DIABETIC FOOT CARE: SELF REPORTED KNOWLEDGE AND PRACTICE AMONG PATIENTS ATTENDING THREE TERTIARY HOSPITAL IN NIGERIA

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SUMMARY

Background: Diabetes Mellitus (DM) foot complications are a leading cause of mortality in developing countries and the prevalence of diabetes is expected to increase in the next decades in these countries. The aim of this study was to determine the knowledge and practice of foot care among diabetes patients attending three tertiary hospitals in Nigeria.

Methods: This is a cross-sectional study carried out from November 2009 to April 2010. Pre-tested structured questionnaires were administered by medical officers to diabetes patients. The outcome variables were knowledge and practice regarding foot care. The knowledge and practice scores were classified as good if score ≥70%, satisfactory if score was 50-69% and poor if score was < 50%.

Results: Of 352 diabetes patients, 30.1% had good knowledge and 10.2 % had good practice of DM foot care. Majority (78.4%) of patients with poor practice had poor knowledge of foot care. With regard to knowledge, 68.8% were unaware of the first thing to do when they found redness/bleeding between their toes and 61.4% were unaware of the importance of inspecting the inside of the footwear for objects. Poor foot practices include; 89.2% not receiving advice when they bought footwear and 88.6% failing to get appropriate size footwear. Illiteracy and low socioeconomic status were significantly associated with poor knowledge and practice of foot care.

Conclusion: This study has highlighted the gaps in the knowledge and practice of foot care in DM patients and underscores the need for an educational programme to reduce of diabetic foot complication.

Keywords: Diabetic Foot Care, Foot ulcer, Knowledge, Practice, Nigeria

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder that is characterized by chronic hyperglycaemia; it is a common and potentially disabling chronic disease.[1-2] The condition is presently afflicting 194 million people worldwide and is estimated to rapidly increase to 333 million people in 2025 as a consequence of longer life expectancy, sedentary lifestyle and changing dietary patterns.[2-4] About 60% of the poorest countries in the world are in sub-Saharan Africa and this region will experience the greatest rise in the prevalence of diabetes in the next 20 year.[3]

This rise in prevalence of DM is likely to bring a concomitant increase in its complications among diabetic patients. One important complication of DM are the foot problems; these complications constitute an increasing public health problem and are a leading cause of admission, amputation and mortality in diabetic patients. The prevalence of diabetic foot ulcer (DFU) ranged between 1.0% and 4.1% in the United States (US), 4.6% in Kenya, and 20.4% in Netherlands.[5,6,7] Hospital-based studies demonstrated that the prevalence of limb ulceration were between 11.7% and 19.1% among individuals with diabetes in Nigeria.[8,9] The prevalence of DFU among hospitalized patients with diabetes in Iran was 20%.[9]

Foot ulcers are chronic complications of diabetes and have been reported to occur after a mean interval of 13 years from the diagnosis of diabetes in a Nigerian population.[10] DFU may become more common in clinical practice in the tropics with the increasing prevalence of diabetes in the Nigerian and Ghanaian adult populations.[11]

In addition to causing pain and morbidity, foot lesions in diabetic patients also have substantial economic consequences, beside the direct costs of foot complications, there are also indirect costs relating to loss of productivity, individual patients' and family costs and loss of health related quality of life. The lifetime risk of a person with diabetes developing a foot ulcer could be as high as 25%, and it is believed that every 30 seconds a lower limb is lost somewhere in the world as a consequence of diabetes.[12]

Globally, DM foot lesion is a result of peripheral vascular disease and neuropathy which is the major contributing factor that is preventable in most cases in developing countries.[1]Some environmental factors like increasing urbanization, unhygienic conditions, poverty, frequent co-existing HIV infection, barefoot gait, low income, and cultural practices have also been said to compound the situation.[14]People with diabetes are prone to develop foot ulcer, amputation and other lower extremity clinical abnormalities if they do not have good knowledge of foot care practice.

In Nigeria the mean costs for successfully treating a patient with Diabetic Mellitus Foot ulceration is 181581.00 Nigerian Naira (NGN), which approximately equivalent to 1200 US dollars , this amount is unaffordable by most hospital patients as about 60% of the population live below the poverty line. [7] Therefore increasing the knowledge, awareness and self care of the foot among diabetic patients have found to be cost effective ways of preventing DM foot ulceration[15,16] especially in low income economy characterized by inadequate healthcare facilities and lack of skilled healthcare personnel. There are no study on knowledge and practice of foot care among diabetic patients in Nigeria. We aimed at conducting a multi-centre study in some tertiary hospitals in Nigeria to determine the knowledge and practice of foot care among diabetic patients.

METHODS

This is a multicentre cross-sectional study carried out in three tertiary hospitals in Nigeria from November 2009 to April 2010 .The country of the study is divided into six geopolitical zones. This survey was conducted in three of the six geopolitical zones which can be considered a representative sample of diabetic patients. We selected Federal Medical Centre in Ido-Ekiti, south western Nigeria, Sir Yahaya Memorial Hospital, Birnin-Kebbi in north western Nigeria and Federal Medical Centre Yola, north eastern Nigeria.

The minimum sample size of 384 was arrived at using the Cochran formula

$$N = \frac{Z^2pq}{d^2}$$

N = Sample Size, p = prevalence of DM in Nigeria is 2.2%. [17] The q = (1 – p), Z = standard normal deviation usually set at 1.96 which correspond to the 95% confidence interval. d = degree of accuracy desired usually set at 0.05.The calculated minimum sample size was 33 All the patients that were willing to participate in the study were recruited at the medical outpatient department and wards of the three hospitals.

The inclusion criteria for the cases included consented patients diagnosed of type I and II diabetes for at least six months and who had never developed foot ulcers. DM patients that were unable to answer the questions because of altered mental state were excluded from the study. The survey instrument used was a pre-tested, structured questionnaire prepared from the recommendation of the American College of Foot and Ankle Surgeons and the Diabetes UK and used in similar previous study.[18-19] The questionnaire was in English, which is the official language of communication in Nigeria, adapted, and translated to Hausa and Yoruba language for those who could not communicate in English. The questionnaire consisted of 11 questions on knowledge of foot care and current self-care practice respectively and each correct question was assigned one mark.

The questionnaires were administered by medical officers who also examined for predisposing factors to foot ulcer in the patients. The outcome variables of the study were knowledge and practice regarding foot care in diabetic patients. Data obtained were analysed using SPSS statistical software version 15 (SPSS Inc., Chicago, IL, USA). Frequency and descriptive statistics were used to examine the general characteristics of the respondents. The response to questions on knowledge, practice and barriers to foot care were analysed and the knowledge and the current practice score of each respondent was determined. Their knowledge and practices score were classified as good, satisfactory and poor depending upon the score. If score ≥70% (8-11), it was regarded as good, if score was 50-69% (6-7) it was regarded as satisfactory and if score was less than 50% (<6) it was regarded as poor. Student t test was used to compare the means of the scores and Chi square test was used to assess the significance of the responses and a P value of < 0.05 was considered statistically significant.

Ethical approval

The ethics and research committee of the Federal Medical Centre Ido-Ekiti and the Federal Medical Centre Yola Nigeria approved the study.

RESULTS

We enrolled a total of 352 diabetic patients to the study, 216 (61.4%) were males and 136(38.6%) were females. Two hundred and twenty two (63.1%) were below the age of 50 years. Of 352 patients, 196 (55.7%) had no formal or primary education while 156(44.3%) had a secondary or tertiary education. The mean age of the respondents was 44.0 ± 15.8 years. Of the 352 patients interviewed, 192(54.5%) had some risk factors of diabetic foot. The characteristics of the patients are shown in table 1.

Table 1: Characteristics of the patients in the study (n=352)

Characteristics	Mean (SD)n (%)
Age(yrs)	44.0(15.8)
Age (yrs)	
<50	222(63.1)
≥50	130(36.9)
Sex	
Female	136(38.6)
Male	216(61.4)
Education	
None/primary	196(55.7)
Secondary/tertiary	156(44.3)
Socioeconomic status	
Upper/mid	118(33.5)
Lower	234(66.5)
Type of DM	
Type 1	18(5.1)
Type 2	334(94.9)
Presence of risk factor for DM foot ulcer	192(54.5)*
-Neuropathy	126(35.8)
-Poor vision/retinopathy	108(30.7)
-Vasculopathy /absent dorsalis-pedis pulsation	62(17.6)
-Foot deformity	38(10.8)

***Please note some patients had multiple risk factors**
SD=standard deviation

Knowledge of foot care

The mean knowledge score was 5.8 ± 3.3. The range of the knowledge score obtained in this study was 0-11 out of maximum possible score of 11. Two hundred and sixty four (75%) of the DM patients were unaware that smoking causes poor circulation of the feet, 242 (68.8%) were unaware of the first thing to do when they found redness/bleeding between their toes and likewise 227 (62.2%) if they found a corn/ hard skin lesion. Majority of the respondent (61.4%) were unaware of the importance of inspecting the inside of the footwear for objects or torn lining. The distributions, of the response to questions related to the knowledge of foot care are shown in Table 2.

Table 2 : Distribution of the responses to questions related to the knowledge of foot care

Questions related to knowledge of foot care	Correct (%)	Wrong (%)
DM patients should take medication regularly because they liable to get DM complication	94.3	5.7
DM patients should look after their feet because they may not feel a minor injury to their feet	49.4	50.6
DM patients should look after their feet because wounds and infection may not heal quickly	54.5	45.5
DM patients should look after their feet because they may get a foot ulcer	54.5	45.5
DM patients should not smoke because smoking causes poor circulation affecting the feet	25.0	75.0
How often do you think you should inspect your feet	84.1	15.9
If you found redness/bleeding between your toes what is the first thing you do	31.2	68.8
Even if you have never had a corn/ hard skin lesion, would you do if you had one	27.8	62.2
How often do you think your feet should be washed	94.3	5.7
What temperature of water do you think you should wash your feet in	51.1	48.9
How often do you think you should inspect the inside of your footwear for objects or torn lining	38.6	61.4

***Wrong: false and don't know**

On classifying the knowledge score of the study participants, 106 (30.1%) had good knowledge of diabetic foot care (score ≥70%), 84(23.9%) had satisfactory score (score 50-69%) and 162(46.0%) had a poor knowledge of diabetic foot care (score <50).

Current practice of foot care

The mean practice score was 5.7 ± 1.9. The range of the current practice score obtained in this study was 2-10 out of maximum possible score of 11. Less than half of the respondents (40.9%) regularly inspect their feet, (46%) regularly wash their feet with warm water and (47.7%) inspect the inside of their footwear.

The distribution of response to questions related to the practice of foot care is shown in Table 3.

Table 3: Distributions of responses to questions related to the practice of foot care

Questions related to practice of foot care	Yes (%)	No/don't know (%)
Do you Inspect feet regularly	40.9	59.1
Do you wash feet regularly	82.4	17.6
Do you wash feet with warm water	46.0	54.0
Do you trim toe nails straight across	33.5	66.5
Do you measure your feet size when last you bought footwear	11.4	88.6
Do you received advice when last you bought footwear	10.8	89.2
Did you ever inspect inside of footwear	47.7	52.3
Do you regularly walk barefoot	38.1	61.9
Do you clean nails with sharp instrument	38.6	61.4
Do you add irritants to water before feet cleaning	27.3	72.7
Do you wear elasticated hosiery	4.5	95.5

On classifying the practice score of the study participants, only 36 (10.2%) had good practice of diabetic foot care (score ≥70%), 142(40.3%) had satisfactory score (score 50-69%) and 174(49.4%) had a poor practice of diabetic foot care (score <50). We also determined the effect of knowledge on the practice of foot care, 174 patients with poor practice score were stratified by their knowledge score and the result showed that 136(78.2%) had a poor knowledge score, 32(18.4%) had a satisfactory score while 6(3.4%) had a good score.

Association of demographic factors with the knowledge and practice of foot care

In order to determine the impact of demographic factors on knowledge and practice of foot care the categorical variables were dichotomized and the student t test was used to compare the mean of the scores. Poor education attainment and low socioeconomic status were significantly associated with lower the knowledge and practice score in this study (Table 4).

Self reported barriers to foot care

In this study, lack of knowledge of foot care was reported by116 (33.0%) as the barrier to good foot care practice, 20(5.7%) cited poverty and 9(2.6 %) cited poor communication between patients and their physician.

Table 4: Impact of Demographic factors on knowledge and practice of foot care

Demographic factors	Knowledge score	p values	Practice score	p value
Age				
<50	5.91		5.72	
≥50	5.65	0.47	5.65	0.72
Sex				
Female	5.54		5.57	
Male	5.58	0.23	5.77	0.35
Education				
None/primary	5.35		5.35	
Secondary/tertiary	6.40	0.003	6.13	<0.001
Socioeconomic status				
Upper/mid	6.67		6.08	
Lower	5.38	0.001	5.50	0.007

DISCUSSION

The result of this study showed that a greater proportion of diabetic patients had a poor knowledge of diabetic foot care. These deficiencies arises from lack of awareness about the effect of smoking in causing poor foot circulation; need for specialist consultation when warning signs like redness/bleeding occurs between toes; importance of regular inspection of the footwear for objects or torn lining and regular inspection of the feet. The lack of knowledge foot care in our study is consistent with findings by other investigators worldwide.[19-22]

We also found that patients having poor education and in low socioeconomic status significantly had lower knowledge of foot care while gender and age differences were not significantly associated with the knowledge of foot care. The relationship between education and foot care among DM patients has been observed in similar studies in India, Iran and Pakistan where illiterate patients were the least knowledgeable.[20-22] The knowledge of appropriate foot care has been suggested to be positively influenced by patient education which in turn reduces the risk of foot ulceration and amputation in high-risk diabetics.[23] The association between education and knowledge may be due to the fact that, educated patient were able to read and understand some of educational supportive materials and also use information technology to obtain more information about the disease.

Women and those above the age of 50 were less knowledgeable about foot care, although these associations were not statistically significant. Similarly in some third world countries due to socio-cultural beliefs women are not allowed to attain higher educational status compared with their male counterpart in the family, eventually resulting in women having less knowledge of DM foot care. This study also revealed that a very small proportion of the diabetic patients (10.2%) had good practice of diabetic foot care (score ≥70%) while almost half (49.4%) had a poor practice of diabetic foot care. This level of foot care is very frightening considering the complication and socioeconomic consequences of diabetic foot ulceration.

This poor level of foot care practice in this study is in agreement with other previous studies [19-22]. Some of the inadequacies of foot care practice in our subjects include non-inspection of inside of their footwear (47.7%), non inspection of their feet (40.9%), and 88.6% failing to get appropriate size footwear. The poor practice of foot care in this study may be attributed to the lack of knowledge among the respondent as 78.4% of those with poor foot care practice also had poor knowledge of foot care. This association was further corroborated as 33% of the respondents reported lack of knowledge as greatest barrier to good foot care practice.

The deficiency in the knowledge may be due to poor communication between the doctors and the patients and also lack of counselling by the doctors and nurses as result of busy clinic schedule. Thus, patient education on the prevention of foot ulceration is imperative and should be incorporated into the routine care of patients with diabetes both in the hospital and in the community. Time must be allotted to communication, information and education during clinic sessions.[24]

Furthermore, the education of physician is highly imperative to complement and reinforce the behaviours of patient with regards to foot care; they need to learn and imbibe the skills of counseling and risk assessment. Our study has been able to determine the knowledge and practice of foot care among diabetic patients in Nigeria.

Strengths and limitations

The results of this study are a wake up call on the clinicians and nurses to establish a patients and physician friendly educational programmes that will enhance and sustain the good knowledge and practice of foot care. The limitation of this study was our inability to cover all six geopolitical zones in Nigeria.

CONCLUSION

In conclusion, the knowledge and practice of foot care among DM patients in study were poor; these were associated with illiteracy and low socioeconomic condition. The result of this study has highlighted the gaps in their knowledge and practice and underscores the urgent need for a patient friendly educational intervention coupled with regular physician reinforcement to reduce the risk of diabetic foot ulcer and amputations.

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