

Perspectives of healthcare workers on factors influencing diabetes management and diabetic foot problems in Zimbabwe

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Background: Poor management of diabetes mellitus gives rise to complications such as diabetic foot (DF), which pose a host of medical and socioeconomic problems, especially in low-income countries where resources, capacity and awareness are limited.

Aim: This study purposed to identify local factors influencing poor management of diabetes and, therefore, increasing risk of DF in Zimbabwe.

Method: This study utilised a descriptive qualitative design with a purposive sample of 30 nurses from 14 polyclinics and 2 major referral hospitals in Harare, Zimbabwe. Four focus-group discussions were conducted following a semi-structured interview guide with sections addressing commonly encountered socio-economic, cultural and behavioural factors, which potentially increase the risk of DF complications among diagnosed and undiagnosed diabetic individuals. Thematic analysis was used to analyse the data.

Results: Four major themes were identified including poor socioeconomic status, poor self-care, religious and cultural factors, and health-system-related factors. Lack of awareness results in poor health-seeking behaviour, and use of unconventional treatment methods, which may increase DF risk among people living with diabetes, both diagnosed and undiagnosed.

Conclusion: Appropriately tailored education and awareness interventions taking into account local socio-economic and cultural factors are key to the prevention of DF and promotion of self-management activities.

Keywords: Africa, diabetes mellitus, diabetic foot, footcare, Zimbabwe

Introduction

Diabetic foot (DF) is the most debilitating diabetes-related complication, potentially resulting in lower limb amputations if left untreated.^{1,2} The burden of diabetes is highest in developed countries (10.4%) compared with low- and middle-income countries (LMICs) (4–9%), yet the burden of diabetes-related complications such as DF is much higher in LMICs.³ This disproportionately high burden of diabetes related complications could be attributed to poor glycaemic control among people living with diabetes in low-resourced countries. DF exacts significant morbidity and mortality in sub-Saharan Africa (SSA), where the estimated burden is > 10%.⁴ SSA is reported to harbour the highest proportion of undiagnosed diabetes, translating to an under-represented diabetes burden of about 62% and related complications in Africa.⁵ The International Diabetes Federation recorded 99 400 diabetes cases in Zimbabwean adults.⁶ Earlier reports indicated that diabetes and pre-diabetes cases are under-diagnosed by 70%,⁷ suggesting that a considerable number of individuals are potentially at a high risk of developing DF, unknowingly.

The risk of developing DF ulcers resulting in amputation increases by two- to four-fold with the duration of diabetes, regardless of type as well as disease progression.⁸ Risk of developing diabetic foot complications is influenced by sex (being male), age, smoking, poor glycaemic control and presence of additional comorbidities such as coronary heart disease, hypertension and Charcot's arthropathy.^{9–12} In addition, socio-

economic factors and poor self-care practices also contribute to this risk for people living with diabetes in both diagnosed and undiagnosed cases.^{13–18} Self-care encompasses self-monitoring of glycaemic control, dietary adjustments, exercise, foot care and additional medications, as well as daily practices, which prevent auxiliary diabetic-related complications.¹⁹ Poor self-care can be influenced by behavioural, cultural and religious factors including lack of knowledge about diabetes, poor drug adherence, lack of access to blood-glucose monitoring, and non-adherence to diet and exercise recommendations.^{13,20–21} Research to understand these factors provides a first step in developing appropriately tailored preventive interventions.

This study was carried out as part of the Zimbabwe Diabetic Foot Project (ZDFP), whose main goal was to establish capacity for footcare services for diabetic patients in Zimbabwe. The purpose of this current study was to explore factors that may influence footcare practices and increase susceptibility to DF or pose a barrier to DF prevention and management, from the perspective of healthcare professionals.

Methods

The study utilised a descriptive qualitative design with a purposive sample of 30 nurses drawn from 14 City of Harare polyclinics and the 2 major referral hospitals in Harare, Zimbabwe. Ethical approval was obtained from both the national research ethics committee, Medical Research Council of Zimbabwe (MRCZ ref number A/1923) and the institutional ethics committee, Joint

Research Ethics Committee for Parirenyatwa Central Hospital and College of Health Sciences at the University of Zimbabwe. The research was conducted in compliance with the Helsinki Declaration.

Selection/inclusion criteria

During the preparation of the ZDFP project, only 14 of the 34 Harare City Health clinics and the two main central hospitals, Parirenyatwa and Harare Central, had been identified as sites to implement DF screening and referral as part of the main study. Nurses selected to be part of the study had to be stationed in a department that managed diabetes in their respective facility or primary care centre. At least 1–2 nurses from each clinic or hospital were invited and attended a ZDFP one-day training workshop at the University of Zimbabwe College of Health Sciences Research Support Centre, where this study was held. Experience of nurses in providing diabetes care and patient management was assumed to be sufficient to establish empirical evidence for answering the study objectives.

We conducted focus-group discussions (FGDs) following a semi-structured interview guide for about 1.5 hours. The interview guide included sections addressing commonly encountered socio-economic, cultural and behavioural factors, which potentially increase the risk of DF complications among diagnosed and undiagnosed people living with diabetes. The discussions were audiotaped while detailed notes were being taken. The researcher led the discussions with the help of a moderator. Thematic analysis, as recommended by Braun and Clarke, was used to analyse the qualitative data following the stages of data organisation, familiarisation, transcription, coding, developing a thematic framework, indexing, displaying and reporting.²² Trustworthiness was ensured by observing credibility, dependability, confirmability and transferability. The thematic analysis was utilised because it is flexible to identify and analyse patterns within a dataset.²³

Findings

Four major themes, namely poor socio-economic status, poor self-care, cultural and religious factors, and health-system-related factors, were identified (Table 1).

Poor socio-economic status

Participants reported that limited or poor transport infrastructure and public transport services results in walking being a common means of transport in most rural and low-resourced areas. Individuals have to walk long distances to access basic services and facilities such as supermarkets, schools and medical centres. In some low social settings shoes are preserved for special occasions and, consequently, routine activities such as walking and farming are done barefoot, which notably increases the risk of foot injuries, infections or burns.

Combining economic constraints with the hot climate in Zimbabwe leads to people opting for cheap and airy shoes such as 'mariposa or manyatera' (Figure 1a) and 'sandaks' (Figure 1b), which are made of rubber and plastic.

'Shoes are expensive so people opt for home-made shoes, such as manyatera (mariposa), flip flops or cheap sandals for women, sandaks.'

Both mariposas and sandaks absorb heat and are rigid, thus exacerbating the risk of pressure sores, blisters or burns. Another commonality is the Zimbabwean-style flip flops 'pata

Table 1: Themes identified from focus-group discussions

Major theme	Categories and codes
Poor socio-economic status	Lack of money to buy proper recommended shoes leading to: <ul style="list-style-type: none"> • use of shoes made of synthetic materials and slippers • using wire for shoe repair • sharing shoes and wearing second-hand footwear from unknown sources. Lack of money for transport and unreliable transport infrastructure: <ul style="list-style-type: none"> • patients walk long distances to visit healthcare facilities, and other social issues • lack of reliable transport services and poor roads, especially in rural areas
Poor self-care	Poor adherence to medications, diet, exercise and other lifestyle modification strategies Poor health-seeking behaviour Poor foot-care practices: <ul style="list-style-type: none"> • Barefoot walking • Working in fields at farms barefoot • Walking long distances • Foot exfoliation daily using pumice (<i>kukweshaman'a</i>) • Bathing in contaminated rivers • Pedicure in unsanitary salons • Unprofessional callus removal • Wearing inappropriate shoes that are 'in fashion', e.g. black is a favoured colour for shoes, narrow toed box shoes and high heels Alternative medicine or unconventional remedies: <ul style="list-style-type: none"> • urine to remedy burns or snake bites • rags or soil to cover open sores • treating thorn pricks by dabbing with hot water
Religious and cultural factors	Religious practice: <ul style="list-style-type: none"> • Footwear is not permitted at places of worship in some religious sects, e.g. Apostles (<i>Vapostori</i>) and Muslims • Skip bathing during special ceremonies • Cultural and religious sects that prohibit self-care activities such as cloth drying or moisturising • Jumping over fire during celebrations and rituals • Walking on embers • Soaking feet in footbaths when entering places of worship • Prolonged fasting for healing • Reliance on prayer for healing Cultural practices: <ul style="list-style-type: none"> • Removing shoes to enter a spiritual healer's (<i>n'anga</i>) shrine • Beliefs in spirit mediums to cause and heal affliction, e.g. disease • Preference for traditional medicine (<i>n'anga</i>) over conventional medicines for chronic diseases • Ritualistic feet incisions (<i>kutemwa nyora</i>) • Use of traditional herbs on wounds
Health-system-related factors	Manpower shortages: <ul style="list-style-type: none"> • Busy work schedules, heavy workloads, insufficient time for patient education and screening Resource limitations: <ul style="list-style-type: none"> • Costs of medicines and treatment beyond reach of many patients in the absence of health insurance



Figure 1: (a) Shoes reported to be commonly worn by Zimbabweans, especially in rural areas. *Mariposa* shoes that are made from old car tyres.²⁴ (b) Sandaks made from synthetic plastic.²⁵

pata pata (Figure 2a), which are characterised by a thin foam layer. The *'pata pata'* does not protect the wearer from sharp objects and has no support to prevent ankle rolls and breaks, toe blistering, forefoot load and stress. At times, shoes are repaired at home using unconventional methods such as wires, which can potentially harm the foot (Figure 2b). It is also habitual to buy second-hand items, including shoes that may not be hygienic.

'Materials of these shoes and their prior storage may be of unacceptable hygiene.'

Poor self-care

Participants reported poor adherence to therapy by patients.

'Patients generally do not adequately adhere to their medications, diet, physical activity and other lifestyle modification strategies.'

Another important factor raised in diabetes management was the high consumption of starch-rich foods such as cornmeal (*sadza*) and other traditional grains, added to increasing availability of refined foods and drinks. In Zimbabwe among other African societies, weight gain is perceived as a sign of wealth while losing weight is associated with negative connotations such as illness and stress. These misconceptions result in increased disease risk and complications associated with poor diabetes management, such as hyperglycaemia. The healthcare practitioners also reported poor health-seeking behaviours and reliance on unconventional alternative home remedies. Group discussants noted that some individuals do not go for regular check-ups and may ignore symptoms of diabetes. Lack of foot-care knowledge was also cited.

'There is a general lack of footcare knowledge, which means that people do not take time to examine their feet for sores, ulcers or blisters.'

Poor foot-care practices such as use of a pumice stone to remove dry skin on feet, referred to as *'kukweshwa man'a'* and pedicures (especially in urban areas as foot-care treatments to exfoliate skin) were reported. These pose risk of injury to people living with diabetes when performed by unqualified practitioners. Furthermore, the use of black shoes as a common colour of choice, as fashion dictates that they can be matched with any colour, was also highlighted. However, sentiments were raised that due to the hot climate black shoes tend to generate heat, causing sweaty feet and exacerbating the risk of infections.

A common observation among respondents was that narrow toed box shoes are fashionable and worn by both men and women despite exerting pressure on different parts of the foot. Foot pressure causes foot deformities such as corns, bunions and hallux valgus (Figure 3a and b).

'People don't pay attention to the fit of a shoe, and when they remove their shoes at any given chance, it may indicate that they are uncomfortable and the shoes are too tight.'

Religious and cultural factors

Participants reported that some religions require their congregants to remove footwear when entering a place of worship.

'Members of the apostolic sect remove shoes during ceremonies which are held outside in the open. Diabetics are at risk because they can step on sharp objects such as nails or glass.'

Some dangerous rituals reported in the FGDs included walking on embers or jumping over fires. Prolonged fasting can also lead to dysglycaemia, further augmenting susceptibility to DF.

Participants cited the role of spiritual and ancestral beliefs in Zimbabwe. The belief in supernatural causes of illness and the supernatural means of healing illnesses interferes with health-seeking behaviours. For example, a participant said:

'Ritualistic incisions are made under the feet to enhance performance and herbs can also be inserted into the incisions as a remedy for ailments and chronic diseases.'

Such behaviour results in poor adherence to pharmacological interventions and increased risk of DF.

Health-system-related factors

Group discussants raised concerns regarding the highly burdened healthcare system in addition to diabetes care being



Figure 2: (a) Foam slippers *'pata patas'*.²⁶ (b) *Pata pata* shoes repaired using wire.

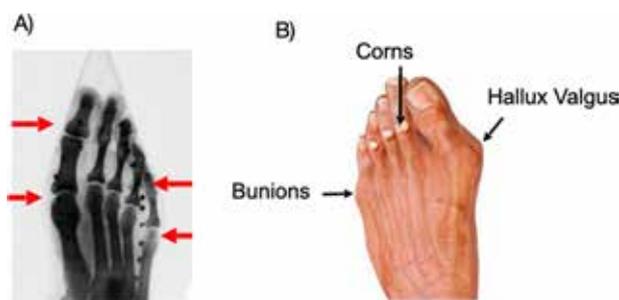


Figure 3: Effects of narrow toe box shoes and the physiological damage. (a) The narrow toe box shoe exerts pressure on points represented by the red arrows.²⁷ (b) The deformities that occur as a result of narrow toed shoes: bunions, corns and hallux valgus.²⁸

under-resourced. Healthcare institutions are saddled with massive staff shortages, resulting in heavy workloads and long working hours. This impacts negatively on routine patient monitoring and health education.

'We have to attend to all patients regardless of their disease or condition. This leaves little time for diabetic patients who require routine foot inspections, education about self-care practices and building awareness about complications.'

In Zimbabwe treatments were often offered on an 'out of pocket' payment basis for hospital, clinics and prescriptions. Therefore, patients may fail to meet the financial requirements to adequately manage chronic diseases such as diabetes, thus increasing risk of complications such as DF.

Discussion

Adherence to treatment and drastic lifestyle changes are necessary for the management of diabetes and glycaemic control. Chronic hyperglycaemia results in cellular changes such as glycation, oxidative stress and dyslipidaemia, which results in vascular complications such as DF.²⁹ While glycaemic control and its management are fundamental to prevent and delay the occurrence of diabetes-related complications, behaviour and lifestyle are equally paramount determinants of treatment adherence, and therefore glycaemic control. Race is often considered a proxy for socioculture and religion; however, the diversity across Africa highlights the need for locally tailored interventions, which can be incorporated into educational campaigns and prevention models. As such, we extrapolated the socio-economic, self-care, religious and health-related factors that may affect health-seeking behaviour and glycaemic control, and consequently ameliorate the risks of DF in Zimbabwe. To date, there are no comprehensive reports of local specific risk factors for DF in Zimbabwe, so the findings reported here are fundamental to improve capacity for prevention of DF.

As a whole, diabetes medications to manage its related complications, as well as lifestyle changes related to diabetes, have significant financial implications on patients, cultivating non-adherence.³⁰ For chronic diseases such as diabetes, treatment adherence is key to successful management and prevention of complications such as DF,³¹ yet the harsh economic conditions in Zimbabwe mean most people are living in poverty and cannot afford medication, or to pay consultation fees or transportation to/from clinics. Furthermore, the FGDs showed that these financial constraints and poor access to health services necessitate unconventional remedies such as traditional

healers with potentially limited knowledge of related complications. Traditional healers also perform treatment practices such as '*kutemwa nyora*', which use herbs or plants and unsterilised instruments, potentiating infection.³² Although these remedies may provide short-term relief, the long-term efficacy of these traditional remedies is yet to be researched and understood in Zimbabwe. To mitigate these financial limitations, establishment of frameworks and policies to subsidise diabetes care may be an appreciable course of action to improve adherence and advance diabetes management in Zimbabwe.

Managing diabetes and complications such as DF is also highly contingent on adherence to dietary restriction such as maintaining a low-carbohydrate and fibre-rich diet.³³ Like most LMICs, the staple food for Zimbabwe is cornmeal, with high starch content and calorific value. Cornmeal is so embedded in the Zimbabwean diet that it may be incorporated in at least two meals, porridge for breakfast and *sadza*, consumed for lunch and/or dinner. Similarly, in Egypt, the burden of diabetes is comparable to that of developed countries (7.2%) and the staple is high calorific wheat flour.³⁴ To ease the burden of diabetes and prevent related complications in Egypt, the World Health Organization and health authorities are generating genetically modified food to replace trans-fats and reduce salt content in the dietary staples.^{35,36} Zimbabwe would benefit from substantial initiatives such as these, to modify dietary intake, apply dietary restrictions and encourage nutrient fortifications. These steps are significant towards glycaemic control while also keeping obesity and other diet-related diseases under control. In addition, it is equally vital to educate diabetic patients and the public on the repercussions of high carbohydrate and sugar-rich foods, while also promoting healthy lifestyles and self-management.

Sedentary lifestyles are also well-established susceptibility factors to diabetes and poor glycaemic control. In many developing countries, modernisation and inert habits are growing due to improved economic access and reduced physical labour across sectors. Ergo, incorporating self-management and maintaining a healthy lifestyle according to defined standards is a challenge in countries such as Zimbabwe.^{13,31,37} Programmes to incentivize health and well-being, through corporate and medical aid initiatives, are also gaining traction in Zimbabwe, yet they still are not accessible to individuals of low socio-economic status as they require formal employment and monthly subscriptions, respectively. Nationwide campaigns to promote active lifestyles, as well as self-care education and public facilities that can promote physical activities, should be included in city planning activities.

Although walking in general and walking barefoot plays a beneficial role in foot structuring and formation, it can also be detrimental to the plantar skin, causing excessive thickening and potentially loss of sensation.^{37–39} The common use of black shoes, and footwear fabrics such as cotton, plastic, polyester, nylon and other synthetics, should be avoided among diabetic patients or closer attention to footcare should be encouraged. In addition, narrow toe box and high-heeled shoes should also be avoided as they may cause lesions, deformities and joint damage.^{40–41} Shoes are important therapeutic tools with the ability to reduce foot pressures, which, if left untreated, result in deformities or disability.^{42–43} In general orthotic shoes are recommended to reduce foot pain and provide greater comfort and improved circulation, although they may not be accessible to most Zimbabweans.

Religious beliefs and spiritual practices determine how patients approach life. Spirituality and religious beliefs have been shown to play a central role in the lives of many Zimbabweans as they can provide support, confidence and hope for people affected by chronic illnesses.⁴⁴ However, spirituality and religion can also affect the adherence to medication by encouraging reliance on prayer, spiritual intervention and meditation to manage illness.⁴² In some religious groups such as the Apostolic Faith (*mapostori*), higher disease burden and mortality has been noticed due to poor health-seeking behaviour.⁴⁵ Similarly, extreme culturalists believe chronic illnesses are caused and remedied by ancestral spirits. Thus, engagement with these cultural and religious communities is paramount in establishing successful awareness programmes, and to encourage individuals to seek healthcare from orthodox health facilities.

In this study, we provided an initial record of local limitations, for which further research is required to understand the challenges in depth in order to develop interventions within the existing economically and infrastructurally constrained environments. Although there are increasing incidences of diabetes, limitations in time and skills of clinical staff mean that foot screening is rarely conducted routinely during clinic visits and action is only taken to treat the complications when they arise, rather than providing preventative screening services. Interestingly, our findings were reverberated by Ethiopian diabetic patients, who indicated that despite having foot injuries, footcare is the least recognised self-care practice.⁴⁶ Furthermore, studies conducted in South Africa, Tanzania and Ethiopia showed that diabetic patients were unaware of the need to inspect their feet regularly, and were also unperceptive to the risks of drying and soaking of feet, walking barefoot and the use of sharp objects as this pertains to diabetic foot complications.^{17,47} Therefore, routine monitoring at health facilities should be complemented by education and awareness campaigns and incorporate hygienic practices, foot inspection and tips on routine self-care in addition to regular check-ups by qualified health professionals.

Conclusions

This study demonstrates how foot care in Zimbabwe is hampered by a range of socio-economic, personal, religious and cultural, and health-system-related factors, leaving diabetic patients susceptible to DF. It is therefore essential to implement tailored countrywide interventions that reinforce self-management while addressing barriers such as those identified in the current study. Although the present study focused largely on the perspective of nurses, who are at the forefront of diabetes care and patient management, this data, combined with future studies on diabetic patient perspectives and the prevalence of DF, will provide comprehensive information to guide education and awareness campaigns that can contribute towards the prevention and management of DF in Zimbabwe.

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