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Knowledge of Diabetic Foot Care among Nursing Practitioners in Rivers State, Nigeria

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Abstract

Diabetic foot ulcers have led to countless amputations and reduced quality of life among individuals living with diabetes. Specialized diabetic foot care has been shown to reduce the risk of foot ulcers and amputation among diabetics. The study assessed the knowledge of diabetic foot care among 100 nurses in the University of Port Harcourt Teaching Hospital and the Rivers State Hospitals Management Board Hospitals (which include General Hospitals from all the local government areas) in Rivers State, Nigeria. A structured questionnaire containing questions on different aspects of diabetic foot care was interviewer-administered to the nurses and scored accordingly. The results showed that only 34 (34%) had training on diabetic foot care; and most of the nurses who had training had more than 20 years of experience. It was observed that the knowledge of diabetic foot care was significantly higher among nurses with more than 10 years of experience (p = 0.0046). Nurses with less than 10 years of experience had a significantly poor knowledge of diabetic foot care. Knowledge of footwear assessment and assessing the patient's capacity for self-care was found to be significantly lower among nurses who had no training on diabetes foot care (p = 0.0001). The study shows the urgent need for frequently organized training on diabetic foot care for nursing practitioners to improve the quality of diabetes care in Rivers state, Nigeria.

Keywords: *Diabetes, Diabetic Foot, Diabetes Foot Care, Nursing Practitioners.*

Introduction

More than 300 million people are affected with Diabetes Mellitus (DM) globally (Rashimi, 2017). In Nigeria the prevalence of diabetes is reported to range from 3 – 11% in the different regions of the country (Oyetunde and Famakinwa, 2014; Oputa et al., 2015; Ejike et al., 2015). The rising incidence of diabetes corresponds with an increase in complications and morbidity with resultant mortality and increase in healthcare costs globally (ADA, 2013).

Diabetic foot ulcer is a significant complication of diabetes mellitus and a risk factor for leg amputations which could lead to a poor quality of life and eventual loss of productivity among diabetics (Schaper et al., 2012). Foot ulcers are responsible for infections, gangrene, amputation and even death if they are not managed properly (Beiranvand et al., 2015). In addition, lower extremity amputation is associated with prolonged hospitalization, increased healthcare cost and rehabilitation, which is also required to home care and social support (Schaper et al., 2012; ADA, 2013; Beiranvand et al., 2015). It has been reported that between 49-85% of all amputations can be prevented by adopting well-structured preventive management for example; healthy diet, physical activity, the prevention of overweight & obesity, and extensive foot care (Ahmed et al., 2011).

There is adequate evidence showing that the appropriate provision of diabetic foot care service is associated with a reduction in related amputations (Beiranvand et al., 2015). In addition to adopting secondary prevention therapies of limb amputations such as peripheral re-vascularization, aggressive wound debridement and cardiovascular risk management, it is recommended that primary prevention strategies such as screening and patient education be adopted to minimize the onset and recurrence of diabetic foot disease (Soriguer et al., 2012; Ali et al., 2013; Zarchi et al., 2014; Uba et al., 2015).

While a multi-disciplinary approach to diabetic foot ulcer is preferred, it is evident that nurses have a great deal of responsibility in providing essential care and information to diabetics to enable the patient live a quality life (Ahmed et al., 2011; Beiranvand et al., 2015). The nurse, therefore, must possess the

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expected knowledge to enable the achievement of this goal. Studies suggest that patient education with proper foot care practices may reduce diabetes related foot ulceration and amputations (Soriguer et al., 2012). Also, with adequate foot care practices problems such as corns and callosities are reduced and managed (Ali et al., 2013). Specialized foot care by nurses in developed countries have recorded considerable successes in the prevention of diabetic foot ulcers, prolonging the use of the feet of diabetic patients and prevention of amputation (Uba et al., 2015). However, it was reported in some developing countries that nurses demonstrated poor knowledge of diabetes, especially specialized diabetic foot care (Ali et al., 2013; Oyetunde and Famakinwa, 2014; Uba et al., 2015). There is a paucity of data on the knowledge and practice of diabetes foot care among nurses in resource-poor settings such as Nigeria. This study assessed the knowledge of diabetic foot care amongst nurses. This is the first part of an intervention study to enhance specialized diabetic foot care among nurses in Rivers State, Nigeria, in order to improve the health outlook of diabetic patients.

Methodology

Study area

The study was carried out in the University of Port Harcourt Teaching Hospital and the Rivers State Hospitals Management Board Hospitals (which include General Hospitals from all the local government areas) in Rivers State, Nigeria.

Study sample

A total of 100 registered nurses in the medical and endocrinology clinics who were directly involved in diabetic patients care for more than 1 year in the hospitals were purposively selected for the study. Participation was voluntary and informed consent was obtained from all nurses, while approval to carry out the study was obtained from the Health Research Ethics Committees of both the University of Port Harcourt Teaching Hospital and the Rivers State Hospitals Management Board.

Study instrument

A structured questionnaire containing 32 items on specialized diabetic foot care as prepared by Abdullah et al., (2017) was adopted for the study. The questionnaire contained three sections including: Section A: Sociodemographic information of the nurses. Section B: Academic qualifications, years of experience and training received by the nurses. Section C contained questions on the knowledge of diabetic foot care in general foot care, Palpation, Auscultation, Footwear Assessment and Assessment of patient's self-care capacity.

Data collection

The questionnaire was interviewer-administered by the researcher to each of the purposively selected 100 nurses. The researcher ensured all questionnaires were completely filled as responses to each question was appropriately filled according to the nurses' responses.

Data analysis

Completed questionnaire items were analyzed using frequency counts and percentages. Responses to the different questions on knowledge of diabetic foot care was collated and the mean score calculated. Chi-square analysis was used to assess the association between knowledge of diabetic foot care, years of practice, training received and academic qualification. All analysis was done with The Epi Info software version 7 and a p-value < 0.05 was considered significant.

Results

Table 1 shows the socio-demographic distribution of the study subjects. The mean age of the Nurses was 44.9±8.9 years. Among the nurses, 6 (6.0%) were between 20 – 30 years, 34 (34.0%), were between 31 – 40 years, 30 (30.0%) were between 41 – 50 years, 27 (27.0%) were between 51 – 60 years and 3 (3.0) were above 60 years. Academic qualifications included; 5 (5.0%) Basic Diplomas, 51 (51.0%) Higher Diplomas, 36 (36.0%) Bachelor's Degree, 6 (6.0%) Masters Degrees and 2 (2.0%) PhD. Distribution of the years of practice shows that 6 (6.0%) had <5 years of practice, 21 (21.0%) had

experience between 11 – 20 years and 31 – 40 years respectively, 22 (22.0%) had experience between 6 – 10 years and 30 (30.0%) had experience between 21 – 30 years.

Table 1. Sociodemographic information

Variable	Frequency (n =100)
Mean Age (±SD)	44.9±8.9years
Age Group (years)	
20 – 30	6 (6.0)
31 – 40	34 (34.0)
41 – 50	30 (30.0)
51 – 60	27 (27.0)
>60	3 (3.0)
Academic Qualification	
Basic Diploma (RN)	5 (5.0)
Higher Diploma (RN, RM)	51 (51.0)
Bachelor's Degree	36 (36.0)
Masters	6 (6.0)
PhD	2 (2.0)
Years of Practice	
<5 years	6 (6.0)
6 – 10 years	22 (22.0)
11 – 20 years	21 (21.0)
21 – 30 years	30 (30.0)
31 – 40 years	21 (21.0)

RN: Registered Nurse, RM: Registered Midwife

Of the 100 Nurses, 34 (34.0%) have had training on diabetic foot care and 66 (66.0%) had no training on diabetic foot care (Figure 1).

Assessment of knowledge on diabetic foot care is presented in Table 2. Only 24(24.0%) had knowledge of a standard of diabetic foot care and 76 (76.0%) did not. Other responses showed that 45 (45.0%) indicated that all patients with diabetes develop reduced blood flow in their feet, 10 (10.0%) indicated that all patients with diabetes develop lack of sensations in their feet, 15 (15.0%) responded that all patients with diabetes develop foot ulcers. Also, 5 (5.0%) indicated that all patients with diabetes develop gangrene, 97 (97.0%) agreed that patient is more prone to have foot ulcers if the patient has loss of sensation on the foot, 89 (89.0%) indicated that if a patient has reduced blood flow in the foot, is he/she more prone to get foot ulcers. While 56 (56.0%) indicated that they assess for diabetic foot in the diabetic patients they see.

Table 2. Knowledge of diabetic foot care

Questions	Yes	No
Knowledge of national or international standard for diabetic foot care	24 (24.0)	76 (76.0)
Do all patients with diabetes develop reduced blood flow in their feet?	45 (45.0)	55 (55.0)
Do all patients with diabetes develop lack of sensations in their feet?	10 (10.0)	90 (90.0)
Do all patients with diabetes develop foot ulcers?	15 (15.0)	85 (85.0)
Do all patients with diabetes develop gangrene?	5 (5.0)	95 (95.0)
Patient is more prone to have foot ulcers if the patient has loss of sensation on the foot?	97 (97.0)	3 (3.0)
If a patient has reduced blood flow in the foot, is he/she more prone to get foot ulcers?	89 (89.0)	11 (11.0)

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Do you assess for diabetic foot in the diabetes patients you see?	56 (56.0)	44 (44.0)

Risk factors for foot ulcers mentioned by the nurses include; past foot ulcer history (24.7%), previous amputation (21.7%), peripheral neuropathy (19.8%), peripheral vascular disease (14.5%) foot deformity (13.6%), diabetic nephropathy (3.6%), poor glycemic control (1.4%) and cigarette smoking (0.6%) as presented in Table 3.

Table 3. Risk factors for foot ulcers

Responses	**Frequency (%)**
Previous amputation	78 (21.7)
Past foot ulcer history	89 (24.7)
Peripheral neuropathy	71 (19.8)
Foot deformity	49 (13.6)
Peripheral vascular disease	52 (14.5)
Visual impairment	-
Diabetic nephropathy	13 (3.6)
Poor glycemic control	5 (1.4)
Cigarette smoking	2 (0.6)
Total	**359 (100.0)**

Note: Multiple responses

Table 4 shows that 2 (5.9%) of the nurses trained on diabetic foot care had less than 5 years practicing experience, 6 (17.7%) had between 11-20 years and 21 – 30 years of experience respectively, 7 (20.5%) had between 6 – 10 years of experience and 13 (38.2%) had 31 – 40 years of experience. There was a significant difference between nurses that have been trained and those that have not been trained which had 31 – 40 years of experience ($p = 0.023$).

Table 4. Cross tabulation of training received on DM foot care and years of practice

	Training Received		
Years of Practice	**Yes**	**No**	**Chi-Square (p-value)**
<5 years	2 (5.9)	4 (6.1)	0.01 (0.9716)**
6 – 10 years	7 (20.5)	15 (22.7)	0.05 (0.8067)**
11 – 20 years	6 (17.7)	15 (22.7)	0.34 (0.5546)**
21 – 30 years	6 (17.7)	24 (36.4)	3.74 (0.0530)**
31 – 40 years	13 (38.2)	8 (12.1)	9.22 (0.0023)*
Total	**34 (100.0)**	**66 (100.0)**	

*****Statistically significant ($p < 0.05$); **Not Statistically significant ($p > 0.05$)

Table 5 shows the level of knowledge on diabetic foot care, 90 (90.0%) had good knowledge on general foot inspection, 86 (86.0%) had good knowledge on diabetic foot assessment, 64 (64.0%) had good knowledge on palpation. Also, 80 (80.0%) had good knowledge of Auscultation, 77 (77.0%) had good knowledge on footwear assessment and 65 (65.0%) had good knowledge on the assessment of patient's self-care capacity.

Table 5. Level of knowledge on diabetic foot care

Questions	**Good Knowledge**	**Poor Knowledge**	**Total**
General foot inspection	90 (90.0%)	10 (10.0%)	100 (100.0%)
Diabetic foot assessment	86 (86.0%)	14 (14.0%)	100 (100.0%)
Palpation	64 (64.0%)	36 (36.0%)	100 (100.0%)
Auscultation	80 (80.0%)	20 (20.0%)	100 (100.0%)

Footwear Assessment	77 (77.0%)	23 (23.0%)	100 (100.0%)
Assessment of patient's self-care capacity	65 (65.0%)	35 (35.0%)	100 (100.0%)

Table 6 shows the difference in years of experience and knowledge of diabetic foot care amongst the nurses. The differences in the years of experience and the knowledge of diabetic foot care was found to be statistically significant ($p < 0.05$).

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Table 6. Difference in years of experience and knowledge on diabetic foot care

Knowledge	<5 years (n = 6) (%)	6 – 10 years (n = 22) (%)	11 – 20 years (n = 21) (%)	21 – 30 years (n = 30) (%)	31 – 40 years (n = 21) (%)
General foot inspection					
Right	3 (50.0)	18 (81.8)	20 (95.2)	29 (96.7)	20 (95.2)
Wrong	3 (50.0)	4 (18.2)	1 (4.8)	1 (3.3)	1 (4.8)
Chi-Square (p-value)	**15.06 (0.0046) ***				
Diabetic foot assessment					
Right	3 (50.0)	16 (72.7)	18 (85.7)	28 (93.3)	20 (95.2)
Wrong	3 (50.0)	6 (27.3)	3 (14.3)	2 (6.7)	1 (4.8)
Chi-Square (p-value)	**11.73 (0.0195) ***				
Palpation					
Right	0 (0.0)	10 (45.5)	12 (57.1)	25 (83.3)	16 (76.2)
Wrong	6 (100.0)	12 (55.5)	9 (42.9)	5 (16.7)	5 (23.8)
Chi-Square (p-value)	**20.32 (0.0004) ***				
Auscultation					
Right	1 (16.7)	12 (55.5)	18 (85.7)	29 (96.7)	20 (95.2)
Wrong	5 (83.3)	10 (45.5)	3 (14.3)	1 (3.3)	1 (4.8)
Chi-Square (p-value)	**32.64 (0.0001) ***				
Footwear Assessment					
Right	1 (16.7)	12 (55.5)	16 (76.2)	27 (90.0)	21 (100.0)
Wrong	5 (83.3)	10 (45.5)	5 (23.8)	3 (10.0)	0 (0.0)
Chi-Square (p-value)	**27.74 (0.0001) ***				
Assessing Patient's Self-care Capacity					
Right	0 (0.0)	9 (40.9)	9 (42.9)	24 (80.0)	18 (85.7)
Wrong	6 (100.0)	13 (59.1)	13 (57.1)	6 (20.0)	3 (14.3)
Chi-Square (p-value)	**26.33 (0.0001) ***				

***Difference is statistically significant ($p < 0.05$).

Table 7 shows that there is no difference in the knowledge of general foot inspection, diabetic foot assessment, palpation and auscultation between trained nurses and untrained nurses ($p > 0.05$). While knowledge on footwear assessment and assessing patient's capacity for self-care was found to be statistically different between the trained and untrained nurses ($p < 0.05$).

Table 7. Cross-tabulation of knowledge of diabetic foot care and training on diabetic foot care

Knowledge	Trained (n=34)	Not Trained (n = 66)	Chi-Square (p-value)
General foot inspection			
Right	31 (91.2)	59 (89.4)	0.07 (0.7783) **
Wrong	3 (8.8)	7 (10.6)	
Diabetic foot assessment			
Right	32 (94.1)	54 (81.8)	2.81 (0.0931) **
Wrong	2 (5.9)	12 (18.2)	
Palpation			
Right	22 (68.7)	40 (60.6)	0.61 (0.4329) **
Wrong	10 (1.3)	26 (39.4)	
Auscultation			
Right	30 (88.2)	50 (75.8)	2.18 (0.1394) **
Wrong	4 (11.8)	16 (24.2)	
Footwear Assessment			
Right	31 (91.2)	46 (69.7)	5.84 (0.0156) *
Wrong	3 (8.8)	20 (30.3)	
Assessing Patient's Self-care Capacity			
Right	29 (85.3)	31 (46.9)	13.7 (0.0002) *
Wrong	5 (14.7)	35 (53.1)	

*****Statistically significant ($p < 0.05$). ******Not Statistically significant ($p < 0.05$).

Discussion

Knowledge of diabetic foot care is crucial in the appropriate practice of diabetic foot care with the aim of improving the quality of life of diabetic patients. Among the nurses sampled, most had higher diploma qualifications (RN and RM). Only 34% of the nurses reported to have special training in diabetic foot care. This is similar to the findings of Oyetunde and Famakinwa which reported a significantly low proportion (<40%) of nurses trained in specialized diabetic foot care in Ibadan, Nigeria (Oyetunde and Famakinwa, 2014). Specialized training on diabetic foot care among health care workers have been reportedly low (< 50%) in Sub-Saharan countries (Trepp et al., 2012; Mohammed, 2013) This is in contrast with the realities in developed countries, where specialized training of diabetic foot care among nurses in endocrinology and medical clinics of health institutions is more than 50% (Trepp et al., 2012). The most prominent risk factors for diabetic foot ulcer mentioned by the nurses were; past history of foot ulcer, previous amputation and peripheral neuropathy. These are consistent with the known common complications of diabetes mellitus reported in various studies (Trepp et al., 2012; Mohammed, 2013), indicating that the nurses have a basic knowledge of diabetes and its accompanying complication (Mohammed, 2013).

Training on diabetic foot care was shown to be higher and increased with the years of experience accordingly among the nurses. Nurses with more than 20 years of practice mostly had training on diabetic foot. This is consistent with the reports of previous studies showing the specialized training on diabetic foot tend to be significantly higher among healthcare professionals with a more year of experience especially in developing countries (Trepp et al., 2012; Mohammed, 2013). Generally

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specialized training on diabetic foot rarely occurs in Nigeria, therefore a select few attend such training (Hu et al., 2011).

There was good knowledge (≥64.0%) on the different aspects of diabetic foot care among the nurses. However, the poor knowledge on the different aspects of diabetic foot care was significantly higher among nurses with less than 10 years of experience. This is consistent with the findings of similar studies, which reported a significant proportion of poor knowledge of diabetic foot care among nurses with less years of practicing experience (Schaper et al., 2012; Zarchi et al., 2014; Scoriguer et al., 2012). The importance of training was evident in the knowledge of footwear assessment and assessing the patient's self-care capacity as trained nurses were found to be more knowledgeable compared to the untrained nurses ($p < 0.05$). This is consistent with the findings of the Oyetunde and Famakinwa (2014), which reported significantly poor knowledge and practice of footwear assessment and assessment of patient's self-care abilities, especially among untrained nurses in Ibadan, Nigeria (Oyentunde and Famakinwa, 2014). Footwear assessment and self-care capacity are very significant aspects of prevention of diabetic foot ulcers and eventual amputations among individuals with diabetes (Trepp et al., 2012; Mohammed, 2013). The use of inappropriate footwear has been shown to significantly increase the risk of amputation (OR = 2.5; 1.4 – 10.5) (Trepp et al., 2012) While appropriate self-care has also been shown to significantly reduce the risks of foot ulcers and amputation among people living with diabetes (Ali et al., 2013; Abdullah et al., 2017). However, there was an averagely poor knowledge of the nurses on the aspects of Auscultation, Footwear Assessment and Assessment of Patient's self-care capacity.

Conclusion

The study showed a relatively good knowledge of diabetic foot care among the nurses. However, nurses with experience less than 10 years notably had poor knowledge of the different aspects of diabetic foot care. Specialized training was shown to be very important, as trained nurses were shown to have better knowledge of diabetic foot care. Although only a small proportion of nurses (34%) had training on diabetic foot care. The study shows the urgent need for frequently organized training on diabetic foot care for nursing practitioners to improve the quality of diabetes care in Rivers state, Nigeria.

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