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Original Research Article

Prevalence of diabetic complications and risk factors among diabetic foot ulcer patients: a retrospective hospital-based study

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ABSTRACT

Background: Diabetic foot ulcer is a painful, demands increased health care utilization, and increases healthcare costs for the patients as well as the health care system. The purpose of this study was to analysis the prevalence of diabetic foot complications and risk factors among diabetic patients at tertiary care Hospital, Karimnagar.
Methods: Total 60 sample sizes were included in the study. The study was conducted at General Surgery ward, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar from July 2017 to June 2018. Demographic, complications and risk factors were recorded, and outcomes were analyzed using SPSS statistics version 21.0.
Results: The Mean age of the study group is 50.31±14.26 years. The male to female distribution is 47 (78.3%) and 13 (21.7%) respectively. The mean duration of illness in days is 96.68±289.21, while mean HbA1C is 9.44±9.02. The mean fasting blood sugar and postprandial blood sugar is 159.78±70.01 and 157.78±86.28 which shown no significance difference (p = 0.87). Odds ratio with 95% confidence interval was computed to the level of significant.
Conclusions: There was no significant outcome was found in diabetic foot ulcer. Patient with high risk complications need as early detection, foot care education, moderate physical, exercise, fitted foot wear and diabetic diet should be decrease the risk of diabetic foot ulcers.

Keywords: Amputation, Diabetic foot ulcer, Complications, Risk factors

INTRODUCTION

Diabetic foot ulcer is a painful, demands increased health care utilization, and increases healthcare costs for the patients as well as the health care system. Worldwide, every year more than 1 million people lose a leg as consequence of this disease.[1] Foot ulceration is a preventable condition, which simple interventions can reduce amputation by up to 70% through programs that could reduce its risk factors.[2] Ulcers are a leading cause of non-traumatic lower limb amputation in diabetic patients, with a foot ulcer preceding 85% of such amputations.[3,4] Diabetic foot ulcer, generally develops because of loss of protective sensation associated with neuropathy and are commonly located at the plantar surface of the toes and forefoot.[5] Foot complications in diabetes including peripheral neuropathy, peripheral vascular disease, foot ulceration, foot infections and osteomyelitis, amputation, charcots neuroarthropathy. The major risk factors for foot ulcers include peripheral arterial disease, neuropathy, and foot deformity.[6] However, these risk factors can also become foot

disorders if severe and result in hospitalization or amputation.[7-9]

Our aim was to analysis the prevalence of diabetic foot complications and risk factors among diabetic patients at rural Hospital, Karimnagar.

METHODS

Study design and setting

This study design was a retrospective hospital-based study conducted at General Surgery ward, CAIMS Hospital, Karimnagar during from July 2017 to June 2018. The study sample size was carried out 60 patients with diabetic foot ulcer. The patient's demographic characteristics including current age, sex, duration of ulcer, site of ulcer, smoking, drinking history, risk factors, and complications were recorded on the first visit. The diagnosis was made based on WHO criteria for diabetes mellitus (approved by American Diabetes Association).

Diabetes glycemic parameters namely; Fasting blood sugar (FBG), random blood sugar (RBS), HbA1c were collected from patients laboratory data according to their hospital visit. Any associated risk factors including hypertension (HTN), cerebrovascular accident (CVA), coronary arterial disease (CAD), peripheral vascular disease (PVD), myocardial infarction (MI), neuropathy, retinopathy, nephropathy, foot deformity, amputation, osteomyelitis was also reported.

Inclusion criteria

Diabetes, type I and II with and without diabetes. Patients age > 20 to 70 years. Laboratory investigations like blood count, fasting and random blood sugar, HbA1c, blood urea, and serum creatinine were advised at the first visit.

Exclusion criteria

Patients with rheumatic joint disease, traumatic foot ulcers, inability to walk or severe disability and mental illness.

This study was approved by Institute Ethics committee (IEC), Chalmeda AnandRao Institute of Medical Sciences, Karimnagar. Written informed consent form was obtained from all the study participants. All participants provided written informed consent before entering the study.

Statistical analysis

All the data collected were entered and analyzed using statistical package for SPSS statistics version 21.0 and Microsoft Excel. Number, percentage (%), mean (X), and standard deviation (SD) were determined. Odds ratio is calculated.

RESULTS

A total of 60 patients were included. Baseline characteristics of the study group are described in Table 1. The Mean age of the study group is 50.31 ± 14.26 years. The male to female distribution is 47(78.3%) and 13(21.7%) respectively. The mean duration of illness in days is 96.68±289.21, while mean Hb A1C is 9.44±9.02. The mean fasting blood sugar and postprandial blood sugar is 159.78±70.01 and 157.78±86.28 which shown no significance difference (p = 0.87). Others characters are shown in Table 1.

Table 1: Baseline characteristic of the study population (n = 60).

Baseline Characteristic	Mean±SD
Age (years)	50.31±14.26
Duration of illness (days)	96.68±289.21
Fasting blood sugar (mg/dl)	159.78±70.01
Postprandial blood sugar (mg/dl)	157.58±86.28
HbAlc (%)	9.44±9.02
Urea	30.51±16.20
Creatinine (mg/dl)	2.58±5.77

31.66% of the patients had hypertension, 78% were Smoker, 63.33% of the patients had diabetic neuropathy, 48.34% had PVD, 40% of the patient had foot deformities, 30% of patients were alcoholic, 20% of patients had diabetic retinopathy, and 21.67% had amputation. Prevalence of others risk factors are shown in (Table 2) (Figure 1).

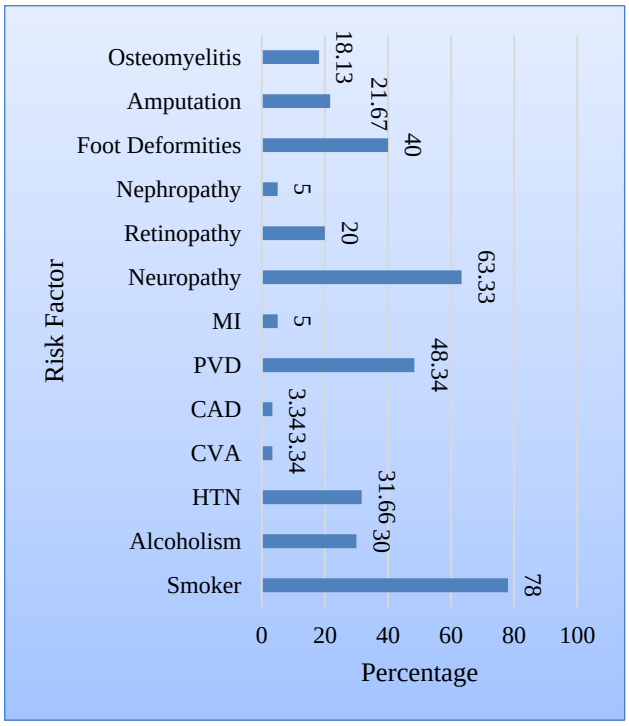

Figure 1: Overall prevalence of risk factor for diabetic foot ulcer.

Table 2: Risk factor for diabetic foot ulcer.

Risk Factors	Prevalence (%)
Smoker	40(78)
Alcoholism	18(30)
HTN	19(31.66)
CVA	2(3.34)
CAD	2(3.34)
PVD	29(48.34)
MI	3(5)
Neuropathy	38(63.33)
Retinopathy	12(20)
Nephropathy	3(5)
Foot Deformities	24(40)
Amputation	13(21.67)
Osteomyelitis	11(18.33)

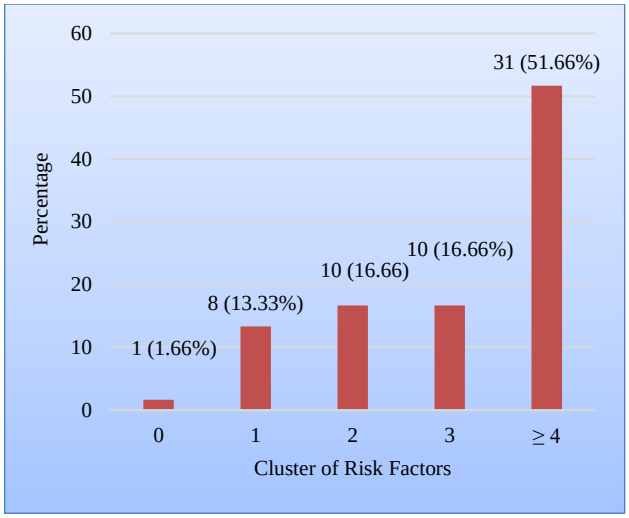

Figure 2: Clusters of risk factors.

Table 3a: Association of potential risk factors and outcome in diabetic foot ulcer patients.

Factors Related	Outcome		Univariate Analysis	
	Patient with Amputation n = 13 (21.66 %)	**Patient without Amputation n = 47 (78.33 %)**	**Odds Ratio (95 % CI)**	**P-value**
Age				
<50 years	7(11.7)	23(38.3)	1.21 (0.35-4.17)	0.75
>50 years	6(10.0)	24(40.0)		
Sex				
Male	12(20.0)	35(58.3)	4.11 (0.48-35.06)	0.1975
Female	1(1.7)	12(20.0)		
Smoker				
Yes	11(18.3)	29(48.3)	3.41 (0.67-17.20)	0.1
No	2(3.3)	18(30.0)		
Alcoholism				
Yes	4(6.7)	14(23.3)	1.04 (0.27-3.97)	0.94
No	9(15.0)	33(55.0)		
HTN				
Yes	4(6.7)	15(25.0)	0.9481 (0.25-3.57)	0.9374
No	9(15.0)	32(53.3)		
CVA				
Yes	0(0.0)	2(3.3)	0.6741 (0.03-14.91)	0.8
No	13(21.7)	45(75.0)		
CAD				
Yes	0(0.0)	2(3.3)	0.6741 (0.03-14.91)	0.8
No	13(21.7)	45(75.0)		

Out of the total patients 51.66% of the patients had influenced by risk factor 4 and more than 4, followed by risk factors 3 and 2 that is 16.66%, 13.33% of the patients influenced by only one risk factor and 1.66% of the patients means only one person had no risk factor influence shown in Figure 2. Potential risk factors and their association outcome are shown in Table 3, in which Osteomyelitis was significantly associated with outcome at (p = 0.0009).

Table 3b: Association of potential risk factors and outcome in diabetic foot ulcer patients.

Factors Related	Outcome		Univariate Analysis	
	Patient with Amputation n = 13 (21.66 %)	Patient without Amputation n = 47 (78.33 %)	Odds Ratio (95 % CI)	P-value
PVD				
Yes	9(15.0)	20(33.3)	3.0375 (0.81 - 11.28)	0.09
No	4(6.7)	27(45.0)		
MI				
Yes	2(3.3)	1(1.7)	8.3636 (0.69 - 100.77)	0.094
No	11(18.3)	46(76.7)		
Neuropathy				
Yes	11(18.3)	27(45.0)	8.3636 (0.69 - 100.77)	0.1
No	2(3.3)	20(33.3)		
Retinopathy				
Yes	1(1.7)	11(18.3)	0.2727 (0.03 - 2.33)	0.236
No	12(20.0)	36(60.0)		
Nephropathy				
Yes	1(1.7)	2(3.3)	1.8750 (0.15 - 22.46)	0.619
No	12(20.0)	45(75.0)		
Foot Deformity				
Yes	6(10.0)	18(30.0)	1.3810 (0.40 - 4.76)	0.609
No	7(11.7)	29(48.3)		
Osteoymyelitis				
Yes	7(11.7)	4(6.7)	12.54 (2.80 - 55.99)	0.0009*
No	6(10.0)	43(71.7)		

DISCUSSION

The diabetic foot is particularly risk for complications because of its inability to tolerate stress. Prolonged uncontrolled blood glucose imparts deleterious effects on all structures related to the foot and ankle, including the skin and subcutaneous tissue, nerve, blood vessels, fascia, ligaments, tendons, muscle and bone.[10,11]

In our study showed that, there was no significant difference between diabetic foot ulcers in terms of male and female. Kumar et al who found no difference in the prevalence of diabetic foot ulcer (DFU) among male and female patients.[12] Our study shows that majority of patients were male and above 50 years old. Other study reports have showed the presence of diabetic foot ulcers mostly in male and middle aged.[13] In the current study, we found that smoking was high prevalence in diabetic foot ulcer (Table 2). Moss et al study found that smoking was predictive of foot ulceration and amputation. Foot ulcerations were most common in younger patients who smoked than in non-smokers.[14] The current analysis found smoking to be associated with foot ulcer and gangrene which was also observed from several studies.[15]

Present study results showed that the overall prevalence of peripheral neuropathy (63.33%) was higher in this study (Table 2). Peripheral neuropathy and peripheral vascular disease (PVD) are strongest risk factors for all the foot complications amongst the studied in Danish and Saudi populations.[16] Peripheral vascular disease (PVD) and neuropathy with diabetic foot complications were high prevalence of peripheral nerve compression among Saudi patients and 33% of diabetic patients are chronic nerve compression.[17-19] Foot deformity was another risk factor of DFU in this study. Few patients in our study had foot deformity (10.0%) including hallux valgus, hammer toe, metatarsal head, bunion and charcot's joint.

We analyzed last one year in our hospital data has shown the overall prevalence of major amputation to have decreased by approximately 20% and both minor amputation and revascularization rates increased by a similar proportion. Present study found that 13 patients (21.67%) underwent amputation. Similar results were shown by Ali SM et al.[20] The essential point of this study was to avoiding risk factors, good education, control blood glucose level, proper foot care to reduce the risk of foot ulceration and amputation in patients with diabetes.

CONCLUSION

In conclusion, present study report showed that smoking, peripheral neuropathies have higher prevalence in this study. There was no significant outcome was found in diabetic foot ulcer. Patient with high risk complications

need as soon as early detection, foot care education, moderate physical, exercise, fitted foot wear and diabetic diet should be to decrease the risk of diabetic foot ulcers and related complications.

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