



## PREVALENCE OF PERIPHERAL NEUROPATHY AMONG PATIENTS DIAGNOSED WITH DIABETIC FOOT ULCERS.

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### ABSTRACT

**Introduction-**Neuropathy in diabetes is a common complication in patients of diabetic foot, contributing to substantial morbidity and resulting in a huge economic burden. Early detection of diabetic neuropathy will significantly reduce the healthcare burden with the disease. So, this study was conducted at a tertiary care hospital. **Aim And Objective-**To study the prevalence of peripheral neuropathy among patients diagnosed with diabetic foot ulcers. **Study Design-** Retrospective observational study. **Study Setting-** Tertiary care hospital. **Period Of Study-** July 2021 to July 2023. **Sample size-**90. **Methodology:**90 patients diagnosed with diabetic foot ulcers who were admitted in Surgery ward over period of two year (July 2021- July 2023) and were willing to give consent were included in study. **Results:** Prevalence of peripheral neuropathy among patients diagnosed with diabetic foot ulcers was found to be 43.33% in this study. The most common presenting symptom in patient was numbness in the foot, foot pain. pedal oedema and claudication. Maximum patients were suffering from diabetes for more than 10 years. **Conclusion:** Screening of neuropathy is noninvasive, fast, and inexpensive. all patients with diabetes foot ulcers should be screened annually for sensory neuropathy.

**KEYWORDS :** Diabetic foot ulcers, peripheral neuropathy, prevalence

### INTRODUCTION-

Diabetic foot is defined as infection, ulceration or destruction of tissues of the foot associated with neuropathy and/or peripheral artery disease in the lower extremity of a person with diabetes mellitus (1).

Diabetic peripheral neuropathy is defined as, 'the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes after the exclusion of other causes.

Diabetes is considered as a modern epidemic affecting 9.3% of 463 million people worldwide (2).

About half of this population has diabetic neuropathy at the time of presentation.

Neuropathy in diabetes is a common complication in patient of diabetic foot, contributing to substantial morbidity and resulting in a huge economic burden. Early detection of diabetic neuropathy will significantly reduce the healthcare burden with the disease, and estimated health care expenditure in patients of diabetic foot, especially in a resource limited setting like India. Hence it is important to detect diabetic neuropathies at an early stage. Pathogenesis of diabetic foot is multifactorial. The most rapid deterioration of nerve function occurs soon after the onset of type 1 diabetes, then within 2-3 years there is a slowing of the progress with a shallower slope to the curve of dysfunction. In contrast, in type 2 diabetes, slowing of nerve conduction velocities (NCVs) may be one of the earliest neuropathic abnormalities and often is present even at diagnosis (9). Screening for neuropathy is noninvasive, fast, and inexpensive. Several consensus documents recommend that all patients with diabetes should be screened annually for sensory neuropathy.

### MATERIAL AND METHODS:

**Aim And Objective -** To study the prevalence of peripheral neuropathy among patients diagnosed with diabetic foot ulcers.

**Study Design -** Retrospective observational study.

**Study Setting -** Tertiary care hospital.

**Period Of Study -** July 2021 to July 2023.

**Sample size -** 90.

**Sampling Technique -** Convenience sampling

**Statistical Analysis -** Data was analyzed by using SPSS software version 20.0

### Methodology:

A retrospective observational study was conducted at a tertiary health care center at Pune.

All patients diagnosed with diabetic foot ulcers who were admitted in Surgery ward over a period of two years (July 2021- July 2023) and were willing to give consent, were included in a study.

Total 90 patient who were clinically diagnosed as diabetic foot ulcer were enrolled in this study. Data was collected by interviewing and examining the patients in wards.

### Inclusion Criteria:

Patients with clinical diagnosis of diabetic foot, patients who have given written consent and are willing to participate in the study.

### Exclusion Criteria:

Patients having other causes of neuropathy such a low levels of vitamin B12, alcohol addiction, certain infections such as HIV, Herpes zoster, Lyme disease, chronic liver and kidney conditions, presence of abnormal proteins in blood (monoclonal gammopathy of undetermined significance), certain types of cancer such as lymphoma, multiple myeloma, hereditary motor sensory neuropathies such as Charcot Marie Tooth disease, Guillain Barre syndrome.

### RESULTS:

**Table 1: Distribution Of Study Subjects According To Their Age:**

Age group(years)	Number of patients	%
< /= 40	18	20.00
41-50	27	30.00
51-60	22	24.44
61-70	13	14.44
> /=71	10	11.11
Total	90	100.00

In our study, 50% of the patients aged less than 50 years and 50% of the patients were above 50 years of age.

**Table 2: Distribution Of Study Subjects According To Their Gender**

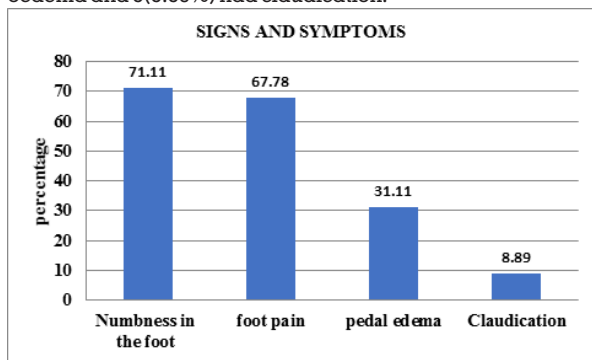
Gender	Frequency	Percent
Female	35	38.88
Male	55	61.11
Total	90	100

Total 61.11% males and 38.88% females were studied.

**Table 3: Presentating Signs And Symptoms :**

Signs and symptoms	No	%
Numbness in the foot	64	71.11
foot pain	61	67.78
pedal edema	28	31.11
Claudication	8	8.89

The most common presenting symptom in patient was numbness in the foot, in 64(71.11%) Patients. 61(67.78%) were suffering from foot pain. 28(31.11%) presented with pedal oedema and 8(8.89%) had claudication.

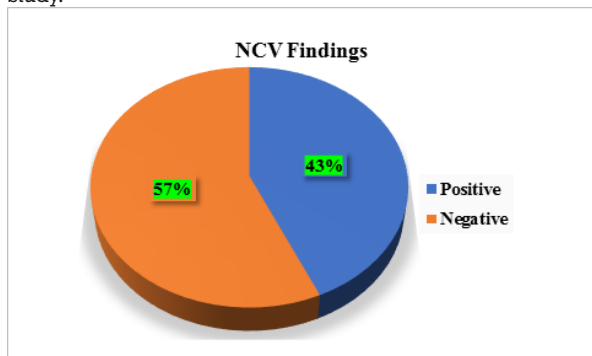


**Figure 1: Signs And Symptoms In Patients:**

**Table 4: NCV Findings In Patients With Diabetic Foot Ulcer**

NCV Findings	No. of patients	%
Positive	39	43.33
negative	51	56.67
total	90	100.00

Out of 90, patients, 39(43.33%) patients had positive NCV finding, Whereas, 51(56.67%) patients had negative NCV finding. So, prevalence of peripheral neuropathy among patients diagnosed with diabetic foot ulcers is 43.33% in this study.



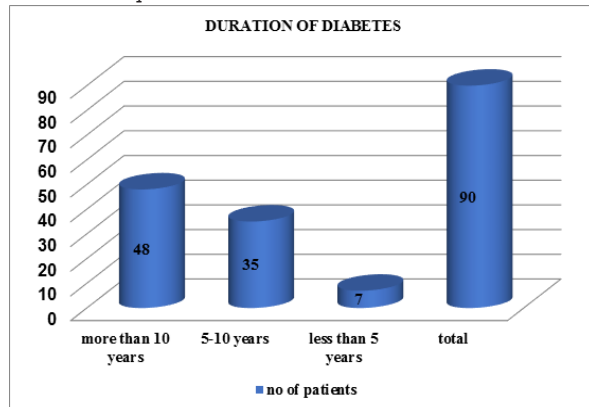
**Figure 2: Distribution Of Patients According To NCV Findings:**

**Table 5: Duration Of Diabetes In Patients**

Duration of Diabetes	No. of patients	%
more than 10 years	48	53.33
5-10 years	35	38.89
less than 5 years	7	7.78
total	90	100.00

53.33% patients were suffering from diabetes for more than 10

years, 38.89% since 5 to 10 years, followed by 7.78% cases for less than five years.



**Figure 3: Duration Of Diabetes In Patients**

**DISCUSSION:**

Peripheral neuropathy due to DM is the most prevalent form of neuropathy (1). It is one of the most common complications that affect a large portion of diabetes patients. Its early symptoms are often very subtle and can easily be overlooked if not asked specific questions about them. There are also very limited treatment options and strategies available for it. There is a lack of awareness among the Indian diabetic population about this complication (2). Diabetic peripheral neuropathy (DPN) has been found to be crucial cause of age-related frailty and probability of fall in elderly (3). It also limits mobility, impairs sleep and reduces the overall quality of life of the patient. There is a shortage of data on the prevalence of DPN, especially in the Indian population(4). Recovery from this complication can be achieved if detected early. To date, limited information is available from the North Indian population(5). The first cross sectional study conducted at HAHC Hospital to determine the prevalence of peripheral neuropathy and associated pain in patients with diabetes.(6) The current study was based on 90 diabetic patient, of which 39(43.33%) patients were diagnosed with peripheral neuropathy using the NCV test(7). So, the prevalence of peripheral neuropathy was 43.33% in diabetic patients in this study. This particular test was used for the diagnosis of neuropathy because it was found to have sensitivity and specificity of up to 82% and 97% respectively (8). Our finding was in alignment with other published studies from southern parts of India. The prevalence ranged from 26% to 31% in surveys on Indian patients (9). In a study conducted in rural south India reported the prevalence of DPN around 39% among T2DM patients. The most common features of neuropathy in our study were numbness in foot and tingling sensations(10). Some patients also reported burning pain. These painful symptoms were found to arise suddenly in patients and were most common in the night, leading to discomfort and difficulty in sleeping. Studies in Arab populations have also linked poor glycemic control to the presence of diabetic neuropathy (11,12). A positive association of HbA1c levels and duration of diabetes with significant effect of age, sex, and BMI was observed for painful DPN in some studies (13). A number of drugs have been proposed for the management of pain in diabetic neuropathy. Pregabalin and Duloxetine are the only ones that have received regulatory approval for treatment in the US, Canada and Europe. Other commonly prescribed drug include Dosulepin. There is a need to emphasize the timely diagnosis and early management of DPN.

**CONCLUSION:**

Screening of neuropathy is noninvasive, fast, and inexpensive. Several consensus documents recommend that all patients with diabetes should be screened annually for sensory neuropathy. All patients suffering from diabetic foot

ulcer should be investigated for diabetic neuropathy and treated for same.

Hence it is important to quantify the incidence and prevalence of neuropathy in patients of diabetic foot ulcer. Focus on the importance of glycemic control and foot care for the prevention and treatment of diabetic peripheral neuropathy. Given that approximately 77% of adults with diabetes will be affected by peripheral neuropathy in their lifetime, more diligent screening and management of the diabetic population are important to reduce the complications and health care burden associated with the disease.

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