

**Original Research Article** 

# DEMOGRAPHIC PROFILE OF PATIENTS WITH DIABETIC FOOT ATTENDING JORHAT MEDICAL COLLEGE AND HOSPITAL

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#### ABSTRACT

**Background:** This retrospective observational study was conducted at Surgical Department of Jorhat Medical College and Hospital, Jorhat between Jan 2023 to Dec 2024. To determine the demographic factors of patients presenting with DFUs at Surgery Department of JMCH, Jorhat. To analyse the demographics of the patients suffering from Diabetic foot. To determine the burden of Diabetic foot and its sequelae in the community.

**Materials and Methods:** 96 patients with Diabetic foot ulcer and it's sequelae admitted in Surgery ward of JMCH and were evaluated demographically, area of residence, and with respect to already diagnosed case of diabetes mellitus, duration of diabetes, any associated comorbidity, HbA1c at presentation, and RBS and laboratory parameters and responsiveness to dosage of Regular insulin at discharge.

**Results:** Average age of presentation is 51.22 year. There is a higher incidence in males. Predominantly the patients are Hindu(90.6%). The patients belong from Rural areas(54 out of 96) and Urban areas(42 out of 96). The average duration of diabetes is 5.27 years. Severity of lesion correlated with severity and duration of diabetes. Patients with higher levels of HbA1c at presentation had more severe lesion.

**Conclusion:** Diabetic foot is a frequent reason of hospitalization of patients with diabetes. Prevention is the best treatment. Males have a higher prevalence and patients from Hindu community are affected more. Patients from Lower economic class are affected more. The people hailing from Rural areas are affected more. The people in the community who belonged to 4th and 5th decade of life are more affected in number. Patients with higher levels of HbA1c, associated comorbidities have more severe disease. This study also showed higher grades of Wageners classification was evident in higher age group and middle aged people suffered from Grade 1 and Grade 2 Diabetic foot. Shah et al in a study showed regular monitoring of blood sugar levels and foot screening should be done for diabetic as well as non-diabetic older adults for early detection of risk factors to reduce the foot complications<sup>5</sup>.

**Keywords:** Diabetic foot ulcers, Risk factor, Demographic factor, Laboratory investing, Insulin, HbA1c, Comorbidity.

# **INTRODUCTION**

With ongoing social and health care infrastructure developments, non infectious chronic diseases have replaced infectious diseases to be the major healthcare problems in the society and Diabetes holds 3<sup>rd</sup> position in terms of prevalence among non infectious diseases worldwide. Diabetic foot is a wearisome complication of Diabetes Mellitus, which is a phenotypically characterised by hyperglycemia.<sup>[2]</sup> World Health Organisation defines Diabetic Foot Syndrome as ulceration of foot, distal to ankle and including ankle, associated with neuropathy and different grades of ischemia and infection.<sup>[3]</sup> Foot problems are the most common cause of hospitalization in Diabetes mellitus and many end up in amputations.<sup>[4]</sup> Diabetes associated problems are the second most common cause of lower limb amputations in India.<sup>[5]</sup> Inadequate awareness about real dimension of diabetes mellitus among the general public of India is a key problem for increase incidence of diabetes.<sup>[5]</sup> Nearly half a billion people are living with diabetes worldwide are affected by DFUs. Approximately 15% of diabetes patients experience a foot ulcer and about 14%-24% of those with foot ulcer require amputation. Around 20% of hospital admissions of DM patients are for treatment of DFUs as they can lead to infection, amputations, and even death if neglected.<sup>[8]</sup> The principal contributory factors in the development of diabetic foot ulcers are neuropathy, peripheral vascular disease, poor glycemic control, duration of diabetes, repeated trauma, foot deformity, past h/o ulcers or amputations, visual impairment and cigarette smoking.<sup>[1]</sup> Inadequate awareness about real dimension of diabetes mellitus among the general public of India is a key problem for increased incidence of diabetic foot.<sup>[6]</sup> Awareness about the disease is very must essential for preventing or fighting with this menace. In the same way, awareness and knowledge towards diabetes mellitus can assist in early detection of the disease and reduce the incidence of complications. Our study was done with the following objectives:

- To analyse the demographics of the patients suffering from Diabetic foot
- To determine the burden of Diabetic foot and its sequelae in the community.

## **MATERIALS AND METHODS**

96 patients with Diabetic foot ulcer and it's sequelae who were admitted in Surgery ward of JMCH, were evaluated demographically, and with respect to already diagnosed case of diabetes mellitus, duration of diabetes, any associated comorbidity, HbA1c at presentation, and RBS and lab parameters.

This retrospective observational study was conducted at Surgical Department of Jorhat Medical College and Hospital Jorhat between Jan 2023 to Dec 2024, and the study group was obtained from hospital records, Consecutive Sampling technique was used. The data was compiled using suitable tables and charts in Microsoft Excel and statistical analysis done with help of IBM SPSS v2.0. The study population were collected keeping in mind the following Inclusion Criteria and Exclusion Criteria. Inclusion Criteria:

- i. Diabetic patients with cellulitis in lower limb
- ii. Diabetic patients with active foot ulcers

iii. Diabetic patients with ulcers and gangrenous changes in foot

Exclusion Criteria

- i. Diabetics with previous amputated appendages
- ii. Diabetics with signs of cellulitis in only upper limbs
- iii. Diabetics with no signs of cellultis anywhere in body.

#### **RESULTS**

In the present study, average age of presentation is 51.22 year. Most patients belong to the age group 41-50 years(34.37%) followed by 51-60 years(28.12%).

There is a higher incidence in males. Male preponderance is 69%, Female preponderance is 27%. Male to Female ration is 2.55:1.

Majority of the study population(52%) belongs to lower socioeconomic class(MKS <5-10). MKS lower <5, upper lower 5-10, lower middle 11-15, upper middle 16-25, upper 26-29.

Patients residing in Rural areas from the study population were about 56%, whereas 44% patients hailed from Urban area.

Among the study population 41.66% were diagnosed recently (~1 year), 37.5% has been living with diabetes for 6-10 years whereas 5.20% have been living with diabetes for 11-15 years. The mean duration of diabetes is 7.053 years.

Among the study population, no. of patients having prediabetes(5.7-6.4) HbA1c levels and no. of patients with good control(6.5-6.7) of HbA1c levels were approximately 5% each. Patients with HbA1c levels with fair control(6.8-7.6) were 25% approx and with poor control(7.7-10.4) were 49% approx, and those with extremely high levels of HbA1c(>10.4) were about 16%.

The duration of stay for most patients was ranging from 1 week to 1 month and such patients were approximately 68% of total study population and and those patient who stayed less than 1 week was 29% of total study population. Mean duration of stay was 11.73 days.

Among the study population, 32.3% patients had Wagener Grade 1 Diabetic foot, 30.2% had Grade 0 and 20.8% had Grade 2 Diabetic foot disease, while older subjects were more prone to suffer from higher grades Wagener Grades.











Figure 5: Distribution by HbA1c status



Figure 6: Distribution by Duration of Hospital stay



Figure 7 : Distribution by Wagners Classification of foot of the patients

Table 1: Distribution by Wagners Classification of foot of the patients.						
Age Groups	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
21-30 у	1	2	2	-	-	-
31-40 y	6	1	4	1	1	-
41-50 y	7	14	7	2	2	1
51-60 y	12	8	3	1	3	-
61-70 y	2	3	3	-	3	1
71-80 y	-	2	1	-	1	-
81-90 y	1	1	-	-	-	-
Total	29	31	20	4	10	2
Percentage	30.2%	32.3%	20.8%	4.2%	10.4%	2.1%

Table 2: Distribution by Duration of diagnosis of Diabetes.

Duration of Diagnosis of Diabetes	Number of Patients	Percentage
1-5 years	15	15.62%
6-10 years	36	37.50%
11-15 years	5	5.20%
Recently diagnosed (~1 year)	40	41.66%



Superficial cellulitis and ulcer in Diabetic foot





Diabetic foot ulcer at presentation and after debridement



Ulcer in leg of a diabetic patient



Gangrenous changes in a Diabetic foot patient



Pictures of Diabetic foot ulcer with Gangrenous changes at presentation and after debridement and disarticulation



Necrotising fasciitis in a patient of Diabetic foot ulcer



Cellulitic changes of lower leg and foot in a patient with diabetes

## **DISCUSSION**

Literature search retrieved very few works on awareness of diabetes mellitus in the state of Assam, India and its different parts.

In a study by Goyal et al in 2012, Effective glycemic control and education are of key importance for decreasing diabetic foot disease, while early presentation and hospital admission, aggressive and appropriate medical and surgical treatment according to grade of disease can improve outcome and reduce the morbidity and mortality due to diabetes.

Moss et al and Frakyberg et al explained that in general the prevalence of sensory neuropathy, peripheral vascular disease is lowered in women as compared to men.<sup>[8]</sup> Our study showed males to be more affected(69%) by diabetic foot than females. In a study by Dutta et al in 2022 showed males to be more affected by diabetic foot(65.5%)8 and by Shah et al showed 77.23% were males.<sup>[5]</sup>

Alam et al demonstrated that peripheral neuropathy was an important contributory factor in the development of DFU. Different studies confirm our results that peripheral neuropathy is the most important factor in the development of foot ulcer.<sup>[3]</sup> Our study showed most of the study population belong to the age group 41-50y(34.37%) followed by 51-60y(28.12%), which is comparable to the

study done by Shah et al showing 33.33% of the study population belonging to 41-50y.<sup>[5]</sup>

Our study showed most of the study population(49 out of 96; approx 52%) belong to the lower socioeconomic class followed by middle class(36 out of 96; approx 37%), and upper class(11 out of 96; approx 11%) which is comparable to the study done by Gohel et al showing 57% belonging to lower economic group, 34% to middle economic group and 9% in higher economic group of the study population.<sup>[2]</sup>

Shah et al in a study showed regular monitoring of blood sugar levels and foot screening should be done for diabetic as well as non-diabetic older adults for early detection of risk factors to reduce the foot complications.<sup>[5]</sup>

In the study by Dutta et al the mean duration of Diabetes was found to be  $4.14\pm3.80$  years, which was comparable to our study which showed mean duration of 7.053 years.<sup>[8]</sup> The average duration of hospital stay was 17.34 days according to a study by Gohel et al and most patient had a duration of stay ranging from 1 week to 1 month(69.5%) and in our study the mean duration of stay was 11.73 days with maximum range 1 week to 1 month(68%).<sup>[2]</sup>

Bansal E et al and Zubair et al reported a high prevalence of poor glycemic control of 67% and 69% respectively in their study, and in our study patients with poor glycemic control accounted for 65% of total study population.<sup>[9]</sup>

Co-morbid conditions like anemia, hypertension, nephropathy and IHD associated with diabetes have been studied9, 42% (63) of patients in this study had anemia whereas Ekta Bansal et al. in their study reported a prevalence of 54%. Co morbid conditions like hypertension (46.7%), anemia (42%), nephropathy (28%) associated with diabetes have been studied by Vlappil et al, 48.9%% approx (47 out of 96) of patients in this study had hypertension and anemia was seen in 40.6% (39 out of 96) and 26% (25 out of 96) had nephropathy which is comparable to the study.<sup>[9]</sup>

The study showed patients with higher levels of RBS at presentation had more severe diabetic foot

symptoms with other changes associated with it. Among the patients admitted 9 people needed to be referred to higher centre for more elaborate management of diabetic foot under specialist consultation. Furthermore, 3 patients among the total of 96 patients needed Disarticulation of a toe and 1 underwent Incision and Drainage to prevent further spread of the disease.

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### Declarations

Funding: There was no application for funding nor any sponsor.

Conflict of interest: There are no conflicts of interest.

Ethical approval: Ethics committee approval was obtained from Ethics Commitee of Jorhat Medical College and Hospital, Assam

## CONCLUSION

Diabetic foot is a frequent reason of hospitalization of patients with diabetes. Prevention is the best treatment. Males have a higher prevalence and patients from Lower economic class are affected more. The people hailing from Rural areas are affected more. The people in the community who belonged to 4<sup>th</sup> and 5<sup>th</sup> decade of life are more affected in number. Patients with higher levels of HbA1c, associated comorbidities have more severe disease. This study also showed higher grades of Wagners classification was evident in higher age group and middle aged people suffered from Grade 1 and Grade 2 Diabetic foot. This study also brings our attention to the fact that higher grades of disease, older age coupled with longer duration of living with diabetes, and higher values of HbA1c, an indicator of uncontrolled diabetes, causes a severe presentation of the patient and warrants more invasive approach, resulting in an increase in duration of hospital stay and cost of treatment, adding to the burden of disease with respect to all the stakeholders. This furthermore cements the fact that more severe disease needs surgical intervention and removal of unhealthy tissue which can bring about a psychosocial burden on the patients and those concerned thereof. Thus, it is important to study this disease presentation on an wider scale to bring about solid database about the burden of the disease in the society and the various ways to build

social, communal and familial awareness to seek help for the affected individuals, and help in earlier diagnosis and effective management.

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