

## A PROSPECTIVE OBSERVATIONAL STUDY OF DIABETIC FOOT ULCER (D.F.U.) IN EASTERN PART OF INDIA, WEST BENGAL

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### ABSTRACT

**Background:** The metabolic disorder, Diabetes mellitus proceeds through the association of various co- morbidities. Among the various morbid pathological conditions like Diabetic Retinopathy, Diabetic Neuropathy, Diabetic Cardiopathy, Diabetic Kidney Disease, the Diabetic Foot Ulcer is one of the most commonly visible pathological finding. The most challenging clinical aspect of Diabetes mellitus is early control and its prevention from the amputation of lower limb. Despite of lack of scientific data regarding D.F.U, an effort has been done to present the current scenario. **Aim:** This study was undertaken to evaluate the current scenario of D.F.U patient in West Bengal. **Materials and Methods:** Total 60 D.F.U patients were selected randomly from OPD of Raghunath Ayurveda Mahavidyalaya and

Hospital, Contai, West Bengal and the study duration was 1 year. **Result:** The study showed that the most common age group of the patient suffering from D.F.U ranges between 45years to 55 years with a minimum history of Diabetes mellitus > 15 years and the commonly involved site of the ulcer was toe followed by planter aspect. Staphylococcus aureus and streptococci were commonest micro organisms found in pus culture. **Conclusion:** This study indicates toward more concern to the increase risk of trauma and ischemia of lower limbs due to peripheral neuropathy which may cause loss of sensation and ultimately leading to amputation.

**KEYWORD:** Diabetic Foot Ulcer, Diabetic Retinopathy, Diabetic Neuropathy, Diabetic Cardiopathy, Diabetic Kidney Disease, Amputation.

## INTRODUCTION

Diabetes mellitus (DM) is amongst the major metabolic diseases disrupting the health system globally. It has been increased dramatically over the past 2 decades. Epidemiological studies has shown that the number of patients with DM has increased unexpectedly from about 30 million cases in 1985, 177 million cases in 2000, 285 million cases in 2010 and it is estimated to be more than 360 million cases by the year 2030.<sup>[1]</sup> Patients with DM are prone to multiple complications. Diabetic foot ulcer (DFU) is the most common complication of diabetes mellitus which hardly heals and by the time it leads to amputation of lower limb. DFU has shown an increasing trend over previous decades as estimated that about 15% of patients with diabetes will suffer from DFU during their lifetime.<sup>[2]</sup> Although, the prevalence of this complication ranges from 4%-27%. Now-a-days, DFU is a major cause of morbidity of diabetes and a leading cause of hospitalization estimated as about 20% of total diabetic patients.<sup>[3]</sup> DFU can lead to infection, gangrene, amputation, and even death if necessary medical interventions are not taken timely.<sup>[4]</sup> Further, DFU has an increased risk of ulcer progression leading to amputation. Overall, the rate of lower limb amputation in patients with DM is 15 times higher than patients without diabetes. It is estimated that approximately 50%-70% of all lower limb amputations are due to DFU.<sup>[5]</sup> DFU is also responsible for substantial emotional and physical distress as well as productivity and financial losses that lower the qualities of life. For this purpose the study was undertaken to highlight the various scenario of D.F.U. like abscess, gangrene, amputation, common site of ulcer, sex ratio and to find and spread the awareness among the diabetic patient in West Bengal.

## MATERIALS AND METHODS

The study was conducted on 60 patients and the patients were selected randomly from OPD of Raghunath Ayurved Hospital, Medinipur, West Bengal, India, during the period of December 2017 to December 2018.

### Method of Collection of Data

Data were collected from:

- a) Past history
- b) Related investigations
- c) Routine physical examination and

d) Local ulcer examination.

### Inclusion Criteria

1. Established cases of Diabetes Mellitus with non healing ulcer in lower limb.
2. Patient undergoing amputation due D.F.U.
3. Age group from 35 -65 years and both male and female sexes were included.

### Exclusion Criteria

1. Foot infection or post hemotoxic snake bite non healing ulcer.
2. Age group below 35years and above 65 years.
3. Patient who were not willing to give consent for this study.

## RESULT

**Table 1: Age wise distribution.**

Group	Age	Percentage
Group- 1	35 to 45 years	13.33%
Group-2	45 to 55 years	50.00%
Group-3	55 to 65 years	36.66%

60 patients were divided in 3 age groups for the study.

**Table 2: Sex wise distribution.**

Male	Female
80%	20%

Out of 60 patient, 48 patients were male (80%) and 12 patients were female (20%).

**Table 3: Site of ulcer distribution.**

Site of distribution	Percentage
Whole lower limb	5%
Planter aspect of foot	28.33%
Dorsum of foot	16.66%
Toe	50%

The most commonly affected part of the diabetic foot ulcer (D.F.U) found in this study was toe which accounts 30 out of 60 patients followed by planter aspect of the foot that was 17 out of 60 patients.



Figure 1: DFU with gangrene in planter aspect of foot.



Figure 2: DFU at dorsum aspect of foot.

Table 4: Clinical features.

Sl.no	Features	Percentage
1.	Ulcer	33.33%
2.	Abscess	25%
3.	Gangrene	26.66%
4.	Digital gangrene	13.33%
5.	Charcot joint	1.66%



Figure 3: Amputated toes of left lower limb non healing ulcer in a case of DFU.



Figure 4: Amputated right lower limb non healing ulcer in a case of DFU.

Table 5: Duration of Diabetes Mellitus in Patients.

Duration in years	Number of patient	Percentage
>5	0	0%
>10	23	38.33%
>15	37	61.66%
Duration unknown	1	1.66%

The study showed majority of the patients were suffering from D.F.U since 15 years with the clinical features of abscess and gangrene in lower limbs.

### Prevalence of micro organism in pus culture

**Table 6: Micro-organism in pus culture.**

Name	No. of patients	Percentage
Staphylococcus aureus	28	46.66%
E.Coli	3	5%
Bacillus subtilis	6	10%
Streptococci	18	30%
Klebsiella	1	1.66%
Pseudomonas	4	6.66%

Pus was collected from the ulcer site of each patient following aseptic methods. In this study 28 out of 60 patients were found positive for Staphylococcus; followed by Streptococci in 18 patients, Klebsiella in 1 patient and Pseudomonas infection in 4 patients.

### Nerve Conduction Study (NCS)

Diabetic neuropathies are the most common cause for ulceration of lower limb. This ulceration may lead to abscess, gangrene, digital gangrene and amputation of the lower limb of the diabetic patient. So, in this study NCS was included to detect the peripheral neuropathy in the 60 patients of D.F.U.

**Table 7: Nerve Conduction Study.**

Parameters	Right Tibia Nerve	Left Tibia Nerve	Right Peroneal Nerve	Left Peroneal Nerve	Right Sural Nerve	Left Sural Nerve
Amplitude	40.1%	44.7%	65%	73%	47.3%	50.1%
Latency	2.9%	3.7%	32.2%	27.6%	15.6%	19.3%
NCV	24.9%	27.4%	36.1%	39.2%	23.6%	25%

### DISCUSSION

The quintessence part of a research work is discussion. It gives the plausible reasons for the observed parameter of the study. In this study out of 60 patients, males were found more predominantly prone towards the D.F.U. and the common site of the ulcer was toe, may be due to their more outdoor exposure which leads to risk of lower limb trauma and less foot care habit compared to female patients which may be the another contributing reason for more predominance of DFU in male patients. However it is arduous to declare that diabetes in male patients are risk factor for D.F.U compare to female diabetic patients; because of the

glycemic control difference in male and female patients and control group was not included in this study. The most common age group for D.F.U was found 45-55 years next to 55-65 years. Majority of the patient had history of diabetes for at least > 15 years. Staphylococcus aureus and streptococci were found the most common causative organism responsible for the non healing diabetic foot ulcer. Sensory neuropathy was observed more in male patient compare to female patient; especially sensation of touch and pain were disrupted. Difference nerve conduction demonstrated in male and in female diabetic patient shows that amplitudes and conduction were decreased in male patients compared to female patients.

## CONCLUSION

In diabetic patients, one of the most common complication is lower limb non healing ulcer. Prolong uncontrolled hyperglycemic stage in diabetic patient may hamper the nerve ending and nerve fiber and it leads to peripheral or proximal or autonomic neuropathy. Peripheral neuropathy may cause loss of motor response towards a stimuli and diminished sensation in lower limbs and also pressure deformity in planter aspect of foot with muscle atrophy involving ischemia and which increase the risk of trauma on lower limbs as both sensory and motor responses degraded now.

In the present study we found the history of irregular use of hypoglycemic drug with poor awareness about their foot care, foot wears as a consequence of this, peripheral neuropathy leads to recurrent non-healing ulcers resulting in amputation of the foot of male patient compared to female patient were found.

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