

# Prevalence of Diabetic Foot Ulcer and Related Factors among Adult Type 2 Diabetes Mellitus Patients in Our Institute

## Missing Table 2

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### Abstract

Diabetes mellitus is a metabolic disorder affecting all systems in the body because of multiple long term complications. Foot ulcers is common complications of diabetes mellitus. However, there are few cases of foot ulcer and causing factors in our institute. An institutional-based cross-sectional study was done to find out foot ulcer occurrence in diabetic patients. Systematic random sampling was done to select 250 study participants. Bivariate and multivariable logistic regression model was made to find out factors associated with diabetic foot ulcer. Odds ratio with 95% confidence interval was used to know the level of significance. Diabetic foot were 15.2%. Type II diabetes mellitus, overweight, obesity, poor foot self-care practice, and neuropathy were factors related to diabetic foot ulcer. Special attention should be paid at weight reduction, managing neuropathy, and promoting foot care practice would decrease diabetic foot ulcer.

**Keywords:** Diabetic Foot Ulcer; Type 2 Diabetes Mellitus.

### Introduction

Diabetes mellitus is the most prevalent chronic disorders these days. It affects more than 40% people worldwide [1]. The number of cases of diabetes mellitus is increasing day by day. It is expected to increase upto 300 million by 2030. This estimation occurred because of changing habits of diet [2].

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There are various complications affecting the person with diabetes, but complications involving the foot are more devastating [3]. Diabetic foot ulcer increases morbidity and mortality thus causing economic burden [4]. The diabetic patients with this condition need hospitalization and have the risk of limb amputation [5,6]. During provision of health education about diabetes complication and follow-up visits people at great risk can be identified by examination of feet [7]. Foot ulcers is common complications of diabetes. 10% of all patients with diabetes will have an ulcer during their course of disease [8].

Diabetes mellitus is associated with many complications and most common being peripheral neuropathy and foot ulcer. The foot ulcer may be complicated by infections and may lead to requirement of amputation of limb. The incidence of amputation of limb for diabetic ulcer is increasingly common worldwide [9].

Diabetic foot ulcer is very common chronic complication of diabetes mellitus with a significant risk, which can be avoidable [12]. Even though preventive strategies are cost-effective, diabetic foot ulcers is occurring frequently and is a challenge for the individual and health system [13]. High quality and efficient health care system is needed for prevention and early management of foot ulcer [14]. Thus, factors for assessment affecting diabetic foot ulcer in different areas is very important to prevent the dangerous effect of foot ulcer among diabetes population. Therefore, this study aimed at assessing diabetic foot ulcer and also associated factors among adult diabetic population attending the diabetic clinic at our hospital.

### Material and Method

An cross-sectional study was conducted at the institute.

This study includes all diabetes mellitus patients who attend the diabetic clinic at our hospital.

### Study Population

All diabetes mellitus attending our OPD during the period of study were included.

### Inclusion Criteria

All diabetic patients were included in the study.

### Exclusion Criteria

Diabetic patients with traumatic ulcers due to any cause.

Severely ill diabetic patient

Patients not giving consent for study.

Some variables also considered as follows:

1. *Behavioural factors:* Lifestyle factors such as smoking cigarette, alcohol consumption, and physical activity
2. *Social and demographic variables:* age, sex, religion, marital status, educational status, area of residence, and average monthly income
3. *Clinical factors:* blood sugar level (fasting), body mass index, detailed history of course of disease and ulceration, regular follow-up to the diabetic clinic, category of diabetes, peripheral vascular disease, neuropathy, and duration of diabetes mellitus
4. *Foot self-care practice-related factors:* characteristics of foot wear, footwear practice, and foot washing.

Severity of Diabetic Foot Ulcer Based on Wagner's Classification. We have the following grades:

- Grade 0—no ulcer, but high risk of ulceration;
- Grade 1—superficial ulceration;
- Grade 2—ulcer with deep infection, but bone is spared;
- Grade 3—ulcer with involvement of bone causing osteomyelitis;
- Grade 4—localized gangrene;
- Grade 5—gangrene involving complete foot.

*Body Mass Index (BMI):* It is the measure of body fat based on height and weight that applies to adult men and women and is calculated as the body weight of the patient divided to the square of the height.

BMI ranges-

< 18.5 kg/m<sup>2</sup> = underweight,

18.5–24.5 kg/m<sup>2</sup> = normal range,

24.5 to 30 kg/m<sup>2</sup> = overweight and

> 30 kg/m<sup>2</sup> = obese.

*Neuropathy:* It is diagnosed if the patient has tingling numbness, pain, weakness and loss of vibration sense.

*Measurement of Diabetes Mellitus:* Fasting blood sugar level on each individual patient was done and fasting blood sugar level greater than 125 mg/dl was considered as diabetic.

*Controlled Diabetes Mellitus:* Peripheral Vascular Disease It is peripheral vascular disease with clinical features of muscle cramps after exertion, tingling numbness and discolouration of skin.

## Results

### Social and demographic Factors

A study group of 250 adult diabetic patients who had diabetic follow-up were included in the study. Other participants were excluded based on exclusion criteria. From the total number of study group, 155 (62%) were males and 95 (38%) were females. The mean age of patients was 50.2 with SD±15.6 years. 194 (77.6%) were married. According to their education, 53 (21.5%) had secondary education and above. 95 (38%) patients were from rural base.

### Clinical Factors

Among the total 250 study participants, 231 (91.3%) had regular follow-up to the diabetic clinic and 169 (67.6%) of them had type 2 diabetes mellitus. A majority of the study participants have a BMI between 18 and 24.5 kg/m<sup>2</sup>. The mean fasting blood glucose level among diabetic patients with foot ulcer was 132.4 mg/dl. 114 patients (42.7%) were diabetic for more than 6 years. 108 patients (43.6) participants had poorly controlled blood glucose levels. About 58 (23.1%) of the participants had chronic health problems, and among these, 50 (86.4) participants had hypertension. Forty-six (16.5) study participants had sensation loss to vibration. Peripheral vascular disease was detected in 27 (9.7) participants and 28 (10%) had peripheral neuropathy. Similarly, 32 (11.5%) of the study population had callus

### Behavioural Factors

Twenty five (25) (10%) of the study patients had history of smoking and among them 17 (78.4%) of them were regular smokers meaning smoked daily. 90 (32.6%) study patients gave history of alcohol consumption and among those 54 (59.3%) of study

patients were daily alcoholic drinkers. Now coming to physical activity in form of physical exercise, 228 (81.7%) of the patients claimed that they engaged in different physical exercises. Two hundred twenty-seven participants (99.5%) wear shoes.

**Table 1:**

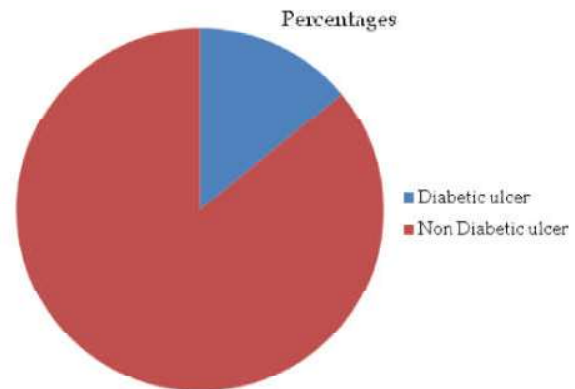
| Variable   | Frequency | Percent |
|--|-----------|---------|
| <i>Prior history of diabetic foot ulcer</i>                |           |         |
| Yes  | 63        | 8.6     |
| No   | 187       | 91.4    |
| <i>Current Diabetic medication if any</i>                  |           |         |
| Oral hypoglycemic  | 131       | 53.0    |
| Insulin  | 119       | 47.0    |
| <i>Prescribed diet</i>                                     |           |         |
| Yes  | 238       | 97.8    |
| No   | 12        | 2.2     |
| <i>Duration of DM</i>                                      |           |         |
| <5 years   | 120       | 55.6    |
| 6-10 years   | 114       | 42.7    |
| 11-15 years  | 16        | 5.7     |
| <i>Current medications controlling Blood glucose level</i> |           |         |
| Good control   | 142       | 63.4    |
| Poorly control   | 108       | 36.6    |
| <i>Follow-up- regular</i>                                  |           |         |
| Yes  | 231       | 90.0    |
| No   | 19        | 10.0    |
| <i>Type of DM</i>  |           |         |
| Type one   | 110       | 39.4    |
| Type two   | 140       | 60.6    |
| <i>Other additional disease</i>                            |           |         |
| Yes  | 50        | 25.1    |
| No   | 200       | 74.9    |
| <i>Types of other chronic disease (n = 70)</i>             |           |         |
| Hypertension   | 54        | 71.4    |
| Renal disease  | 16        | 22.9    |
| Asthma   | 2         | 2.9     |
| Heart disease  | 2         | 2.9     |
| <i>Callus</i>  |           |         |
| Yes  | 32        | 11.5    |
| No   | 218       | 88.5    |
| <i>Sensory loss to vibration</i>                           |           |         |
| Yes  | 27        | 16.5    |
| No   | 223       | 83.5    |
| <i>Peripheral vascular disease</i>                         |           |         |
| Yes  | 28        | 9.7     |
| No   | 222       | 90.3    |
| <i>Neuropathy</i>  |           |         |
| Yes  | 22        | 10.0    |
| No   | 251       | 90.0    |
| <i>Body mass index</i>                                     |           |         |
| <18  | 12        | 7.5     |
| 18-24.49   | 122       | 49.1    |
| 24.5-29.5  | 84        | 23.3    |
| >29.5  | 32        | 20.1    |

**Table 2:** Clinical features of respondents

**Missing Table 2**

**Prevalence of Diabetic Foot Ulcer**

Among 279 study participants in the diabetic clinic 35 (14%) patients had developed foot ulcer (Figure 1).



**Discussion**

Ten (10%) was the incidence in diabetic patients according to our study [8,16].

Similar study in Kenya showed prevalence of 6% with probable explanation being availability of health care facilities knowledge and attitude of people between the two study groups [5]. The incidence of diabetic foot was significantly higher in rural areas than in urban areas due to lack of awareness and less self-care practices. Obese diabetic patients were at a higher risk than thin diabetic patients with probable cause being vascular instability and hypertension. We also observed the incidence of diabetic foot was statistically significant in type 2 diabetics as compared to type 1.

Diabetes patients using oral contraceptive pills had a risk of deep vein thrombosis which predisposed them to develop diabetic ulcers.

Diabetic foot ulcer was strongly associated with lack of foot care. Patients mainly lack in foot self-care. The diabetics who lacked in foot self-care were 3.5 times more likely to develop diabetic foot ulcer as compared to diabetic patients who had practiced foot self-care. This practice could reduce the development of diabetic foot ulcer due to the benefits of washing their own feet regularly followed by drying after washing, daily evaluation of their foot status, and/or facilitating circulation and early intervention of any abnormality that may occur on the foot.

## Conclusion

The result of our study showed high prevalence of diabetic foot ulcer due to risk factors like peripheral neuropathy, lack of knowledge and attitude of people and chronic course of diabetes. Better health care facilities at primary level for early detection and appropriate management is need of the hour for reducing morbidity caused by diabetic ulcer.

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