3944 (SD = 0.13840). This substantial increase in the mean score suggests a significant improvement in diabetes foot care behaviors following the educational intervention, highlighting the intervention's potential to positively influence patient engagement in foot care practices.

Table 35: Inferential Statistics-Behavior level Pre and Post-Intervention Embu

Test Assumption	Levene's Test (F, Sig.)	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Equal variances assumed	F = 47.014, p = .000	-33.506	215	0.000	-1.19755	0.03574	[-1.26800, -1.12711]
Equal variances not assumed	–	-34.970	155.245	0.000	-1.19755	0.03424	[-1.26520, -1.12991]

Levene's Test for Equality of Variances indicated a significant difference in variances between the two groups ($F = 47.014$, $p < .001$), violating the assumption of homogeneity of variances required for a standard t-test. Consequently, Welch's t-test (equal variances not assumed) was employed to provide a more accurate and robust statistical analysis.

The Welch's t-test revealed a highly statistically significant difference in behavior scores between the pre- and post-intervention groups ($t(155.245) = -34.970$, $p < .001$). The mean difference was -1.19755 (SE = 0.03424), with a 95% confidence interval ranging from -1.26520 to -1.12991. The negative mean difference reflects higher behavior scores in the post-intervention group, confirming a clear and measurable improvement in reported foot care practices as a direct result of the educational intervention.

These results indicate both statistical and practical significance, with the large effect size suggesting that the educational program had a meaningful impact on participants' behavior. The narrow confidence interval further supports the reliability of the findings. Overall, the analysis underscores the effectiveness of structured diabetic foot care education in enhancing preventive self-care behaviors among individuals at risk of foot-related complications.

4.8.3. DFC Self-Efficacy Level for Embu Respondents Pre and Post Intervention

To examine the effect of the educational intervention on participants' self-efficacy regarding diabetic foot care (DFC) in Embu, both descriptive and inferential statistical analyses were conducted. Table 36 provides descriptive statistics showing the mean self-efficacy scores, standard deviations, and standard errors for the pre- and post-intervention groups. To determine whether the observed difference was statistically significant, an independent samples t-test was performed. The results of this analysis are presented in Table 37. Levene's Test for Equality of Variances indicated a significant result ($p < .001$), suggesting unequal variances; hence, Welch's t-test results are reported and interpreted.

Table 36:Descriptive Statistics- Self-Efficacy level Pre and Post-Intervention Embu

Group	N	Mean	Standard Deviation (SD)	Standard Error Mean
Pre	115	2.4812	0.60215	0.05615
Post	102	4.2753	0.16027	0.01587

As presented in Table 36, the pre-intervention group (N = 115) had a mean self-efficacy score of 2.4812 (SD = 0.60215), whereas the post-intervention group (N = 102) recorded a significantly higher mean score of 4.2753 (SD = 0.16027). The increase in mean scores suggests a substantial improvement in respondents' confidence in managing diabetes foot care after receiving the intervention.

Table 37: Inferential Statistics- Self-Efficacy level Pre and Post-Intervention Embu

Test Assumption	Levene's Test (F, Sig.)	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Equal variances assumed	F = 75.929, p = .000	-29.183	215	.000	-1.79417	0.06148	[-1.91535, -1.67299]
Equal variances not assumed	–	-30.748	131.988	.000	-1.79417	0.05835	[-1.90959, -1.67875]

Levene's Test for Equality of Variances yielded a statistically significant result ($F = 75.929$, $p < .001$), indicating a violation of the assumption of equal variances. Consequently, the Welch's t-test (equal variances not assumed) was applied to provide a more accurate statistical estimation.

The results of the Welch's t-test revealed a statistically significant difference in self-efficacy scores between the two groups ($t(131.988) = -30.748$, $p < .001$). The mean difference was -1.79417 with a standard error of 0.05835, and the 95% confidence interval ranged from -1.90959 to -1.67875. The negative value of the mean difference confirms that self-efficacy levels were higher in the post-intervention group.

The findings demonstrate a statistically and practically significant improvement in self-efficacy levels following the diabetes foot care intervention. The large mean difference, narrow confidence interval, and highly significant p-value provide strong evidence that

the intervention effectively enhanced participants' confidence in managing and performing diabetes foot care practices. These results support the utility of structured health education programs in empowering individuals with the skills and self-belief needed to engage in preventive health behaviors.

4.8.4 DFC Knowledge Level for Kerugoya Respondents Pre and Post Intervention

Tables 38 and 39 present the results of an analysis conducted to assess the effect of an educational intervention on participants' knowledge of diabetic foot care (DFC) at Kerugoya Level Five Hospital. Table 38 shows the descriptive statistics, indicating an increase in the mean knowledge score from the pre-intervention group to the post-intervention group. To determine whether this increase was statistically significant, an independent samples t-test was performed. As shown in Table 39, Levene's Test for Equality of Variances was not significant ($p = .159$), suggesting that the assumption of equal variances holds. Therefore, the t-test assuming equal variances was used, revealing a statistically significant improvement in knowledge levels following the intervention ($p < .001$).

Table 38: Descriptive Statistics- Knowledge level Pre and Post-Intervention Kerugoya

Group	N	Mean	Standard Deviation (SD)	Standard Error Mean
Pre	115	2.6665	0.30721	0.02865
Post	103	3.0882	0.31554	0.03109

As shown in Table 38, the pre-intervention group (N = 115) recorded a mean knowledge score of 2.6665 (SD = 0.30721), while the post-intervention group (N = 103) had a higher mean score of 3.0882 (SD = 0.31554). This suggests a positive shift in participants' knowledge levels following the implementation of the DFC educational intervention.

Table 39: Inferential Statistics- Knowledge level Pre and Post-Intervention Kerugoya

Test Assumption	Levene's Test (F, Sig.)	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Equal variances assumed	F = 1.996, p = .159	-9.989	216	0.000	-0.42169	0.04221	[-0.50490, -0.33849]
Equal variances not assumed	–	-9.975	211.995	0.000	-0.42169	0.04228	[-0.50503, -0.33836]

Levene's Test for Equality of Variances yielded a non-significant result (F = 1.996, p = .159), indicating that the assumption of equal variances was met. Consequently, the standard independent samples t-test assuming equal variances was used for interpretation.

The t-test results indicated a statistically significant difference in knowledge scores between the pre- and post-intervention groups ($t(216) = -9.989$, $p < .001$). The mean difference was -0.42169 with a standard error of 0.04221. The 95% confidence interval ranged from -0.50490 to -0.33849, clearly excluding zero and confirming the statistical significance of the result.

These findings reveal a modest but statistically significant improvement in diabetes foot care (DFC) knowledge levels among respondents at Kerugoya Level Five Hospital, where participants received routine clinical care but were not exposed to the structured educational intervention implemented in Embu. The increase in mean knowledge scores at Kerugoya may therefore be attributed to general exposure to standard health education or continued interaction with healthcare providers as part of routine care.

In contrast, respondents at Embu Level Five Hospital, who received a targeted and structured DFC education program, demonstrated a substantially greater improvement in knowledge levels. The marked difference in outcomes between the two sites underscores the added value of the structured intervention in Embu. This comparison suggests that while routine care can lead to some improvements in health knowledge over time, a well-designed educational program yields significantly greater gains. The

results therefore support the effectiveness of structured patient education in improving knowledge and awareness of diabetes foot care practices beyond what is typically achieved through standard clinical routines.

4.8.5 Behavior Level for Kerugoya Respondents Pre and Post Intervention

To evaluate the effect of the diabetes foot care (DFC) intervention on participants' foot care behaviors at Kerugoya Level Five Hospital, behavior scores were compared between the pre- and post-intervention time points. Although the same population was targeted, the analysis involved different numbers of participants at each stage due to attrition and incomplete responses. As a result, an independent samples t-test was used to determine whether there was a statistically significant difference in behavior levels before and after the intervention.

Table 40: Descriptive Statistics- Behavior level Pre and Post-Intervention Kerugoya

Group	N	Mean	Standard Deviation (SD)	Standard Error Mean
Pre	115	0.9130	0.29134	0.02717
Post	103	1.3711	0.30192	0.02975

As shown in Table 40, the pre-intervention group (N = 115) had a mean behavior score of 0.9130 (SD = 0.29134), while the post-intervention group (N = 103) recorded a higher mean score of 1.3711 (SD = 0.30192). This suggests a moderate increase in participants' reported diabetes foot care behaviors over time.

Table 41: Inferential Statistics- Behavior level Pre and Post-Intervention Kerugoya

Test Assumption	Levene's Test (F, Sig.)	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Equal variances assumed	F = 0.981, p = .323	-11.393	216	.000	-0.45810	0.04021	[-0.53735, -0.37885]
Equal variances not assumed	–	-11.371	211.472	.000	-0.45810	0.04029	[-0.53751, -0.37868]

Levene's Test for Equality of Variances was not statistically significant (F = 0.981, p = .323), confirming that the assumption of equal variances was met. Therefore, the results

of the standard independent samples t-test assuming equal variances were used for interpretation.

The t-test revealed a statistically significant difference in behavior scores between the two groups ($t(216) = -11.393$, $p < .001$), with a mean difference of -0.45810 and a standard error of 0.04021. The 95% confidence interval for the difference ranged from -0.53735 to -0.37885, indicating that the increase in behavior scores was both statistically significant and practically meaningful.

These findings demonstrate a significant improvement in diabetes foot care behaviors among respondents at Kerugoya Level Five Hospital over the course of the study period. However, it is important to note that this improvement occurred in the absence of a structured educational intervention and may reflect the effect of routine clinical care or increased general awareness over time. When compared with the outcomes observed in Embu Level Five Hospital—where a structured DFC education program was delivered—the behavioral improvements in Kerugoya were less pronounced. This suggests that while standard care may lead to gradual behavioral change, structured education is likely more effective in promoting consistent and proactive foot care practices among individuals with or at risk of diabetes.

4.8.6 Self -efficacy Level for Kerugoya Respondents Pre and Post Intervention

Tables 42 and 43 present the results of an analysis conducted to assess the effect of the educational intervention on participants' self-efficacy in diabetic foot care at Kerugoya Level Five Hospital. Table 42 provides descriptive statistics, showing an increase in the mean self-efficacy score from the pre-intervention to the post-intervention group. To determine the statistical significance of this change, an independent samples t-test was performed. As indicated in Table 43, Levene's Test for Equality of Variances was not significant ($p = .318$), confirming that the assumption of equal variances was met. Accordingly, the standard t-test assuming equal variances was used and revealed a statistically significant improvement in self-efficacy scores following the intervention ($p < .001$).

Table 42: Descriptive Statistics- Self-efficacy level Pre and Post-Intervention Kerugoya

Group	N	Mean	Standard Deviation (SD)	Standard Error Mean
Pre	115	2.1920	0.51443	0.04797
Post	103	2.6464	0.65507	0.06455

As shown in Table 42, the mean self-efficacy score increased from 2.1920 (SD = 0.51443) in the pre-intervention group (N = 115) to 2.6464 (SD = 0.65507) in the post-intervention group (N = 103). This increase suggests a positive change in participants' perceived ability to engage in diabetes foot care following the intervention period.

Table 43: Descriptive Statistics- Self-efficacy level Pre and Post-Intervention Kerugoya

Test Assumption	Levene's Test (F, Sig.)	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval
Equal variances assumed	F = 1.003, p = .318	-5.725	216	0.000	-0.45441	0.07937	[-0.61086, -0.29797]
Equal variances not assumed	–	-5.650	193.090	0.000	-0.45441	0.08042	[-0.61303, -0.29580]

Levene's Test for Equality of Variances yielded a non-significant result (F = 1.003, p = .318), indicating that the assumption of equal variances was satisfied. Consequently, the t-test assuming equal variances was used for interpretation.

The independent samples t-test revealed a statistically significant difference in self-efficacy scores between the pre- and post-intervention groups ($t(216) = -5.725$, $p < .001$). The mean difference was -0.45441, with a standard error of 0.07937, and the 95% confidence interval ranged from -0.61086 to -0.29797. These results confirm a reliable and meaningful increase in self-efficacy over time.

The findings indicate a moderate but statistically significant improvement in self-efficacy levels among Kerugoya respondents over the study period. Given that participants at this facility did not receive a structured educational intervention—unlike their counterparts in Embu—the observed improvement is likely attributable to ongoing routine care, patient-provider interactions, or natural progression in managing their

condition. Compared to the more substantial gains observed in Embu, where a targeted diabetes foot care education program was implemented, the results from Kerugoya underscore the additional value of structured interventions in enhancing patient confidence and engagement in self-care practices.

4.9 Comparison of Post-Intervention Results Among Respondents in Embu and Kerugoya

4.9.1 Post intervention Knowledge Level Comparison-Embu Vs Kerugoya

Table 44 and 45 presents a comparative analysis of participants' knowledge levels on Diabetic Foot Care (DFC) following the implementation of a structured DFC education intervention in Embu County. The objective of this analysis was to assess the effectiveness of the intervention by comparing post-intervention knowledge scores between participants from Embu (who received the DFC education) and those from Kerugoya (who did not receive the intervention), serving as the control group.

Table 44: Descriptive statistics- Post intervention Knowledge Level Comparison-Embu Vs Kerugoya

Group	N	Mean	Std. Deviation	Std. Error Mean
Kerugoya	103	3.0987	0.33158	0.03251
Embu	102	4.3061	0.09283	0.00924

Descriptive statistics revealed a notable difference in knowledge scores between the two groups. Participants in Embu County (intervention group), who received the DFC education intervention, recorded a higher mean knowledge score of 4.31 (standard deviation = 0.09, n = 102). In contrast, participants in Kerugoya (control group), who did not receive the intervention, recorded a lower mean score of 3.10 (standard deviation = 0.33, n = 103).

The low standard deviation observed in the Embu group suggests that participants in the intervention group had relatively uniform knowledge scores, indicating consistent learning outcomes from the intervention. Conversely, the higher standard deviation in the Kerugoya group implies greater variability in knowledge levels, reflecting less uniformity and potentially limited exposure to structured DFC education

Table 45: Inferential statistics-post intervention knowledge level comparison-Embu Vs Kerugoya

Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
66.611	0.000	-35.276	203	0.000	-1.20741	0.03423	-1.27490	-1.13992
		-35.722	119.495	0.000	-1.20741	0.03380	-1.27433	-1.14048

An independent samples t-test was conducted to determine whether the observed difference in knowledge scores between the two groups was statistically significant. Prior to the t-test, Levene's Test for Equality of Variances was applied and yielded a statistically significant result **(**$F = 66.611$, $p < 0.001$**),** indicating a violation of the assumption of equal variances. Consequently, the t-test results assuming unequal variances were used for interpretation.

The t-test results showed a statistically significant difference in knowledge scores between the Embu and Kerugoya groups ($t = -35.722$, degrees of freedom = 119.495, $p < 0.001$). The mean difference in scores was -1.21, with a 95% confidence interval ranging from -1.27433 to -1.14048. The confidence interval does not include zero, confirming that the difference is statistically significant.

4.9.2 Hypothesis Testing

The null hypothesis stated that there would be no significant difference in DFC knowledge levels between participants who received the education intervention (Embu group) and those who did not (Kerugoya group). Based on the results of the t-test, the null hypothesis is rejected. The statistically significant difference in post-intervention knowledge levels indicates that the DFC education intervention had a substantial and positive impact on improving participants' knowledge in the Embu group compared to the control group.

4.9.3 Post intervention Behavior Level Comparison-Embu Vs Kerugoya

This section presents the results of the analysis comparing Diabetic Foot Care (DFC) behavior among participants in Embu, where a DFC education intervention was implemented, and Kerugoya, which served as the control group. The objective was to assess whether the education intervention led to improved behavioral practices related to diabetic foot care. The findings are summarized in Tables 46and 47

Table 46: Descriptive statistics- Post intervention Knowledge Level Comparison-Embu Vs Kerugoya

Group	N	Mean	Std. Deviation	Std. Error Mean
Kerugoya	103	1.3711	0.30192	0.02975
Embu	102	2.3944	0.13840	0.01370

As shown in Table 46, the mean DFC behavior score for participants in the Embu (intervention) group was 2.39 (SD = 0.14, n = 102), while the Kerugoya (control) group had a substantially lower mean score of 1.37 (SD = 0.30, n = 103). This notable difference indicates a higher level of positive foot care practices among participants who received the DFC education intervention.

Furthermore, the standard deviation was much lower in the Embu group (0.14) compared to the Kerugoya group (0.30), suggesting greater consistency in reported foot care behaviors among the intervention participants. The smaller standard error in the Embu group (0.01370) compared to Kerugoya (0.02975) also reflects more precise estimates of the group mean.

Table 47: Inferential Statistics- Post intervention Knowledge Level Comparison-Embu Vs Kerugoya

Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
33.043	0.000	-31.141	203	0.000	-1.02325	0.03286	-1.08803	-0.95846
		-31.241	143.359	0.000	-1.02325	0.03275	-1.08799	-0.95850

To determine whether the observed difference in DFC behavior between the two groups was statistically significant, an independent samples t-test was performed. As shown in Table 47**,** Levene's Test for Equality of Variances was statistically significant **(**$F = 33.043$, $p < 0.001$**),** indicating a violation of the assumption of homogeneity of variances. Therefore, the results from the t-test assuming unequal variances were considered more appropriate for interpretation.

The t-test revealed a highly significant difference in post-intervention behavior scores between the Embu and Kerugoya groups **(**$t = -31.241$**,** $df = 143.359$**,** $p < 0.001$). The mean difference was **-**1.02325**,** with a 95% confidence interval ranging from -1.08799 to -0.95850**.** Because the confidence interval does not include zero, the difference in mean behavior scores is considered statistically significant.

The results clearly demonstrate that participants who were exposed to the DFC education intervention in Embu exhibited significantly improved foot care behaviors compared to those in the control group (Kerugoya). The statistically significant increase in the mean behavior score in Embu, coupled with a narrow confidence interval and a very low p-value, provides robust evidence that the intervention had a substantial positive impact on the behavioral practices of participants.

The higher and more consistent behavioral scores among the intervention group suggest that the education program was effective in promoting adherence to recommended DFC practices. In contrast, the lower mean score and higher variability in the control group point to the absence of structured foot care education, resulting in less favorable behavior.

4.9.4 Hypothesis Testing

The null hypothesis for this analysis stated that there would be no significant difference in DFC-related behavior between participants in Embu (intervention group) and Kerugoya (control group) in the post-intervention phase. Given the statistically significant findings ($p < 0.001$), the null hypothesis is rejected. It can therefore be concluded that the DFC education intervention significantly improved foot care behavior among the target population in Embu.

4.9.5 Post intervention Self-Efficacy Level Comparison-Embu Vs Kerugoya

This section presents the results of the analysis comparing participants' self-efficacy in diabetic foot care (DFC) practices in the post-intervention phase. The analysis compares two groups: participants from Embu, who received a structured DFC education intervention, and participants from Kerugoya, who did not receive the intervention and served as the control group. Self-efficacy is a critical determinant of sustained health behavior change, and understanding its variation between groups can inform the effectiveness of the intervention. The results are summarized in Table 48 and Table 49.

Table 48: Descriptive statistics -Post intervention Self-efficacy Level Comparison-Embu Vs Kerugoya

Group	N	Mean	Std. Deviation	Std. Error Mean
Kerugoya	103	2.6464	0.65507	0.06455
Embu	102	4.2753	0.16027	0.01587

As illustrated in Table 48, participants in the Embu (intervention) group demonstrated a substantially higher mean self-efficacy score of 4.28 (SD = 0.16, n = 102), compared to their counterparts in the Kerugoya (control) group, who reported a mean score of 2.65 (SD = 0.66, n = 103). This marked difference suggests that participants exposed to the DFC education program developed greater confidence in managing foot care practices.

Furthermore, the lower standard deviation and standard error in the Embu group (0.16 and 0.01587, respectively) indicate that the participants' self-efficacy levels were not only higher but also more consistent. In contrast, the wider spread in the Kerugoya group (SD = 0.66) reflects greater variability in participants' perceived confidence regarding foot care practices

Table 49: Inferential Statistics- Post intervention Self-efficacy Level Comparison- Embu Vs Kerugoya

Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
44.511	0.000	-24.400	203	0.000	-1.62889	0.06676	-1.76051	-1.49726
		-24.506	114.282	0.000	-1.62889	0.06647	-1.76056	-1.49722

To determine whether the observed difference in self-efficacy was statistically significant, an independent samples t-test was conducted. Prior to the t-test, Levene's Test for Equality of Variances was applied to assess the assumption of homogeneity of variances. The test yielded a statistically significant result ($F = 44.511$, $p < 0.001$), indicating a violation of the assumption. As such, the t-test assuming unequal variances was adopted for interpretation.

As shown in Table 49, the t-test revealed a highly significant difference in self-efficacy scores between the intervention and control groups ($t = -24.506$, $df = 114.282$, $p < 0.001$). The mean difference in self-efficacy scores was -1.63, with a 95% confidence interval ranging from -1.76056 to -1.49722. Since the confidence interval does not include zero, the result confirms that the difference in self-efficacy between the groups is statistically significant.

These findings demonstrate that the DFC education intervention implemented in Embu had a significant and positive impact on participants' self-efficacy regarding diabetic foot care. Participants who received the intervention expressed greater confidence in their ability to perform foot care behaviors, as evidenced by the notably higher and more consistent self-efficacy scores.

The magnitude of the difference, coupled with a very low p-value and a narrow confidence interval, reinforces the effectiveness of the intervention in strengthening psychological readiness and perceived control over self-care behaviors. In contrast, the control group's lower scores and higher variability suggest limited exposure to targeted education and reduced confidence in executing proper foot care routines.

4.9.6 Hypothesis Testing

The null hypothesis for this analysis stated that there would be no significant difference in DFC-related self-efficacy between participants who received the intervention (Embu group) and those who did not (Kerugoya group). Based on the statistical evidence, the null hypothesis is rejected. The results confirm that the DFC education intervention significantly enhanced participants' self-efficacy, further validating the intervention's effectiveness as a tool for empowering individuals with diabetes to take proactive roles in their foot care management.

CHAPTER FIVE
DISCUSSION OF RESULTS

5.1 Quantitative Finding Discussion

5.1.1 Levels of Diabetic Foot Care Knowledge Among Diabetic Mellitus Patient

The baseline survey indicated that a significant proportion of participants possessed inadequate knowledge regarding diabetic foot care. Specifically, 47.8%(n=55) of respondents in Embu and 48.7%(n=56) in Kerugoya demonstrated poor overall knowledge. These findings underscore a substantial gap in awareness and understanding of diabetic foot care across both settings, highlighting the critical need for targeted educational interventions to address this deficiency. The predominance of poor knowledge levels is consistent with other studies conducted in similar settings. Adeyem, et al., (2021) observed that limited knowledge about diabetic foot care was prevalent among patients attending outpatient diabetes clinics in Scarborough Health Centre, Tobago. Another study in a resource rich health care system like in Madinah, Saudi Arabia,only 35percent of patients demonstrated good foot‑care knowledge (Aljaouni, et al., 2024). This shows that even in resource-rich healthcare systems, gaps persist. Limited knowledge significantly increases the risk of foot complications, including ulcers and amputations, as patients may not recognize early warning signs or understand the importance of preventive actions.A more specific knowledge domains were also assessed and revealed related findings as discussed in the subsequent paragraph

This study found a significant disparity in glycemic control knowledge between respondents from Kerugoya and Embu. 65.2% of Kerugoya participants demonstrated good knowledge, compared to 31.3% in Embu. Additionally, only 7.8% of Kerugoya respondents had poor knowledge, versus 22.6% in Embu, suggesting better awareness and understanding of diabetes management in Kerugoya.

These findings may reflect differences in access to diabetes education, healthcare services, or demographic factors such as education and health literacy. Similar patterns have been observed elsewhere; for example, a study in Egypt found knowledge levels strongly associated with formal education and health service utilization (Ali, Hetta, & Wassif, 2025) (Mutua et al., 2021). Likewise, Lema & Gebeyaw, (2025) reported high diabetes knowledge in public hospitals in Debre Berhan, Ethiopia though this did not

always translate into effective glycemic control, highlighting the gap between knowledge and practice.

The study demonstrated a generally low level of knowledge regarding the identification of the at-risk foot among diabetic patients in both Embu and Kerugoya. Only 3.5% of respondents in Embu and 7.8% in Kerugoya exhibited good knowledge in this area, while more than half in both locations fell within the poor knowledge category. This reflects a significant gap in the recognition of early risk indicators such as peripheral neuropathy, foot deformities, and vascular insufficiency—factors that are critical in the prevention of diabetic foot complications.These findings align with existing literature across sub-Saharan Africa. For example, Letta et al. (2023) in Ethiopia and Atalay, Alemie, and Gelaw (2025), in a recent systematic review, reported similarly low awareness levels among diabetic patients, largely attributed to inadequate patient education on foot care. Despite the World Health Organization's (2023) guidelines emphasizing early detection and management of foot risk to prevent ulcers and amputations, uptake and implementation of these recommendations remain limited, particularly in low-resource settings.

Knowledge regarding daily foot inspection and examination was notably low among the study participants from both facilities. Only 3.5% of participants in Embu and 5.2% in Kerugoya demonstrated good knowledge in this domain. The majority—59.1% in Embu and 57.4% in Kerugoya—had poor knowledge. These findings suggest a limited understanding of basic foot self-assessment practices, including the identification of foot abnormalities, signs of infection, and hygiene-related concerns. These results are consistent with findings from other sub-Saharan African studies, which indicate that many diabetic patients do not routinely perform foot self-inspections due to limited awareness, lack of training, or insufficient emphasis by healthcare providers(Lorna, et al., 2023). This deficit poses significant risks, as early detection of complications through routine foot checks is a cornerstone of effective diabetic foot management (Schaper , et al., (2023)

Another domain assessed assessed patients' engagement with regular diabetic foot care education. The results indicated that very few respondents had good knowledge: 2.6% in Embu and 3.5% in Kerugoya. Although Embu had a higher proportion of respondents

with satisfactory knowledge (45.2%) compared to Kerugoya (32.2%), more than half of the participants in both facilities demonstrated poor knowledge.These findings suggest limited exposure to structured education programs on diabetic foot care. This aligns with previous studies indicating that educational interventions are either inadequately implemented or inconsistently reinforced in many low-resource settings (Wanja et al., 2019). Structured, sustained educational interventions have been shown to improve foot care knowledge and reduce the incidence of foot ulcers and amputations when properly delivered (Drovandi, Seng, & Golledge, 2024).

Knowledge regarding appropriate foot care practices was similarly deficient and consistent across the two study sites. Both Embu and Kerugoya recorded 13.0% of respondents with good knowledge, 37.4% with satisfactory knowledge, and 49.6% with poor knowledge. This domain included knowledge of wearing protective footwear, avoiding walking barefoot, and changing socks regularly.The uniformity in these findings suggests that the knowledge gap is not limited to individual facilities but may reflect broader systemic shortcomings, including lack of public awareness campaigns, cultural practices, or inadequate emphasis on preventive care within clinical settings. These findings are supported by similar studies conducted in East Africa, which noted poor adherence to basic foot care practices among diabetic patients (Ghasemi et al., 2021;Wanja et al.,2019)

Unlike the other domains, risk factor management demonstrated a notable disparity between the two study sites. Embu had a higher proportion of respondents with good (11.3%) and satisfactory (40.0%) knowledge compared to Kerugoya (3.5% and 32.2%, respectively), while Kerugoya had more respondents with poor knowledge (64.3% vs. 48.7%). This domain focused on awareness of preventable factors such as fungal infections, corns, blisters, and improper toenail care—all of which increase the risk of diabetic foot complications when not properly managed (Bus et al., 2020; IWGDF, 2023). The variation suggests possible differences in informal education or clinician emphasis at facility level. However, the overall low scores in both sites highlight a systemic gap in patient education regarding foot risk mitigation. As such, this study served as a baseline assessment to inform the design of a targeted foot care education intervention.

This study identified significant associations between levels of diabetic foot care knowledge and various sociodemographic and clinical characteristics, based on Chi-square analysis. Variables such as education level, employment status, residence, duration of diabetes, presence of comorbidities**,** and type of treatment were all significantly associated with respondents' foot care knowledge levels.

Participants with tertiary education demonstrated significantly higher knowledge of diabetic foot care compared to those with no formal education *(*χ^2 =13.457, $p < 0.004$). This trend aligns with findings from Pourkazemi et al. (2020), who reported that individuals with lower educational attainment exhibited significantly poorer awareness and practice of diabetic foot self-care. Limited health literacy among individuals without formal education likely contributes to difficulty in understanding self-care instructions, interpreting clinical advice, or recognizing early warning signs of foot complications.

Similarly, formal employment was positively associated with better knowledge levels *(*χ^2 =9.124, $p < 0.002$*),* suggesting that economic empowerment plays a role in facilitating access to healthcare, educational materials, and diabetes management resources. In contrast, unemployed or informally employed individuals may face barriers such as transportation costs, limited clinic attendance, or inability to afford protective footwear. These findings are consistent with Lamptey et al. (2023), who emphasized that low income remains a key determinant of poor self-care behavior in chronic disease management across low-resource settings.

Residence also showed a statistically significant relationship with knowledge levels. Respondents from urban areas were more likely to demonstrate adequate foot care knowledge compared to their rural counterparts *(*χ^2 =11.119, $p < 0.001$*).* This may be explained by disparities in healthcare infrastructure, access to regular diabetes education programs, and general health literacy. Wang et al. (2024) similarly observed that patients in rural settings had markedly lower awareness of preventive foot care, citing limited access to information and fewer clinical touchpoints as key contributing factors.

The duration of diabetes was another critical factor associated with foot care knowledge. Participants who had been living with diabetes for over 16 years were significantly more

knowledgeable than those with a shorter disease history ($\chi^2 = 22.187$, $p < 0.001$). Longer disease duration likely leads to more frequent interactions with healthcare providers, thereby increasing opportunities for exposure to structured education and foot health counseling. Khan et al. (2020) found a similar relationship, where individuals with over ten years of diabetes demonstrated better foot self-care practices compared to those newly diagnosed.

In addition, the presence of comorbid conditions such as hypertension was significantly associated with better foot care knowledge *(*$\chi^2 = 10.036$, $p < 0.02$). Patients with comorbidities are often under closer medical supervision, increasing their likelihood of receiving preventive guidance during follow-ups or chronic disease management clinics. This observation aligns with Sertsu et al. (2023), who found that patients without comorbidities were more likely to have poor foot care adherence and knowledge, highlighting the importance of sustained healthcare engagement.

Finally, the type of diabetes treatment also influenced knowledge levels. Respondents receiving combined therapy (both oral and insulin) were significantly more likely to possess good foot care knowledge than those on oral therapy alone ($\chi^2 = 6.004$, $p < 0.048$*).* This may reflect increased clinical complexity among these patients, necessitating more frequent consultations and greater exposure to structured diabetes education. Ayaz et al. (2022), in a recent systematic review, emphasized that intensive diabetes management is often accompanied by targeted education, which significantly improves both knowledge and self-care behavior.

These findings underscored the need for a targeted educational intervention, particularly for individuals with lower socioeconomic status, rural residence, and early-stage diabetes. Insights from the baseline assessment informed the design of a context-specific foot care education program, ensuring relevance to the population's needs. This evidence-based approach strengthened the intervention's effectiveness in improving self-care practices and reducing the risk of diabetic foot complications.

5.1.2 Levels of Diabetic Foot Care Behavior Among Diabetic Mellitus Patient

The baseline findings of this study revealed generally poor self-care behaviors related to diabetic foot care (DFC) across both Embu and Kerugoya Level 5 Hospitals, with

Embu participants demonstrating slightly better outcomes across all measured domains. These results provide important insight into patient behaviors at the outset of the intervention and underscore the urgent need for structured diabetic foot education. This low adherence to recommended foot care practices poses a significant risk for developing diabetic foot ulcers and related complications.These finding mirrors trends in similar populations. For instance, a 2022 multicenter study in Eastern Ethiopia reported that 44.3 % of individuals with diabetes had inadequate adherence to foot care recommendations—such as regular inspection, cleaning, drying, and proper footwear use—indicating widespread gaps in self-care practices (Sertsu, et al., 2023). Similar trends were observed in a study by Woo & Cui, (2023),where poor foot care behaviors were prevalent among diabetic patients in low-resource settings. Several studies have revelaed lack of structured foot care education contributed significantly to neglected foot care behavours(Ayaz, et al., 2022 ;Tekir et al.,2023).Persistent poor foot care practices can lead to delayed identification of foot problems, increased risk of infections, prolonged hospital stays, and higher likelihood of amputation. This places a heavy burden not only on the patients but also on the healthcare system.

In the domain of glycemic control, a key factor in preventing diabetic foot complications, only 8% of respondents from Embu and a mere 1% from Kerugoya exhibited good behavior. Poor glycemic control behaviors, such as non-adherence to medication, irregular blood sugar monitoring, and poor dietary habits, were reported by 53% in Embu and an even more concerning 73% in Kerugoya. This mirrors findings by Hirpha et al (2020) who documented similar deficiencies in self-care behaviors among diabetic populations in East Africa. Effective glycemic control is foundational to diabetic foot prevention, as persistent hyperglycemia contributes to neuropathy, poor circulation, and delayed wound healing—conditions that increase the likelihood of foot ulceration (Azzam et al., 2021;Tarekegn et al.,2025).

Foot inspection and examination behaviors were equally concerning. Only 3% of respondents in Embu and 2% in Kerugoya reported good practices, while more than three-quarters of respondents in both settings reported poor engagement in foot checks. This is consistent with findings by Ababio et al. (2022), who noted that most patients do not regularly inspect their feet, resulting in delayed identification of injuries or infections. Daily foot inspection is recommended as a low-cost, high-impact

intervention to detect early signs of ulcers, infections, or trauma (Lopes, et al., 2024). The extremely poor performance in this domain mirrors findings from research by (Jia, et al., 2022) which indicated that a lack of foot care knowledge and cultural beliefs contributed to neglect in foot monitoring practices. Moreover, a lack of structured diabetic foot care education in primary healthcare settings limits patients' capacity for self-examination (Mehana, et al.,2025).

The use of appropriate footwear presented another critical gap. While only 3% of Embu and 1% of Kerugoya respondents reported good footwear practices, poor behavior was reported by 76% and 92%, respectively. This is in line with studies such as Wanja et al. (2019), which found that most diabetic patients in Kenya lack knowledge about the importance of wearing protective footwear. The high prevalence of barefoot walking and use of open or ill-fitting shoes highlights the cultural and economic barriers that impede protective foot care practices (Luo, et al., 2022). Moreover, the low levels of good behavior in this domain may reflect inadequate counseling during clinical visits or the absence of patient education materials tailored to local contexts.

In the area of risk factor management—which includes practices such as avoiding hot water bottles, trimming nails safely, and applying moisturizing creams appropriately—18% of Embu respondents and 11% in Kerugoya demonstrated good behavior. However, poor practices were still widespread, with 65% in Embu and 85% in Kerugoya reporting behaviors that increased their risk for foot injury or infection. These findings suggest that many patients continue to rely on harmful traditional remedies or lack the necessary guidance to adopt safer alternatives. This is supported by Pourkazemi et al. (2020), who reported that patients with low health literacy are more likely to engage in unsafe foot care behaviors. Similar trends were observed by Sertsu et al. (2023), who found that lack of education and infrequent clinical interactions contribute to the persistence of high-risk behaviors.

The overall analysis of self-care behavior painted a concerning picture. In Embu, 8% of respondents demonstrated good overall foot care behavior, 25% moderate, and 67% poor. In Kerugoya, the situation was more severe, with only 3% exhibiting good behavior, 14% moderate, and 83% classified as poor. These results emphasize the significant behavioral gaps that exist in both urban and peri-urban settings. The

relatively better performance in Embu may be attributed to slightly higher education levels, better access to diabetes education, or more frequent interactions with healthcare providers. These disparities are consistent with studies by Wang et al. (2024) and Lamptey et al. (2023), who found that rural residence and low socioeconomic status are associated with lower diabetes knowledge and poorer self-care practices.

Collectively, these findings served as the foundation for the development of the diabetic foot care education intervention implemented in this study. Each behavioral domain that showed suboptimal performance was directly targeted through tailored education modules. For example, the low rates of foot inspection led to the integration of practical demonstrations, while poor footwear use informed context-specific guidance on affordable protective footwear options. Additionally, the significantly poorer outcomes in Kerugoya prompted the use of community-based strategies and enhanced follow-up to support behavior change.

The overall behavioral patterns reported in this study indicate a critical need for comprehensive, community-based diabetic foot care interventions. Education should not only raise awareness but also equip patients with practical skills, such as daily foot inspections, glycemic control strategies, and knowledge of proper footwear use. In addition, the healthcare system must be empowered to provide culturally relevant foot care resources, especially in rural and resource-poor settings.

The present study identified several significant associations between respondents' sociodemographic and clinical characteristics and their diabetic foot care (DFC) behavior levels. Among the sociodemographic variables, education level, source of income, and place of residence showed strong relationships with DFC behavior. Participants with secondary or tertiary education were more likely to engage in appropriate foot care practices compared to those with only primary or no formal education. This aligns with findings from Negash et al. (2022), who reported that individuals with higher educational attainment demonstrated better foot self-care behaviors. Similarly, studies by Alshammari et al. (2021) and Desalu et al. (2011) have emphasized the role of education in improving health literacy and facilitating adherence to self-care recommendations.

Employment status was also significantly associated with DFC behavior, with those engaged in formal or informal work reporting better practices than the unemployed. This finding is consistent with reports by Mollaoglu and Beydag (2020), who observed that income stability contributes to access to health resources and consistent self-care routines. In addition, respondents residing in urban areas were more likely to exhibit favorable foot care behaviors compared to those in rural areas. This pattern mirrors observations in studies by Tesfaye et al. (2019) and Kassahun et al. (2020), which highlighted the urban–rural divide in access to healthcare services, health education, and preventive care.

In terms of clinical characteristics, duration of diabetes, type of treatment, and the presence of comorbidities were all significantly associated with DFC behavior. Individuals with a duration of illness between 6 to 15 years displayed better self-care, suggesting that time may contribute to greater experience and familiarity with disease management. Similar trends have been noted in the literature, including a study by Kaliyaperumal et al. (2021), which reported improved self-care behaviors in patients with longer exposure to diabetes education over time. However, a decline in behavior among those with a longer duration of illness (>16 years) may reflect fatigue or complications that impair the ability to maintain effective routines.

Moreover, participants on combination therapy (oral and injectable medication) demonstrated better DFC practices, possibly due to more intensive clinical management and increased awareness of disease severity. This is supported by findings from Ahmad Sharoni et al. (2020), which emphasized the positive influence of frequent healthcare provider contact on self-care adherence. The presence of comorbidities was also linked to more appropriate foot care behaviors, likely due to increased interaction with health services and heightened awareness of health risks—a trend corroborated by research from Abate et al. (2020) and Yazew et al. (2021).

Overall, these findings underscore the need for targeted interventions that address gaps in diabetic foot care behavior based on both sociodemographic and clinical profiles. Tailoring education efforts toward those with lower educational levels, unstable income, or rural residence, as well as providing continued support for patients at various

stages of treatment and disease progression, may enhance foot care outcomes and reduce the burden of diabetic foot complications.

5.1.3 Levels of Diabetic Foot Care Self- efficacy Among Diabetic Mellitus Patient

This study explored self-efficacy in diabetic foot care (DFC) across three core domains—task difficulty, belief in one's ability, and ability to work under pressure—comparing respondents from Embu Level 5 Hospital and Kerugoya Level 5 Hospital. The results revealed significant disparities in self-efficacy levels between the two settings, highlighting important implications for diabetes education and behavioral support interventions.

In the task difficulty domain, a higher proportion of Embu respondents (18%) demonstrated high self-efficacy compared to only 13% in Kerugoya, suggesting that patients in Embu may perceive DFC tasks as more manageable. Conversely, more than half of the Kerugoya respondents (53%) reported low self-efficacy in this domain, indicating greater perceived barriers in executing foot care routines. These findings are consistent with prior studies such as Kaplan et al., (2024), which reported that patients with lower health literacy and less exposure to structured diabetes education were more likely to perceive routine self-care tasks as burdensome. The disparity may reflect differences in patient education programs or levels of clinical support available at the two facilities.

In terms of belief in one's ability, which reflects confidence in performing DFC-related behaviors, Embu again showed relatively better outcomes, with 9% of respondents reporting high self-efficacy compared to only 5% in Kerugoya. However, nearly half of respondents in both hospitals still reported low self-efficacy (Embu: 49%, Kerugoya: 67%), suggesting a broader gap in confidence that could negatively impact consistent engagement in foot care practices. This aligns with the findings of Sezgunsay et al.,(2025) who identified self-efficacy as a strong predictor of adherence to diabetes self-care behaviors, including foot inspection, hygiene, and injury prevention. A lack of confidence may stem from insufficient patient education, limited reinforcement from healthcare providers, or prior negative experiences with foot complications.

The most notable difference between the two sites was found in the domain of working under pressure. A significant 87% of Kerugoya respondents reported low self-efficacy in this area, compared to 50% in Embu. Only 2% of Kerugoya participants expressed high self-efficacy under pressure, versus 16% in Embu. These findings suggest that respondents in Kerugoya may be particularly vulnerable to lapses in DFC behavior when faced with stress, time constraints, or competing priorities. Similar challenges have been reported in other low-resource settings. For instance, a study by Gebremedhin et al. (2021) in Ethiopia found that emotional distress and social pressures reduced patients' ability to perform routine diabetes self-care, particularly among those with limited support networks or coping mechanisms. This underscores the need for psychosocial support and stress management components in diabetes care programs.

The composite self-efficacy scores reflect these patterns. In Embu, 14% of respondents reported high self-efficacy, 40% moderate, and 46% low. In contrast, only 7% of respondents in Kerugoya exhibited high self-efficacy, and a majority (69%) reported low levels. This pronounced disparity suggests systemic or contextual differences between the two healthcare settings, possibly in terms of patient education delivery, healthcare provider engagement, or continuity of care. Studies by Walker et al. (2020) and Ozieh et al. (2021) highlight the role of provider–patient communication and continuity of care in fostering self-efficacy, particularly in the management of chronic conditions like diabetes.

These findings emphasize the critical importance of context-specific interventions to strengthen DFC-related self-efficacy, particularly in Kerugoya. Structured, facility-based diabetes education programs—tailored to address perceived task difficulty, build confidence, and equip patients with coping strategies under pressure—may help bridge the self-efficacy gap. Moreover, the incorporation of peer support models, culturally relevant teaching materials, and individualized counseling may enhance patient empowerment and resilience in both settings.

5.2 Qualitative Finding Discussion

5.2.1 Factors Influencing Diabetes Foot Care Practices Among Diabetes Mellitus Patients

A number of themes emerged from the study, highlighting how they interact to influence the risk of diabetic foot complications. The themes—inadequate knowledge, poor foot care behavior, low self-efficacy and health related barriers and facilitators were consistently reported across participants and supported by qualitative narratives

Theme 1: Inadequate Knowledge of Diabetes Foot Care

Participants exhibited limited awareness of what causes diabetic foot complications and the associated risk factors, that is, they lacked specific knowledge linking diabetes to foot-related issues such as poor blood circulation, nerve damage (neuropathy), or infection risk.They also lacked knowledge of preventive strategies like daily foot inspection, proper footwear use, and timely reporting of foot injuries. Limited exposure to structured foot care education also came out as a key contributor to this inadequate knowledge.

Several participants expressed this inadequate knowledge on the link between diabetes and foot related issues. For example, one participant reported *“I don’t know what causes diabetic wounds. Maybe it's from the shoes or when the skin gets dry.”-P3 G2(male, 25years)*

Other participant on limited knowledge on preventive strategies quoted: *"I have never checked my feet unless I feel pain. I didn’t know you should look at them every day."-P5 G 1(male 71years)*

Another one added on appropriate use of footwear

“Shoes are expensive. I only wear them when going out. At home, I walk barefoot.”-P11 G2 (Female,70years)

On their perception on main contributor to this limited knowledge, one participant reported:

"During my clinic visits doctor and nurses mostly emphasis on medication and food intake, rarely do they talks about how to take care of my feet"-P38 G 4(Female 66 years)

These responses reflect a lack of basic understanding of preventive foot care with inadequate structured diabetes foot care education as the main contributor

These findings are consistent with previous research in low- and middle-income countries (LMICs). In a phenomenological study conducted in Ghana, Bossman et al. (2021) discovered that while most participants described diabetes as a disorder linked to elevated blood sugar, their understanding of the risk factors and related complications was lacking.Similarly Omotosho, et al.,(2024) found that more than half of the participants(n = 114; 52.5%) had poor level of foot self-care knowledge. This knowledge deficiency poses a serious barrier to early intervention and prevention of diabetic foot complications. Without awareness of the underlying causes and necessary preventive behaviors, patients are unlikely to seek care until ulcers have developed, increasing the risk of infection and amputation. The findings support the principles of Bandura's Social Cognitive Theory, which identifies knowledge as a key element influencing behavior and self-efficacy (Bandura 1997). When individuals lack understanding, they are less likely to feel confident in taking preventive action, and more likely to delay seeking medical help.

Theme 2: Poor Diabeted Foot Care behavior

Majority of the participants revealed that, they engaged in suboptimal foot care practices, increasing their vulnerability to diabetic foot complications. Specifically, three major behavioral patterns emerged:irregular foot inspection and cleaning, walking barefoot or wearing inappropriate footwear, and poor self-management of foot-related issues. These behaviors were largely influenced by physical limitation, cultural norms and beliefs and lack of knowledge.

Most participants reported irregular foot inspection or cleaning practices, especially when not experiencing symptoms: *"If I feel fine, I don't see the need to wash or check my feet every day."- P7G1 (male 47years)……"I wash during bathing, but I don't give special attention to my feet."- P16 G2 (female, 60years).*The lack of regular foot

inspection poses a major barrier to the timely identification of skin changes, deformities, or minor trauma, which are often precursors to ulcers and infections.

Several other participants admitted walking barefoot indoors or wearing unsuitable shoes (e.g., open): *"I don't feel comfortable wearing shoes in the house, and I'm used to walking around the compound barefoot." P33 G4 (male, 72years)…. "I wear plastic shoes because they are cheap, even though they hurt sometimes."(sandals, tight shoes)- P 18 G2 (female, 56years).* This behavior exposes individuals to trauma and infection, heightening the risk of ulceration. This finding is consistent with prior studies,such as Ang, et al., (2024) in Singapore who found that suboptimal behaviour, such as walking barefoot indoors, neglecting to dry between toes, and frequently choosing slippers

Other several participants reported use home remedies like herbal ointments, hot water soaks, or self-medicating with over-the-counter creams without proper diagnosis: *"When I see a wound, I clean it with salt water or herbs from home. I don't always go to the hospital unless it gets worse."-P 11 G 2(Male, 49years).* Ogunlana, et al., (2021) established similar findings in Nigeria, where many participants reported to have consulted non-biomedical methods and self-managed themselves prior to presenting at a health facility

Some participants associated these pattern with physical limitation, cultural norms and beliefs, and lack of knowledge: *"I can't bend like I used to. It's hard to see under my feet." P34 G3 (Female,74 years);…."In our communities, walking barefoot indoors is normal and even seen as a sign of cleanliness or respect,…. like at our home, everyone removes shoes at the door. It's our way"-P8G1 (Female, 55years;…. "I thought the numbness was just because of old age or cold weather — I didn't know it could be a sign of something serious."P 35 G3(female,69years).*

These findings are consistent with, and further supported by, recent studies in similar low-resource settings. According to a study by Atalay et al. (2025) on the prevalence of diabetic foot self-care practices among patients in Africa, a pooled prevalence of 46.93% (95% CI 39.44–54.41) indicated that over half of diabetic patients had poor diabetes foot self-care practices. Moreover, the meta-analysis's combined findings showed a strong correlation between participants' knowledge and foot self-care

behaviors (Atalay, et al,. 2025). Similarly, Ogunlana, et al., (2021) found that, irregular or absent foot checks were associated with low awareness and limited diabetes education.

In summary, the qualitative data highlight several dimensions of poor foot care behavior that pose significant risks to diabetic patients. These include poor adherence to routine foot care, unsafe footwear practices, improper self-management to foot related issues strongly with physical limitation, cultural norms and beliefs and lack of knowledge. These findings stress the urgent need for culturally tailored, behaviorally focused diabetes foot care education and support programs.

Theme 3: Low Diabetes Foot Care (DFC) self-efficacy

The qualitative findings of this study indicate that many participants exhibited low self-efficacy in relation to diabetes foot care (DFC), adversely impacting their ability to engage in consistent and effective preventive practices. Participants' narratives were interpreted based on the three key domains (Magnitude, Strength and Generality) of self -efficacy according to Bandura's social cognitive theory (Bandura, 1997).The results reflected deficits across all three dimensions, highlighting the complex barriers that undermine proactive diabetes foot care behavior.

The magnitude of self-efficacy refers to the perceived difficulty of a task and whether an individual believes they can perform it successfully (Bandura, 1977). In this study, participants demonstrated confidence only in basic or low-effort tasks but lacked the self-belief to engage in physically demanding, technically difficult, or skill-intensive foot care activities.

One participant reported: *"My eyesight is not good. Even if I try to look, I can't see clearly. That's why I don't inspect my feet much."- P15 G2 (male,62years).* This response reflected a low magnitude of self-efficacy, where participants lack belief in their ability to perform tasks that require effort, flexibility, or visual assessment.This aligns with findings from Hirpha,et al., 2020) who observed that people with diabetes in low-resource settings frequently felt incapable of performing essential foot care tasks due to poor knowledge and skill gaps.

The strength of self-efficacy refers to how firmly a person believes they can consistently perform a behavior under varying circumstances (Bandura, 1997). Many participants demonstrated hesitancy, self-doubt, and avoidance behaviors, indicating weak self-efficacy strength in performing key foot care tasks. For example, one participants reported. *"I don't feel confident cutting my toenails. I might cut too deep or cause bleeding, so I leave it until someone can help me." - P38 G4 (female, 63years).* This reflects the findings of Küççük & Tosun, (2022) who found that individuals with weak confidence in their foot care abilities were less likely to maintain consistency in preventive practices and more likely to abandon the behavior without reinforcement or visible benefits.

According to Bandura's dimension of generality, self-efficacy can vary across different behaviors or situations. Majority of the participants often demonstrated confidence in routine or familiar tasks, such as washing their feet, but showed uncertainty or avoidance toward tasks perceived as more technical, risky, or unfamiliar, such as inspecting feet for signs of infection, choosing protective footwear, or trimming nails correctly. For instance, one participant reported: *"I wash my feet every day after work, but I don't really know how to look for signs of infection or anything like that." –P 11 G 2 (male,59years).* The fragmented nature of their self-belief indicated that even when participants managed certain aspects of foot care, they were unlikely to extend these behaviors across varied situations. This pattern is consistent with research by Huda, et al., (2021), which found that many patients with diabetes lack generalizable self-efficacy across multiple foot care domains.

Low self-efficacy in all three dimensions resulted in irregular or reactive foot care behaviors. These findings suggest the need for tailored interventions that teach foot care skills and enhance self-belief gradually by building confidence (strength) through demonstration and supervised practice, encouraging broad skills (generality) to apply preventive care across different tasks, and supporting performance of difficult tasks (magnitude) with assistive tools or caregiver involvement. Strengthening self-efficacy in all three dimensions is essential for empowering individuals to take ownership of foot care, especially in low-resource and high-risk settings.This is observation is consistent with Sadeghi, et al.,(2025) who found that improved self efficacy promoted self-management behaviors in chronic conditions like diabetes mellitus.

Theme 4: healthcare system related barriers to foot care practices

The study revealed that multiple healthcare-related barriers hindered effective diabetes foot care (DFC) practices among participants. These included limited exposure to structured foot care education, shortage of healthcare staff, and the unaffordability of essential health services. These systemic challenges limited patients' ability to engage in preventive foot care, seek timely intervention, and adopt consistent self-care behaviors.

Several participants reported that their health care visits focused on blood sugar control, and preventive foot care was rarely discussed.While others added clinic visits were rushed, and education was minimal due to overcrowding. For example, one male participant cited, *"There are too many patients. The nurse just checks blood sugar level and gives you medicine then tells you to come back after a month."……."They don't have time to explain things, especially about feet." P20 G2 (male 48years).* This indicates a systemic failure to deliver consistent and structured foot care education within clinical encounters. A recent study by Hon, et al., (2024) reported that many patients, especially in low-resource settings, lack access to adequate foot care information, with health professionals often prioritizing glycemic control over comprehensive education.Similarly a study by Swaminathan, et al., (2024) in sub-Saharan Africa emphasized that health systems often do not institutionalize foot care education into routine diabetes care. This systemic oversight leaves patients underprepared to manage foot-related risks, despite high prevalence of foot complications in such settings.

Another recurring theme was persistent shortage of healthcare staff in diabetes clinics, which significantly undermines the delivery of comprehensive foot care services. Participants frequently expressed concern over long waiting hours, rushed consultations, and limited interaction with health providers. One participant stated: *"You can see how many patients come in a day. The nurses and doctors are few, so they don't have time to check everyone properly, especially things like feet."-P19 G2 (female 64years).* This sentiment reflects how human resource constraints compromise individualized care and limit the ability of providers to offer preventive foot care assessments or education.These findings are consistent with current research highlighting healthcare workforce shortages as a systemic barrier to effective diabetes

care. According to McPherson, et al.,(2022), persistent staff shortages in public health facilities result in overburdened providers, who are forced to prioritize acute issues over preventive interventions such as foot care. Similarly, Ranuve & Mohammadnezhad, (2022) reported that limited numbers of trained nurses and podiatric specialists in diabetes clinics constrain the routine delivery of foot care services, particularly in resource-limited settings.

The unaffordability of essential diabetes-related services—such as costs associated with consultations, medications, recommended ointments or footwears and transport to health facilities were often beyond their means, especially for those in rural areas and those using national insurance scheme -Social Health Authority(SHA) as it does not have outpatient package for chronic diseases like diabetes mellitus. One participant shared: *"We used to get our drugs and foot check-ups through NHIF when we came for clinic. But now with SHA, we are told it doesn't cover outpatient diabetes care"-P32 G 4(male, 66years).* Another participant added: *"I live far from the health center. I can't go often, so I only go when it's very serious."-P1 G1 (female 73years).* Such narratives reflect how financial hardship creates a structural barrier to timely and adequate foot care. Recent research supports this concern. In a study by McPherson, et al,, (2022) patients cited high out-of-pocket costs as a key deterrent to seeking preventive care and managing foot complications early. Similarly, Kishindo, et al., (2023) found that many patients in Kenyan public hospitals delay treatment or resort to traditional remedies due to the high costs associated with diabetic foot care, contributing to avoidable complications like infections and amputations.

Theme 5: healthcare system related facilitators to foot care practices

Despite the presence of numerous systemic challenges, several healthcare-related facilitators were identified in this study that positively influenced diabetes foot care (DFC) behaviors. These include the presence of peer support groups, daily accessibility of clinic services, and the friendliness of healthcare staff. These factors created an enabling care environment, improved patient motivation, and enhanced continuity in preventive foot care behaviors.

Peer support groups were identified as a powerful source of motivation, practical knowledge, and emotional encouragement. Participants who were part of support

groups consistently described how learning from others with shared experiences increased their awareness of foot care risks and motivated them to adopt better self-care practices. One participant recalled how a peer's testimony about how he almost lost his toe due to a neglected foot wound influenced her behavior:

"I didn't know about checking my feet every day until someone in the support group talked about how he almost lost his toe. Now, we always remind each other to check our feet and wear shoes."-P17 G 2(female,62years).

These findings underscore the impact of social learning—a key construct in Bandura's social cognitive theory—where individuals learn through observation and interaction. Peer groups provided a platform for sharing lived experiences, problem-solving, and offering reminders for daily care. Recent research by Kavinguha, et al, (2025) confirms that peer-led education enhances adherence to DFC practices and increases self-efficacy, particularly where health systems lack adequate personnel or structured education programs.

Another important facilitator that emerged from participants' experiences was the accessibility of daily clinic services, which enabled continuity of care even when scheduled appointments were missed. Participants valued the flexibility of being able to visit the clinic on alternative days without being turned away or penalized. This accessibility played a crucial role in preventing delays in foot care, especially in managing minor injuries or foot symptoms before they progressed to severe complications One participant explained: *"Sometimes I miss my clinic date because I have to take care of my grandchildren or there is no fare. But because the clinic is open every day, I just go when I get time. They still attend to me without any problem."-P5 G 1 (female, 72years).* Such narratives reflect how daily clinic availability serves as a protective buffer against treatment interruptions caused by common life challenges, such as lack of transportation, caregiving duties, or illness. This finding is consistent with research by Chen, et al., (2024) who reported that the ability to access services at any time during the week fosters a more patient-centered which improve treatment adherence and health-seeking behavior among patients with chronic conditions.

The approachability and kindness of healthcare staff also significantly influenced participants' engagement with foot care practices. Despite challenges such as overcrowded clinics and staff shortages, many participants expressed appreciation for the respectful and nonjudgmental manner in which they were treated. This created a trusting environment where patients felt comfortable discussing sensitive issues, including foot wounds and hygiene practices. As one participant remarked: *"Sometimes the clinic is so full, and the nurses are moving up and down, but still they take time to talk to you well. They don't ignore you. They ask about your feet and explain things kindly."-P35 G 4 (female 45years)* These findings reflect the importance of patient-centered communication in promoting self-care behavior. Asmat, et al. (2022) affirm that healthcare providers' empathy and respectful interaction are linked with better adherence to diabetes care, including foot protection and wound monitoring.

5.3 Conclusion of Baseline Study

The baseline findings from Embu and Kerugoya Level 5 Hospitals reveal substantial gaps in diabetic foot care (DFC) knowledge, behavior, and self-efficacy among patients with diabetes, with consistently poorer outcomes observed in Kerugoya. Nearly half of all participants demonstrated poor DFC knowledge, particularly in recognizing risks and implementing preventive practices—gaps that were strongly influenced by educational attainment, employment status, and disease duration.

Correspondingly, DFC behaviors were suboptimal across both sites, with low adherence to critical practices such as glycemic control, daily foot inspection, and protective footwear use. These behaviors were significantly shaped by sociodemographic and clinical factors, underscoring the need for tailored interventions responsive to patient context.

Self-efficacy in DFC was also notably low, especially in managing foot care under stress or in challenging conditions. Respondents reported limited confidence in performing essential foot care tasks consistently—reflecting a combination of knowledge gaps, limited health support, and psychosocial barriers.

Qualitative insights further reinforced these findings, identifying four key themes: inadequate knowledge, poor behavioral patterns, low self-efficacy, and systemic health

care barriers such as lack of structured education, resource constraints, and unaffordable services. However, facilitators such as peer support groups and approachable healthcare providers indicate that opportunities for intervention do exist within the current system.

Together, these findings strongly support the implementation of a structured, context-sensitive DFC education intervention aimed at enhancing knowledge, promoting preventive behavior, and building self-efficacy. Such interventions should be integrated into routine diabetes care, adapted to local realities, and supported by both facility and community-level resources to effectively reduce the burden of diabetic foot complications in low-resource settings.

5.4 Recommendation on Baseline Study

To improve diabetic foot care outcomes in Kenya, policymakers should prioritize integrating foot care into national diabetes and non-communicable disease strategies, while expanding health insurance coverage to include outpatient diabetes and foot care services. Investment in community-based education and peer support programs, along with increased training and deployment of specialized healthcare workers, is essential.

At the facility level, there is a need to provide structured diabetic foot care education during routine visits, support peer support groups, and train healthcare staff in foot care counseling and risk assessment. Ensuring the availability of essential foot care supplies and services will also enhance patient outcomes.

Future research should focus on evaluating the effectiveness of foot care education interventions, understanding barriers to self-efficacy and behavior change, and assessing the cost-effectiveness of integrating foot care into primary healthcare. Developing and testing locally relevant educational tools will further support these efforts.

5.5 Discussion of Evaluation Phase Results

The findings of this study revealed that diabetes foot care (DFC) education had a statistically significant positive impact on patients' knowledge, foot care behavior, and self-efficacy. These results underscore the importance of structured education in improving self-management outcomes among individuals with diabetes.

5.5.1 The Effect of DFC Education Intervention on Knowledge Among the Study Participants

The findings of this study demonstrate a significant improvement in diabetes foot care (DFC) knowledge among participants who received the educational intervention compared to those in the control group. At baseline, both groups exhibited limited understanding on glycemic control measures, identification of the at risk foot, Inspection and examination of the feet, importance of regular foot education, appropriate foot care and how to manage common pre-ulcerative symptoms. However, post-intervention data reveal a statistically and clinically meaningful enhancement in knowledge scores among the intervention group.

In the intervention group, the mean knowledge score increased markedly from M=2.63, SD 0,19 at baseline to 4.30, SD 0.09 post intervention, suggesting a higher and more consistent level of knowledge after the intervention. In contrast, the control group demonstrated a slight significant increase (e.g M=2.67, SD=0.31 to M=3.09, SD=0.32). Comparing the post intervention means of the two hospitals, that is, Kerugoya (n = 104) with a mean knowledge score of 3.10 (SD = 0.33), and Embu group (n = 101) with a notably higher mean score of 4.31 (SD = 0.09). This results suggest Embu exhibited higher average knowledge scores after the intervention compared to those from Kerugoya. Additionally, the lower standard deviation in Embu's scores indicates greater consistency in knowledge acquisition among participants at that site. The mean difference in knowledge gain between groups was statistically significant ($\Delta = 2.21$, 95% CI: 1.27–1.14, $p < 0.001$), confirming the effectiveness of the structured DFC education intervention.

This substantial improvement suggests that structured and contextually relevant educational sessions were effective in enhancing participants' understanding of glycemic control measures (e.g collaboration of drug adherence, exercise and diet), importance of the at risk foot identification such as through routine foot screening, inspection and examination of the feet to identify early warning signs, importance of regular foot education, use of appropriate foot wear and how to manage common pre-ulcerative symptoms. Interactive methods, including visual aids, group discussions, and practical demonstrations, likely played a key role in fostering knowledge acquisition and retention.

Consistent with this study's results, several recent studies support the positive impact of foot care education on knowledge: Ayaz, et al, (2022) in a systematic review and meta-analysis aimed to synthesize randomized controlled trials on the impact of foot care education on knowledge showed that diabetic foot education improved the level of knowledge (standardized mean difference (SMD): 1.656, 95% [CI]: 1.014-2.299, $P < .001$), emphasizing the value of structured, repeated education sessions. Similarly, Banu, et al., (2022) found that knowledge scores increased significantly following a mobile-based DFC educational program, confirming that digital and in-person interventions are effective in low-literacy settings. Additionally, Manickum, et al., (2022) in South Africa reported that patients attending structured foot care workshops demonstrated improved knowledge scores at follow-up compared to those receiving routine care.

The improvement in knowledge among the intervention group addresses long-standing gaps in diabetes-related health literacy. Many participants were previously unaware of the glycemic control measures, importance of early symptoms identification among others. The education sessions served not only to inform but also to correct misconceptions, such as the belief that foot problem like numbness was because of old age or cold weather. Enhanced knowledge is a critical precursor to behavior change and improved health outcomes. The results support integrating structured foot care education into routine diabetes management, especially in resource-limited settings. Health care providers should prioritize individualized and culturally appropriate education to reinforce preventive foot care practices.

The study findings confirm that the DFC education intervention significantly improved participants' knowledge regarding diabetic foot care. The use of patient-centered educational approaches contributed to a substantial and statistically significant increase in knowledge, laying the foundation for better self-care practices and complication prevention.

5.5.2 The effect of DFC Education Intervention on Behavior Among the Study Participants

This study revealed a significant improvement in foot care behavior among participants who received the DFC education intervention. At baseline, both the intervention and control groups demonstrated suboptimal behavior in critical areas such as Glycemic control practices, routine foot inspections and examination, appropriate foot wear use and response to foot problems. However, after the intervention, the intervention group showed a statistically and clinically significant enhancement in foot care behavior compared to the control group. The mean behavior score for the intervention group improved from M=1.20, SD = 0.34 at baseline to M=2.39, SD = 0.14 post-intervention. In contract the control group exhibited minimal change from M=0.91, SD = 0.29 to M=1.37, SD = 0.30. The mean difference in behavior scores between groups was statistically significant (Δ = 1.02; 95% CI: 1.09 to 0.96; $p < .001$), indicating a strong intervention effect.

The significant behavioral improvement in the intervention group is attributable to the structured, culturally relevant foot care education delivered using visual aids, demonstrations, group discussions, and practical sessions. Participants learned essential foot care practices such as: daily foot inspection and hygiene, proper toenail trimming techniques, avoiding walking barefoot, and use of appropriate, protective footwear. The intervention empowered participants with both knowledge and confidence to implement these practices, thereby fostering positive health-seeking behavior. These results align with other recent studies: Xu, et al., (2024) demonstarted that a 2-week DFC education program significantly improved foot care behavior among Type 2 diabetic patients, with a behavior adherence increase from 36% to 76% post-intervention. Similarly, Ayaz, et al, (2022) in a systematic review and meta-analysis showed diabetes foot care education improved the level of behavior (standardized mean difference (SMD): 1.045, 95% CI: 0.849-1.242, $P < .001$) emphasizing the value of structured, repeated education sessions. Additionally, Ranjbar,et al., 2024) reported that participants who received interactive foot care education based on behavior reason theory showed improved mean score of self-management behavior specially in the control of FBS and HbA1C levels compared to the control group.

Three months' post-intervention follow-up in this study indicated that the majority of participants in the intervention group maintained their behavioral improvements. This highlights the sustainability of educational interventions, particularly when reinforced through peer support and accessible health services. Behavioral improvements were especially notable among participants who attended all sessions and actively participated in demonstrations. This supports the role of engagement and repetition in sustaining health behavior change. Before the intervention, several behavioral barriers were noted: limited awareness of foot care routines, low risk perception, traditional beliefs, and lack of confidence in performing foot inspections. The DFC education program helped to address these barriers by: Enhancing knowledge and understanding of diabetic foot complications, demonstrating practical foot care techniques, increasing participants' self-efficacy in foot care, encouraging peer learning and shared experiences.

The DFC education intervention significantly improved foot care behavior among participants. The positive effect observed post-intervention confirms that structured, interactive, and culturally tailored education is a powerful tool to modify health behaviors and reduce the risk of foot complications among individuals living with diabetes. The behavioral change observed was both statistically significant and clinically meaningful, supporting its integration into routine diabetes care.

5.5.3 The Effect of DFC Education Intervention on Self-efficacy Among the Study Participants

The study showed a statistically significant improvement in self-efficacy among participants who received the Diabetes Foot Care (DFC) education intervention. Self-efficacy—defined as an individual's belief in their ability to perform specific behaviors successfully—is critical in promoting sustained diabetes foot care practices. Prior to the intervention, most participants exhibited low self-efficacy, reflected in their lacked of confidence in more complex or sensitive tasks (magnitude), reduced degree of certainty with which they believed they could carry out foot care tasks correctly and consistently (strength) and low level of transferability across different but related situations (generality). These components are essential for the individuals in adopting and sustaining foot care practices.

At baseline, the intervention group had a mean self-efficacy score of M=2.48, SD = 0.60 which significantly increased to M=4.28, SD = 0.16. In contrast, the control group showed negligible change with increasing slightly from M=2.19, SD = 0.51 to 2.65 SD = 0.66. The mean difference in self-efficacy gain between groups was statistically significant (Δ=1.63; 95% CI: 1.76 -1.50). These findings confirm that participants at Embu Level Five Hospital exhibited significantly higher levels of self-efficacy after the intervention compared to those at Kerugoya. This significant improvement in self-efficacy among the intervention group can be attributed to the use of empowerment-focused education methods, which included: Skill-building through practical demonstrations (e.g., foot washing, nail trimming), role-playing scenarios on recognizing and responding to foot injuries, group discussions to share experiences and foster peer support and positive reinforcement by educators and health providers. These methods helped participants overcome psychological barriers such as fear, helplessness, and lack of confidence, which are commonly reported in patients with chronic conditions.

Consistent with these findings, current evidence shows that educational interventions significantly improve self-efficacy in diabetes foot care. Hijazi, et al., (2025) demonstrated that interactive educational approaches—featuring group discussions, real-time problem-solving, immediate feedback, and family support— empowered diabetic women to take a more active role in managing their foot health. Tekir, et al., (2023) in hospitals located in the city of Balıkesir in Turkey demonstrated significantly higher self efficacy scores in experimental group($P < 0.05$) following three months educational intervention. Juarez, et al., (2022) reported that improved self-efficacy was a mediating factor between foot care education and behavior change, emphasizing that knowledge alone is not sufficient without confidence in execution.

Before the intervention, participants expressed fear of injuring themselves during foot inspection or nail care, and felt inadequate in identifying early signs of complications—indicative of low self-efficacy. The education sessions addressed these concerns by simplifying routines, promoting mastery through supervised practice, offering encouragement, and using peer demonstrations. These strategies align with Bandura's four sources of self-efficacy and help build confidence and persistence in health behaviors (Bandura, 1977).

The DFC education intervention led to a sustained increase in self-efficacy. Practical skills, supportive environments, and motivational strategies empowered participants to manage foot care effectively. Strengthening self-efficacy is essential for improving outcomes and reducing diabetic foot complications

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1Summary of the Study

This study investigated the effect of Diabetes Foot Care (DFC) education intervention on preventive foot care practices, specifically focusing on knowledge, behavior, and self-efficacy among individuals with diabetes. The intervention was carried out using a structured, participatory, and culturally tailored educational model, designed to empower patients with essential knowledge and practical skills. At baseline, the majority of participants exhibited inadequate knowledge, poor foot care behavior, and low self-efficacy, which are all known risk factors for diabetic foot complications such as ulcers, infections, and amputations. A controlled intervention approach was employed, whereby one group received the structured DFC education intervention and the control group received routine diabetes care.

Post-intervention findings revealed a statistically significant improvement in all three outcome measures—knowledge, behavior, and self-efficacy—in the intervention group compared to the control group. The study demonstrated that structured DFC education is not only effective in increasing awareness but also in promoting behavior change and enhancing individuals' confidence to maintain preventive foot care practices independently. These findings support a growing body of evidence that emphasizes the critical role of patient education in preventing diabetes-related foot complications and reducing associated morbidity and health care costs.

6.2 Conclusion of the study

Based on the study findings, the following conclusions can be drawn:

Improvement in Knowledge: The DFC education intervention significantly increased participants' knowledge about glycemic control measures, importance of routine foot screening, how to inspect and examine foot for signs and symptoms of diabetes related problems, the need for regular diabetes foot care education, appropriate use of footwear and how to manage risk factors for diabetes foot ulceration. This foundational knowledge is essential for informed decision-making and early prevention of complications

Positive change in foot care behavior: The intervention group showed marked improvement in key foot care behaviors. Participants adopted good glycemic control measures, practices regular foot inspection, used protective footwear, avoided risky practices (such as walking barefoot), and responded more promptly and appropriately to signs of foot problems. These behavior changes are directly linked to reduced risk of foot ulcers and lower limb amputation.

Enhanced self-efficacy: The DFC education led to a significant improvement in self-efficacy—across three dimensions; Magnitude-participants were able to perform more complex foot care tasks, Strength-they developed greater confidence and consistency in their actions and Generality-they could maintain foot care practices in diverse and challenging situations. This empowerment is crucial for ensuring that the behavior change achieved through education is sustained over time.

Generally, the study concludes that structured DFC education is an effective strategy for improving preventive foot care practices among people with diabetes. It addresses multiple barriers to care, improves self-management capabilities, and reduces reliance on health systems for avoidable complications.

6.3 Recommendations of the Study

6.3.1 For Policy Makers

i. The Government of Kenya to establish national and regional guidelines mandating the integration of structured diabetes foot care education into standard diabetes management protocols.

ii. County Government to make policies promoting increased funds allocation to toward managing non-communicable diseases such as diabetes for capacity building to health workers especially nurses and community health volunteers, to deliver structured DFC education effectively

iii. Ministry of health in County Government to ensure the availability and affordability of essential foot care materials (e.g., inspection mirrors, emollients, nail clippers, protective footwear) in primary health facilities.

6.3.2 For Clinical Practice

i. Incorporate structured diabetes foot care education into routine care in outpatient diabetes clinics and community-based programs.
ii. Use culturally appropriate, interactive methods—such as group sessions, visual aids, practical demonstrations, and peer support groups—to enhance learning and retention.
iii. Empower patients through personalized counseling and hands-on skills training to build confidence in daily foot care.

6.4 Suggestion for Future Research

i. Conduct longitudinal studies to assess the long-term impact of DFC education on incidence of foot ulcers, hospitalizations, and amputations.
ii. Explore digital and mobile health platforms to scale DFC education in rural and low-resource settings.
iii. Investigate how gender, literacy, socioeconomic status, and comorbidities influence the uptake and effectiveness of DFC education interventions.

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APPENDICES

Appendix 1: Informed Consent

Study title: **Effect of diabetic foot care education on preventive practices among diabetes mellitus patients in Embu and Kirinyaga hospital, Kenya**

Principal Researcher and institutional affiliation

Mrs Annastacia Mbisi, Chuka University

Supervisors and institutional affiliations

Prof. Lucy Gitonga, Chuka University

Dr. Beth Gichobi, Chuka University

Introductory section:

May I take this opportunity to notify you concerning a research being undertaken by researchers whose names appear above. The reason for this is to service you with the requisite knowledge to determine whether to participate in this work or not. You may pose any queries concerning the aims and objectives of the study, implications of your participation, results, potential risks or benefits, your fundamental rights in the capacity of a participant, or uncertainties of any nature regarding the study or about this document. After we have answered all your questions satisfactorily, you have the right to choose whether to continue with the study or to withdraw altogether. This is called 'informed consent'. After understanding and agreeing to participate, I will kindly ask you to indicate your name and enter your signature or thumbprint on this form. There are a few principles that commonly apply to participants in a medical study as outlined below: i) Your decision to participate or fail to participate is absolutely voluntary ii) You may opt out of the research any day or time and no one can question your reasons for doing so. iii) If you refuse to participate, it will not affect the quality of services you receive at the center. A duplicate of the form will be provided to you in case you may wish to keep a record of the same

Should I proceed? YES or NO

This research is approved by Chuka University's Ethics and Research Committee and the protocol number is:

WHAT DOES THE STUDY ENTAIL?

Those with diabetes mellitus who are at risk of developing foot ulcers will be interviewed by the aforementioned researchers. This conversation aims to identify diabetic patients who are at risk of developing foot ulcers. It then asks these patients about their **knowledge, self-efficacy, skills, and factors influencing diabetic foot care.** This study includes roughly **230 randomly selected participants**. We respectfully request your approval to take part in the study.

WHAT HAPPENS WHEN YOU PARTICIPATE IN THE STUDY?

When you consent to get involved, you can expect the following:

You are going to be asked interview questions on your foot knowledge, self-efficacy and foot care practices in a private quiet area. We shall also organise you into a subgroup of about 10 participants to conduct a focus group discussion on factors influencing diabetic foot care practices. After this stage we will give you two weekly clinic follow for three months during which we shall be conducting health education on ideal foot care preventive practices. We require of you to provide us with a reliable phone contact in case we need to call you. In case you provide the requested contact, rest assured that only the researchers participating in this research will be allowed to reach you.

IS THE STUDY ASSOCIATED WITH ANY RISKS, OR HARMS OR INCONVENIESNCES OF ANY KIND?

Research, especially medical related, can potentially introduce psycho-social, emotional as well as anatomical risks. All efforts should be geared always to reduce these risks. One of the potential or possible risks of participating in this research is loss of one's privacy. On our part we are going to ensure that everything you tell us will be kept confident. We will utilize a numerical code for your identification and protect your identify using a computer in a database which is password-secured, and all our papers and files will be locked in a safe cabinet. Nonetheless, no single system of identity protection can be one hundred percent secure, and therefore, it may still be possible that somebody could still end up finding out that you participated in the study, and also get to know some data or information concerning you.

Moreover, giving answers during interviews may be somehow inconveniencing on your side. It is your right to turn down the interviewer or any queries he or she may pose. Moreover, all the researchers and those conducting the interviews have professional knowhow in these kinds of interviews.

In the event that you suffer any harm connected to the study, please make sure you get in touch with the staff right away using the phone listed at the bottom of this form. If you have any minor injuries or conditions, the research team will take care of them or refer you whenever necessary.

DO I STAND TO GAIN ANYTHING UPON PARTICIPATION?

You are going to benefit by being taken through free health education on ideal foot care preventive practices. Moreover, the data you give will give us better insights into your foot care knowledge levels, self-efficacy, foot care practices and factors influencing diabetic foot care practices so that we can correct any misconceptions. This data will contribute to science and benefit not just you but the community at large

DOES PARTICIPATION COST ANYTHING?

This research will cost you nothing in monetary terms. However, it will require a bit of your time and concentration as we go through the health education programme.

WHAT HAPPENS IF YOU GET QUESTIONS LATER?

Just in case you may have additional queries or misconceptions concerning participation in the research, kindly make a point of reaching out or sending a short message to any member of the research team using the contacts appearing later in the document. For any costs you incur during such correspondence, the team will surely reimburse you.

DO YOU HAVE OTHER OPTIONS?

It is important to stress that participation is entirely voluntary. Should you choose to leave the study at any point during the day, you won't experience any animosity, prejudice, mistreatment, or loss of the previously mentioned advantages.

STATEMENT OF CONSENT TO PARTICIPATE

Statement of the participant

This form has been read in its entirety by me, or someone else has read it to me in a language I can understand. In addition, the advantages, risks, and potential drawbacks have all been discussed, and I am taking part fully aware of these possibilities. I understand completely that I am choosing to engage of my own free will and that I am not being forced to do so. I also understand that if I decide to end this study project early, I won't be victimized in any way.
I've received clear explanations on how my identity and all the data I submit will be handled with confidence.

Appending my signature or thumb stamp on this form has not stripped me of my legal rights as a respondent.

I have agreed to take part in the study:	**Yes**	**No**
I have agreed to give phone number for follow-up:	Yes	No

Printed name of participant: ……

Thumb stamp or participant's signature……..
Date……..

Statement of the researcher

As the researcher signed here after, I have explained comprehensively all the details pertaining to this research to the respondent whose name appears above, who has indicated full understanding of all the implications and has willingly consented to participate.

Name of the researcher/ Research assistant: ……

Signature……. Date: ……

Appendix 2: Questionnaire

Code No…….

Section A: Sociodemographic information and Clinical characteristics

Study participants' Sociodemographic information and clinical characteristics		
Age in completed years…….	Sex: a) Male b) Female	Marital status a) Never married b) Married c) Separated/divorced/windowed
Level of education a) Tertiary b) Secondary c) Primary d) No formal education	Source of income a) Unemplyment b) Informal employement c) Formal employment	Religion a) Catholic b) Protestants c) Muslim d) Others(specfify)…….
Residence a) Rural b) Urban	Type of diabetes mellitus a) Type1DM b) Type2DM	For how long have had DM(Years)……
Which diabetic treatment are on currently? a) Oral antidiabetic b) Injectibles c) Combined	Do you suffer from any other disease? a) No…. b) Yes…..Specify	Current BMI (take and indicate) a) Less than 18.5kg/m2 b) 18.5 – 24.5kg/m2 c) 24.5 – 30kg/m2 d) Above 30kg/m2
What is your smoking staus a) Currently smoking b) Past smoker c) Never smoked	What is your alcohol intake status? a) Currently using alcohol b) Taken in the past c) Never took alcohol	

Section B: Diabetic Foot Care Knowledge Scale(DFCKS)

Instruction: Kindly tick the correct response which best describes your level of agreement or disagreement with each of the corresponding statements listed below**.**

		Responses with scales

	Items	Strongly agree(5)	Agree (4)	undecided (3)	Dis agree(2)	Strongly disagree (1)
	Glycemic control					
1	I understand maintaining optimal blood sugar level can prevent foot problem					
2	I understand adherence to diabetes diet can achieve optimal blood sugar level					
3	I know exercise is necessary in achieving blood sugar control					
4	I understand medication adherence can achieve blood sugar control					
	Identification of the at risk foot					
5	I understand routine screening for foot ulcer risk factors can prevent first ever or recurrent ulcer					
6	I know regular check up with medical professional is highly recommended					
7	Do you agree or disagree that disclosing medical history such as episodes of ulcer, lower extremity Amputation and claudation to health professional is important					
	Inspection and examination of the foot					
8	I know it is advisable to check for callus, oedema, skin color, temperature etc on my feet regularly					

9	I understand bones and joints need to be checked regularly for any abnormalities such large bony prominence, restricted joint mobility, claw or hammer toes					
10	I know I need to check daily for foot hygiene such as dirty sock, unshaved toenails and superficial fungal infection					
11	I understand drying between the toes after washing is important					
12	I understand physical limitation such as obesity or poor vision that limit foot care should be reported to medical professional					
	Regular DFU education					
13	I know one need to have self-motivated to seek right information on DFC					
14	I know I need to have regular attendance of DFC program to master the skills					
15	I understand getting in touch with my medical professional for regular DFC updates is important					
	Appropriate foot care					
16	I know Socks or stocking with seams needs to be worn inside out and be changed daily					
17	I understand avoiding tight or knee high sock it is advisable					

18	I understand it important to avoid walking barefoot, in socks without shoes or in slippers with thin soles whether at home or on go					
19	I understand custom-made shoes, insoles or toes orthoses are advisable to individual with pre-ulcerative symptoms to lessen planter pressures					
	Risk factors management					
20	I know it is important to refrain from using hot water bottles or heaters to warm my feet					
21	I understand it is important to avoid use of plasters or chemical to remove corns or callus without consulting my medical professional					
22	I understand it is important for individual with dry skin to apply emollient but not in between their toes					
23	I understand it is important to consult with my medical professional on nails care, corn, callus, fungal infection or blisters management					

Section C: Diabetes Foot Self-care Behavior Scale(DFSBS)

- **Instruction**: Please select the category that most accurately describes what you actually do.

S/no	**Items**	**Responses**			
	Scores	**3**	**2**	**1**	**0**
	Glycemic control				

1	Do you do blood sugar monitoring(fasting/random)	Several times during the day	Once every day	A couple of times every week	Fewer than once a week
2	Do you do glycosylated haemoglobin level	Once in three months	Once in six months	Less that in a year	Never
3	Do you do take the recommended diet?	Often	Sometimes	Rarely	Never
4	How often do you miss your prescribed medication	Never	Rarely	Sometimes	Most of the time
5	How often do you do physical exercise?	Several times during the day	Once every day	A couple of times every week	Fewer than once a week
	Regular foot inspection and examination				
5	Do you check your feet for hygiene?	Several times during the day	Once every day	A couple of times every week	Fewer than once a week
6	Do you attend diabetic foot screening?	Most of the times	Sometimes	Rarely	Never
7	Do you check your skin for abnormal skin color, and temperature	Often	Sometimes	Rarely	Never
8	Do you check your feet for the presence pre-ulcerative signs	Often	Sometimes	Rarely	Never
9	Do you report identified foot problem to your HCW	Always	Often	Sometimes	Rarely/never
	Appropriate use of foot wear				
11	Do you wear shoes with straps, Velcro, or lace-up closures?	The majority	Occasionally	Infrequently	Never

		of the time			
12	Do you wear unfastened slippers?	Never	Rarely	Sometimes	Most of the time
13	Do you wear shoes with pointy toes?	Never	Rarely	Sometimes	Most of the times
14	Do you check your shoes before you put them on and taking the off?	Frequentl y	Occasionall y	Seldom	Never
15	Do you wear shoes devoid of tights, socks, or stockings?	Never	Rarely	Sometimes	Often
16	Do you go outside or around the house barefoot?	Never	Rarely	Sometimes	Often
	Risk factors management				
17	Do you use moisturizing cream on your feet?	Daily	Once a week	About once a week	Never
18	Do you apply emollient cream in the space between your toes?	Never	About one a month	About once a week	Daily
19	How frequently do you get your toenails trimmed?	Once a week	Once a month	Less than once a month	Never
20	Do you place your feet on a radiator or next to a fire, or do you use a hot water bottle in bed?	Never	Rarely	Sometimes	Often
21	When you get a corn, do you utilize corn cures, corn plasters, or corn paints?	Never	Rarely	Sometimes	Often
22	When you get a blister, cut, or burn, do you treat it with a dry dressing?	Often	Sometimes	Rarely	Never

Section C: Diabetic Foot Care Self-Efficacy Scale(DFCSES)

Instructions:

- A collection of scenarios pertaining to your **thoughts or actions** regarding **foot care** is provided below.
- Please indicate your **level of task difficulty (magnitude), belief in your ability (generality), and being able to work under pressure (strength)** for each of the following **circumstances by marking the corresponding scale.**
- An **"1" indicates** that the person has the lowest level of magnitude, generality and strength and a **"5" indicates** that **the person has the highest levels**

	Diabetic Foot Care Self Efficacy Scale					
	Level of task difficulty(magnitude)					
	Scale	**5**	**4**	**3**	**2**	**1**
		Very easy	**Easy**	**Neutral**	**Difficulty**	**Very difficulty**
1	How capable do you feel in achieving glycemic control?					
2	How capable do you feel in doing regular foot inspection & examination?					
3	How capable do you feel in achieving appropriate foot wear?					
4	How capable do you feel in managing foot ulcers risk factors?					
	Belief in one's ability (strength)					
	Scale	**Yes, definitely**	**Probably yes**	**May be yes**	**Probably no**	**No definitely**
5	Do you feel confident in achieving your glycemic control?					

6	Do you feel confident in doing regular foot inspection & examination?					
7	Do you feel confident in achieving appropriate foot wear?					
8	Do you feel confident in managing foot ulcer risk factors?					
	Being able to work under pressure(generality)					
	Scale	**Extreme stress**	**Much stress**	**Moderate stress**	**Mild stress**	**No stress**
9	Under what situation can you achieve glycemic control?					
10	Under what situation can you achieve regular foot inspection and examination?					
11	Under what circumstance can you achieve appropriate foot wear?					
12	Under what circumstances can you achieve proper foot ulcer risk factor management?					

Appendix 3: Focus Group Discussion Guide

Section A: Acceptance of Focus Group Participation

My name is Annastacia Mbisi, PhD student at Chuka university, doing a study on **effect of diabetic foot care education on preventive practices among patient at risk of foot ulceration in Embu and Kerugoya hospitals, Kenya.** This discussion will help us understand what helps or hinders people with diabetes from preventing foot complications. We are especially interested in what you know, do, and feel confident about, and how healthcare services influence your foot care**.** You are free to decide whether or not to take part in the focus group and to leave at any moment. Your answers will be kept private, and no identities will appear in the report—even though the focus group will be videotaped. The questions posed in the focus groups have no right or incorrect responses. We would like to hear from everyone and from a wide range of perspectives. Even while your answers can differ from those of the group as a whole, we hope you will still be sincere. We ask that everyone respond in confidence and that only one person talk at a time in the group out of respect for one another. I accept this information and consent to fully participate in accordance with the previously mentioned term

Signature: _____ Date: _____

I am grateful that you agreed to participate in this discussion. Kindly allow me have the following information from you

Sociodemographic information and clinical features of participants		
Age in completed years…….	Sex: c) Male d) Female	Marital status d) Never married e) Married f) Separated/divorced/windowed
Level of education e) Tertiary f) Secondary g) Primary h) Noformal education	Source of income d) Unemplyment e) Informal employement f) Formal employment	Residence a) Rural b) Urban
Type of diabetes mellitus Type 1 DM Type 2 DM	For how long have had DM(Years)……	Do you suffer from any other disease? a) No…. b) Yes…..Specify
What is your smoking staus a) Currently smoking b) Past smoker c) Never smoked	What is your alcohol intake status? a) Currently using alcohol b) Taken in the past	Type of treatment a) Oral antidiabetes b) Injectibles c) Combined

	c) Never took alcohol	

FGD Guide: Factors Influencing Diabetic Foot Care Prevention

INTRODUCTION

Purpose of the discussion

- To explore perspectives on what helps or hinders the prevention of diabetic foot complications, with focus on:
    - What you know and do regarding foot care
    - How confident you feel in managing their foot health
    - The role of health care service availability and financial structures in your foot care
    - What hinders or facilitate your foot care

Target participants: Patient with type 1 or type 2 diabetes preferably without active foot ulcer

Duration: 60 – 90minutes

Group size: 10 Participants

Facilitator:…….

Note-Taker:……

Ground rules

i. We would like everyone to take part, so please speak up. If I haven't heard from you in a while, I might give you a call.
ii. There are no right or incorrect responses. The experiences and viewpoints of each individual are valued; Whether you agree or disagree, please speak up; we want to hear all points of view.
iii. We want people to feel comfortable talking when delicate topics come up. What is said in this room stays in this room.
iv. The group is going to be tape recorded: We aim to record all of your comments; no one's name is mentioned in our report. You won't be identified.

Participants introduction

- Allow each participant to introduce themselves specifically; share their name, how long they've had diabetes, and whether they've ever been taught about foot care

Warm-Up Questions: 5-10minutes

- How has diabetes affected your daily life?
- What comes to your mind when you hear "diabetic foot care"?

CORE QUESTIONS:

Patient related factors

Knowledge

- What do you know about foot complications from diabetes?
- What signs or symptoms would make you concerned about your feet?
- Where did you learn about diabetic foot care (clinic, media, family, peers)?
- Have you received clear instructions from healthcare providers on foot care?

Practices

- How do you usually take care of your feet? (Daily routines)
- Do you regularly check your feet? Why or why not?
- How often do you see a doctor or nurse for foot checks?
- What kind of shoes do you usually wear? Are they comfortable and protective?

Self-Efficacy

- How confident are you in caring for your feet properly?
- Are there situations when it's hard for you to follow foot care advice?
- What makes it easier or harder for you to take care of your feet?

Health Care–Related Factors

Barriers and Enablers

- What makes it harder to access or afford foot care?
- What has helped you overcome these challenges?

Suggestion, recommendation and conclusion

- What changes in healthcare services would help improve your foot care?
- What kind of information or support would help you care for your feet better?
- Thank participants for their time and valuable contributions.
- Provide any handouts, brochures, or follow-up resources, if available.

Appendix 4: Diabetic Foot Screening Form

Patient's Biodata and medical history				
Full Names:			Age:	
Sex:	Clinic No:	Active Mobile no:		
Risk factors for foot ulceration			Present	Absent
Peripheral neuropathy: Light touch (Ipswich touch test) undetectable				
Vascular status: palpation of pedal pulses • Posterior tibial artery absent • Dorsal pedal artery absent				
Foot deformity or excessive bony prominences				
Limited joint mobility				
Signs of abnormal pressure, such as callus				
Ruddy discoloration on dependency				
Poor foot hygiene				
Inappropriate footwear				
Previous ulcer				
Lower extremity amputation				
End stage renal disease				
The IWGDF 2019 Risk Stratification System				
Category	**Ulcer Risk**	**Characteristics**		
0	Very low	No LOPS and No PAD		
1	Low	LOPS or PAD		
2	Moderate	LOPS + PAD, or LOPS + foot deformity, or PAD + foot deformity		
3	High	LOPS or PAD, and one or more of the following: History of • A foot ulcer • Lower-extremity amputation (minor or major) • End-stage renal disease		

Appendix 5: Curriculum for Educating Patients on Diabetes Foot Prevention

Annastacia M.Mbisi

MScN(Medical-surgical), BScN, KRCNN

Developed for capacity development programe for the phase two of a research done in the partial fulfilment of the requirements for the award of doctor of philosophy in nursing of Chuka University

June, 2025

Table of content

Preamble

A baseline survey was done in Embu and Kerugoya level five hospital among 230 patients sampled from the patient with diabetes mellitus attending the clinic.

The specific objective of the survey

i. To determine levels of diabetic foot care knowledge among diabetic patient attending Embu and Kerugoya Level 5 hospitals
ii. To assess diabetic foot care skills level among diabetic patient attending Embu and Kerugoya Level 5 hospitals
iii. To determine levels of diabetic foot care self-efficacy among patient attending Embu and Kerugoya Level 5 hospitals
iv. To identify factors influencing diabetic foot prevention practices among patient attending Embu and Kerugoya Level hospitals

The finding from the baseline survey revealed that majority of the respondents had inadequate DFC knowledge (n=111,48%), poor DFC behavior (n=172, 75%) and low self-efficacy (n=132,58%) in both facilities. International guidelines state that patients should have sufficient knowledge, self-efficacy, and practices to take care of their diabetic feet ((Bus S. , et al., 2023). This implies that patients should be able to show a thorough comprehension of foot care concepts, regularly follow advised foot care procedures, and have confidence in their capacity to effectively manage their diabetic feet ((Bus S. , et al., 2023).

Rationale

The finding of the study provided basis for intervention and evaluation phase, which is development of education modules and education of the participants of diabetic foot care prevention practices; and evaluation of the impact of education on knowledge, behavior and self-efficacy respectively

Philosophy

The education modules were developed on the belief that

i. Patients with long-term medical disorders, such as diabetes mellitus, are crucial in preventing long-term complications, such as diabetic foot disease
ii. In order to implement diabetic foot care routines, self-efficacy and knowledge are essential.
iii. The prevention of diabetic foot disease is mostly attributed to diabetic foot care confidence and practices.

Education program goal

To equip the patients with relevant knowledge, practices and self-belief attitude so as to effectively contribute toward quality care to their feet thus preventing foot related complication

Learning outcome

Upon completion of education program, the participants will be able to

a. Understand the fundamental principles in prevention of diabetes foot disease
b. Apply the diabetic foot care preventive knowledge in the management of their foot
c. To demonstrate change of self-care beliefs and attitudes toward diabetic foot care practices

Teaching/learning methodology

Interactive Discussion, Demonstration and Return Demonstration, Audio-Visual Aids, Goal Setting and Behavior Contracting & One-on-One Counseling

Teaching/learning resources

Printed Educational Materials, Demonstration Kits, Daily Foot Care Checklists, Real-Life Case Scenarios or Testimonials & Peer Support Groups

Mode of learning

It involved theory and practical, for examples; Face-to-Face Education, Group Education Sessions Simulation & Demonstration. Monday to Friday from 8am to 5pm

Mode of evaluation

- Pretest
- Post test

COURSE STRUCTURE

DIABETES FOOT CARE EDUCATION

MODULE ONE: INTRODUCTION TO DIABETES AND FOOT COMPLICATION

Unit one: Introduction/Module overview

Unit two: Learning objective

- Definition of Diabetes Mellitus
- Distinguish its majors Types of Diabetes (Type 1, Type 2)
- Relate how high blood sugar contributes to foot complication
- Identify common diabetes foot complication
- Describe early signs of diabetes foot problem
- List major diabetes foot list factors
- Importance of early detection & regular foot examination

MODULE TWO: GLYCEMIC CONTROL AND ITS ROLE

Unit one: Introduction/Module overview

Unit two: learning objectives

- Explain the significance of glycemic control
- Describe how chronic hyperglycemia contributes DFUs & infections
- Identify clinical indicators of poor glycemic control
- Demonstrate knowledge of evidence-based practices for achieving blood glucose level
- Recognize early signs of diabetic foot problems that warrant prompt attention

MODULE THREE: REGULAR FOOT INSPECTION AND EXAMINATION

Unit one: Introduction/Module overview

Unit two: Learning objectives

- Explain the importance of routine foot inspection & examination
- Identify common foot abnormalities in diabetic patients
- Demonstrate proper techniques for conducting daily self-foot inspections & examination
- List common risk factors for Diabetes foot complication

MODULE FOUR: APPROPRIATE FOOT WEAR & SOCKS

Unit one: Introduction/Module overview

Unit two: learning objectives

- Explain the role of proper footwear and socks in preventing DFUs
- Identify key features of diabetic-friendly shoes and socks
- Recognize the risks associated with inappropriate footwear
- Demonstrate how to assess and choose proper footwear and socks
- Promote awareness of when to seek medical professional care

MODULES FIVE: MANAGEMENT STRATEGIES FOR COMMON PRE-ULCERATIVE SIGNS

Unit one: Introduction/Module overview

Unit two: learning objectives

- Identify early signs of pre-ulcerative foot conditions
- Explain the underlying causes of these conditions in diabetic patients
- Demonstrate appropriate management techniques for: Callus & corns, blisters fungal infection & nail care
- Educate patients on self-care practices and warning signs that require professional attention.

- Differentiate between condition which can be managed at home and that which requires professional care

MODULES SIX: DIABETES FOOT CARE EDUCATION PROGRAM RECAP

Unit one: Introduction

Unit two: Learning objectives

- Recall key concepts from the diabetes foot care education program
- Reiterate the importance of daily foot inspection and proper hygiene
- Review correct foot care practices
- Reinforce the importance of wearing appropriate footwear and socks
- Identify early warning signs of foot problems that require immediate medical attention
- Clarify any misconceptions or doubts
- Encourage continued adherence to foot care practices

COURSE DESCRIPTION

DIABETES FOOT CARE EDUCATION MODULES

MODULE ONE: INTRODUCTION TO DIABETES AND FOOT COMPLICATION					
Learning objectives					
General objectives	**Specific objectives**	**Content outline**	**Duration**	**Instructional methods**	**Resources**
To provide learners with foundational knowledge of diabetes and its potential complications, with a focus on the causes, signs, and prevention of diabetic foot problems.	By the end of this module, learners will be able to: Define diabetes mellitus and distinguish between its major types (Type 1 and Type 2). Explain how high blood sugar affects the nerves and blood vessels, contributing to foot complications. Identify at least three common diabetic foot complications (e.g., neuropathy, ulcers, infections, amputations). Describe early warning signs of diabetic foot problems (e.g., numbness, tingling, foot deformities, wounds that don't heal). List the major risk factors for diabetic foot complications (e.g., poor glycemic control, smoking, improper footwear, lack of foot care).	Definition of Diabetes Mellitus Distinguish its majors Types of Diabetes (Type 1, Type 2) Relate how high blood sugar contributes to foot complication Identify common diabetes foot complication Describe early signs of diabetes foot problem List major diabetes foot list factors	I hour	Interactive Discussion, Demonstration Case Studies or Scenarios Question-and-Answer Sessions Group Activities or Brainstorming	PowerPoint Slides / Flipcharts Foot Care Kits (for demo) Models/ Charts Printed Handouts

	Discuss the importance of early detection and regular foot exams in preventing severe complications.	Importance of early detection & regular foot examination			
MODULE TWO: GLYCEMIC CONTROL					
General objectives	**Specific objectives**	**Content outline**	**Duration**	**Instr. method**	**Resources**
To provide learners with an understanding of the role of glycemic control in the prevention of diabetes-related complications, particularly diabetic foot, and to promote effective management strategies for maintaining optimal blood glucose levels.	By the end of the session, participants should be able to: Explain the significance of glycemic control in preventing both the onset and progression of diabetes complications, including neuropathy and vascular disease. Describe how chronic hyperglycemia contributes to the development of diabetic foot ulcers and infections. Identify clinical indicators of poor glycemic control, such as elevated HbA1c levels, and understand their implications for foot health. Demonstrate knowledge of evidence-based practices for achieving and maintaining optimal blood glucose levels through lifestyle modifications and pharmacologic treatments.	Explain the significance of glycemic control Describe how chronic hyperglycemia contributes DFUs & infections Identify clinical indicators of poor glycemic control Demonstrate knowledge of evidence-based practices for achieving blood glucose level Recognize early signs of diabetic foot problems that	1 hour	Presentation with Visual Aids, Interactive Discussion Demonstration and Return Demonstration Case Studies or Scenarios, Small Group Activities / Brainstorming, Goal-Setting Activity, Question-and-Answer	PowerPoint Slides or Flip Charts, Glucometer Kits & Demonstration Models, HbA1c Charts & Interpretation Guides, Printed Handouts, Food Models / Nutrition Labels, Patient Logbooks(to encourage blood glucose monitoring & tracking

	Recognize early warning signs of diabetic foot complications in patients with poorly controlled diabetes.	warrant prompt attention			
MODULE THREE: REGULAR FOOT INSPECTION AND EXAMINATION					
General objectives	**Specific objectives**	**Content outline**	**Duration**	**Instr.method**	**Resources**
To promote the practice of regular foot inspection and examination as a critical component of diabetic foot prevention, aiming to reduce the incidence of ulcers, infections, and lower limb amputations in individuals with diabetes.	By the end of the session, participants should be able to: Explain the importance of routine foot inspection in the early detection of diabetic foot problems. Identify common foot abnormalities in diabetic patients, such as calluses, blisters, skin discoloration, wounds, and signs of infection. Demonstrate proper techniques for conducting daily self-foot inspections or clinical foot examinations. List the risk factors that increase susceptibility to diabetic foot complications.	Explain the importance of routine foot inspection & examination Identify common foot abnormalities in diabetic patients Demonstrate proper techniques for conducting daily self-foot inspections & examination List common risk factors for Diabetes foot complication	1 hour	Demonstration and Return De Interactive Lecture with Visual Aids monstration, Hands-On Training, Case Studies / Problem-Solving Activities, Question-and-Answer	Foot Models or Mannequin Feet, Hand Mirrors, Printed Checklists or Log Sheets, Sample Foot Care Kits
MODULE FOUR: APPROPRIATE FOOT WEAR & SOCKS					

General objectives	Specific objectives	Content outline	Duration	Instr. ,method	Resources
To highlight the importance of wearing appropriate footwear and socks in the prevention of diabetic foot complications by protecting against injury, reducing pressure points, and enhancing overall foot health in individuals with diabetes.	By the end of the session, participants should be able to: Explain the role of proper footwear and socks in preventing foot injuries and ulcers in individuals with diabetes. Identify key features of diabetic-friendly shoes and socks, such as seamless design, cushioning, proper fit, and breathable materials. Recognize the risks associated with inappropriate footwear, including tight shoes, high heels, or walking barefoot. Demonstrate how to assess and choose proper footwear and socks for individuals with different levels of foot risk (e.g., neuropathy, deformities, prior ulcers). Promote awareness of when to seek medical professional care, example, to a podiatrist or orthotist for specialized footwear needs.	Explain the role of proper footwear and socks in preventing DFUs Identify key features of diabetic-friendly shoes and socks Recognize the risks associated with inappropriate footwear Demonstrate how to assess and choose proper footwear and socks Promote awareness of when to seek medical professional care	1 hour	Lecture with Visual Aids, De Hands-On Practice monstration, Interactive Discussion / Brainstorming Case Studies	Samples of Footwear and Socks, Footwear Selection Checklist (Printed or Digital), Posters or Flip Charts, Foot Models or Diagrams
MODULE FIVE: MANAGEMENT STRATEGIES FOR COMMON PRE-ULCERATIVE SIGNS					
General objectives	**Specific objectives**	**Content outline**	**Duration**	**Instr.method**	**Resources**

To equip learners with knowledge and skills to identify and manage common pre-ulcerative foot conditions—such as calluses, corns, blisters, fungal infections, and nail abnormalities—in order to prevent the progression to diabetic foot ulcers and related complications.	By the end of the session, participants should be able to: Identify early signs of pre-ulcerative foot conditions including calluses, corns, blisters, fungal infections (e.g., athlete's foot), and ingrown or thickened nails. Explain the underlying causes of these conditions in diabetic patients, especially the roles of pressure, friction, moisture, and neuropathy. Demonstrate appropriate management techniques for: • Calluses and corns: regular debridement (by professionals), pressure offloading • Blisters: protection and sterile care to prevent infection • Fungal infections: use of topical antifungals, moisture control • Nail care: proper trimming techniques, avoidance of self-treatment in high-risk patients Educate patients on self-care practices and warning signs that require professional attention. Differentiate between conditions that can be managed at home and those	Identify early signs of pre-ulcerative foot conditions Explain the underlying causes of these conditions in diabetic patients Demonstrate appropriate management techniques for:Callus & corns, blisters fungal infection & nail care Educate patients on self-care practices and warning signs that require professional attention. Differntiate between condition which can be managed at home and that which requires professional care	1 hour	Lecture with Visual Aids, Demonstration and Return Demonstration, Case Study Analysis, Interactive Discussion, Small Group Work / Brainstorming	Posters and Charts, Foot Models / Mannequin Feet, Demonstration Kits. Printed Handouts, Patient Logbooks or Monitoring Tools

	that require referral to a podiatrist or specialist.				
MODULES SIX: DIABETES FOOT CARE EDUCATION PROGRAM RECAP					
General objectives	**Specific objectives**	**Content outline**	**Duration**	**Instr.method**	**Resources**
To reinforce and consolidate participants' knowledge and practices regarding diabetic foot care to ensure continued prevention of foot complications and promote long-term self-care behaviors.	By the end of the recap session, participants should be able to: Recall key concepts from the diabetes foot care education program, including causes, risk factors, and complications of diabetic foot. Reiterate the importance of daily foot inspection and proper hygiene in preventing ulcers and infections. Review correct foot care practices, including nail trimming, moisturizing, and avoiding injury. Reinforce the importance of wearing appropriate footwear and socks, and avoiding walking barefoot. Identify early warning signs of foot problems that require immediate medical attention. Demonstrate confidence in self-care techniques through practice or interactive discussion.	Recall key concepts from the diabetes foot care education program Reiterate the importance of daily foot inspection and proper hygiene Review correct foot care practices Reinforce the importance of wearing appropriate footwear and socks Identify early warning signs of foot problems that require immediate medical attention	1 hour	Interactive Lecture / Presentation, Demonstration and Return Demonstration, Case Study Review, Goal-Setting Activity	Summary Posters or Charts, PowerPoint Recap Slides, Handouts & Take-Home Booklets, Foot Models / Demonstration Kits, Self-Assessment Checklists

	Clarify misconceptions or doubts that participants may still have after the initial education sessions. Encourage continued adherence to foot care routines and regular check-ups with healthcare providers.	Clarify any misconceptions or doubts Encourage continued adherence to foot care practices			

REFERENCE MATERIALS

1. Guidelines and Clinical References

● International Working Group on the Diabetic Foot (IWGDF) Guidelines

- https://iwgdfguidelines.org
- Global gold-standard for diabetic foot care prevention, risk assessment, footwear, and ulcer management.

● American Diabetes Association (ADA) Standards of Care in Diabetes

- https://diabetes.org/standards
- Includes recommendations for foot exams, patient education, and treatment of complications.

● World Health Organization (WHO): Diabetic Foot Guidelines

- https://www.who.int
- Includes foot care checklists and public health tools for low-resource settings.

● National Institute for Health and Care Excellence (NICE) – UK

- https://www.nice.org.uk/guidance/ng19
- Provides structured recommendations on diabetic foot problems, prevention, and multidisciplinary care.

2. PATIENT EDUCATION TOOLS AND HANDOUTS

● **Centers for Disease Control and Prevention (CDC): Diabetes Foot Care Tips**

- https://www.cdc.gov/diabetes/library/spotlights/foot-care.html

● **National Diabetes Education Program (NDEP) – Foot Care Brochures**

- https://www.cdc.gov/diabetes/ndep

● **American College of Foot and Ankle Surgeons (ACFAS)**

- https://www.foothealthfacts.org
- Provides patient-friendly resources on common foot conditions and care techniques.

3. BOOKS AND MANUALS

"The Diabetic Foot" – by John Bowker & Michael Pfeifer

- Comprehensive clinical reference often used in nursing and podiatry programs.

● **"Clinical Care of the Diabetic Foot" – by David G. Armstrong & Lawrence Lavery**

- Focuses on practical clinical interventions, ulcer prevention, and treatment.

● **WHO Diabetic Foot Manual (for LMICs)**

- Practical guide with illustrations on examining and caring for diabetic feet in primary care.

4. TOOLS AND CHECKLISTS

- IWGDF Risk Stratification Tool
- ADA Annual Foot Exam Checklist
- Daily Self-Inspection Chart for Patients
- Footwear Evaluation Sheet

Appendix 6: Ethical Clearance

CHUKA UNIVERSITY

Knowledge is Wealth *(Sapientia divitia est)* Akili ni Mali

CHUKA UNIVERSITY INSTITUTIONAL ETHICS REVIEW COMMITTEE

Telephones: 020-2310512/18
Direct Line: 0772894438
Email: info@chuka.ac.ke,
P. O. Box 109-60400, Chuka
Website: www.chuka.ac.ke

18th February, 2025

REF: CUIERC/ NACOSTI/679
TO: **Anastacia Munzi Mbisi**

RE: Effect of Diabetic Foot care Education on preventative Practices among Patients at Risk of Foot Ulceration Attending Embu and Kerugoya Level Five Hospitals, Kenya.

This is to inform you that *Chuka University IERC* has reviewed and approved your above research proposal. Your application approval number is *NACOSTI/NBC/AC-0812.* The approval period is 18th February, 2025 – 18th February, 2026.

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 *Chuka University IERC*.
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 *Chuka University IERC* 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 *Chuka University IERC* within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to *Chuka University IERC*.

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

Yours sincerely

Dr. Benjamin Kanga
SECRETARY

INSTITUTIONAL ETHICS REVIEW COMMITTEE
18 FEB 2025
P.O. Box 109-60400, CHUKA
CHUKA UNIVERSITY

Appendix 7: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **523478**

Date of Issue: **14/March/2025**

RESEARCH LICENSE

This is to Certify that Miss.. annastacia MUNZI mbisi of Chuka University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Embu, Kirinyaga on the topic: EFFECT OF DIABETES FOOT CARE EDUCATION ON PREVENTIVE PRACTICES AMONG DIABETES MELLITUS PATIENTS ATTENDING EMBU AND KERUGOYA LEVEL FIVE HOSPITALS, KENYA for the period ending : 14/March/2026.

License No: **NACOSTI/P/25/416744**

523478

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 8: Authorization Letter- Embu Level Five Hospital

EMBU COUNTY GOVERNMENT
DEPARTMENT OF HEALTH

EMBU LEVEL 5 HOSPITAL
Address P.O. Box 33-60100 Embu Telephone 068-2231055/56
Cell phone +254 722 406 595 Email: pghembu@gmail.com

REF: EL5H/ADM/VOL.IV (154) **DATE:** 19th Aug, 2024

The In charge
Diabetic Clinic
EMBU LEVEL 5 HOSPITAL

RE: AUTHORITY TO CONDUCT RESEARCH AT EMBU LEVEL 5 HOSPITAL ANNASTACIA MUNZI MBISI REG/NO. HD10/45948/21

The above subject matter refers.

The bearer of this letter is a bonafide student from the Chuka University pursuing a Phd. in Nursing.

She has been given authority to conduct a research on, **'Effect of diabetic foot care education on preventive practices among patients at risk of foot ulceration attending Embu Level 5 Hospital'**

NB: The student is expected to observe and maintain utmost confidentiality of information while doing her research and the findings **MUST** be shared with the hospital.

Kindly accord her the necessary support.

CHIEF EXECUTIVE OFFICER
EMBU LEVEL 5 HOSPITAL
P. O. Box 33, EMBU
Tel: 068-2231055/56
Email: ceoembulevel5@gmail.com

Bancy W. Mutuah
Ag. Chief Executive Officer
Embu Level 5 Hospital

Appendix 9: Authorization Letter- Kerugoya Level Five Hospital

COUNTY GOVERNMENT OF KIRINYAGA

COUNTY DEPARTMENT OF HEALTH

E- mail: dmohkirinyaga@gmail.com or gkaroki@kirinyaga.go.ke

When replying please quote:

COUNTY DIRECTOR OF HEALTH
KIRINYAGA,
P. O. BOX 24,
KERUGOYA

REF: CDH/RES/ VOL.III (2) 87

21st March, 2025

Noted.

HOSPITAL MANAGER
KERUGOYA COUNTY REFERRAL HOSPITAL
P. O. Box 24 - 10300,
KERUGOYA.
Date.....
Em... ...spital@gmail.com

The Hospital Manager
Kerugoya County Referral Hospital

RE; APPROVAL TO CONDUCT STUDY FOR RESEARCH TITLED "Effect of Diabetes Foot Care Education on Preventive Practices among Diabetes Mellitus Patients Attending Kerugoya Level Five Hospital" in Kirinyaga County– Annastacia M. Mbisi

We acknowledge the application for approval by the above named to conduct study for research titled **"Effect of Diabetes Foot Care Education on Preventive Practices among Diabetes Mellitus Patients Attending Kerugoya Level Five Hospital" in Kirinyaga County.**

The student is pursuing PhD in Nursing at Chuka University

She is hereby granted approval to conduct research in the Hospital.

She is **Expected to Submit** the research findings to the County Department of Health on completion of the project.

COUNTY DIRECTOR OF HEALTH
KIRINYAGA COUNTY
21 MAR 2025
Sign.....
P.O. Box 24 - 10300, KERUGOYA

Dr. Esbon Gakuo
Director Medical Services, Public Health and Sanitation.
KIRINYAGA COUNTY.
CC

- **County Health Research Focal Person**