Research Article

Risk Factors and Practices on Diabetic Foot Among Patients at the Buea and Limbe Regional Hospital, South West Region of Cameroon

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Abstract

Background: Diabetes mellitus (DM) foot complications are a leading cause of many admissions in health facilities and death.

Objective: The aims of this study were to determine the 1) proportion of patients with associated risk factors of diabetic foot ulceration, and 2) the association between practices and clinical foot examination.

Methods: This was a cross-sectional study using time limited sampling. Participants were known adult diabetic patients attending the Buea Regional Hospital (BRH) and Limbe Regional Hospital (LRH) who fulfilled the inclusion criteria. Also a clinical foot examination was conducted to check for common foot deformities, nail care, skin of foot condition, foot pulses, sensory neuropathy and foot wear assessment. Fourteen questions were asked regarding practices of foot care. Each question was assigned one mark for correct response. A score of more than 70% (10 - 14), 50 - 70% (7 - 9) and less than 50% (<7) were graded as good, satisfactory and poor for practices.

Results: A total of 404 diabetic patients were recruited in the study. The mean age of the respondents was 56.8 ± 13.5 years. Meanwhile, 320 (79.2%) and 82 (20.8%) had favourable and unfavourable attitudes respectively. Whereas 156 (38.6%), 169 (41.8%) and 79 (19.6%) of the respondents had good, satisfactory and poor practices respectively. The educational level of the respondents had significant statistical association with knowledge (p < 0.01) and attitudes (p < 0.01) but not practices regarding foot care. Sex had significant association with knowledge (p < 0.01) regarding diabetic foot care. Sex and monthly income of the respondents were not significantly associated with attitudes and practices. 91 (22.5%) of the respondents had some associated risk factors of diabetic foot ulceration. Improper foot wear had shown significant statistical association with the occurrence of blisters (p < 0.01) and swelling (p < 0.01) regarding foot care respectively.

Conclusion: More than one third of diabetic patients had good practices while less than one third had good habits. Close to one quarter of the patients have risk factors of diabetic foot ulceration. Foot wear had showed significant association with the occurrences of blisters and swelling. The results of this study highlight the gaps in practices and underscore the urgent need for a patient friendly educational intervention coupled with regular physician reinforcement to reduce the risk of diabetic foot ulcer and amputations.

Keywords: Diabetic Foot Care; Practices; Prevention; Risk Factors

Introduction

Diabetes mellitus (DM) is defined as a metabolic disorder characterized by chronic hyperglycaemia due to absolute or relative insulin deficiency, resistance or both [1].

In patients with established diabetic foot infections careful attention and coordinated management, preferably by a multidisciplinary foot-care team can save many feet from amputations [2].

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All patients with diabetes are potentially at risk of diabetic foot disease which can only be avoided by creating awareness about the importance of appropriate self care. Prevention, however, requires appropriate knowledge and understanding of diabetic foot care [3].

Foot complications have been shown to be already present in about 10% of diabetic patients at the time of diagnosis [4]. The lifetime risk of a person with diabetes developing a foot ulcer could be as high as 20%, and it was believed that every 30 seconds a lower limb was lost somewhere in the world as a consequence of diabetes [4].

Thus, in realizing the importance of diabetic foot problems, the International Diabetes Federation (IDF) chose the theme of World Diabetes Day in 2005 as "Put Feet First, Prevent Amputation" [5]. Therefore increasing the knowledge, awareness and self-care of the foot among diabetic patients has been found to prevent diabetes mellitus foot problems [3].

Today, of the 277 million people with diabetes worldwide, there are 415,000 aged between 20 and 79 years living in Cameroon [6].

Diabetes mellitus is a major cause of significant morbidity and mortality. Being a chronic disease, it places a huge strain on public health funding [7]. It is largely a self-care disease and requires active involvement of the patient in the management. One of the major complications of diabetes is foot ulceration which can lead to digits or limb amputation if adequate measures are not taken to prevent and treat it. With diabetes mellitus reaching epidemic levels, the number of foot ulceration and other associated foot problems would equally increased and this impacts greatly on the quality of life of people with the disease. Foot ulceration and its complications can be largely prevented and the rate of digits or limb amputation greatly reduced if proper foot care practices are done by diabetic patients. Lastly we need to understand why diabetic foot is so susceptible to infection, so that we may improve on foot care.

This study has been conducted in other countries but there are little studies in Cameroon. Furthermore, there are no studies that have been conducted in the Buea and Limbe Regional Hospitals regarding diabetic foot care.

Epidemiological reports indicated that over 1 million amputations are performed on people with diabetes each year [5]. This amounts to a leg being lost to diabetes somewhere in the world every 30 seconds [5]. Recent prevalence data of 2011 World Diabetes Day indicated that a lower limb was lost every 20 seconds somewhere due to diabetes globally [8]. It is hoped that the results of this study would be useful in developing health educational programs which may serve as interventions to improve foot care practices and reduce the rates of foot amputations among these patients..

The goal is to improve on foot care among diabetic patients in Buea and Limbe Regional Hospitals and in Cameroon.

Research objectives
General objective
To assess the awareness (KAP) of diabetic foot care among diabetic patients attending the Buea and Limbe Regional Hospitals.

Specific objectives
- To assess the proportion of patients with associated risk factors of diabetic foot problems.
- To assess the association between practices of diabetic foot care and clinical foot examination.

Materials and Methods
Study design
This study was a cross-sectional hospital based study.

Study area and setting
Study sites
This study was conducted from May to July 2013 and from January to February 2014 in the Buea and Limbe Regional Hospitals located in the South West Region of Cameroon. The South West Region is one of the ten regions of the Republic of Cameroon.

The diabetic unit of the Buea Regional Hospital (BRH) is headed by a general practitioner who consults on Thursdays and he is assisted by a part time Diabetologist from Limbe Regional Hospital (LRH) who consults on Tuesdays. They are been assisted by four nurses. The diabetic unit has about 195 patients that are been followed for diabetes. Activities such as routine fasting blood glucose, blood pressure, weight and counselling are done in the unit. Diabetic counselling is done on Tuesdays and last for about two hours.

This study was also carried out in the Limbe Regional Hospital (LRH). The Limbe Regional Hospital is one of the Regional Hospitals in Cameroon. There is a diabetic unit which is responsible

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for the management of diabetic patients. The unit is headed by a medical doctor who is a Diabetologist and he is assisted by a nurse. The diabetic unit has about 180 patients that are been followed for diabetes. Activities such as routine fasting blood glucose measurements, blood pressure, weight and counselling are done in the unit. Counselling is done on Wednesdays and last for about one hour. There is a consultation room, a nursing station and a sitting corridor.

Setting

Hospital facility based at the diabetic units of the Buea and Limbe Regional Hospitals.

Study population

The study population included consenting known adult diabetic patients attending Buea and Limbe Regional Hospitals from June to July 2013 and from January and February 2014. Different codes were given to each patient. This included both male and female known adult diabetic patients of age 21 years and above (the minimum of 21 years was taken because it is the legal age at which a person can validly provide consent in Cameroon) and as well as hospitalised patients. The objectives of the study was described to all potential participants. Time limited sampling technique was used for this study.

Inclusion criteria

- Type 1 and Type 2 known adult diabetic patients diagnosed at least one year (one year was taken because a newly diagnosed diabetic patient would have recently learnt about the disease)
- Willingness to participate.
- Participants who fill the inform consent form or give a verbally inform consent.

Exclusion criteria

- All acutely ill DM patients.
- Altered mental state DM patients.
- Patients with active foot ulcer

Sample size calculation

The sample size was calculated using the formula

Where:

n = sample size

P = 50% = 0.5

q = 1− p= 0.5

95% = 1.96

d= degree of accuracy corresponding to 5% margin of error = 0.05

The calculated minimum sample size was 385. We recruited 404 patients since all patients willing to participate in the study were recruited.

Data collection tools

The instrument used for data collection was a pre- tested, structured questionnaire prepared from the recommendation of the American College of Foot and Ankle Surgeons and the Diabetes United Kingdom and used in similar previous study [9]. The questionnaire collected data on:

- Socio-demographic characteristics of the participants.
- Risk factors of diabetic foot ulceration such as duration of diabetes, previous history of foot ulcer and amputation, history of smoking, history of impaired vision, neuropathic symptoms (burning or shooting pain, sharp sensation, feel feet dead, numbness) and peripheral vascular symptoms (claudication, rest pain).
- Foot self-care practices.
- The researcher used this opportunity to examine the feet of consenting participants in order to determine common abnormalities/lesions observed during the study so as to determine the proportion of patients with feet at risks of diabetic foot disease. The clinical examination involved; doing a fasting blood sugar (FBG), frequency of glycemic control, nail inspection (too long, ingrown, colour ,thickness and improper trimming), foot deformity (claw toe, bunion, hammer toe, charcot foot), skin of foot condition for the presence of (callus, discoloration, warmth, fissure, swelling, dryness, blisters, fungal infection and gangrene), testing for neuropathy with a 10g monofilament at four different sites on each feet (1st, 3rd, and 5th metatarsal heads and plantar surface of distal hallux) and recorded as conserved, impaired and lost and using a 125 Hz tuning fork, peripheral vascular disease was done by palpating the foot for the presence of posterior tibial and dorsalispedis pulsation and this was recorded as present or absent, and a foot wear assessment was done to check for inappropriate foot wears.

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Peripheral neuropathy was diagnosed using the Neuropathy Symptom Score (NSS) and the Neuropathy Disability Score (NDS). This is shown in the table 1 below.

NSS - Symptoms. Maximum scores = 6		NDS - Signs. Maximum scores = 12 (six signs each foot)	
Symptoms	Score	Symptoms	Score
Self-reported foot problems	1	Dry cracked skin	1
Pain when walking	1	Loss of hairs from toes	1
Pain when resting	1	Impaired sensation	1
Pain in the feet	1	Impaired vibratory perception	1
Pricking-burning sensation	1	Diminished big toe flexion	1
Numbness	1	Foot deformity	1

Table 1: Presentation of symptoms -Neuropathy Symptom Score (NSS) and Neuropathy Disability Score (NDS). Calculation of the score.

Peripheral neuropathy was diagnosed when: NDS signs ≥7only or whenNDS signs ≥ 4 + NSS symptoms ≥ 4. Source [10].

Pre- testing of questionnaire

The questionnaire was edited by the Diabetologist from LRH and my supervisor, pre-tested on seven diabetic patients from the Kumba District Hospital (KDH) then corrected. Pre-testing was done to find out whether the patients would understand the questionnaire as well as to amend and adopt it. The following corrections such as the taking the fasting blood glucose and the frequency of glycemic control, noting the instruments used in cutting toenails, replacing redness with discoloration and reporting the sensory foot examination as conserved, impaired and loss were made before final copies printed.

Sampling methods

This study was conducted in the Buea and Limbe Regional Hospitals because these hospitals have a good proportion of diabetic patients. The participants were selected using the time limited sampling. All consecutive cases of known adult diabetic patients from 21 years and above were recruited until the sample size was achieved.

Study procedures

Firstly, the protocol which was developed and presented in December 2012/2013 academic year. After presentation, the title

became Knowledge, Attitudes and Practices on the Prevention and associated risk factors of diabetic foot in the Buea and Limbe Regional Hospitals.

Secondly, administrative authorization to carry out the study was obtained from the South West Regional Delegation of Public Health, later we applied for administrative approval from the Directors of the Hospitals and finally we used the above documents to apply for ethical clearance from the Faculty of Health Sciences Institutional Review Board.

Data collection

The recruitment of participants was conducted by the investigator with the assistance of the nurses working in the diabetic units on working days. Participants were selected as they come for routine follow up. The aim of the study was well explained in both Pidgin and English language to all the patients present including risks and benefits. Those interested indicated and gave a verbally informed consent. Thereafter, the questionnaire was handed out by the researcher to the consenting patients to complete. Those who were literate completed the questionnaire by themselves whereas those who are illiterate were assisted by the principal investigator.

The researcher used the opportunity to examine the feet of consenting participants for common foot problems and a monofilament was used to test for neuropathy and the findings recorded on data collection sheet.The monofilament examination was done as follows: The procedure was explained to each patient and informed consent obtained. The patient was told to remove his or her shocks and shoes. With the patient well seated on the examination table with feet extend in a well lighted room, the monofilament was demonstrated on the researcher`s arm such that the patient understands that the instrument is not sharp and would not harm him or her. Then it was demonstrated on each patient`s palms such that the patient gets the response expected from him or her. With the patient`s eyes maintained closed, the patient was instructed to say ``yes`` when they feel the monofilament and ``no`` when they did not when tested on different sites on the soles of the foot. It is recommended that four sites (1st, 3rd, and 5th metatarsal heads and plantar surface of distal hallux) be tested on each foot.

Data analysis

Two codes were used: BRH (xyz) and LRH (pqr) where (xyz) and (pqr) are natural numbers and BRH and LRH representing the two different hospitals. Examples such as BRH 001 (this means

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the first patient was from Buea Regional Hospital) and LRH 020 (means the 20th patient was from Limbe Region Hospital). At the end of each day, the data collected was carefully cross checked for incomplete filling or irrelevant information and safeguarded in preparation for entry. After entry, the questionnaire was well kept safely for future verifications.

Analysis was done using Epi Info version 3.5.3 and Microsoft Excel version 2010. The study population was appropriately described according to age, gender, level of education, occupation, region of origin and marital status using appropriate charts and frequency tables. The dependent variables of the study were knowledge, attitudes and practices regarding foot care, clinical foot findings and associated risk factors of foot problems in diabetic patients, and the independent variables education, occupation and income per capita. Frequency and descriptive statistics were used to examine the general characteristics of the respondents. Chi-squared test was used to determined the `relationship between practices and clinical foot findings. A p-value < 0.05 was considered statistically significant. Analysis of variance (ANOVA) was used to compare determinants between and within hospitals.

Fourteen questions each were asked regarding practices of foot care. Each correct answer was given one mark.

Practices were graded as follows

- Good Practices: A score more than 70% (10-14)
- Satisfactory Practices: A score between 50-70% (7-9)
- Poor Practices: Scores less than 50% (<7)

The proportion of patients with risk factors was determined based from the number of respondents with risk factors.

The association of foot care practices with clinical foot examination was obtained using bivariate analysis.

Ethical considerations

This study obtained approval from the Faculty of Health Sciences Institutional Review Board of the University of Buea: administrative clearance from the Regional Delegation of Public Health in the South West Region, the Directors of the Buea and Limbe Regional Hospitals and the informed verbal consent of the respondents. Strict autonomy and confidentiality was maintained in the handling of participant's information by using codes to identify participants and saving their information in a password protected folder.

This saved information was later used only for the purpose of the study. There were no risks associated with the study. The study had no direct benefits for the participants. However, recommendations made would improve on the future of diabetic foot care.

Study limitations

Among the limitations of the study we have:

- Many patients were not willing to participate in the study but later accepted after been convinced.
- Difficulties reaching the sample size and as such hospitalized diabetic patients were included for the study.
- Some educated patients were not willing to fill the questionnaire themselves and as such they were assisted by the principal investigator.

Results

Of the 404 patients, 204 came from the Buea Regional Hospital (BRH) while 200 came from the Limbe Regional Hospital (LRH). Of the 204 patients from the BRH, there were 146 (71.6%) females and 58 (28.4%) males, whereas of the 200 patients from the (LRH), there were 119 (59.5%) females and 81 (40.5%) males. The results are shown in table 2 below.

Regional hospitals	Sex	
	Female	**Male**
	No (%)	**No (%)**
Buea	146 (71.6)	58 (28.4)
Limbe	119 (59.5)	81 (40.5)
Total	265 (65.6)	139 (34.4)

Table 2: Distributions of patients according to hospitals

Socio-demographic characteristics of patients

The minimum age of the patients was 21 years and the maximum was 89 years (range 21-89 years) with a mean age of 56.8 ± 13.5 years. Age was categorized into 10 years intervals as shown in figure 1.

Of the 404 patients, majority 265 (65.6%) were females, married 246 (60.9%), had primary education 160 (39.6%). Most of the patients 165 (40.8%) were employed and had income between 25,000 - 50,000 FCFA 197 (48.8%). The characteristics of the patients are shown in table 3.
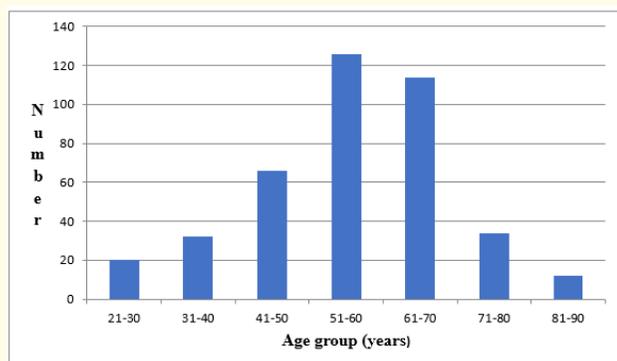
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Figure 1: Bar chart showing the different age groups.

Characteristic	No (%)
Sex	
Female	265 (65.6)
Male	139 (34.4)
Education	
None	68 (1.5)
Primary	160 (39.6)
Secondary	107 (26.5)
Tertiary	69 (17.1)
Marital status	
Married	246 (60.9)
Widow(er)	110 (27.2)
Single	42 (10.4)
Divorced	6 (1.5)
Occupation	
Employed	165 (40.8)
Unemployed	115 (28.5)
Retired	76 (18.8)
Farming	48 (11.9)
Monthly Income	

Table 3: Socio demographic characteristics of patients

Scoring (Out of 15)	No (%)
> 70% (Good) (10-14)	156 (38.6)
50-70% (Satisfactory) (7-9)	169 (41.8)
< 50% (Poor) (Less than 7)	79 (19.6)
Total	404 (100.0)

Table 4: Percentage scoring of practices about foot care among the patients.

Regional Hospitals	Buea	Limbe
Scoring (Out of 15)	No (%)	No (%)
> 70% (Good) (10-14)	84 (41.2)	72 (36.0)
50-70% (Satisfactory) (7-9)	93 (45.6)	76 (38.0)
< 50% (Poor) (Less than 7)	27 (13.2)	52 (26.0)
Total	204 (100.0)	200 (100.0)

Table 5: Percentage scoring of Practices about foot care among the patients according to hospitals.

Presence of risk factors for DM foot ulcer	No (%)
Poor glycemic control	294 (67.8)
Neuropathy	55 (13.6)
Poor vision/retinopathy	10 (2.5)
Absent dorsalis-pedis pulsation	4 (1.0)
Smoking	7 (1.7)
Previous history of foot ulcer	7 (1.7)
Previous history of amputation	7 (1.7)
Foot deformity	1 (0.2)

Table 6: Risk factors for DM foot ulcer.

Results of fasting blood glucose (FBG) and Frequency of glycemic control

The maximum value of the fasting blood glucose (FBG) (mg/dl) was 497 and the minimum was 86 (range 86-497 mg/dl). When the FBG was categorized into groups of two groups, 110 (27.2%) belonged to the FBG range 86 to less than 126 while 294 (67.8%) belonged to the FBG range greater than or equal to 126. Frequency of control was grouped into daily, weekly and monthly. Of the 404 patients, 232 (57.4%) controlled glycemia weekly while 35 (8.7%) and 137 (33.9%) controlled glycemia daily and monthly respectively. The results are showed in table 7 below.

Glycemia and Frequency of control	No (%)
Glycemia (mg/dl)	
86- <126	110 (27.2)
>126	294 (67.8)
Frequency of control	
Daily	35 (8.7)
Weekly	232 (57.4)
Monthly	137 (33.9)

Table 7: Glycemia and frequency of control.

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Variable	Practices scoring about foot care				
Education level	Good practices	Satisfactory practices	Poor practices	Chi-square (χ2)	p-value
	No (%)	No (%)	No (%)		
None	19 (27.9)	36 (52.9)	13 (19.1)		
Primary	68 (42.5)	58 (36.3)	34 (21.3)		
Secondary	46 (43.0)	42 (39.3)	19 (17.8)		
Tertiary	23 (33.8)	33 (47.8)	13 (18.8)	8.05	0.23
Sex					
Female	107 (40.4)	108 (40.8)	50 (18.9)		
Male	49 (35.3)	61 (43.9)	29 (20.9)	1.02	0.60
Monthly income					
<25,000	39 (42.9)	31 (34.1)	21 (23.1)		
25,000-50,0000	70 (35.5)	85 (43.1)	42 (21.3)		
50,000-100,000	25 (39.7)	23 (36.5)	15 (23.8)		
100,000-200,000	19 (45.2)	23 (54.8)	0 (0.0)		
>200,000	3 (27.3)	7 (63.6)	1 (9.1)	16.82	0.03

Table 8: Relationship of practices about foot care with educational status, sex and income.

Presence of associated risk factors for DM foot ulcer

Regarding risk factors for DM foot ulcer, 55 (13.6%) of the participants showed some form of neuropathy. Of these, 43 (10.6%) had neuropathic symptoms while 10 (2.5%) [95% CI: 1.3 − 4.7] had impaired sensation and 2 (0.5%) had complete loss of sensation. 4 (1.0%) had absent dorsalis-pedis pulsation while 10 (2.5%) [95% CI: 1.3 − 4.7] had poor vision/retinopathy. 7 (1.7%) [95% CI: 0.8 − 3.7] were smokers, 7 (1.7%) [95% CI: 0.8 − 3.7] had a previous history of amputation and foot ulcer. Foot deformity was present in 1 (0.2%) [95%CI: 0-1.6] of the patients. The results are summarized in table 9 below.

Glycemia and Frequency of control	No (%)
Glycemia (mg/dl)	
86- <126	110 (27.2)
>126	294 (67.8)
Frequency of control	
Daily	35 (8.7)
Weekly	232 (57.4)
Monthly	137 (33.9)

Table 9: Glycemia and frequency of control.

Foot examination

Foot examination revealed that 73.4% of the patients had improperly trimmed toe nails and 37.1% wore inappropriate shoes.

Fungal foot infection was found in 132 (32.7%) [95%CI: 28.2 − 37.5], blister in 13 (3.2%) [95%CI: 1.8 − 5.6], dryness 16 (4.0%) [95%CI: 2.4 − 6.5], swelling 26 (6.4%) [95%CI: 4.3 − 9.4], discoloration 5 (1.2%) [95%CI: 0.5 − 3.0], callus 2 (0.5%) [95%CI: 0.1 − 2.0], gangrene in 2 (0.5%), warmth in 4 (1.0%) [95% CI: 0.3 − 2.7] and deformity in 1(0.2%)[95%CI: 0.0 −1.6] of the patients. 242 (59.9%) [95%CI: 54.9 − 64.7] of the patients had no skin condition of the foot and there were no cracks and fissure. The results are shown in table 10 below.

Foot Condition	No (%)
No foot problem	242 (59.6)
Callus	2 (0.5)
Discoloration	5 (1.2)
Warmth	4 (1.0)
Fissure	0
Swelling	26 (6.4)
Dryness	16 (4.0)
Blister	13 (3.2)
Athlete's foot	132 (32.7)
Gangrene	2 (0.5)
Charcot foot	1 (0.2)

Table 10: Foot problems observed in patients.

The association of foot care practices and examination findings are shown in table 11 below.

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Foot care practices		Foot examination findings			
		Fungal infections			
		Yes	No	Chi-square (χ2)	P value
Wash foot many times daily	Yes	42	57		
	No	90	215	5.668	0.02
		Fungal infections			
Dry feet after washing	Yes	103	235		
	No	29	37	4.5517	0.03
		Foot skin texture			
Emolient application after foot wash	Yes	13	325		
	No	3	63	0.710	0.79
		Blisters			
Proper foot wear	Yes	0	254		
	No	13	137	22.7452	< 0.01
		Callus			
Proper foot wear	Yes	1	253		
	No	1	149	0.1426	0.70
		Swelling			
Proper foot wear	Yes	5	249		
	No	21	98	22.6715	<0.001

Table 11: Association of foot care practices with foot examination findings.

Discussion, Conclusion and Recommendations

Importance of the study

It is aimed at determining the proportion of patients with associated risk factors of diabetic foot, impact of demographic factors on knowledge, attitudes and practices as well as to evaluate the effects of these practices on the clinical foot examination among diabetic patients attending the Buea and Limbe Regional Hospitals. The main questions explored were socio-demographic factors, knowledge, attitudes, practices and a clinical foot examination.

The findings in this study clearly support the hypothesis that diabetic patients attending the Buea and Limbe Regional Hospitals do not have adequate awareness (knowledge, attitudes and practices) regarding foot care. This can be seen from the fact that less than half of the participants had good knowledge, attitudes and practices regarding foot care. This therefore means more emphasis in health education is required so as to increase the level of awareness among patients attending these hospitals. Also, the above mentioned specific objectives were achieved.

Diabetes and diabetic foot ulcers in particular are of great importance due to the risk of amputations of digits and limbs, reduced functioning, escalating financial burdens, and the dramatic reduction of the diabetic patient's quality of life. Diabetes requires daily self management at all stages of the disease and this study demonstrates the role of a patient specific educational intervention in the prevention of diabetic foot and in improving foot related behaviours. The importance of knowledge, attitudes and practices regarding diabetic foot care has been shown in many studies to improve on their foot health. Daily foot care is essential for preventing complications of diabetic neuropathy and vascular insufficiency. Diabetes mellitus patients through continuous health education can significantly reduce the chances of developing long term complications by improving self-care activities including tight blood glucose control, taking medications when indicated, following foot guidelines, following a meal and engaging in appropriate physical activities. The data generated in this study has provided us with an insight into important aspects of the knowledge, attitudes and practices relating to diabetic foot care in the Buea and Limbe

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Regional Hospitals. Answers to questions tapping knowledge, attitudes and practices have revealed a wide room for improvement in patients' knowledge, attitudes and practices of their diabetic foot. Rodigues et al shown in their study that the more education a patient has, the more he or she can cope with their condition [11].

Even though it was not part of our study objectives, in this study we were able to compare the level of knowledge, attitudes and practices in the two hospitals. The patients in BRH had 100 (49.0%), 73 (35.8%) and 32 (15.2%) for good, satisfactory and poor knowledge respectively. On the other hand, 78 (39.0%), 68 (34.0%) and 54 (27.0%) had good, satisfactory and poor knowledge respectively from the LRH. These results had shown that the patients in BRH have better knowledge (p=0.003) of diabetic foot care than those in the LRH. Similarly, the practices score for BRH was 84 (41.2%), 93 (45.6%) and 27 (13.2%) for good, satisfactory and poor practices respectively while that of LRH was 72 (36.0%), 79 (38.0%) and 52 (26.0%) for good, satisfactory and poor practices respectively. The level of practices in the BRH was better (p <0.01) regarding diabetic foot care than those in the LRH. The attitudes in the BRH was 51 (25.0%), 115 (56.4%) and 38 (18.6%) for good, satisfactory and poor attitudes respectively while that from the LRH was 66 (33.0%), 88 (44.0%) and 46 (23.0%) for good, satisfactory and poor attitudes respectively. More patients had favourable attitudes in BRH than LRH. However, there was no statistically significant association of attitudes in the two hospitals (p = 0.8). In conclusion, the level of awareness regarding diabetic foot care was better in BRH than LRH. This could be so because clinic counselling day are respected in BRH and last longer than those in LRH. Also, the patients in BRH are attended by two doctors (a Diabetologist and a generalist) which provides a wider time for counselling while in LRH they are attended to by one doctor (a Diabetologist).There was a statistically significant relationship between knowledge and practices (p <0.01) and vice versa. Lastly, the patients in BRH are more inquisitive during counselling and thus learn more about the disease. This study reinforces the view that providing education and other support programmes to diabetic patients would likely be more effective if their knowledge, attitudes and practices are better understood.

Discussion

The findings have been discussed in the context of the research questions and objectives.

Associated risk factors of diabetic foot.

This study has shown that 13.6% of the respondents had neuropathy compare to 35.8% in Nigeria [32] and 50% in Islamabal [13]. Similarly, 1.0% of the patients had peripheral vascular disease whereas other studies showed a 17.6% vasculopathy [12] and 21.3% ischemia [7]. 2.5% had poor vision/retinopathy while 30.7% and 54.5% were found in other studies [12,13]. 1.7% smoked compared to 68.8%, 31% and 6% in Nigeria, Isamabal and Ethiopia respectively [12,13]. 1.7% had a previous history of amputation and foot ulcer each. 0.2% had foot deformity compared to 10.8% in Nigeria [12]. In the recent study, the presence of risk factors for diabetes mellitus foot ulcer was found in 22.5% of the patients compared with 54.5% in one study [12]. When compared with the above mentioned studies, the findings of the proportion of patients with associated risk factors of diabetic foot ulceration are less frightening when considering the complications and socio-economic consequences of diabetic foot ulceration. This may be explained on the basis that majority of the respondents (96.0%) had the knowledge and 88.1% had the practice to take medications to prevent complications. Conversely, this difference of 8.1% means that some diabetic patients are doing poor practices which are poor for health despite good knowledge. Also, in this study up to 70% of the patients had poor glycaemic control despite the fact that 88.2% of the respondents accepted taking medications regularly. This could be explained on the basis that many of our patients reportedly controlling their blood glucose level only during the following-up visit. Thus, the importance of blood glucose control can only be achieved through educational interventional. Moreover, in this study more than 70% of the participants reported that they have never had their feet examined by their physician and 55% referred that they had not received proper foot education. This findings were similar to that obtained in a study from Italy where more than 50% of the patients reported that they had not have their feet examined by their physician and 28% referred that they had not received foot education [11]. This goes to explain how the role of physicians is very important in improving the knowledge, attitudes and practices regarding foot care in diabetic patients. Thus patients' knowledge, attitudes and practices are strongly related to physician attitudes. Furthermore, the education of physician is highly imperative to complement and reinforce the behaviours of patient with regards to foot care.

Association of foot care practices with clinical foot examination

This study showed that increased frequency of foot washing has no impact on fungal infections but we observed that up to 83.7%

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of the patients were careful about drying their feet and even in this majority, drying of web spaces was a rarely performed practice.

Another study done in Iran showed that 60% patients with diabetes failed to inspect their feet, 42% did not know how to trim their toe nails and 62% used to walk bare feet [12]. In the present study, the results were more alarming and percentages of high risk behaviours were worrisome as 82.7% did not know about correct technique of nail cutting and 50.2% failed to inspect their feet daily. This result could be so because when patients are diagnosed of diabetes, they are briefly educated by their health care provider about diabetes and it complications but such education was not reenforced in subsequent follow up. De Bernard demonstrated that patients who received foot care education and had foot examination by doctors were significantly more likely to check their feet regularly [8]. In another study multiple educational approaches were used to teach diabetic patients about foot examination, foot washing and proper foot wear. It was found that an intensive education programme improved the foot care knowledge and behaviour of high risk patients [14].

In recent years the diabetic community has accepted that good foot wear, prevent ulceration [6]. The relation of inappropriate foot wear with ingrowing toe nails, corns and callosities has been established in many studies [13] but was not evident from the present study which means we need modifications at all levels. The use of inappropriate shoes in this study had shown to be statistically significant with the development of swelling and blisters. 37.1% of the respondents in this study wore inappropriate shoes whereas 85.4% accepted practicing wearing appropriate shoes. This difference of 48.3% means that many diabetic patients do not know about the correct foot wear to use. Thus, selection of appropriate foot wear is important and requires patient's education.

Conclusion

The proportion of patients with risk factors of diabetic foot ulceration was high. Some practices were associated with foot examination findings. Foot wear was the main risk factor asscociated with diabetic foot. The results of this study highlight the gaps in practices and underscore the urgent need for a patient friendly educational intervention coupled with regular physician reinforcement to reduce the risk of diabetic foot ulcer and amputations.

Recommendations

To Diabetic patients

- They should maintain good glycemic control to prevent or delay the onset of peripheral neuropathy.

- They should utilize Podiatric care that includes regular foot inspection.

- They should avoid delays in presenting to hospitals when a foot lesion, however minor, develops.

- They should avoid walking barefoot and cutting toe nails with razors or knives at home.

To the Health Personnel working at the diabetic units nationwide

- They should focus on regular foot examination which requires less expensive equipment.

Ministry of public health

- To develop a countrywide network of diabetes centers with implementation of prevention programme regarding foot care.

- To focus on sensitization in hospitals with the use of postals as well as the use of the media to create awareness on diabetic foot care.

To the faculty of health sciences

- Similarly studies be carried out in other areas involving non-adult diabetic patients (age less than 21 years).

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