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Research Article

**A DESCRIPTIVE STUDY ON THE OCCURRENCE OF  
DIABETIC FOOT SYNDROME IN TYPE 2 DIABETES**<sup>1</sup>Rao Awais Akhtar, <sup>2</sup>Dr Muhammad Talha Nazir, <sup>3</sup>Zunaira Hannan<sup>1</sup>Shaikh Zayed Hospital Lahore, <sup>2</sup>Allied / DHQ Faisalabad, <sup>3</sup>Mayo Hospital Lahore.

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**Abstract:****Objectives:** To record the rate of diabetic foot syndrome (DFS) in cases with type 2 diabetes mellitus.**Material and Methods:** We included 200 type 2 diabetic cases for evaluation of DFS. All cases were evaluated for the presence/absence of DFS. After clinical and neurological examination of diabetic foot, the cases were classified in 4 categories (according to International Consensus on Diabetic Foot Risk Classification).**Results:** Out of 200 cases, 44%(n=88) were male and 56%(n=112) were females, mean age of the patients was calculated as 53.11±8.47 years, the diabetic foot syndrome was recorded in 12%(n=24) of the cases.**Conclusion:** We estimated a higher rate of diabetic foot syndrome in type 2 diabetes mellitus cases. Good glycemic control along with adequate awareness regarding diabetes related complications and proper care may reduce the risk of this morbidity.**Keywords:** Type 2 diabetes mellitus, diabetic foot syndrome, foot ulcer, amputation**Corresponding author:****Rao Awais Akhtar,**

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**INTRODUCTION:**

Worldwide, the burden of diabetic related complications is alarmingly increasing. Diabetic foot is one of the common complications of diabetes. The incidence of this morbidity varies between 3-30% of diabetics. Diabetic foot syndrome may lead to an ulcer in 10-30% of the cases. The risk of amputation is increased by 8 to 23-fold and causes increased mortality in diabetics. Complicated foot ulcer leads to a potential reason of amputation, hospitalization and health care resources. It is hypothesized that chronic hyperglycemia has a significant association with micro and macro-vascular changes that play an essential role in diabetic foot. The local data reveal that the rate of diabetic foot ulcers varies between 4% to 10% whereas the rate of amputation is higher and ranges from 21% to 48%. Acute pain in cases with foot ulcers is a significant cause of less mobility and restricts the patients to its social functions and psychological well-being and also responsible for a higher burden of treatment costs. Since the significant proportion of amputation in diabetics is reported with foot ulcers, the understanding of risk factors and pathways are essential for improving of quality of life and reducing the risk of ulceration and ultimate avoidance of amputation of the lower extremity.

The previous data is evident that diabetic neuropathy, peripherals vascular disease, history of foot amputation or ulceration and foot deformity are correlated with the diabetic foot ulcers. Moreover, duration of diabetes, higher plantar pressure, gender and race are also found to be associated with ulcerations in diabetic cases. Multidimensional approach is required for the management of diabetic foot syndrome including preventive and management strategies. The rate of foot ulcers and amputations is reduced by preventing diabetic foot syndrome with long term use of antibiotics. Early detection of cases with higher risk of development of diabetic foot and its proper management may reduce the economic burden by reducing treatment cost especially amputation cost in developing world. In addition to clinical strategies for the management of foot care, improving awareness in patients, good glycemic control and smoking cessation may be helpful in reduction of diabetic foot syndrome related morbidities and mortality. A local research-based data was required for effective prevention and management of diabetic foot syndrome; however, this study was done at Shaikh Zayed Hospital Lahore to facilitate the health care professionals and the patients as well.

**MATERIAL AND METHODS:**

In this descriptive cross-sectional trial, non-interventional study, we included a total of 200 cases by taking frequency of diabetic foot ulcers as 10% in type 2 diabetes mellitus cases with 95% confidence interval and 4% margin of error. The age of all cases was  $\geq 20$  years with diagnosed Type 2 diabetes mellitus, all gestational diabetes mellitus cases and amputation due to trauma or any other conditions except diabetes were excluded from the study. We evaluated and recorded demographic characteristics like age, gender, BMI, blood pressure, HbA1c, FBS and duration of DM were recorded. We also recorded the brief history of previous diabetic foot ulcer, gangrene, deformity, amputation, and current ulceration. Both feet were examined clinically to evaluate cracked skin, dryness of skin, and discoloration/pigmentation, any infection, muscle wasting or blister and callus growth. The neurological examination of the foot was done, for ankle reflexes. The vascular status of the foot was also evaluated by using ankle brachial pressure index (ABPI) and Doppler ultrasound. A lower blood pressure in the leg compared to the arm signifies blocked arteries and peripheral vascular disease. An ABPI value  $>0.9$  is considered normal,  $<0.8$  is associated with claudication, and  $<0.4$  is commonly associated with ischemic rest pain and tissue necrosis. Other parameters such as pinprick sensation and temperature variation between the two feet were also assessed.

After the examination of diabetic foot, the cases were classified in 4 categories (according to International Consensus on Diabetic Foot Risk Classification) which include category 0 of those cases with no findings of neuropathy, category 1 was for those having neuropathy but no evidence of peripheral vascular disease or foot deformity, category 2 was in those cases having neuropathy with deformity/peripheral vascular disease whereas category 3 was allotted to those having history of foot ulceration/lower extremity amputation. Categorical variables were presented as frequency and percentage while mean and sd was calculated for quantitative variables. The statistical analysis was done with the help of SPSS-18.

**RESULTS:**

In this study, basic characteristics reveal that 24%(n=48) were between 20-50 years of age whereas 76%(n=152) were between 51-70 years of age, 44%(n=88) were male and 56%(n=112) were females. The diabetic foot syndrome was recorded in 12%(n=24) of the cases. (Table 1). Mean age of the patients was calculated as  $53.11 \pm 8.47$  years, BMI was  $28.76 \pm 6.17 \text{ kg/m}^2$  systolic blood pressure was

136.71±21.40mmHg and diastolic blood pressure was 86.52±11.62mmHg, duration of diabetes was 7.84±3.22 years, HbA1c (%) was 8.87±3.19%, fasting blood sugar was 181.57±63.36mg/dL. (Table 2)

Patients' categories according to International Consensus of Diabetic Foot Risk Score shows that 88%(n=176) had 0 category, 3.5%(n=7) had category 1, 5.5%(n=11) had category 2 and 3%(n=6) had category 3. (Table 3)

Table 1 (n=200)

Basic characteristics	No. of patients	%
<b>Age(years)</b>		
20-50	48	24
51-70	152	76
<b>Gender</b>		
Male	88	44
Female	112	56
<b>Diabetic foot syndrome</b>		
Yes	24	12
No	176	88

Table 2 (n=200)

Parameters	Mean	SD
Age(years)	53.11	8.47
BMI (kg/m <sup>2</sup> )	28.76	6.17
Blood pressure (systolic)mmHg	136.71	21.40
Blood pressure (Diastolic) mmHg	86.52	11.62
Duration of diabetes (years)	7.84	3.22
HbA1c(%)	8.87	3.19
FBS, mg/dL	181.57	63.36

Table 3 Categories according to International Consensus of Diabetic Foot Risk Score (n=200)

Category	Frequency	%
0	176	88
1	7	3.5
2	11	5.5
3	6	3

### DISCUSSION:

In our study, a high frequency (12%) was recorded positive for diabetic foot syndrome in cases with T2DM in our local population. The most common findings were recorded as cracked skin, dryness of skin, discoloration/pigmentation. A higher proportion had lost the protective sensation. The incidence of diabetic foot syndrome was recorded in all levels of HbA1c. The rate of diabetic foot syndrome in T2DM cases recorded in our study is higher than recorded in previous local studies i.e., 4% and 10%<sup>9</sup> but lower than a recent study i.e., 13.9%. The number of participants in our study was smaller than a previous study i.e. (n=2,199), The findings of our study are nearly in agreement with an Indian study showing 15% neuropathy.

Developed countries like Germany and UK and lower rate of diabetic foot syndrome in type 2 diabetic cases i.e., 2.8% and 8.5% respectively. The difference may be due to less given important to diabetic related complications in developing world due to poverty, low education and limited healthcare facilities. However, early detection of the disease may prevent foot ulceration. Unlike recent local study category 3 of diabetic foot syndrome was not in higher frequency, however, category 2 was significantly higher when compared to category 1 of the diabetic foot syndrome cases of our study. This might be due to early presentation of cases.

Like other local studies and a German study, CAD and smoking were the significant risk of diabetic foot syndrome. Socio-cultural factors like poor socio-

economic status and bare-foot walking with improper awareness and are responsible for higher risk of diabetic foot syndrome in diabetics. This is in agreement with previous studies.

Good glycemic control along with early detection and adequate awareness of footwear may reduce the risk of amputations of lower extremities which is recorded in more than 50% of the cases in previous data.

Preventing strategies with the help of antibacterial regimens are found to lower the risk of ulceration and may improve the quality of life in cases with diabetic foot syndrome.

### CONCLUSION:

We estimated a higher rate of diabetic foot syndrome in type 2 diabetes mellitus cases. Good glycemic control along with adequate awareness regarding diabetes related complications and proper care may reduce the risk of this morbidity.

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