



## Original Research Article

## Prevalence and determinants of peripheral neuropathy in patients with type 2 diabetes mellitus

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## ARTICLE INFO

## Article history:

Received 11-03-2021

Accepted 17-03-2021

Available online 12-04-2021

## Keywords:

Type 2 Diabetes mellitus

Diabetic neuropathy

Peripheral neuropathy

## ABSTRACT

**Background:** Diabetic neuropathy is a common disorder and is defined as signs and symptoms of peripheral nerve dysfunction in a patient with diabetes mellitus in whom other causes of peripheral nerve dysfunction have been excluded. The incidence of diabetic neuropathy is not well-known but in a study from south India 19.1% type 2 diabetic patients had peripheral neuropathy.

**Objective:** To study the prevalence and identify relevant determinants of peripheral neuropathy in patients with type 2 diabetes mellitus from 18 months to 3 years.

**Materials and Methods:** All the patients attending camp in my clinic, mysuru from Jan 2020 to March 2020, 150 patients having diabetes were selected randomly, including both males and females of age group 35-50 years. The average duration of diabetes mellitus was 18 months to 3 years. They were categorized as neuropathy group and non-neuropathy group. All the patients were assessed for control of glycaemia by checking fasting blood glucose, post prandial blood glucose, blood pressure levels and Michigan neuropathy screening test<sup>8</sup> were also compared.

**Results:** The study found that known cases of diabetic mellitus had early signs of peripheral neuropathy. Hence it is recommended to test the signs of peripheral neuropathy in early cases of diabetes mellitus as well, to decrease the overall morbidity in the patients.

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## 1. Introduction

Diabetes mellitus is a disease caused by deficiency or diminished effectiveness of endogenous insulin. It is characterized by hyperglycemia, deranged metabolism and sequelae predominantly affecting the vasculature.<sup>1</sup> As of 2015, an estimated 415 million people had diabetes worldwide, with type 2 DM making up about 90% of the cases. This represents 8.3% of the adult population, with equal rates in both men and women.<sup>1,2</sup> As of 2014, trends suggested the rate would continue to rise. Diabetes at least doubles a person's risk of early death and wider health problems accelerate the deleterious effects of diabetes.<sup>2,3</sup> These include smoking, elevated levels of lipid profile, obesity, high blood pressure, and lack of regular exercise. The World Health Organization (WHO)

estimates that diabetes mellitus resulted in 1.5 million deaths in 2012, making it the 8th leading cause of death.<sup>4,5</sup> However another 2.2 million deaths worldwide were attributable to high blood glucose and the increased risks of cardiovascular disease and other associated complications (e.g. kidney failure), which often lead to premature death and are often listed as the underlying cause, on death certificates rather than diabetes. Diabetic neuropathies are nerve damaging disorders associated with diabetes mellitus. These conditions are thought to result from diabetic microvascular injury involving small blood vessels that supply nerves (vasa nervorum). In addition to that relatively common conditions which may be associated with diabetic neuropathy include third nerve palsy; mononeuropathy; mononeuropathy multiplex; diabetic amyotrophy; a painful polyneuropathy; autonomic neuropathy; and thoracoabdominal neuropathy.<sup>6</sup>

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## 2. Objectives

To study the prevalence and identify relevant determinants of peripheral neuropathy in patients > 18 years old with type 2 diabetes mellitus of 18 months to 3 years.

## 3. Materials and Methods

The study was conducted on the diabetic patients coming to outpatients of medicine department of Mysore medical college and research center. The study was prospective study included a total of 150 diabetic patients. 90 male and 60 female patients were included in the study, they were divided into two groups those having diabetic neuropathy and non neuropathy. The assessment of neuropathy was done based on Michigan neuropathy screening instrument which has two components questionnaire based patients version and physical assessment by clinical examination.<sup>7</sup> Multiple regression analysis included various components like sex, age, duration of diabetes, alcohol use, smoking, other habits etc. the clinical parameters like blood pressure and blood glucose levels were also analyzed.

### 3.1. Inclusion criteria

1. Patients having both Diabetes and Hypertension, having at least one of them for 18 months to 3 months and under treatment.
2. Age group 35-50 years.

### 3.2. Exclusion criteria

1. Cardiovascular disorders other than hypertension
2. H/o of Major surgeries in the past 6 Months
3. H/o/smoking/alcohol intake
4. H/o Reno vascular diseases.
5. H/o infectious diseases

## 4. Results

The present study entitled "Prevalence and determinants of peripheral neuropathy in patients with type 2 diabetes attending medicine OPD of tertiary care hospital" was conducted in Outpatient Department of Medicine, K R Hospital, Mysore Medical College and Research Institute, Mysore.

Among 150 study population, 96 (%) males and 54 (%) females are categorized following age groups from 35-50 years (Table 1).

In the present study of 150 diabetic patients, 80 patients were had a controlled blood glucose levels and 70 were not under control; 50(33%) patients had signs of peripheral neuropathy and remaining 100(67%) patients had no signs of diabetic neuropathy. (Table 2).

The average age of diabetic neuropathy patient was 55.45 and non-neuropathy was 48.54. History of alcohol use was 75(50%) of patients, it was 68 males (90%) and

in 7 females (10%). And also smoking was also common in males compared to females (nil). The average duration of disease was 18 months.

The mean blood glucose levels in diabetic neuropathy patients were fasting (220+/-45), post prandial (330+/-45) compared to fasting (190+/-55), post prandial (240+/-45) in non-neuropathy diabetic patients.

The mean blood pressure were systolic(145), diastolic (100) in nephropathy compared to systolic (135), diastolic (95) in non-nephropathy diabetic individuals.

**Table 1:** Profile of study population

Age in years	Male	Female	Total (%)
35-40	30	20	50 (33%)
40-45	40	14	54 (36%)
45-50	26	20	46 (31%)
Total	96	54	150 (100%)

**Table 2:** Diabetes status and neuropathy

Diabetes status	Neuropathy	Non Neuropathy	Total (%)
Under control	40 (27%)	40 (27%)	80 (54%)
Not under control	10 (06%)	60 (40%)	70 (46%)
Total	50 (33%)	100 (67%)	150 (100%)

## 5. Discussion

In 2014, the International Diabetes Federation (IDF) estimated that diabetes resulted in 4.9 million deaths worldwide, using modeling to estimate the total amount of deaths that could be directly or indirectly attributed to diabetes.<sup>2</sup> The goals of treatment are to slow the progression of kidney damage and control related complications. The main treatment, once proteinuria is established, is ACE inhibitor medications, which usually reduce proteinuria levels and slow the progression of diabetic nephropathy.<sup>5</sup> Other issues that are important in the management of this condition include control of pressure and blood sugar levels (see diabetes management), as well as the reduction of dietary salt intake. Diabetic peripheral neuropathy is the most likely diagnosis of exclusion for someone with diabetes who has pain in a leg or foot, although it may also be caused by vitamin B12 deficiency or osteoarthritis. A recent review in the Journal of the American Medical Association's "Rational Clinical Examination Series" evaluated the usefulness of the clinical examination in diagnosing diabetic peripheral neuropathy.<sup>3</sup>

Peripheral neuropathy as a complication of diabetes mellitus is considered as the diagnosis of exclusion and usually seen in diabetics over 5 years of diseases but this study indicated that there was 33% of diabetics below 3

years of diseases had signs of peripheral neuropathy. Hence it is highly recommended to test the signs of peripheral neuropathy in early cases of diabetes mellitus as well, which will ultimately help in decreasing the overall morbidity in the patients.

## 6. Source of Funding

None.

## 7. Conflict of Interest

The authors declare that there is no conflict of interest.

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**Cite this article:** Arpith M N, Narayan V. Prevalence and determinants of peripheral neuropathy in patients with type 2 diabetes mellitus. *Indian J Clin Anat Physiol* 2021;8(1):57-59.