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Original Research Article

Knowledge and Factors Affecting Perceived Practice of Foot Care among Patients with Diabetes Mellitus in a Federal Medical Centre in Nigeria

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Abstract: Diabetic foot is one of the most dreaded complications of diabetes due to the disability it presents and the repercussions on the quality of life of individuals suffering from it. This study assessed the knowledge and factors affecting the perceived practice of foot care among patient with diabetes mellitus in Federal Medical Center, Owo, Ondo State. A cross sectional design was adopted. Purposive sampling technique was used to select 150 respondents. Data was collected using a self-administered questionnaire. Data collected were analyzed using descriptive and inferential statistics with the aid of SPSS version 23. Results were presented using frequency tables and charts. Result from this study showed that 40% of the respondents had good knowledge on foot care, while 15.3% had poor knowledge on foot care. Also, 70.7% of the respondents had high level of foot care practice, while 29.3% had low level of foot care practice. Also, the study showed that the following factors affected the practice of foot care among diabetic patients: Financial weakness (65.3%); improper hospital management (82%), time frame for cleaning (52%), inadequate knowledge of foot care (66.7%), failure to get appropriate footwear (62.7%), and religious' belief (60.7%). The study showed a significant relationship between the level of education and knowledge on foot care (X^2=20.32, df =4, P=0.03), also, there was a significant relationship between knowledge and practice of foot care among respondents (X^2=23.12, df=6, P=0.04). The study concluded that the level of education of the patients has a significant impact on their understanding of diabetic foot and the level of knowledge also influenced their good practice of diabetic foot.

Keywords: Knowledge, Practice, Factors, Diabetes mellitus; Patients, Foot Care, Owo.

BACKGROUND

Diabetes is among the leading causes of mortality within the world (WHO, 2015). Diabetes mellitus (DM) refers to a gaggle of common metabolic disorders that share the makeup of symptoms. The different types of DM are caused by a complex mix of genetic and environmental factors (American Diabetes Association, 2015). Reckoning on their etiology; the factors that contribute to hyperglycemia include reduced insulin secretion, a decrease in aldohexose utilization and a rise in its production (Alhariri, Daud, Almaiman, & Saghir, 2017).It is presently accepted that there are chiefly three types of diabetes: type 1 (DM1), type 2 (DM2) and gestational (GDM). However, there are also other varieties of the disease, such as monogenic diabetes and secondary diabetes (International Diabetes Federation, 2017). Type 2 diabetes is the most frequent form and accounts for up to 90% of the total number of cases of diabetes *(Franz et al.*, 2010). It has been calculated that there are around 425 million folks around the world, corresponding to 8.8% of adults from the ages of 20 to 70 years, who are suffering from diabetes mellitus (Franz *et al*., 2010). Approximately 79% of these people live in low- to medium-income countries (International Diabetes Association, 2017). Diabetic foot is one among the foremost dreaded complications of diabetes due to the disability that it generates and its repercussions on the

quality of life of individuals suffering from it (Abbas, 2017). Diabetic foot is the most common cause of hospitalization and is defined as a foot affected by ulcers that is associated with neuropathy and/or peripheral arterial disease of the lower limb in diabetic patients (Alexiadou & Doupis, 2012). The prevalence of foot ulcers among the diabetic population ranges from 4% to 10% and it is estimated that around 5% of all patients have a history of foot ulcers, whereas the lifetime risk of developing this complication was 15% (Uemura, 2014). A total of 10% to 15% of foot ulcers would remain active and 5% to 24% of them will finally lead to amputation within a period of 6 to 18 months after the first evaluation (Alexiadou & Doupis, 2012). Furthermore, it has been reported that 40% to 70% of all non-traumatic amputations of lower limbs occur among diabetic patients and that foot ulcers precede approximately 85% of all amputations performed (Amin & Doupis, 2016) compared to non-diabetics, the need for amputation is around 30 to 40 times higher in patients with type 2 diabetes mellitus. This is a very serious health problem that requires management with a multidisciplinary focus. Prevention is crucial due to the negative impact on quality of life. According to the document entitled Guidance on the Management and Prevention of Foot Problems in Diabetes (IWGDF, 2015) the basic prevention and treatment principles are: identification of the at-risk foot; regular inspection and examination; education of patients, families and healthcare providers; routine wearing of appropriate footwear and treatment of pre-ulcerative signs. Also, according to the Canadian Diabetes Association (2019), it was recommended that all diabetic patients and particularly those with high-risk foot conditions, with a history of ulcers or amputations, deformities, loss of protective sensation (LOPS) and peripheral arterial disease (PAD), and their families should receive education about risk factors and appropriate management (Canadian Diabetes Association, 2019). People at risk need to understand the implications of these changes in appropriate foot care, including nail and skin care and the importance of foot monitoring on a daily basis (Kampmann *et al*., 2015). Patients with LOPS should be educated on ways to substitute other sensory modalities (palpation or visual inspection using an unbreakable mirror) to monitor possible foot problems (ADA, 2015). Adequate self-care can reduce the risk of lesions, infections and amputation among the foot-risk people. These measures include daily foot and footwear control, adequate daily hygiene, not walking barefoot, using appropriate footwear, cutting nails, avoiding the use of abrasive material, early professional care for open foot wounds and lesions, and routine foot examinations by a trained professional to identify diabetic foot complications (Chellan *et al*., 2012). Foot ulcers and amputations were found to increase among patients who did not adopt these practices(Bonner, Foster, & Spears-Lanoix, 2016). At the same time, knowledge is conducive to proper foot care, whereas lack of knowledge and/or clear daily foot care plans increases the risk of developing ulcers and amputations (Khan *et al*., 2012). It also leads to inadequate practices and confirms the submission that even diabetics with proper attitudes are unable to perform correct self-care practices (Policarpo *et al*., 2014).This indicates that foot care knowledge and practices of patients are highly associated (Policarpo *et al*., 2014). If these patients received appropriate foot care guidelines and education, they would carry out the corresponding practices with significant results (Chellan *et al*., 2012). Inadequate knowledge on the part of patients may be due to lack of communication and tight schedule of medical and nursing personnel (Dündar, 2014).There seem to be few indigenous studies that had looked at the knowledge and factors affecting the perceived practice of foot care among patient with diabetes mellitus in the study setting. Hence, the need for conceptualizing this study.

JUSTIFICATION OF THE STUDY

Global prevalence of diabetes is high and still on the rise (IDF, 2017). In the last two decades in Nigeria, the country had witnessed more than a 100% increase in the prevalence of the disease, from 2.2% in 1997 to nearly 6% in 2015 (IDF, 2017). (J. C. Mbanya, Al-Sifri, Abdel-Rahim, & Satman, 2015) reported that Nigeria which is the most populous country in Africa has the greatest burden of diabetes within the Sub-Saharan sub-continent *(J. C. Mbanya et al.*, 2015). The prevalence of diabetes in the world and that of Africa stand at 8.8% and 3.2% respectively (IDF, 2017). Previous studies in Nigeria showed that the prevalence of diabetes ranged from low level of 0.8% among adults in rural highland dwellers to over 7% in urban dwellers with Lagos having an average of 2.2% nationally (Dahiru, Aliyu, & Shehu, 2016). A rise in the prevalence of diabetes has been associated by an increase in its complications such as foot ulcers which sometimes results in lower extremity amputations, in that, the lifetime risk of a person with diabetes developing a foot ulcer was put at 25% (J. C. N. Mbanya, Motala, Sobngwi, Assah, & Enoru, 2010). With regards to diabetic foot ulcers, it has been shown that 12% of all hospitalized diabetic patients in Africa had foot ulceration (J. C. N. Mbanya *et al.*, 2010). The burden of DFU has been reportedly high in Nigeria, with prevalence rates ranging from 11%-32% among hospitalized patients ((Ugwu *et al*., 2019)). At about half a decade ago, amputation rate from DFU in Nigeria was as high as 52% (Edo, 2013). Furthermore, DFU is the commonest indication of diabetes-related mortality in Nigeria after hyperglycemic emergencies. Based on the fact disclosed above, there is the need to evaluate knowledge and factors affecting the perceived practice of foot care among patients with diabetes mellitus in a Federal Medical Center in Nigeria. The specific objectives were to;

a. assess the level of knowledge on foot care among patients with diabetes mellitus in FMC, Owo
b. determine the level of perceived practice of foot care among patients with diabetes mellitus in FMC, Owo and;
c. identify the factors affecting the perceived practice of foot care among patients with diabetes mellitus in FMC, Owo

METHODOLOGY

Research Design

A descriptive cross-sectional design was adopted for the study.

Research Setting

The study was conducted at Federal Medical Center, Owo, Ondo State, Nigeria. The hospital was established in 1989. Federal Medical Center is a public health care center located along Ikare Road, Owo on coordinates of 7º13'03"N and 5º35'52"E. The hospital is a multi-specialist tertiary health centre that provides 24hours emergency care services, diagnostic services, community health care services, general out-patient care services and related others. There are about 13 units, including Medical unit, Surgical unit, Burns unit, Intensive care unit, Orthopedic unit, Neonatal unit, Renal unit, Ear Nose and Throat unit, Ophthalmology unit, Radiology unit, Accident and Emergency unit, Administrative unit, Obstetrics and Gynecology unit and related others.

Target population

The target populations for this study were patients who have been diagnosed with diabetes mellitus and attending the diabetes clinic of the Medical Out-patient Department at the Hospital Unit.

Sampling technique and sample size

A simple random sampling technique was used to select 150 respondents.

The sample size was calculated using the Naegle's rule:

$$N = \frac{p\,(1-p)\,z^2}{d^2}$$

Where,
N = sample size
p = proportion of people practicing self-care in a previous study was 89% (Egbi, Ofili, & Oviasu, 2015).
z = standard normal variance where confidence level is 1.96 at 95%
d = absolute precision or error margin (5%) or 0.05

$$\text{Therefore, } N = \frac{0.89(1-0.89)1.96 \times 1.96}{0.05 \times 0.05}$$

$$N = \frac{0.37609264}{0.0025}$$

$$N = 150$$

Instrument for Data Collection

A self-constructed questionnaire was used to collect data and has four sections as follows:
Section A: socio-demographic data of the respondents
Section B: knowledge of foot care among diabetic patients containing 10 items
Section C: assessment of perceived practice of foot care among diabetics containing 11 items
Section D: factors influencing knowledge and factors of foot care containing 10 items

Validity of Research Instrument

Validity was established through face and content validity criteria. The instrument was critically reviewed by experts in the field of nursing, public health and statistics for appropriate structuring of the questions to ensure internal consistency and suitability toward achieving the research objectives.

Reliability of the Study

Reliability of the instrument was determined by test re-test method. In achieving this, the questionnaire was pretested using 10% of the sample size and re-administered in a similar but different facility after two-week interval and results was subjected to reliability test where the Cronbach Alpha value was used. An alpha value of 0.7 and above was accepted for a reliable instrument.

Procedure for Data Collection

Respondents were approached in the clinic to obtain individual informed consent following the approved protocol. The questionnaires were given to the respondents who were randomly selected from the register in the clinic to fill. Assistance was rendered to the respondents who were not able to interpret the questionnaire. Data collection took four weeks to complete.

Method of Data Analysis

Data collected was manually sorted out, coded before being subjected to computer analysis using the statistical package for social sciences (SPSS) version 23 to analyze using descriptive and inferential statistics. Results were presented using frequency tables and percentages.

Ethical Consideration

Ethical approval to conduct the study was obtained from the Health Research and Ethics Committee of Federal Medical Centre, Owo, Ondo State. Consent was obtained from participants before enrolling them for the study. All respondents who consented to take part in the study were informed of the methodology, the benefit of the study and the voluntary aspect were made known to the respondents to aid them in making informed decision to be part of the study. Respondents were assured of confidentiality and anonymity. Respondents were made to know that there were no incentives and that they could withdraw at any time during the study**.**

RESULTS

Table 1 presents the socio-demographic profile of the respondents. The table showed that 52% were above 60years and 55.3% were male. Also, 54% were Christians, 56.7% were Yoruba and 60% had tertiary education. Most (52.7%) were civil servant, 40.7% were diagnosed of diabetes 1-5years. As regards monthly salary, 52% take home below #100,000, 20% take home above #200,000 and 79.3% have 20.7% have heard foot ulcer before.

Table 2 shows the knowledge on foot care among respondents. It showed that 65.3% agreed that washing feet daily with soap will prevent foot infection and keeps foot healthy, 54% agreed that washing with warm water keeps feet soft and prevents cracking, 60.7% agreed that wearing slippers is a good habit as it protects feet from accidental injury, 65.3% drying of feet with soft towel can prevent irritation, and 79.3% agreed that daily inspection of feet to detect the danger early helps to prevent foot ulcer. Furthermore, 88.7% agreed that measuring of feet and buying right new shoes will reduce the risk of foot ulcer, and the same percentage disagreed that inspecting the inside of the footwear before putting them is less important while 56.7% claimed that stocking helps to keep feet dry and soft also absorb moisture and avoid warmness.

Figure 1 showed the level of knowledge on foot care among respondents. It showed that 23(15.3%) had poor knowledge on foot care, 67(44.7%) had fair knowledge while, 60(40.0%) had good knowledge on foot care.

Table 3 showed the practice of foot care among respondents. The table depicts that 44.7% sometimes checked their feet to identify their problems, 36.7% always wash their feet with warm water while 44% always dry their feet with soft towel to prevent irritation. Also, 38.7% sometimes put on socks to prevent dryness of foots, 40.7% rarely wear news shoes, 38.7% rarely check the inside of their footwear, 39.3% sometimes check their feet before and after bath while 26.7% always use lotion to prevent cracks. Figure 2 showed the categorization of the perceived practice of foot care among respondents. The figure showed that 44(29.3%) had poor level of foot care practices while 106(70.7%) had good level of foot care practice. Table 4 showed the factors influencing the practice of foot care among Respondents

From the table, 65.3% of the respondents agreed with financial weakness, 82% agreed with improper hospital management while 52% agreed with time frame for cleaning. Also, 66.7% of the respondents agreed with inadequate knowledge of foot ulcer, 62.7% agreed with failure to get appropriate footwear while most (60.7%) disagreed with religion belief.

The test of association between the level of education and knowledge on foot care among respondents is presented in Table 5. The table showed a significant relationship between level of education and knowledge on foot care ($p = 0.03$). Also, the test of association between knowledge and practice of foot care among respondents was presented in Table 6. The table showed that knowledge on foot care was significantly associated with practice of foot care among respondents ($p = 0.04$)

DISCUSSION

This study was conducted to assess knowledge and factors affecting the perceived practice of foot care among patients with diabetes mellitus in Federal Medical Center, Owo, Ondo State. The demographic profile of the patients revealed that 52% were above 60years while 55.3% were male. Also, 54% were Christians, 56.7% were Yoruba and 60% had tertiary education. More than half (52.7%) were civil servants, less than half 40.7% were diagnosed of diabetes between 1-5years. As regards monthly salary, 52% took home below #100,000, 20% were on income above #200,000. Findings of this study showed that 40% of the respondents had good knowledge on foot care, while 15.3% had poor knowledge on foot care., also, it was observed that the patients who have a high knowledge of diabetic foot ulcer mostly asserted that washing of feet with soap, warm water, wearing slippers as well as putting on socks would help prevent foot

ulcer. The high level of knowledge of diabetic foot and its management as was observed in this current study was in contrast to the study conducted by (Saber & Daoud, 2018) which reported majority of participants with poor knowledge score and moderate practice score respectively. This showed that more and more patients with diabetes mellitus are becoming aware of their disease state. As regards perceived practice of foot care, the patients stated that they always check their feet to identify any problem, always wash their feet with warm water as well as wearing of socks and new shoes to prevent dryness of foots. On assessment of their perceived level of practice, this present study reported that 70.7% of the patients had good practice of foot care. This high level of perceived practice was similarly reported in the study carried out by (Saber & Daoud, 2018) who stated that the practice of foot care measures such as daily foot washing and drying, daily foot examination, proper nail care, and footwear were important in regard to prevention and early detection of diabetic foot complications. The high level of perceived practice in this current study was however in contrast to the study conducted by (Desalu *et al.*, 2011). which reported that majority (78.4%) of their patients were with poor practice and poor knowledge of foot care. The findings of this study as regards the perceived practice of foot care showed that health workers in the study setting are doing much work concerning health education in relation to the prevention of diabetic foot ulcers among their patients with Diabetes mellitus. Regarding factors affecting practice of foot care practices among the patients, the following factors were identified: financial weakness; improper hospital management; time frame for cleaning; and inadequate knowledge of foot ulcer as well as failure to get appropriate footwear were factors limiting the perceived practice of foot care. Lack of knowledge as well as poverty was indicated in the study conducted in Nigeria by (Ugwu *et al.*, 2019). The hypothetical result showed a significant relationship between level of practice and knowledge of foot care and also between level of education and knowledge of foot care.

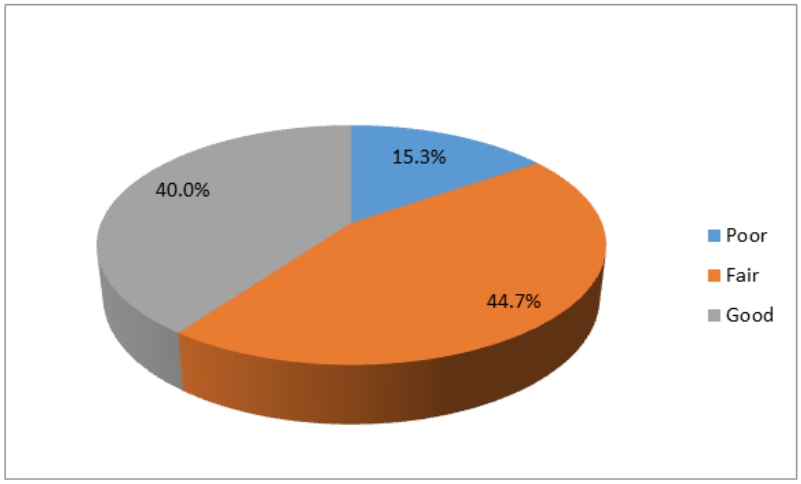

Fig 1: Categorization of Knowledge on Foot Care among Respondents

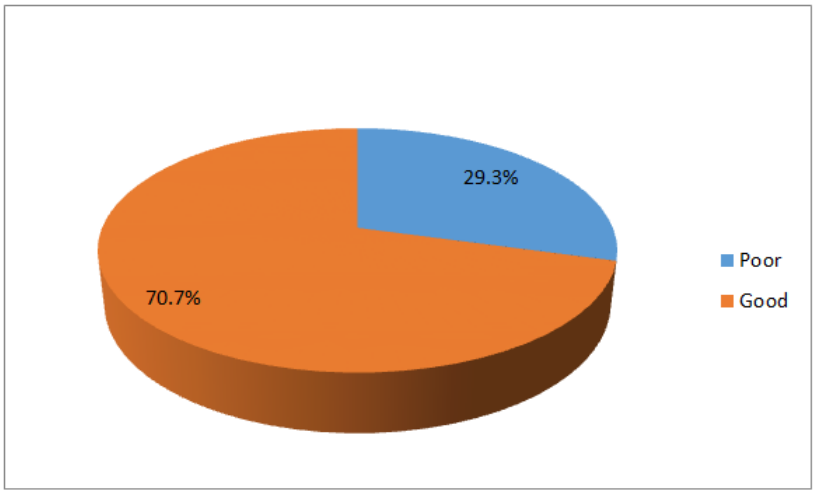

Fig 2: Categorization of Foot Care Practice among Respondents

Table 1: Socio-demographic Characteristics

Variables	Frequency (n)	Percentage (%)
Age (56.10±8.21)		
40-49	20	13.3
50-59	52	34.7
Above 60	78	52.0
Gender		
Male	83	55.3
Female	67	44.7
Religion		
Islam	69	46.0
Christianity	81	54.0
Ethnicity		
Yoruba	85	56.7
Igbo	59	39.3
Hausa	6	0.04
Level of education		
Primary	12	8.0
Secondary	48	32.0
Tertiary	90	60.0
Occupation		
Civil servant	79	52.7
Self-employed	51	34.0
Retired	20	13.3
Duration of diagnosis		
Less than 6 months	54	36.0
1-5years	61	40.7
Above 5years	35	23.3
Marital status		
Single	23	15.3
Married	78	52.0
Divorced	38	25.3
Separated	11	7.3
Monthly income		
below #50,000	22	14.7
below #100,000	78	52.0
above #150,000	20	13.3
Above #200,000	30	20.0
Have you had foot ulcer before		
Yes	31	20.7
No	119	79.3

Table 2: Showing knowledge of foot care

	YES n (%)	**NO n (%)**
Washing feet daily with soap will prevent foot infection and keeps foot healthy.	**98(65.3)**	**52(34.7)**
Washing with warm water keeps feet soft and prevents cracking.	**81(54.0)**	**69(46.0)**
After washing feet, wearing slippers is a good habit as it protects feet from accidental injury.	**91(60.7)**	**59(39.3)**
Drying of feet with soft towel can prevent irritation	**98(65.3)**	**52(34.7)**
Excessive moisture lotion or oils used in between toes can prevent maceration.	**112(74.7)**	**38(25.3)**
Exercise increases the blood circulation of body and maintains the blood glucose level and prevents foot complications.	**90(60.0)**	**60(40.0)**
Daily inspection of feet to detect the danger early as : cut ,blister, bruises, redness, helps to prevent foot ulcer etc.	**119(79.3)**	**31(20.7)**
Feet ankle and legs exercise increases blood circulation and keeps the foot healthy.	**123(82.0)**	**27(18.0)**
Measure the feet, buy right new shoes and choose soft shoes to prevent trauma reduces the risk of foot ulcer.	**133(88.7)**	**17(11.3)**
Inspecting the inside of the footwear before putting them is less important.	**17(11.3)**	**133(88.7)**
Stocking helps to keep feet dry and soft also absorb moisture and avoid warmness.	**65(43.3)**	**85(56.7)**

Table 3: Showing Practice of Foot Care among Respondents

	Never Practice n (%)	**Seldom Practice n (%)**	**Sometimes Practice n (%)**	**Always n (%)**
How often do you check the local foot skin to identify problems	9(6.0)	12(8.0)	67(44.7)	62(41.3)
How often do wash your feet with warm water to prevent cracking and keep the feet soft	17(11.3)	25(16.7)	53(35.3)	55(36.7)
How often do you dry your feet with soft towel to prevent irritation	7(4.7)	17(11.3)	60(4.0)	66(44.0)
How often do you cut your toe nails to keep the contour of the toes	26(17.3)	45(3.0)	34(22.7)	45(3.0)
How often do you put on socks to prevent dryness of the foot	33(22.0)	49(32.7)	58(38.7)	10(6.7)
How often do you perform sitting foot exercise	28(18.7)	58(38.7)	53(35.3)	11(7.3)
How often do you buy the right new shoes and choice soft shoes to avoid trauma	21(14.0)	45(3.0)	69(46.0)	15(10.0)
How often do you wear new shoes gradually to avoid foot blister	46(30.7)	61(40.7)	32(21.3)	11(7.3)
How often do you check the inside of your footwear before putting them	28(18.7)	58(38.7)	53(35.3)	11(7.3)
How often do you check your feet before and after bath	11(7.3)	34(22.7)	59(39.3)	46(30.7)
How often do you use a moisture lotion or oils to prevent cracks	40(26.7)	40(26.7)	30(20.0)	40(26.7)

Table 4: Showing factors influencing the practice of foot care among Respondents

Variables	**YES**	**NO**
Financial weakness	98(65.3)	52(34.7)
Improper hospital management	123(82.0)	27(18.0)
Time frame for cleaning	78(52.0)	72(48.0)
Poor attitude from health team	89(59.3)	61(40.7)
Inadequate knowledge of foot ulcer	100(66.7)	50(33.3)
Poor communication between patients and health team	112(74.7)	38(25.3)
Failure to get appropriate footwear	94(62.7)	56(37.3)
Culture	67(44.7)	83(55.3)
Religion belief	59(39.3)	91(60.7)
Inability to get helper	61(40.7)	89(59.3)

Table 5: Association between level of education and knowledge on Foot care

	Knowledge of foot care			
Level of education	Low n (%)	Moderate n (%)	High n (%)	Total n (%)
Primary	2(1.3)	6(4.0)	4(2.7)	12(8.0)
Secondary	12(8.0)	17(11.3)	19(12.7)	48(32.0)
Tertiary	9(6.0)	44(29.3)	37(24.7)	90(60.0)
Total	23(15.3)	67(44.7)	60(40.0)	150(100.0)

*** df = 4, x^2 = 20.32, P-value = 0.03**

Table 6: Association between knowledge and practice of foot care among Respondents

	Knowledge of foot care			
Practice of foot care	Low n (%)	Moderate n (%)	High n (%)	Total n (%)
Poor	8(5.3)	14(9.3)	22(14.7)	44(29.3)
Good	15(10.0)	53(35.3)	38(25.3)	106(70.7)
Total	23(15.3)	67(44.7)	60(40.0)	150(100.0)

*** df = 6, x^2 = 23.12, P-value = 0.04**

CONCLUSION

This study hereby concluded that diabetic patients in the study setting have a high level of knowledge of diabetic foot, while majority have shown a good level of practice of foot care. Poverty, improper hospital management, time frame for cleaning, inadequate knowledge of foot ulcer and failure to get appropriate footwear were factors limiting effective practice of foot care. However, the level of education of the patients has a significant impact on their understanding of their diabetic foot while their knowledge also influenced their good practice of diabetic foot.

Implications to Nursing

As first line health care providers, it is imperative that nurses educate their diabetic patients on the need to comply with their medications. Also, nurses need to provide information on the importance of foot treatment among individuals presenting with diabetes as most lower limbs amputations among patients with diabetes are preceded by a foot ulcer, whose risk factors apart from peripheral vascular disease and peripheral neuropathy, are walking barefooted, inappropriate use of footwear, poor foot hygiene and delay in seeking medical attention.

RECOMMENDATIONS

Based on the findings from this study, the following recommendations were made:

- More efforts are needed from healthcare providers on patients' education and motivation as well as to emphasize the importance of achieving adequate glycemic control through incorporating healthy lifestyle changes including diabetes self-care behaviors
- There is the need to develop effective communication skills when counseling diabetic patients. Rather than only focusing on providing services, patient education through increasing diabetes knowledge, building positive attitudes, monitoring patients' compliance to glycemic control, encouraging adherence to self-care behaviors as well as dietary and lifestyle modifications should be emphasized to diabetic patients at every appointment
- There is the need to develop effective behavioral strategies (i.e., consider social and cultural habits) to overcome barriers to diabetes self-care behaviors and diabetes self-management among Nigerian people with diabetes. Healthcare providers, especially family practitioners and dietitians should discuss barriers when counseling patients and solutions should be tailored toward individual needs.

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Authors' contributions

OAI and ATO carried out the study from the conception, analysis and interpretation of data as well as reviewing the manuscript. OMI and AO participated in reviewing, data analysis, drafting and editing the manuscript. All authors read and approved the final draft of the manuscript.

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Competing interest: The authors hereby declare that they have no competing interests.

Availability of data and materials: All data generated or analyzed during the current study are available from the corresponding author upon a reasonable and considerable request.

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