

Challenges of Foot Care among Patients Attending Diabetic Clinic: A low Resource Country Experience

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Background: *Foot complications are a serious and costly complication of Diabetes Mellitus. With about one third of Tanzanian diabetic patients likely to require hospitalization due to limb complications, with its high mortality, which can be prevented or decreased by proper limb assessment? This study aimed at determining the practice of foot assessment of diabetic patients and factors hindering it at the diabetic clinic in a Rural Tanzanian hospital.*

Methods: *A hospital based descriptive cross-sectional study was carried out in the diabetic clinic of Shinyanga regional hospital. A patient knowledge assessment tool was developed and used for exit survey, and a separate provider tool adopted from National Diabetic association of Australia was also used on the last day of the study.*

Results: *A total of 268 patients were interviewed of whom 45% had poor knowledge on footcare. Only one third of patients had their feet assessed in spite of good knowledge mean score of health workers as regards diabetic footcare. Work overload was cited as the hindrance factor.*

Conclusion: *Poor quality of diabetic care still exists even after efforts to establish special clinics. A chronic care model should be developed and disseminated to all HCWs offering care to diabetic patients.*

Introduction

Diabetes mellitus (DM) is increasingly becoming a major health problem especially in low and middle income countries claiming as many lives as HIV/AIDS. ^[1] Foot complications related to the disease are among the most serious and costly complications of diabetes mellitus and are reported to be on the increase worldwide, with reports suggesting that every 20 seconds a limb is lost^{2, 3}. Most of these complications can be prevented by patients' education on self footcare and routine foot assessment by health care providers. Studies suggest that a simple foot assessment including skin, vascular, neurological and musculoskeletal systems examination can prevent a lot of amputations^{2, 3, 4}.

Despite the frequency of complications involving diabetic patients' lower limbs, primary care practitioners frequently neglect to examine their feet; fewer than half of diabetic patients receive foot evaluation⁵. It is essential to identify the foot at risk, through careful inspection and physical examination of the foot followed by neuropathy and vascular test⁶. Regular foot examination, patient education, simple hygienic practices, provision of appropriate footwear, and prompt treatment of minor injuries can decrease ulcer occurrence by 50% and eliminate the need for major amputation in non-ischemic limbs.^[2] Studies suggest that all diabetic patients should be screened for individual risks of foot ulceration⁷.

Tanzania with a population of 42 million people has about one million people living with diabetes and one third likely to require admission for diabetic foot requiring amputation, with a mortality of 29% ^{8,9,10}. The mortality can be higher than this for those patients who present late, as is the case with most of the patients in our locality. Low socioeconomic status, poor quality of health services, cultural reasons, old age, male gender and long duration of diabetes are some factors shown to contribute to diabetic foot problems^{11, 12}. With close to 80% of the Tanzanian population living in rural areas, inadequate healthcare funding, and low levels of education, the above mentioned reasons might apply.

Data in Tanzania and many other sub-Saharan African countries on the diabetic foot assessment, knowledge of the patients and health care workers on foot care and foot assessment respectively and the factors hindering foot assessment in the diabetic clinic are sparse. However, as diabetes and foot complications, especially amputations increase worldwide. There is no reason to believe that Tanzania is any different, given our health resources. This is particularly evident is the scarcity of co-ordinated foot care and podiatry. Recently, special diabetes clinics have been established in all the regional hospitals in Tanzania with a focus of improving quality of care among diabetic patients. Training has been conducted to site staff and equipments supplied including monofilament and tuning forks for foot assessment. So this study was undertaken to document on foot assessment and patients and providers knowledge on its importance.

Patients and Methods

This cross-sectional study was carried out in Shiyanga regional hospital serving approximately 2.8 million people. The study was done in the months of August and December 2013. Ethical clearance to perform the study was obtained from MUHAS ethical clearance committee and local permission obtained. The hospital has a special diabetic clinic manned by two medical officers and a specially trained diabetic nurse. The clinic is equipped with Tuning forks and monofilaments for sensation testing, and Snellen's chart for vision assessment. All consecutive patients attended at the clinic were recruited after obtaining a written informed consent. The clinic is held once a week receiving both new and follows up cases; on average 40 patients are seen during each clinic day. On arrival at the clinic, the nurse conducts a diet counseling to the whole group attending the clinic, then checks their Random Blood Sugar (RBG), Blood Pressure (BP), and urinalysis by dipstick. Most patients get their refill from the nurse and only those with uncontrolled RBG and the elderly see the doctors.

Patients tool consisting of a fifteen item structured questionnaire, adopted from American College of Foot and Ankle and Diabetes UK, was used. Categorization of knowledge was low for score of <8, satisfactory for 8 – 10 and good for >10. This was administered after care has been offered (on exit). Additional information gathered included demography and type of assessment received. On the last day of the study, Knowledge of the three Health workers on diabetic foot care was assessed using Basic Foot Assessment Checklist developed by the National Association Diabetes Centre of Australia where a score of 7 or more was considered good. Focused provider interview to determine factors hindering foot assessment was also done.

Data was checked for consistency, coded and entered into computer using SPSS (version - 20) where cross tabulations was performed, comparisons were done using chi-square, and a p-value of less than 0.05 was considered statistically significant. The Fischer's exact test was used when the expected values in the cell was less than five for 25% of the cells or more.

Results

The three health workers had good mean score on knowledge of diabetic foot care, the highest score observed in the nurse. All of them cited work overload as the main hindrance to diabetic foot assessment and lack of schedule of health education offered in the clinic. A total of 268 diabetic patients were attended during the three months study period, majority of them being female giving a female to male ratio of 1.3:1, their ages ranged from 23 to 78 with a mean of 48.5±16.

Most of the patients had a Fasting or a Random blood sugar, weight and blood pressure checked during their clinic encounter. Only 29.9% (80) had their feet evaluated and 3.7% (10) had an eye examination performed on them (Figure 1).

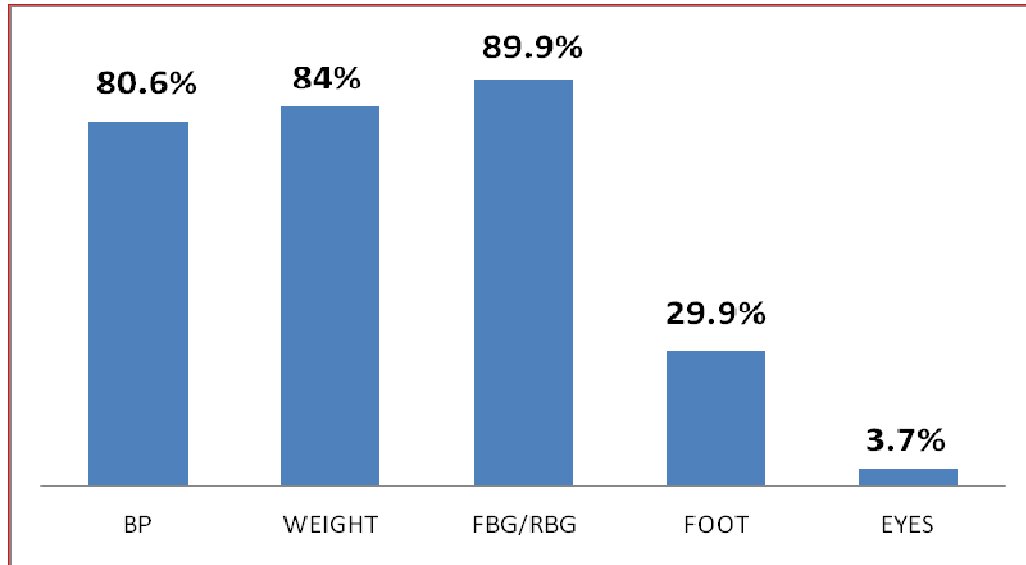


Figure 1. Parameters Assessed During Clinic Visit (No=268)

Table 1. Knowledge on Aspects of Foot care among Patients (n=268).

S.No	Questions related to knowledge on foot care	Knowledge	
		Number	Percentage
1	Adherence to medications for controlling blood sugar	179	66.8%
2	Knows smoking dangers in a DM patient.	107	39.9%
3	Checking temperature of water before using	146	54.5%
4	Drying the feet after washing	134	50.0%
5	Talcum powder usage for keeping inter-digital spaces dry	50	18.7%
6	Keeping skin of the feet soft to prevent dryness	164	61.2%
7	Not to apply lotion in the inter-digital spaces	163	60.8%
8	Daily change of socks	169	63.1%
9	Trimming nails of feet frequently	126	47.0%
10	Conducting regular self feet inspection	79	29.5%
11	Wearing comfortable coat shoes	86	32.1%
12	Checking the shoes from inside before wearing	107	39.9%
13	Not walking bare foot	173	95.0%
14	Knows what to do if find redness/bleeding between toes	117	43.7%
15	Knows what to do if has a corn	51	19.0%

On various aspects of knowledge on diabetic foot prevention among patients, most respondents had poor knowledge on the following facts: talcum powder usage to keep inter-digital spaces dry 218 (81.3%), frequency of foot inspection (70.5%), importance of wearing comfortable coat shoes 182 (67.9%), importance of inspecting the inside of the footwear for objects or torn lining 161(60.1%), smoking of cigarette causes poor circulation affecting the feet 161 (60.1%), what to do when there is redness/bleeding between their toes 151 (56.3%), and what to do with a corn/hard skin lesion in the sole of the foot 217 (81.0%) (Table 1).

Most of the study subjects were: aged 40 years and above, 72.8% (195), had primary level of education or less at 60.8 % (163), had been diagnosed more than six years ago 40.7% (109). Majority of the respondents had poor knowledge on foot care by 45.5% (122), followed by satisfactory knowledge among 32.1% (86) and only 22.4 % (60) had good knowledge. Most of the female had poor knowledge when compared with male but this was not statistically significant, p value 0.16. Age too had no significant influence on foot inspection with both having poor knowledge. Increasing level of education was associated with good knowledge of diabetic foot assessment, p-value of 0.002, so were the diagnosis of type 1 diabetes and negative history of foot infection (Table 2).

Table 2. Distribution of the Level of Knowledge About Foot Care among the Diabetic Patients (N=268)

Knowledge	Poor	Satisfactory	Good	Total	χ^2 (P-Value)	95% CI
Age group (yrs)					14.837 (0.119)	0.081 - 0.158
<20	4 (16.0)	14 (56.0)	7 (28.0)	25(9.30%)		
20 – 29	5 (50.0)	2 (20.0)	3 (30.0)	10(3.70%)		
30 – 39	17 (44.7)	13 (34.2)	8 (21.1)	38(14.2%)		
40 – 49	23 (41.8)	17 (30.9)	15 (27.3)	55(20.5%)		
50 – 59	37 (56.9)	17 (26.2)	11 (16.9)	65(24.3%)		
> 60	36 (48.0)	23 (30.7)	16 (21.3)	75(28.0%)		
Gender					3.655 (0.187)	0.140- 0.233
Male	46(39.0)	42(35.6)	30(25.4)	118(44%)		
Female	76(50.7)	44(29.3)	30(20.0)	150(56%)		
Level of Education					23.868 (0.000)	0.000-0.011
None	13 (52.0)	7 (28.0)	5 (20.0)	25(9.30%)		
Primary	70 (50.7)	48 (34.8)	20 (14.5)	138(51.5%)		
Secondary	20 (40.0)	20 (40.0)	10 (20)	50(18.7%)		
Higher	19 (34.5)	11 (20.0)	25 (45.5)	55(20.5%)		
History of Foot infection					9.992 (0.007)	0.000- 0.018
Yes	51(56.7)	28(31.1)	11(12.2)	90(33.6%)		
No	71(39.9)	58(32.6)	49(27.5)	178(66.4%)		
Type of DM					12.852 (0.002)	0.000- 0.011
Type 1	10(22.7)	23(52.3)	11(25.0)	44(16.4%)		
Type 2	112(50.0)	63(28.1)	49(21.9)	224(83.6%)		
Year first diagnosed					22.097 (0.000)	0.000- 0.011
< 1	41(67.2)	13(21.3)	7(11.5)	61 (22.8%)		
1 – 2	12(32.4)	15(40.5)	10(27.0)	37 (13.8%)		
3 – 5	27(44.3)	23(37.7)	11(18.0)	61 (22.8%)		
6 – 10	27(34.2)	29(36.7)	23(29.1)	79 (29.5%)		
>10	15(50.0)	6(20.0)	9(30.0)	30 (11.2%)		
Total	122(45.5)	86(32.1)	60(22.4)	268		

Discussion

Care of the feet among diabetic patients is essential in the prevention of complications related to vascular insufficiency and diabetic neuropathy. The results from this study show that nearly half

of the patients had poor knowledge regarding foot care. This is similar to findings by other researchers on the same topic^{13,14}. Factors that were found to have significant influence on level of knowledge regarding foot care included level of education, history of foot infection and type of diabetes. As the level of education increased, so was the level of knowledge on foot care. The relationship between education and foot care among DM patients has been observed in similar studies in India, Iran, Pakistan and Nigeria where respondents with lower education level were least knowledgeable^{15,16}. This can be explained by the fact that higher level of education might be associated with increased quest for reading about ones chronic disease and its complication from different sources. Other studies have indicated that level of patients' education influenced the medical providers to offer more detailed information on foot care¹⁷. However, this was not covered in our study and may be an important focus of study in the future.

Knowledge was also low in those with prior history of foot infection. This is contrary to expectation that prior foot infection might have led to education on foot care to prevent another future diabetic foot related problems. This is supported by the findings of other researchers which explain the impact of psychological and behavioural issues on diabetic foot thus patient cognitive changes which influence comprehending abilities and therefore reduce the effectiveness of foot health education. This also explains why some patients get repeated ulceration in spite of being educated and warned of the risk of ulceration. ^[18] This can also be explained by findings from other studies which showed that inadequate diabetes health care has a direct effect on the knowledge of the patient which leads to poor/inadequate knowledge of self care^{11, 12}.

How patients were categorised as having either type one or two DM was beyond the scope of this work, but this information was found on patients treatment chart. Type one diabetic patients seem to have good knowledge when compared to type two patients. This could also be explained by the expected young age of the cohort with increased quest for information regarding care of their afflicting disease. Efforts to increase foot care knowledge should be heightened to reduce the risk of foot complications which results into increased morbidity and mortality among diabetic patients. Women and those above the age of 50 were less knowledgeable about foot care, although these associations were not statistically significant but due to socio-cultural beliefs women are not allowed to attain higher educational status in many third world countries compared with their male counterpart in the family, eventually resulting in women having less knowledge of foot care. Again, this study was carried out in a region with the lowest levels of education especially among female in the country.

In this study, only one third of the respondents attending the diabetic clinic reported that their feet were checked. These findings are in accordance to a study done in Italy where more than half of the patients reported that physician didn't assess their feet and 28% reported that they had not received foot education. ^[19] This shows that knowledge and the practice of the patient are strongly related to physicians' attitudes. This was not expected as this clinic is very special only to diabetic patients thus was expected to offer the highest comprehensive level of care to its patients. This study found that work overload was the main hindrance to foot assessment among diabetic patients by health professionals in the clinic. But it can also be due to poor communication between the doctors and the patients and also lack of counseling by the doctors and nurses as result of busy clinic schedules, negligence or work overload. This is supported by a study conducted in UK where there was a positive correlation between the score and having advised on foot care. ^[13] Lack of protocols on what should be offered for every clinic visit to the whole group of cohort attending and what should be individualized is also lacking, thus adding to fatigue of running a busy clinic, contributing to this low quality care for diabetic patients and probably other patients as well.

This study showed that the diabetic nurse had the highest knowledge on diabetic foot assessment than the medical doctors due to prior training on diabetic care. But most patients

still had low knowledge of foot care and received no foot care at the clinic. The role of the nurse in diabetic clinic was to provide counseling on diet, take basic measurements and help type one patients with insulin administration. There was no schedule of health education topics to be covered on clinic visits, neither a chart carried by patients showing what service to expect on the visit. Lessons learnt from comprehensive HIV/AIDS clinics should be adopted in diabetic clinic since this is also a chronic and lifelong disease, even associated with serious complications and morbidity. The diabetic patient reaching the surgeon for amputation should be regarded as a failure in care delivery and should be used as an index for monitoring quality of care both at local and national level.

Conclusion

This study has shown that the quality of services offered to diabetic patients is poor at Shinyanga regional hospital diabetic clinic, and so was the knowledge of foot care among the patients. On the other hand, overall improvement of education standards, including adding DM education to current curricular of primary schools should be encouraged. There is a need to develop a chronic care model for diabetic patients to ensure that no component of care is missed for any particular clinic visit. Lastly, loss of limb or part of it should be used as an index of measuring quality of care and targets should be determined.

References

1. International Diabetes Federation. IDF Diabetes Atlas, 6th edn. Brussels: International Diabetes Federation, 2013. <http://www.idf.org/diabetesatlas>
2. Alexiadou K, Doupis J. Management of Diabetic Foot Ulcers. *Diabetes Ther* 2012, 3(1): 4
3. Foster AVM. (2006). *Podiatric Assessment and Management of the Diabetic Foot*. Edinburgh: Churchill Livingstone Elsevier.
4. Peters E. Screening for the diabetic foot: How and why. *Diabetes Voice* 2005; 50: 25-27.
5. Bowering CK. Diabetic foot ulcers; Pathophysiology, assessment, and therapy. *Can Fam Physician* 2001; 47:1007-1016.
6. Lavery LA, Wunderlich RP, Tredwell JL. Disease management for the diabetic foot: effectiveness of a diabetic foot prevention program to reduce amputations and hospitalizations. *Diabetes Res Clin Pract.* 2005; 70:31-7.
7. Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients with diabetes. *JAMA* 2005; 293: 217 – 228.
8. Abbas ZG, Lutale JK, Morbach S, Archibald LK: Clinical outcome of diabetes patients hospitalized with foot ulcers, Dar es Salaam, Tanzania. *Diabet Med* 2002, 19(7):575-579.
9. Abbas ZG, Archibald LK: Challenges for management of the diabetic foot in Africa: doing more with less. *Int Wound J* 2007, 4(4):305-13.
10. Hellar AM, Mbembati NAA: The Pattern and Surgical Management of Diabetic Foot at Muhimbili National Hospital, Dar-es-salaam, Tanzania. *ECAJS*, 2011:16(1):37-45
11. Andrew Clarke. Avoiding foot complications in diabetes. *CME* 2010, 28(4):181-285
12. Nyamu PN, Otieno CF, Amayo EO, Mcligeyo SO: Risk factors and prevalence of diabetic foot ulcers at Kenyatta National Hospital, Nairobi. [East Afr Med J](#). 2003 Jan; 80(1):36-43.
13. Pollock RD, Unwin NC, Connolly V. Knowledge and practice of foot care in people with diabetes. *Diabetes* 2003 Jan;80(1):36-43
14. Khamseh ME, Vatankhah N, Baradaran HR. Knowledge and practice of foot care in Iranian people with type 2 diabetes. *Int Wound J*. 2007; 4(4):298-302.
15. Hasnain S, Sheikh NH. Knowledge and practices regarding foot care in diabetic patients visiting diabetic clinic in Jinnah Hospital, Lahore. *J Pak Med Assoc.* 2009; 59(10):687-90.
16. Viswanathan V, Shobhana R, Snehalatha C, Seena R, Ramachandran A. Need for education on footcare in diabetic patients in India. *J Assoc Physicians India.* 1999; 47(11):1083-5.



17. Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients with diabetes. JAMA 2005; 293: 217 – 228.
18. Vileikyte L, Rubin RR, Leventhal H. Psychological and behavioural issues in diabetic foot ulceration. John Wiley 2006; 132-142.
19. De Beradis G, Pellegrini F, Fanciosi M, Belfiglo M, et al. Are Type 2 diabetic patients offered adequate foot care? The role of physician and patient characteristics. J Diabetes Complications 2005; 19: 319-27.