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Journal of Diabetes, Metabolic Disorders & Control

Research Article

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# Barriers to diabetes foot care practices among diabetes patients attending diabetes clinic in Embu county, Kenya

## Abstract

**Background:** Diabetes mellitus is becoming a major public health concern of the 21st century globally, with disproportionately great socioeconomic liability in the emerging world. The prevalence of diabetes mellitus continues to rise resulting in significant morbidity and mortality. This is as a result of the development of chronic complications such as cardiovascular, eye, renal diseases and foot problems. Foot ulcerations related to peripheral neuropathy and vascular disease has led to distressing health consequences as well as amputations among the diabetics. Thus, the study aimed at establishing barriers to foot care practice among diabetes patients attending diabetes clinic in Embu County, Kenya.

**Method:** A descriptive survey targeting a population of 1413 type 2 diabetic patients and 12 key informants was the target population of the study. From this, a sample size of 301 participants and 12 key informants were drawn to take part in the study using fischer et al formular. The participants were conveniently sampled from the selected DM clinics respectively. Self-administered questionnaires and focused group discussion was used for data collection. Data from study was thematically analyzed and the results presented in narration and tables.

**Results:** Major barriers identified were impaired vision and knowledge deficit. This was backed by health care provider perception barrier that; health education given had little effect on foot care practices. Evident from the findings was inadequate delivery of services due to staff shortage as well as a communication barrier and patients negative attitude.

**Discussion:** Intensive campaigns on the practice of the recommended diabetic foot care practices in management of diabetes should be done. Facilitation through the provision of adequate human and material resource by the government to ensure adequate delivery of health services to her citizen is also paramount.

**Keywords:** diabetes foot ulcer, diabetes mellitus, Kenya, Embu county, diabetes patients

Volume 7 Issue 4 - 2020

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**Received:** August 29, 2020 | **Published:** December 29, 2020

**Abbreviations:** DM, diabetes mellitus; DFU, diabetic foot ulcer; IDF, international diabetes federation; NCD, non-communicable diseases

## Introduction

Diabetes mellitus (DM) is a shared public health problem experienced worldwide, with Diabetic Foot Ulcer (DFU) being a major problem experienced by diabetes patients.[1] Globally, 8.3 percent of the patients are affected with DM.[2] A survey done by WHO[3] showed the figure had increased to 422 million internationally by 2014. The International Diabetes Federation (IDF) did their study in 2015and projected the figure to rise to 642 million by 2040.[2] From this data it is evidence that DFU is an increasing health problem. DM is among the top four non-communicable diseases (NCDs) with gradual progression over the years.[3] The figure of patients with diabetes condition in Africa has been increasing considerably, and the expectations of doubling the amount in the coming decades are high. In 2015, it was estimated that 14.2 million persons were suffering from diabetes in Africa and if that current approximation continues the overall occurrence of DFU is expected to rise. A study by IDF[2] indicates that in Africa, 21.5 million persons live with diabetes with yearly estimate of 480,900 diabetes-related deaths. In Africa DFU rates varies from one region to another. In Nigeria, a Hospital-Based study revealed that the occurrence of lower limb ulceration ranged from 11 per cent to 19.1 per cent, among the diabetics diabetes[4,5] while in Kenya the prevalence is at 4.6%.[6,7] Among the complications affecting people with diabetes; foot ulcer complication has been found to be among the problems.[8] It is believed that the lifetime risk of developing foot ulcer in patient with diabetes ranges from 15% to 25%.In addition, every 30 seconds a lower limb amputation occurs somewhere in the world as a results of diabetes.[9] A study on the mortality rate as a result of diabetic foot amputation showed that 13% to 40%occurred within one year, 35% to 65 per cent at 3 years while 39% to 80% occurred within at 5 years. This was found to be worse than the mortality rate for most cancers.[10,11] 50 % of the amputations can be prevented only if patients understand the standard daily foot care practices.[2] Diabetes Foot lesions cause pain and morbidity to the patient. Foot ulcers have direct and indirect economic cost to the family. Other than the direct costs incurred due to complications of foot ulcers, there are other indirect costs related to loss of health-associated quality of life, individual patients' loss of quality life, family costs and the loss of productivity.[2] Neuropathy can be prevented through appropriate diabetic foot self-care,[12] which encompasses all areas to prevent and correct care of the ankle and foot.[13]

In developing countries such as Kenya, barefoot gait has been recognised as a common practice among the rural people[6] alongside

improper footwear as well as inappropriate foot care practice.[14] A hospital case study by Padma et al.,[15] among 117 type 2 diabetes patients to assess the foot self-care practices, revealed that the patients knowledge levels and their commitment to managing the disease was inadequate. Almost two thirds of the respondents were conscious of the importance involved with having regular exercise recommended dietary control in terms of proportions and prescribed drug compliance. Sixty four per cent of those who followed the recommended self-care methods realised glycaemic control. The patients who were knowledgeable of the disease, but did not adequately adhere to the foot care practices. A study done by[16] in Nigeria found out that of 352 patients with diabetes, 30.1 percent was knowledgeable on the disease with only 10.2 per cent practicing good self-foot care. Majority of the patients (78.4%) who had poor self-foot care practices lacked adequate knowledge on the good foot care practices. On knowledge evaluation (68.8 %) was not aware of the first thing to do after finding an erythematic lesion on their feet or bleeding between their toes. Another 61.4 per cent were not aware of the significance of inspecting the inside of their footwear for sharp bits and pieces. Results on the self-foot care practice revealed that 89.2 per cent did not receive advice when they bought new footwear especially on breaking in and 88.6 percent failed to get comfortable size footwear as recommended. Low levels of poverty and education were linked to poor foot care practices. Minority of the participants (40.9 percent) inspected their feet on a regular basis, (46 percent) washed their feet with warm water regularly and (47.7 percent) inspected their shoes for objects before and after wearing them.[17] According to Jamil et al.,[18] in a study to determine patients with diabetes practising the recommended measures, only 6 per cent were practicing the recommended foot care measures. Seventeen percent examined their feet on a daily basis, 20 percent washed their feet with warm water every day, while 73 percent washed their feet with warm water more than one in a single day.

Twenty three per cent dried their feet after every foot wash especially between the toes. 27 percent applied emollients lotions on their feet while 25 per cent inspected their shoes before wearing them. From the study 24 per cent wore shoes that fitted comfortably, with 8 per cent wearing socks made from cotton and changed them every day. However, 36 per cent of the patients walked bare footed illustrating poor practices. Seld et al.,[19] in Ethiopia examining barriers for self-foot care revealed gaps. The participants were asked if they had barriers limiting them from the recommended self-foot care practices. 48 percent and 52 percent indicated "no" and "yes," respectively. As to the barriers of proper foot self-care practices stipulated, 92 participants pointed out the lack of proper knowledge and poor communication between healthcare practitioners and patients. Another report indicated poor knowledge as the major contributing factor for poor self-foot care practice levels.[20] In the same study, the inadequacy of knowledge on self-foot care was at 33.0 percent, 5.7 percent of the participants reported poverty as a factor, and 6 percent reported poor communication of the recommended health messages as hindrances to foot care.[20] Poor knowledge on diabetes was found to be common among individuals with low education levels making the learning of specific self-management difficult. In Embu, Foot problems are a major source of morbidity associated with diabetics and the top cause of hospital admission among this population in the area. Foot problems can be effectively and efficiently managed but unfortunately, most of the patients seek health care when it is too late thus risking losing their feet. The study therefore; seeks to find out the main reasons behind this situation. Understanding the existing gap is paramount and is be a step towards improving the current situation.

## Material and methods

### Study area

The study was carried out in Embu County facilities offering specialized diabetes Care.The County is divided into four Sub County namely; Mbeere South, Mbeere North, Runyenjes and Manyatta Sub-Counties. Each sub county has a level four hospitals plus one main teaching and referral hospital (level 5) in Manyatta Sub County. Among these facilities, Kianjokoma, Runyenjes and Embu hospital are the only onesthat provide the specialised care.

### Study design

A descriptive study design was used in the study to describe the phenomena or the subjects under study as accurately as possible without manipulation of variables. It was used to assess barriers to foot care practices among patients with type 2 diabetes seeking care at Embu County health care facilities.

### Study population

The study Targeted 1413 people, with 954 from level five hospital, 234 form Runyenjes hospital, and 225 attending Kianjokoma hospital. A population of 301respondents was arrived as a sample size using fischer et al formular. Four key informants (nurse, dietician, medical officer and paediatrician) from each facility were also involved in the study. A sample size from each facility was proportionately calculated and systematic random sampling was used to get the desired sample from daily type register. Key informants were conveniently selected to participate in focused group discussion. The reliability of the instrument was ensured through pre-test at Chuka general hospital whereby a parallel form technique was used to check how well the instruments produces the same answers to the concerns raised. The content validity was determined through seeking expert opinion to judge whether or not the content and format of the instrument was appropriate. The quantitative data was analysed using Microsoft excel and qualitative data thematically analysed. Proportions were calculated and reported as percentage of totals. Data was presented in narration and summary tables. Ethical issues were ensured through seeking authorization from National Council for Science, Technology and Innovation ("NACOSTI") and Embu county institutional research board committee before the execution of the research. Permission was gotten from the participants in the study. Confidentiality of the data assembled from the subjects was conserved.

## Results

A total of 301 respondents and 12 key informants were involved in the study, with a response rate of 98%. The reliability coefficient for the data collection tool was calculated and a chronbach's alpha of 0.83 was obtained.

### Patients related barrier to foot care practices

After assessing the patient's foot self-care knowledge and assessing their foot self-care practice, the study wanted to identify the barriers hindering proper foot self-care. A large proportion of the respondents' 219 (73.7 percent) reported to have barriers to foot self-care Table 1. The factors indicated in table 1 were found to hinder foot self-care. 122 (41.1 percent) of the participants reported that their vision was impaired, they were not able to see well. 55.6% were not able to reach their feet for inspection, 10.1 percent the cost of the recommended shoes was not affordable and 38.4 percent never thought it was

 

important to do foot self-care. According to 42.8 percent they never knew how to do foot self-care, 0.3 percent were not able to practice foot self-care due to poor communication between the health care provider and the patient, 6.4 percent lacked family support to practice foot self-care, and 1.3 percent, 1 percent reported to walk bare foot since it is a common practice in their society and lacked motivation respectively.

**Table 1** Barriers to foot self-care

| | Frequency | percentage |
|---|---|---|
| Barriers to foot self-care among the respondents | | |
| Poor vision among respondents | 122 | 41.1 |
| Inability to reach their feet | 165 | 55.6 |
| Cannot afford the recommended shoes | 30 | 10.1 |
| Don't think it is important to do foot self-care | 114 | 38.4 |
| Don't know how to do foot self-care | 127 | 42.8 |
| Poor communication between the health care provider and the patient | 1 | 0.3 |
| Lack of family support | 19 | 6.4 |
| Walking bare foot is common and seen to be normal in the society | 4 | 1.3 |
| Lack of motivation | 3 | 1 |

## Healthcare providers' perception on barriers to foot care practices

A total of 12 key informants were selected from the three health facilities offering specialized diabetic clinic. Participants were sampled from various disciplines to obtain a broad range of viewpoints on their opinions on patients' compliance with appropriate foot care instructions. The breakdown of the participant was four in every facility, that is, 1 nurse, 1nutritionist, 1medical officer and 1 podiatrist. Therefore; in every facility a discussion of four participants was carried out. From the discussion we observed common factors, initially we designed our interviews to elicit type of foot care education given and when do they typically provide the information.

It was evident from the members that once the patient is diagnosed they were given comprehensive health message.

"*During clinics we put all diabetic patients together, teach them on blood glucose control, diabetic diet and any other relevant information as per their questions. Sometimes we find ourselves busy and only give key information about diabetes only" (respondent 2 nurses from Embu level 5 hospital)*

From the above comment it is evident that the patients receive health messages on diabetes but not specifically on diabetic foot care. It was also supported by nurse's response from Embu level 5 hospital podiatrists.

*"I teach my patients mostly on the food portions to eat and type of food to take. This helps on maintaining glycemic blood sugars within the normal ranges. We rarely emphasize on foot care not unless a patient asks a specific question on foot car"(Respondent 9 podiatrist from Embu level 5 hospital)*

In another interview

*"When a patient is diagnosed with diabetes they are connected to the nutritionist for counseling. Sometimes when there is enough time, the patients are put together and taught about diabetes. But mostly, due to work load we only teach them on basic diabetic care and answer any questions specifically asked." (Respondent 6 nurse in Runyenjes sub county hospital)*

When the nutritionist was interviewed, it was evident that most of the time the patients received health messages regarding diabetic food and blood glucose glycemic control. There was little evidence of teaching these patients on diabetic foot care practices.

*"When the patients are sent to me, i teach them on diabetic nutrition food proportions and maintaining blood glucose within normal ranges. (Respondent 3 Nutritionist from Kianjokoma Sub county hospital)*

In another interview,

*I teach my patients on diabetic food, and the general care for diabetic patients. Sometimes the patients report late than agreed and find us on with health messages; this means they miss some information. In other days, we offer individualised health education, and this depends on the need of the patients. Some patients don't ask about foot care practices. (Respondent 4 Nutritionist from Embu level 5 hospital)*

Another key question tried to elicit information on health workers perceived barriers to the provision of education on foot care, and common factors such as communication barrier, staff shortages, patients' attitudes and also lack of appropriate teaching aids were emphasised through expression of the following statement.

*"When I teach my clients I mix the languages this makes it difficult to understand some practices. I do not know the local language of the majority of the patients so is forced to use Kiswahili. Some of the patients do not even understand Kiswahili and it requires the nutritionist to translate. This poses a communication barrier." (Respondents 7 Medical Officer Embu level 5 hospital)*

In another interview;

*Sometimes the attitude of the patients to foot care is negative, they don't concentrate with foot care, and they want us to teach them on diabetic food to take to control their blood sugars. I also would like to teach them on foot care practices but i don't have the charts for demonstration of these practices. We also need specific updates for the recommended practices so that we can teach the patients the right and correct procedures. (Respondent 10 Podiatrist in Runyenjes sub County hospital)*

Another respondent said;

*In my place of work, it's recommended that the diabetic patients are given health message on diabetic food, foot care practices and general health care. However, this is not done due to understaffing. As a nurse you are expected to attend to various patients and at the same time teach the diabetic patients. When time is available we do that, but sometimes we send them to the nutritionist for counselling. Sometimes the patients request for specialised care and screening for the risk factors for development of foot ulcers. Unfortunately, the specialists visit the facility once in a while and can't reach all the diabetic patients.(Respondent 8 Nurse from Kianjokoma Sub county hospital)*

During another focus group discussion it was evident that diabetic food and foot wear was among the key messages offered to patients;

*Most of the patients are taught on control of blood sugars and foot wear appropriate for diabetic patients. The patients are supposed to be taught on foot care practices and how to prevent foot complications but due to staff shortages it is provided once in a while.(Respondent 9 Podiatrist Embu level 5 Hospital)*

There was also another key question which tried to obtain information on health care workers perceived facilitators to the provision of education on diabetes foot care and common themes identified were; management support, occasional facilitators from external specialist, team working and support group linkage. These point were clearly expressed through the following statements.

*"In our facility we really appreciate the management support, we get through their provision of continuous update through trainings, workshops etc either within the facility or outside on diabetes management, that is, we always have the current information, the limitation is too much workload such that to provide the information appropriately to the client is a challenge"(Respondent 2, nurse Embu teaching and referral hospital)*

In another interview

*"We do have established support which meets once per month, during which clients share their experience both positive and negative concerning their condition thus encouraging one another. I do also come in to clarify any concern raised by the group members or offer any other health information based on identified need of the client. Even in those groups when funds are available we do invite some specialist such eye specialist, renal specialist among others who comes screen the client and share with them some health messages"(Respondent 5 Medical Officer from Runyenjes sub county hospital)*

This was echoed by a another respondent

*"Our support group has been the main entry point through which we pass health messages to our clients because that is the time we can get large numbers gathered together"(Respondent 1medical officer from Kianjokoma sub county hospital)*

In another interview

*"Our team work spirit has been a great boost to our success in management of our client, this is because with our staffing shortages if we don't work as team may achieve little. For example at times you may find that when am out may be for other official duty and my colleague is not available any other team member available will always provide foot care health messages required by the client."(Respondent 11 from Runyenjes sub county hospital)*

Another respondent also agreed with the above statement;

*"If it were not for our team work, with crisis we have from manpower, material and even workload we could be having recurrent burn out but God is faithful we have never had any incidents"(Respondent 12, nutritionist from Runyenjes sub county hospital)*

From these focus group discussions, it was evident that there is deficit of knowledge specifically on the ideal foot care practice. In addition, there is a communication barrier between the health care providers and the patients. Staffing issues was a common reason given for not giving the messages as recommended as well as the lack of visual aids for teaching. Getting current updates, involvement of external specialist in the clients care, team work and having support group linkages were cited as some of the facilitating factors to diabetes care.

## Discussion

### Patients' related barriers to foot care practices

In this study, impaired vision, 41.1 percent (122), inability to reach the feet, 55.6 percent (165), knowledge deficit on diabetic foot care and 42.8 percent (127) failure to realize the importance of the practice were identified as some of the main barriers. Other barriers were unaffordability of shoes 10.1%, and lack of family support 6.4% associated with foot ulcer development. These results were based on 219(73.7 percent) respondents who reported to have barriers to foot self-care out of 297 participants of the study. From this study it is clear that majority 219(73.7 percent) of the participants encounter several barriers while trying to self-manage their feet. This was consistent with a study done by Seid et al.,[19] in Ethiopia on barriers to foot care practices. The study indicated that out of 313 participants, 162 (54 percent) experienced some hindrance to their effective foot care. Impaired vision and the inability to reach their feet for inspection among the participant in this study were major barriers identified. However, this was contrary to a study by[19] which indicated that these were among the least barriers that bothered the patients, 9 (5.5 percent) and 6(3.7 percent) respectively. Given that both studies were done in developing countries, it is suggestive that each country has its own unique barriers to foot care which cannot be generalized. Knowledge deficit was identified as a major hindrance as supported by a study done by Bago[20] in Ethiopia which indicated poor knowledge was a contributing factor to poor practice level of self-foot care. This is in line with work done by Seid et al.,[19] which showed that 82 (50.6 percent) had poor knowledge on foot care practices. Amogne et al.,[21] also stipulated that poor knowledge on diabetes foot care is a challenge to effective foot self-care practice.

### Health care providers perspective on patients compliance with appropriate foot care instruction

The results analysis identified three broad themes: The kind of health messages given to the clients came out clearly as blood glucose control, diabetic food diet with very little emphases on diabetic foot care. Barriers encountered when delivering the intended health messages included communication barriers, staff shortages, patients attitude and lack of appropriate teaching materials. Despite the fact that foot ulcer is one of the most devastating and common complications associated with diabetes mellitus, it's evident that foot self-care health messages are not a priority among health workers. This was clearly indicated from this study:

*"I teach my patients mostly on the food portions to eat and type of food to take. This helps on maintaining glycemic blood sugars within*

*the normal ranges. We rarely emphasize on foot care not unless a patient asks a specific question on foot care" (R9).*

This was also supported in a study done by Guell et al.,[22] that health provider main goal is achieving patient's glycemic control. Foot care comes as additional treatment and care following tight glycaemic controls and measures. It is also indicated from Guell et al.,[22] study that staff shortage is a factor hindering the delivery of the appropriate health messages to the diabetes clients which is consistent with the finding from this study that;

*"In my place of work, it's recommended that the diabetic patients are given health message on diabetic food, foot care practices and general health care. However, this is not done due to understaffing. As a nurse you are expected to attend to various patients and at the same time teach the diabetic patients. When time is available we do that, but sometimes we send them to the nutritionist for counselling. Sometimes the patients request for specialised care and screening for the risk factors for development of foot ulcers. Unfortunately, the specialists visit the facility once in a while and can't reach all the diabetic patients."(R8)*

## Conclusions and recommendations

In conclusion on patient related barriers, impaired vision, inability to reach the feet for inspection, knowledge deficit, and inability to afford recommended shoes were cited as the major barriers to effective foot care practices. On health care provider's perception on patient's compliance with appropriate foot care instructions, three themes were identified; health messages given concentrating on blood glucose control, diabetes diet and very little on foot care practices. Other barriers to effective delivery of health messages were communication barriers, staff shortages, patient's attitudes and lack of appropriate teaching materials. The health care workers lacked facilitating factors to their delivery of health messages such as regular training for updates, team work spirit, support group linkage and occasional facilitation by external experts.

### Recommendation

The Ministry of Health under the Kenyan Government should involve the county government to intensify on the sensitization of the recommended diabetic foot care practices to promote good health of her citizens. The county government to make sure there is adequate staffing, provision of necessary teaching materials as well as staff motivation in ensuring effective service delivery in an effort of improving diabetes foot care practices.

## Acknowledgments

None.

## Conflicts of interest

The authors declare that there are no conflicts of interest.

## Funding

None.

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