International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 15; Issue: 9; September 2025
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Factors Influencing Diabetes Foot Preventive Practices Among Patients Attending Embu and Kerugoya Level Five Hospitals, Kenya

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DOI: https://doi.org/10.52403/ijhsr.20250910

ABSTRACT

Background: Diabetes mellitus is a growing global health concern, and foot complications remain among its most debilitating outcomes, often resulting in ulcers, infections, and amputations. Effective preventive foot care is essential, yet in many settings, adherence remains low. Understanding the underlying factors that influence foot care practices is critical to inform targeted interventions.
Objective: This study explored the patient-related and healthcare-related factors influencing diabetes foot care practices among individuals living with diabetes.
Methods: A qualitative, exploratory design was employed. Data were collected through focus group discussions (FGDs) with purposively selected diabetes patients attending outpatient clinics. A total of four FGDs involving 40 participants were conducted. The discussions were audio-recorded, transcribed verbatim, and analysed thematically to identify recurrent patterns and insights.
Results: Two major categories of influencing factors emerged: patient-related and healthcare-related. Patient-related factors included limited knowledge of foot care, poor foot care behaviour and low self-efficacy in managing foot health. Healthcare-related factors included limited access to structured foot care education, staff shortages, and the unaffordability of health services. However, facilitators such as the availability of daily clinic services, peer support groups, and the friendliness of healthcare staff were found to positively influence patient engagement in foot care.
Conclusion: The study underscores the multifaceted nature of DFC practices, highlighting the need for comprehensive interventions that address both individual and systemic barriers. Incorporating structured education, strengthening patient support systems, and improving accessibility and affordability of foot care services are essential for promoting effective preventive practices. Addressing these factors may significantly reduce the burden of diabetic foot complications and improve the quality of life for patients.
Keywords: Diabetes mellitus, foot care practices, diabetes foot, patient-related factors, healthcare barriers, Healthcare facilitators, structured education.

INTRODUCTION

Globally, diabetes mellitus is a very common condition that significantly increases morbidity and mortality. This is reflected by global prevalence of 536.6(10.5%) million people in 2021 with estimated rise to 783.2 (12.2%) in 2045 among adults, 20-79years old (1). Due to

several pathophysiologic alterations linked to diabetes, these individuals often experience foot-related conditions such as gangrene, ulcerations, infections and in severe cases amputation (2). These alterations mainly arise from a diabetic's concurrent presence of two or more risk factors, with Peripheral Arterial Disease (PAD) and Diabetic Peripheral Neuropathy (DPN) mostly playing a major role (3). Amputations and foot ulcers are significant sources of morbidity and death in individuals with diabetes (4). According to Edmonds, Manu, & Vas, (5) an estimated 9.1 million to 26.1 million people with diabetes worldwide get foot ulcers each year, and the lifetime chance of getting one ranges from 19% to 34%. This represents a serious risk for lower limb amputation especially those with neuropathy and/or vascular disease (5). In Africa diabetic related foot complications are major public health concern, where they frequently develop into sepsis or gangrene, resulting in extended hospital admissions and a high death rate (6).

These complications are preventable through consistent and appropriate foot care practices[7]. Several studies have emphasized that effective diabetes foot care is influenced by a combination of interrelated factors, including adequate knowledge, adherence to proper self-care behaviors, and psychological readiness—particularly the individual's level of self-efficacy, which reflects the confidence to perform preventive actions (8,9,10). These three indicators—knowledge, behavior, and self-efficacy—are closely interconnected. While knowledge provides the essential foundation for informed decision-making, behavior signifies the practical application of that knowledge, and self-efficacy ensures sustained engagement and confidence in carrying out foot care practices. For instance, a structured foot care education program incorporating hands-on demonstrations, motivational interviewing, and peer-led support groups has been shown to significantly enhance all three indicators (11).

Knowledge is a critical foundation for initiating preventive behaviors. Studies have consistently shown that diabetic patients with higher levels of knowledge about foot care are more likely to engage in appropriate practices (12). Another facility-based survey in Buraydah, Saudi Arabia, found that 56% had good knowledge, and 56.9% had good practice. Good knowledge correlated significantly with better practice ($p < 0.05$) (13). Additionally, Pourkazemi, et al., (14) study, indicated that practicing and understanding DFU well, lowers the risk of complications and, eventually, amputation from diabetic foot ulcers. While knowledge is a necessary foundation for behavior change, behavioral translation still may be low, suggesting a need for interactive, culturally tailored, reinforcement-based strategies. For instance, in Faisalabad, Pakistan, only 32.7% had good knowledge and just 12.2% demonstrated good practice—demonstrating a disconnect between awareness and habitual action ($P < 0.05$) (15)

Foot care behavior encompasses the actual actions—such as daily foot inspection, proper washing and drying, footwear choices, attending foot screening, and avoiding barefoot walking (4). These behaviors translate knowledge into practice and are critical in preventing diabetic foot complications. Empirical findings across settings consistently indicate that behavioral factors play a pivotal role in preventive foot-care practices, beyond mere knowledge. A Singapore study revealed that higher self-efficacy was significantly associated with preventive foot behaviors ($\beta = 0.272$), whereas 43% of patients failed to attend annual screenings, especially those with poor glycemic control or moderate foot risk (16). In contrast, U.S. data highlights gaps in examinations among individuals with sedentary lifestyles and poor mental health, suggesting that motivation and psychosocial barriers limit healthcare utilization (17). Additionally, a study by

Qasim, et al., (15) revealed that education and literacy, peer and family support, and female gender consistently correlate with better foot care behavior. Community-level findings corroborate that peer support, literacy, and gender influence preventive foot-care routines: in Indonesia, patients lacking peer support had significantly poorer behavior ($p < .003$) (18). Furthermore, studies from Ethiopia and Pakistan showed that education alone isn't suficient to ensure behavior change—other factors such as family support, urban status, and prior information contribute significantly (19). A Bangkok study underscores that self-regulation (motivation, goal-setting, habit formation) accounted for nearly half of the variation in preventive behavior, whereas knowledge explained only a small proportion (20).

Emerging evidence indicates that self-efficacy, defined as one's belief in their ability to carry out specific tasks (21) plays a pivotal role in preventive foot-care behaviors. In Singapore, higher foot-care confidence was a significant predictor of preventive foot-care adherence ($\beta = 0.272$, $p < .01$) independent of clinical or demographic risk factors (16). Findings from Turkey also reported a positive linear relationship between self-efficacy scores and foot self-care behaviors among patients with ulcers (mean efficacy = 68.4; behavior = 59.1), mediated by prior education and activity levels (10). Intervention studies corroborate this—such as a self-efficacy enhancement program in Thailand (2025), which produced significant improvements in foot-care behavior sustained over six months ($p < .001$) (22). A 2023 digital trial in older adults also demonstrated substantial gains in both self-efficacy and behavior, with A1c reduction ($p < .01$) (23). However, broader meta-analytical evidence (2022) suggests that while education reliably improves knowledge and behavior, it may not always move the needle on self-efficacy unless theory-based, multimodal approaches are used (SMD = 0.557, $p > .05$) (24). In conclusion, diabetic foot care practices are shaped by the complex interplay between knowledge, behavior, and self-efficacy. Improving these three domains through structured education, behavioral support, and empowerment strategies is essential for reducing the burden of foot complications among diabetes patients.

Despite growing recognition of the importance of diabetic foot care education (DFC) in preventing complications such as ulcers and amputations a number of obstacles stand in the way of putting this universal good care into practice. These include challenges related to patients, such as insufficient knowledge, skills, and self-efficacy (25). Similarly, multiple health system factors such as limited structured education, unaffordability, and staff shortages, significantly impede effective diabetes foot care particularly in low- and middle-income countries (26,27). Although international guidelines emphasize the importance of regular foot care education for patients with diabetes, the practical implementation remains limited in many settings (3). Studies have shown that the absence of tailored, repetitive, and contextually appropriate educational interventions contributes to poor knowledge and preventive behavior among patients (28). These persistent challenges point to a critical need for in-depth, qualitative exploration of both patient and healthcare system experiences to better understand the complex, context-specific factors influencing diabetes foot care practices

MATERIALS & METHODS

Study Design: This study employed a qualitative explorative design targeting patients living with diabetes mellitus. The explorative approach was chosen to gain an in-depth understanding of the individual, social, and systemic factors influencing foot care practices from the patients' perspectives. This design allowed for a rich exploration of participants' beliefs, behaviors, and challenges in relation to foot care, which are often not well captured in quantitative studies.

Study Setting: The study was conducted at Embu and Kerugoya level five hospital among diabetes patients attending outpatient clinic. This setting was selected because it serves a diverse population of diabetic patients and provides a relevant context for understanding real-life experiences related to foot care.

Study Population: The target population comprised adult patients diagnosed with type 1 or type 2 diabetes mellitus who had been attending regular follow-up at the diabetic clinic for at least five years. These individuals were considered capable of providing valuable insights into their personal experiences and the barriers they face in practicing preventive foot care.

Sampling Technique and Sample Size: A purposive sampling technique was used to select participants who met the inclusion criteria and could contribute meaningful information. Inclusion criteria included: being aged 18 years or older, having a confirmed diabetes diagnosis, and being mentally and physically able to participate in discussions. Sampling continued until data saturation was reached—when no new themes or insights emerged from further data collection. A total of 40 participants were involved in the study.

Data Collection Methods: Data were collected using Focus Group Discussions (FGDs), which encouraged open and interactive dialogue among participants. A semi-structured FGD guide was used to steer discussions around patients' knowledge, foot care practices, self – efficacy, perceived barriers, and experiences with the healthcare system. Each FGD comprised 10 participants and lasted approximately 60 to 90 minutes. Discussions were conducted in a language comfortable for participants, audio-recorded with consent, and supplemented by field notes. The moderator and assistant note-taker were trained in qualitative interviewing techniques.

Ethical Considerations: Ethical clearance was obtained from Chuka university ethics and research committee and permit to conduct study from National Commission for Science, Technology, and Innovation (NACOSTI). All participants provided written informed consent prior to participation. Confidentiality and anonymity were strictly maintained. Participants were assured that their involvement was voluntary, and they could withdraw at any time without affecting their access to care or services.

STATISTICAL ANALYSIS

Data were transcribed verbatim and translated into English where necessary. Thematic analysis was used to interpret the data, following Braun and Clarke's six-step framework: familiarization with data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Emerging themes were grouped into patient-related and systemic (healthcare-related) factors influencing foot care practices.

RESULT

A total of 40 participants took part in four FGDs, each comprising 10 participants. The participants included both male and female patients aged between 19 to 84years (mean age 58.65years) with majority of them being female 27(67percent). Most had been living with diabetes for more than five years. Recruitment was purposive, and data collection continued until thematic saturation was reached. The data were analyzed thematically, and themes emerged around patient-related and healthcare-related barriers

Theme 1: Patient related factors

Subtheme i: Inadequate Knowledge on Diabetes Foot Care

Participants demonstrated limited understanding of what causes diabetic foot complications and the associated risk factors as well as inadequate Knowledge of Preventive Measures. Some participants

attributed foot complications to external or mechanical causes such as walking long distances or wearing shoes too tight

One participant reported,

"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)

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

Another participant expressed,

"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)

This theme reveals a significant knowledge gap among participants. This lack of information may contribute to delayed reporting of foot problems and poor self-care behavior.

Subtheme ii: Poor Diabetes Foot Care behavior

Many participants engaged in irregular or no foot inspection and cleaning practices, walking barefoot or wearing unsafe footwear and poor self-management of foot issues

Some 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)

Other 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)

On management of foot problems, some 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).

This theme reflects poor foot care practices among participants, characterized by inconsistent foot inspection, walking barefoot or using inappropriate footwear, and inadequate response to emerging foot problems. These behaviors suggest a low level of awareness and prioritization of preventive foot care. Additionally, they point to a lack of self-efficacy and practical skills needed for effective foot management.

Subtheme iii: Low Diabetes Foot Care self-efficacy

Many participants demonstrated low self-efficacy across all the three dimensions-magnitude, strength, and generality according to Bandura's theory of self-efficacy, which impacted their ability to perform consistent, safe, and preventive foot care behaviors

On magnitude participants reported 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,

"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)

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

Some 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)

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

On generality, 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, one participant noted;

"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)

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

Theme 2: Health Care–Related Factors

Subtheme i: Healthcare related barriers to Foot Care Practices

Many participants demonstrated several barriers such as limited access to structured foot care education, persistent staff shortages, and the high cost of essential health services that hinder effective foot care practices

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)

Some other participants 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)

A significant number of participants 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:

"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 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)

This theme highlights systemic healthcare barriers that hinder effective diabetes foot care. Staff shortages lead to rushed consultations and limited patient engagement, while the high cost of services and transport deters regular clinic visits. Additionally, the absence of structured foot care education within routine care leaves patients uninformed and unprepared to manage their foot health. These factors collectively contribute to delayed care-seeking, poor self-care practices, and increased risk of complications, underscoring the need for resource strengthening and integration of targeted foot care education in diabetes services.

Subtheme ii: Health Care–Related facilitators to Foot Care Practices

Participants in this study described several aspects of the healthcare environment that positively influenced their diabetes foot care practices. These included; the presence of peer support groups, the consistency of daily clinic operations, and the friendliness of healthcare staff.

Many participants emphasized that their involvement in peer support groups had a direct impact on their understanding and practice of diabetes foot care:

"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).

This reflects how peer interactions served as informal yet powerful sources of education,

promoting behavior change through relatable experiences and shared advice

Other 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:

"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)

Other reported 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:

"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)

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.

DISCUSSION

Inadequate knowledge on preventive practices

In this study many participants had a limited understanding of the causes of diabetic foot complications, risk factors, and appropriate preventive measures. This gap in knowledge contributes to poor recognition of early warning signs and delays in seeking care, which are consistent with previous research in low- and middle-income countries (LMICs). In a phenomenological study conducted in Ghana, by Bossman, et al., (29) 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, Sanyang, & Senghore (30), 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

Poor diabetes foot care practices

Participants commonly reported walking barefoot, wearing unsafe footwear, and failing to clean or inspect their feet regularly. These findings are consistent with, and further supported by, recent studies in similar low-resource settings. According to a study by Atalay, Alemie, & Abebe, (31) 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[31]. Similarly, Ogunlana, et al., (32) found that, irregular or absent foot checks were associated with low awareness and limited diabetes education. These findings stress the urgent need for culturally tailored, behaviorally focused diabetes foot care education and support programs.

Low Diabetes Foot Care (DFC) self-efficacy

Another key finding of this study was the low self-efficacy among participants in performing appropriate foot care practices. Many participants revealed lack of belief in their ability to perform tasks that require effort, flexibility, or visual assessment. This aligns with findings from Hirpha, Tatiparthi, & Mulugeta (33), 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. In this study also some expressed fear of doing harm to themselves when attempting to trim nails or manage minor wounds. Others admitted engaging in basic hygiene practices like washing their feet, but this confidence did not extend to other critical areas of foot care. This reflects the findings of Küççük & Tosun (34), 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. These findings suggest that low self-efficacy is a critical barrier to consistent and preventive foot care behaviors. Without a strong belief in their ability to perform self-care effectively, patients are less likely to initiate or sustain protective behaviors—even when they are aware of the risks. This finding is supported by several recent studies. For example, Sadeghi, Raiesifar, & Aazami (35), observed that improved self-efficacy promoted self-management behaviors in chronic conditions like diabetes mellitus

Healthcare system related barriers to foot care practices

Several challenges were reported on this theme which limited patients' ability to engage in preventive foot care, seek timely intervention, and adopt consistent self-care behaviors. These included; limited exposure to structured foot care education, shortage of healthcare staff, and the unaffordability of essential health services. Participants reported rarely receiving detailed or consistent education on foot care during clinic visits. When education was provided, it was often general, brief, or focused solely on blood sugar control and diet, with foot care being overlooked. This indicates a systemic failure to deliver consistent and structured foot care education within clinical encounters. A recent study by Hon, McMillan, & Fitridge(36), 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.

Another recurring concern among participants was the chronic shortage of healthcare providers, which led to long waiting times, rushed consultations, and limited time for individualized education or follow-up care. 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, Carroll, & Stewart (25) 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.

Several participants described financial constraints as a major barrier to accessing foot care services, medications, and even transportation to health facilities. As a result, they delayed seeking care, used traditional remedies, or skipped appointments. Economic hardship remains a critical determinant of health-seeking behavior. The high out-of-pocket costs associated with chronic care limit the ability of patients to receive timely and consistent support. This is supported by Angnes, Ginting, & Wienaldi (37) and WHO (38), who found that patients in resource-limited settings often prioritize food and basic needs over clinical follow-up, contributing to poor foot outcomes.

Healthcare related facilitators to foot care practices

While several barriers to diabetes foot care (DFC) were identified in this study, participants also described key facilitators within the healthcare system that supported or encouraged positive foot care behaviors. These included the presence of peer support groups, daily accessibility of clinic services, and the friendliness of healthcare staff.

These enablers played a valuable role in enhancing patient engagement, motivation, and adherence to foot care practices. Peer support allowed patients to learn vicariously through others' challenges and successes, enhancing their understanding of risk factors and management strategies. This finding aligns with recent studies showing that peer support positively influences diabetes self-management, including foot care, by reducing isolation and improving health literacy (39). When peer groups are structured and linked to health education programs, they have been found to improve patient engagement and adherence to foot care routines.

Participants also noted that the consistent availability of clinic services on a daily basis—rather than restricted or irregular clinic days—made it easier for them to seek assistance, follow up on complications, and engage in routine foot checks. Such continuity of care reduced complications and fostered a proactive approach to foot care. Recent literature supports this view, indicating that access to reliable, routine services significantly improves diabetes outcomes by facilitating early detection and intervention of foot-related issues (40).

The demeanor and communication style of healthcare workers were found to greatly influence patient behavior. Participants shared that healthcare providers who were welcoming, respectful, and attentive created a supportive atmosphere that encouraged open dialogue and active participation in care plans. This emotional connection fostered trust and increased the likelihood of patients returning for follow-up visits and adhering to foot care recommendations. According to a recent study by Chen, Su, & Liu (23), positive patient-provider relationships are associated with improved self-management in diabetes, including adherence to foot care practices. Patients who perceive their providers as empathetic and non-judgmental are more likely to disclose early symptoms and follow clinical advice, leading to better outcomes.

CONCLUSION

Preventive foot care among individuals with diabetes is influenced by a combination of personal, educational, and systemic factors. While many patients are willing to engage in proper foot care, their efforts are often hindered by limited knowledge, low self-confidence, and health system constraints. At the same time, accessible health services, supportive peers, and empathetic health professionals were found to empower patients toward better foot care. Improving foot care practices therefore requires a holistic approach that considers both the patient's capacity for self-care and the structure of healthcare delivery systems. To enhance preventive foot care among individuals with diabetes in resource-limited settings like Kenya, a holistic approach is essential. This should include structured education to address knowledge gaps, strategies to boost self-efficacy, and improvements in health system support. Strengthening access to empathetic, patient-centered care and peer support can further empower individuals.

Declaration by Authors

Ethical Approval: Approved
Acknowledgement: None
Source of Funding: None
Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Annastacia Munzi Mbisi, Lucy Gitonga, Beth Gichobi. Factors influencing diabetes foot preventive practices among patients attending Embu and Kerugoya Level Five Hospitals, Kenya. *Int J Health Sci Res.* 2025; 15(9):71-81. DOI: *https://doi.org/10.52403/ijhsr.20250910*

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