

Prevalence and risk factors for diabetic foot ulcer among diabetes patients attending the medical clinic in Teaching Hospital Batticaloa

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Abstract- Diabetic foot ulcer (DFU) is one of the most significant complications of diabetes and is associated with multiple risk factors. The development of DFU increases risk of developing foot infections, prolonged healing time, poor quality of life, gangrene, and lower limb non traumatic amputations. Studies have been conducted to identify the factors associated with DFU to determine what strategies can be implemented to prevent DFU leading to amputations and other complications. The aim of this study is to assess the prevalence and associated risk factors for DFU among diabetes patient who are attending to medical clinic in Teaching Hospital Batticaloa. A cross sectional descriptive study was conducted on diabetes patients attending to medical clinic in THB. An Interviewer administered questionnaire was used to assess the prevalence and risk factors for DFU. All the diabetes patients attending to medical clinic on October 2016 were selected. Weight and height were measured using appropriate measuring scales. Out of 248 diabetic patients' prevalence of DFU was 22.2%, and 58.2% (n=32) of diabetes patients with foot ulcer were females and according to result of the study DFU more common among the age group of 55-64 years (47.3%). Findings suggest that DFU is increasing the health problems among diabetes patients. The results indicate that glycemic control, amputation, renal disease, visual problems after diabetes, moisturizing of foot were significantly associated with DFU. The findings of this study may widen the awareness of healthcare professionals as well as diabetes patient over the DFU care and prevention of diabetes patients and guide them to find out solution to prevent DFU leading to amputations and other complications.

Index Terms- Amputation, Diabetic foot ulcer, Diabetes mellitus

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels (1). Diabetic foot ulcer is one of the most significant complications of diabetes, and is defined as a foot affected by ulceration that is associated with neuropathy and peripheral arterial disease of the lower limb in a patient with diabetes (2). As well as diabetic foot ulcer usually fail to heal and leading to lower extremity amputation (3).

Recent studies have indicated multiple risk factors associated with diabetic foot ulcer (4). Those risk factors are walking with bare foot, poor knowledge of diabetic foot care, male gender, duration of diabetic longer than 10 years, advanced age of patient, high body mass index (BMI) and other comorbidities such as retinopathy, diabetic peripheral neuropathy, peripheral vascular disease, persistent impaired blood glucose level, foot deformity, high planter pressure, infection, inappropriate foot self-care habit (3-5-6). A study conducted by Kumarasinghe a. Et al, has revealed that poverty, poor education, inappropriate foot wear, duration of diabetes and poor glycemic control might be more important risk factors associated with diabetic foot ulcer in Sri lanka (6).

As the incidence of diabetes mellitus is increasing, complications arising along with are also which become unquestionable (7). The development of diabetic foot ulcer increases a patient's risk of developing foot infections, prolonged healing time, poor quality of life, gangrene, and lower limb non traumatic amputations (4, 8). The term 'diabetic foot' consists of a mix of pathologies (9). Ulcers are more common foot complication in diabetes (10).and the serious condition is chronic ulcer leading to amputation which can cause to reduce quality of life of diabetic patients (11).most lower extremity amputating are early identify by skin ulceration (5).

Wet gangrene is one of the common causes of amputation in the diabetic foot (12). The pathophysiology of foot complications can cause to foot osteomyelitis (5, 13). One in ten diabetes patients can get affected with diabetic foot ulcer during their lifetime (14). However once the ulceration occurs, the prevention of further deterioration and measures to accelerate healing should be undertaken promptly to prevent limb threatening and the life threatening complication (15). Clinical guidelines recommend early identification of risk is more important in prevention of diabetic foot ulcer (4).

The optimal therapy for diabetic foot ulcer and its complications is prevention through identification of high-risk patients, education of the patient, and institution of measures to prevent ulceration (9). Diabetes patient should be skilled in self-care and have to be aware of proper foot care (11). Also monitoring of blood glucose level, monitoring of blood pressure, daily inspection of the feet to detect early signs of poor-fitting footwear or minor trauma, and safety measure such as selecting appropriate foot wear and daily foot hygiene to keep the skin clean and moist (3-8).

In addition, several studies have highlighted the dissimilarities in diabetes incidence, management, prevalence and metabolic control. But descriptive data on risk factors for foot ulcer and ulcer prevalence are lacking (10). Thus study needed for gained information regarding prevalence and identify the risk factors associated with diabetic foot ulcer, and also this would provide valuable information to future researchers, the government and non- governmental organizations and health professionals to identify those factors influencing diabetic foot ulcer and help diabetic patients in modifying their lives. And this will aid diabetic patient and community to prevent from diabetic foot ulcer and also from diabetic foot ulcer leading serious complications. By conducting this study we hope to arrange an awareness programme to educate diabetic patients regarding diabetic foot ulcer, its risk factors and preventive measures.

METHODOLOGY

Ethical approval was obtained from Ethical Review Committee, Faculty of Health-Care Sciences, Eastern University, Sri Lanka. Approval was obtained from Director of Teaching Hospital Batticaloa, consultants and nursing incharge of medical clinic to collect the data from patient. Informed written consent was obtained from participants of this study.

An analytical descriptive cross-sectional study was carried out among all type of diabetes patient who were attending to medical clinic in Teaching Hospital Batticaloa. The convenience sampling approach was applied because of unavailability of records on diabetic population. All the diabetes patients attending to medical clinic on October 2016 were selected.

All type of diabetic patient(s) who were coming to medical clinic were included. Data were collected from those who were willing to participate in the study. All types of diabetic patient (s) who were not present at the time of study, patient (s) who refused to participate in the study on the day of visit, patient (s) with gestational diabetes and adults who were mentally disabled were excluded.

The total study was conducted from March 2016 to February 2017. An Interviewer administered questionnaire was used to assess the prevalence and risk factors for DFU. Weight and height were measured by using appropriate measuring scales. Data were collected by investigators. The collected data were transferred to SPSS 19 statistical software and analyzed based on the research problem, objectives and variables. Gender and age related prevalence and sample prevalence were estimated for Batticaloa area with following equation,

$$\text{Prevalence: -} \quad \frac{\text{Number of diabetic foot ulcer patients}}{\text{Total study sample}} \times 100$$

All the data were maintained confidentially on personal computer with password. The processing and analysis was carried out only by investigators and used only for the above study.

RESULTS AND FINDINGS

Out of 248 diabetic patients' prevalence of diabetic foot ulcer was 22.2% (n=55). In the sample study 58.2% (n=32) of diabetes patients with foot ulcer were females and 41.8% (n=23) were males. According to result of this theses diabetic foot ulcer more common among the age group of 55-64 years (47.3%).

Present study reveals that gender was significantly associated with DFU. Female gender 0.527 times more risk for DFU present than males . Age and Sugar usage also significantly associated with DFU. Age more than 55 years 3.618 times more risk for DFU present than age <55 years and the present study reveals that moisturizing of foot , knowledge of loss of sensation ,amputation, visual problem present after diabetes , renal disease, willing to wear special footwear and willing to wear slippers at indoor were significantly associated factors for DFU.

Table 1: PREVALENCE OF DIABETIC FOOT ULCER

Variables	Foot ulcer present		Foot ulcer absent	
	No	(%)	No	(%)
Gender				
Male	23	41.8	53	27.5
Female	32	58.2	140	72.5
Age				
<18	0	0	1	0.5
19-24	0	0	4	2.1
25-34	1	1.8	2	1.0
35-54	8	14.5	73	37.8
55-64	26	47.3	64	33.2
>65	20	36.4	49	25.4
Sample prevalence	55	22.2	193	77.8

Table 2: Significant levels of significant variables for diabetic foot ulcer

Variable	Chi-square	P value
Gender	4.151	0.042
Age	15.127	0.010
Amputation	13.034	0.000
Visual problem present after diabetes	4.160	0.041
Renal disease	15.755	0.000
Sugar usage	9.030	0.029
Moisturizing of foot	6.435	0.040
Willing to wear special footwear	17.837	0.000
Willing to wear indoor	18.025	0.000
Knowledge of loss of sensation	4.507	0.034

DISCUSSION

Prevalence of diabetic foot ulcers is expected to increase given the global prevalence of diabetes cause of majority of people with diabetes do not receive guideline-recommended foot care (11). This study include the assessment of prevalence and associated risk factors for diabetic foot ulcer among diabetes patients who were attending to medical clinic in Teaching Hospital Batticaloa.

This study reveals that prevalence of diabetic foot ulcer among diabetes patients is 22.2%. Similar results have been published by Chiwanga and Njelekela reported that prevalence of diabetic foot ulcer was 15.3% in Tanzania (11). And Yusuf S, et al revealed that DFU higher in developing countries and prevalence of DFU was 12% in Indonesia (18). This finding revealed that considerable amount of the diabetes patients are having DFU compared with other studies therefore they need additional support and guideline recommended foot care.

In our research finding most of diabetes patients with DFU were females (58.2%) when compare with males (41.8%) and similar results shown in other studies done among diabetes patients in Tanzania and Kenya (11, 16). A study conducted by Khan AR, et al revealed that the prevalence was significantly higher among the females than the males (17). But at the same time some other studies show the opposite results, done in South Ethiopia reported that occurrence of DFUs mostly in males (07) and another study done in Colombo district reveal male sex as potential risk factor for DFU (06). This finding was variation to present finding may due to more female involvement for the study than males.

Prevalence of DFU was high among both males and females those who were between the age of 55-64 years, as similar a study which was done by Danmusa UM, et al reported that patients in the age of 51-60 years had the highest frequency of DFU (19). And a study conducted by Rajakanth M, et al show that highest number of cases was found in the age group 55-70 years (09).

Senanayake, et al revealed that diabetes patients with DFU high among the age ranging from 33 to 78 years (15). The etiology for higher incidence of DFU among middle aged might be the progress of aging.

Present study reveals that gender was significantly associated with DFU. Female gender 0.527 times more risk for DFU present than males. Similar study revealed that prevalence of DFU among the female subjects was significantly higher than the males (17, 18, 19). At the same time some other studies shown that male gender as a risk factor for DFU in developing countries (6, 9). In South American countries reported that male gender as independent risk factor for diabetic foot ulcer (10). This variation from present study because of more female participation for study than males.

Age and Amount of sugar usage were significantly associated with DFU. Age more than 55 years 3.618 times more risk for DFU present than age <55 years. A study done in Eastern Indonesia show that older age as predictive risk factor for DFU (18). Parisi, et al show that the poorer glycemic control was significantly associated with DFU (10) and HbA1C above 7.5% was risk factor for DFU (19).

Amputation, Visual problem present after diabetes, renal disease were significantly associated factors for DFU. A study done among diabetes patients in Kenya South Ethiopia show that when holding all other factors constant diabetic patients with co morbidity are 7.8 times more likely to have foot ulcer than those who don't have co-morbidity; and also nephropathy and retinopathy which could lead to the occurrence of foot ulcer in the diabetic patients (7). Parisi, et al revealed that presence of retinopathy significantly associated with DFU (10).

Moisturizing of foot was significantly associated with DFU. Deribe, et al show that having diabetic foot ulcer among those diabetic patients with dry and cracked foot skin are 3.5 times higher as compared to those with smooth and moist foot skin (7). Knowledge of loss of sensation also significantly associated with DFU.

Wearing covered shoes as a protective factor for foot ulcer (6). Deribe, et al express that if all the factors are kept constant, diabetic patients using ill Fitting shoes were 12.2 times more likely to have foot ulcer as compared to those who do not use ill-fitting shoes (7). But according to present study reveals that willing to wear special footwear, willing to wear slippers at indoor were significantly associated with DFU due to more patients like to wear recommended footwear.

This study is aid to identify the prevalence and risk factors for DFU in Batticaloa and to prevent DFU leading complications. Adequate attention should be given those who are at risk and this may guide DM patients to enhance their quality of life.

Conclusion

Findings suggest that DFU was increasing health problems among diabetes patients. Although female gender and with age more than 55 years DFU occurrence increase; results indicate that amputation, visual problems present after diabetes, renal disease, moisturizing of foot, glycemic control, willing to wear special footwear, willing to wear indoor and knowledge of loss of sensation were significantly associated with DFU. There may be more factors other than the findings of this study can influence the DFU. The findings of this study may widen the awareness of healthcare professionals as well as diabetes patient over the DFU care and prevention of foot ulcer; and guide them to find out solution to prevent DFU leading to amputations and other complications.

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