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## Diabetic Foot Care: Knowledge and Practices among Diabetic Patients Attending a Nigerian Tertiary Health Institution

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### **Abstract:**

*Background:* Foot complications are common among diabetic patients. The study aims at determining the knowledge and practices of foot care among diabetic patients attending a tertiary health institution in southern Nigeria.

*Method:* The study was descriptive cross sectional conducted in November, 2015. A pre-tested interviewer-administered structured questionnaire was the study instrument.

*Results:* Out of 158 respondents, 75 (47.5%) were females, the modal age range was 50 - 59 years, 61.4% were married, 89.9% were Christians and over 70% had a minimum of secondary education. Awareness of diabetic foot was 80.4% and Health care workers (77.2%) were their main source of information. Foot ulcer (69.3%) was the most common foot problem known but 35.4% knew at least one cause of diabetic foot. Methods of prevention include: proper feeding (40.1%), daily foot examination (19.7%) and use of appropriate foot wear (14.9%). Most, (91.1%) were positively disposed to regular foot examination and over 70% believe this should be done daily. Almost 82% practice regular foot examination but 13.2% do so daily. Only 19% regularly cut their nails straight with a safety clipper and a trained family member (50.6%) is responsible for nail cutting. Almost 62% reports any new wound on the feet immediately to the doctor and 50.6% use cotton or wool stockings. Most use sturdy and comfortable shoes (79.1%) which is regularly examined before use (83.5%) and 38% always light the pathways used at night.

*Conclusion:* Knowledge of diabetic foot care was fair, attitude was good but practices were suboptimal.

**Keywords:** Diabetes, foot care, knowledge, practices, patients

### **1. Introduction**

Diabetes mellitus (DM) is a group of metabolic disorders characterized by a chronic hyperglycemic condition resulting from defects in insulin secretion, insulin action or both, (Ozougwu et al, 2013). It is a progressive disorder characterized by multiple organ involvement. According to World Health Organization (WHO), 422 million people had DM in 2014 and the prevalence is rising rapidly particularly in middle-and-low- income countries (including Nigeria)- no wonder, it is today considered a global epidemic, (WHO, 2016; Samira et al, 2015). Despite advances in health care, diabetes is still a major cause of premature mortality. In 2014 alone, 4.9 million people died from diabetes, meaning that one person with diabetes dies every 7 seconds, (IDF, 2016). These deaths are attributed mainly to the complications associated with diabetes.

The complications of diabetes are many and varied and can be divided into acute metabolic complications such as diabetic ketoacidosis and hypoglycemic coma. However, the more devastating complications are the long term vascular complications namely, macrovascular complications (coronary artery disease, peripheral arterial disease, and cerebrovascular disease) and microvascular complications which included diabetic nephropathy, neuropathy, and retinopathy, (Forbes & Cooper, 2013; Fowler, 2013). Diabetic foot complications contribute substantially to morbidity and mortality among people with diabetes and constitute enormous physical, physiological and financial burden for both patients and the entire community. These problems are responsible for nearly 50% of all diabetes related hospital admissions. The risk for ulceration and amputation increases by 2-4 folds with the progression of age and duration of diabetes irrespective of the type. It is also estimated that the life time foot ulcer risk for diabetic patients is 25%, (Al-Rubeaan et al, 2015).

Diabetic foot ulcer (DFU) is one of the most important and disabling conditions among the foot complications. It is believed to arise from a combination of oxygen deficiency caused by peripheral vascular disease, peripheral neuropathy, minor foot traumas, deformities and infection, (Madanchi et al, 2013). The mortality rate among diabetic patients with DFU is 2.4 times greater than in those without foot ulcers. The quality of life among this group of patients is also reduced as a result of decreased mobility, increased dependence on others and the risk of foot amputation which is quite high as more than 60% of non-traumatic lower extremities amputation occur among people with diabetes, (Seid & Tsige, 2015; Nasiriziba et al, 2015).

Nevertheless, of all the complications of diabetes, the foot problems are considered the most preventable. This is because their risk factors namely: poor knowledge of foot care and poor foot care practices such as, bare-foot walking, inappropriate foot wear, poor

foot hygiene and delay in seeking medical attention are easy to identify and address. Thus DFU can be prevented through strict adherence to the recommended guidelines on diabetic foot care (George et al, 2013; Chiwanga & Njelekela, 2015). Several studies have also reported that early identification of people at high risk for foot problems and management of the risk factors can prevent foot ulceration and lower extremity amputation (Chiwanga & Njelekela, 2015; Al Odhayani et al, 2015). It has equally been shown that engagement in simple daily foot care routine is associated with low risk of developing foot complications thus, highlighting the importance of self-care in the prevention of diabetic foot complications, (McInnes et al, 2011).

However, foot care practices among patients with diabetes are low and studies have established that a majority of diabetic patients did not receive foot care education, (Chiwanga & Njelekela, 2015; Selvaraj et al, 2016). The success of foot care in preventing foot problems depends on the patient's knowledge and practice of good foot care. Present study is therefore aimed at determining the knowledge and practices of foot care among diabetic patients attending a tertiary health institution in southern Nigeria. It is also hoped that findings will be of value in determining ways to promote appropriate foot care practices among people with diabetes.

## 2. Methods

The study was descriptive cross-sectional done in November, 2015 among adult diabetic patients attending the Endocrinology clinic of Enugu State University Teaching Hospital, Parklane, Enugu, Southeast Nigeria. The hospital occupies a central position in Enugu metropolis, the capital of Enugu State and serves as a referral centre for secondary and primary facilities within the state and from neighbouring states. The clinic runs once weekly and the average weekly attendance is 45. All eligible patients attending the clinic who gave informed consent were admitted into the study.

Data collection was done over 4 consecutive weeks in November, 2015 using interviewer-administered semi-structured questionnaire. The questionnaire was pre-tested among diabetic patients of a federal tertiary health institution within the state. Content of the questionnaire include socio-demographic variables, knowledge of diabetic foot care and foot care practices. Ethical permission was obtained from the Ethics Committee of Enugu State University Teaching Hospital. Data were entered and analyzed in statistical package for social sciences (SPSS) version 17. Frequencies and percentages were presented as tables.

## 3. Result

One hundred and fifty eight (158) respondents participated in the study. Out of these, 75 (47.5%) were females. The age range was 30 – 75 years with a modal age range of 50 - 59 years. Most, (61.4%) were married while 39 (24.7%) were widows/widowers and 5 (3.1%) were either divorced or separated from their partners. Christianity, (89.9%) is the predominant religion and over 70% of respondents had secondary education or more Table 1.

Variable	Frequency N = 158	Percent
<b>Sex</b>		
Male	83	52.5
Female	75	47.5
<b>Age range</b>		
30 – 39	17	10.8
40 – 49	36	22.8
50 – 59	55	34.8
60 – 69	30	19.0
70 and above	20	12.6
<b>Marital Status</b>		
Married	97	61.4
Single	17	10.8
Widowed	39	24.7
Divorced	5	3.1
<b>Education</b>		
Non/Primary	44	27.9
Secondary	56	35.4
Tertiary	58	36.7
<b>Religion</b>		
Christianity	142	89.9
African Traditional	13	8.2
Islam	3	1.9

Table 1: Socio-demographic variables of respondents

One hundred and twenty seven (80.4%) were aware of diabetic foot and Health care workers (77.2%) were their main source of information. Foot ulcer (69.3%) was the most common foot problem known but 4 (3.1%) could not identify any foot problem. Only 45 (35.4%) knew at least one cause of diabetic foot. Methods of prevention reported include: proper feeding (40.1%), daily foot examination (19.7%) and use of appropriate foot wear (14.9%) Table 2.

Knowledge	Frequency	Percent
Awareness of diabetic foot	127	80.4
Source of first information:		
Health worker	98	77.2
Mass media	19	14.9
Friend	8	6.3
Relative	2	1.6
Common foot problems among diabetics:		
Foot ulcers	88	69.3
Reduced blood supply	16	12.6
Loss of sensation	11	8.7
Gangrene	8	6.3
Don't know	4	3.1
Causes of diabetic foot:		
Poor foot wears	31	24.4
Poor blood supply	8	6.3
Nerve damage	6	4.7
Methods of prevention:		
Proper feeding	51	40.1
Daily feet examination	25	19.7
Lighting the pathways used at night	20	15.7
Wearing sturdy and comfortable shoes	19	14.9

Table 2: Knowledge of diabetic foot among respondents

Most of the respondents (91.1%) were positively disposed to regular foot examination and over 70% believe that this should be done daily Table 3.

Attitude	Frequency	Percent
Regular foot examination is necessary	144	91.1
Regularity of foot examination:		
Every day	105	72.9
Every week	18	12.5
Every month	11	7.6
Others (bimonthly, quarterly)	10	6.9
Raising foot care awareness is important	145	91.8
Methods of increasing foot care awareness:		
Public enlightenment using the mass media	90	62.1
Health education at Diabetic clinics	48	33.1
Others (House-to-house, use of places of worship)	7	4.8

Table 3: Attitude to foot care among respondents

Almost 82% practice regular foot examination but only 17 (13.2%) do so daily while 52 (40.3%) do it once every week. Of the 29 respondents who do not examine their feet regularly, reasons given for non-regular foot examination include: too busy (41.4), don't remember (24.1%) and no need to pay particular attention to only the feet (3.5%). The toe nails were mostly (41.1%) cut straight with a razor while only 19% regularly cut their nails straight with the use of a safety clipper. A trained family member is responsible for nail cutting for more than half of the respondents while 63 (39.9%) allow any willing person to cut their toe nails. Almost 62% of the respondents reports any new wounds on the feet immediately to the doctor while 8 (5%) use herbal medications to treat such new wounds Table 4.

Practice	Frequency	Percent
Regular foot examination:		
Yes	129	81.6
No	29	18.4
Total	158	100
Frequency of foot examination:		
Weekly	52	40.3
Occasionally	49	38.0
Daily	17	13.2
Monthly	6	4.6
Bimonthly	5	3.9
Total	129	100
Reasons for non-foot examination:		
Too busy	12	41.4
Bath every day	9	31.0
Don't remember	7	24.1
No need to particular attention to only my feet	1	3.5
Total	29	100
Nail care practices:		
Regularly cut straight with a razor	65	41.1
Occasionally cut curved with a razor	44	27.9
Regularly cut straight with a safety clipper	30	19.0
Regularly cut curved with a safety clipper	18	11.4
Neat, long and beautifully polished	1	0.6
Total	158	100
Person responsible for cutting toe nails:		
A trained family member	80	50.6
Anyone who agrees to cut them	63	39.9
My doctor	5	3.2
I simply allow them to grow	10	6.3
Total	158	100
Response to new wounds on the feet:		
Report immediately to my doctor	97	61.4
Treat with antibiotic powder	32	20.3
Wash and allow to heal	21	13.3
Use herbal medications	8	5.0
Total	158	100

*Table 4: Foot care practices among respondents*

Slightly above half of the respondents use cotton or wool stockings while the rest are either not particular about the socks they wear or actually use elastic stockings. Most use sturdy and comfortable shoes (79.1%) which they regularly examine before use (83.5%) to ensure there are no stones or items that could prick them (95.5%). Only 60 (38%) always light the pathways used at night but 86.7% keep their homes neat and dry and without obstacles on their way to avoid tripping.

Practice	Frequency (N = 158)	Percent
Type of stockings regularly worn:		
Cotton or wool	80	50.6
Any fine socks available	42	26.6
Hosiery	21	13.3
Elastic	15	9.5
Total	158	100
Type of shoes frequently used:		
Sturdy and comfortable shoes	125	79.1
Fine and shapely high heeled shoes	5	3.2
Designers shoes	2	1.3
Others (sandals, slippers)	26	16.4
Regular shoe examination:		
Yes	132	83.5
No	26	16.5
Reasons for regular shoe examination:		
To ensure there are stones or items that may prick me	126	95.5
To ensure they are well matched with my dress	6	4.5
Total	132	100
House lighting at night:		
Lights are on at night but when there is power failure, the house is usually dark	81	51.3
Always light the pathways used at night	60	38.0
Cannot afford to leave the lights on all through the night	10	6.3
Others (rarely wakes up at night, etc)	7	4.4
Environmental management at home:		
Dry and neat without obstacles on my way to avoid tripping	137	86.7
Neat but usually scattered because I have small children	21	13.3

Table 5: Foot care practices among respondents contd

#### 4. Discussion

Contrary to expectations in south-east Nigeria where studies have shown a higher prevalence of diabetes among females, present study for no obvious reason revealed a slight male preponderance, (Chukwu et al, 2013; Ejike et al, 2015). Similar male predominance has been reported in south-west Nigeria, (Ekore et al, 2010). The age characteristics are however similar to a previous finding where the mean age of respondents was 57 years, (Selvaraj et al, 2016). This shows that diabetes (Type 2) is indeed a disease of middle age and prevalence tends to be positively correlated with advancing age. Since Christianity is the predominant religion in southern Nigeria, it is not surprising that most of the respondents were Christians. Over 70% of the respondents had either secondary or tertiary education. This is probably because the study was conducted in a tertiary institution located in the center of a capital city where patients are drawn mainly from the elites in the society.

Awareness of diabetic foot was quite high among the respondents and so was the knowledge of common diabetic foot problems. A similar high knowledge of foot complications in diabetes mellitus has been reported among similar patients, (Jinadasa & Jeewantha, 2011). This could be as a result of their source of information which was mostly health workers. An earlier study also reported health workers as the source of information in over 90% of respondents, (Chiwanga & Njelekela, 2015). This is good and shows that health workers have not completely forgotten patients' education as a vital aspect of their work. On the contrary, knowledge of the causes of diabetic foot was rather poor, implying that the education given to patients might not be detailed or might have been rushed in busy clinics. The importance of health education in helping patients to imbibe healthy preventive behaviours cannot be over-emphasized.

In addition, only 19.7% of the respondents knew about daily foot inspection as a preventive measure. This is a far cry from the expected and it is ridiculously lower than 74.5% reported 3 years ago from a rural secondary health facility in southern India, (George et al, 2013). Despite the poor knowledge that daily foot examination is a preventive measure of diabetic foot complications, over 90% had positive attitude towards regular foot examination and most, (72.9%) believed that this should be done daily. Furthermore, almost 82% of the respondents examined their feet regularly but only 13.2% did it daily. Again, this could be attributed to lack of detailed knowledge of diabetic foot care and this practice is a lot lower than earlier findings, (Seid & Tsige, 2015; Chiwanga & Njelekela, 2015).

The use of safety clippers for safe toe nail care was practiced by only 19% of the respondents. Although this practice is still very poor, it is an improvement on a previous report in Ibadan, Nigeria where only 2.9% of respondents clipped their toe nails with care, (Ekore et al, 2010). This further highlights the need to intensify efforts at sustained foot care education for patients with diabetes. It is also noteworthy that in agreement with earlier studies, many of the respondents still engage in the dangerous habit of using sharp instruments to cut the toe nails, (Chiwanga & Njelekela, 2015). This is particularly important as only half of the respondents have their toe nails cut by a trained person. Thus, the chances of injuring the toes every time the nails are cut are extremely high.

Reporting of any changes in the foot immediately to health care center is associated with low risk of developing foot complications, (McInnes et al, 2011). In the present study, 61.4% report any new foot wound immediately to their doctor as expected. However, the remaining resort to self-medication and use of local herbs. This should be discouraged as it results in delays from accessing appropriate medical treatment crucial in ensuring fast wound healing. Most of the respondents (50.6%) use cotton or wool socks. The recommended diabetic socks is any comfortable and well fitted socks capable of absorbing moisture and preferably of light colour to make any draining wound obvious, (Feldman & Davis, 2001). In addition, majority of the respondents use appropriate shoes which are regularly examined (83.5%) to avoid being pricked (95.5%). This good practice which is essential in the prevention of foot ulcer is better than previous reports, (George et al, 2013; Chiwanga & Njelekela, 2015; Ekore et al, 2010). Lighting of homes at night particularly the pathway used at night is of great importance in reducing foot complications especially those arising from injuries sustained at night. Only 38% of the respondents regularly put on their lights at night. Reasons given for not lighting the house include power failures and unaffordability of electricity bills.

## 5. Conclusions/Recommendations

Knowledge of some aspects of diabetic foot care was high. However, detailed knowledge was poor. Attitudes to essential foot care behaviour were favourable but the practices are still suboptimal. Continued foot care education at diabetic clinics and with use of mass media are recommended.

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