

Original Research

Diabetic neuropathy among type 2 diabetic patients: An observational study

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ABSTRACT:

Background: Diabetic neuropathy (DN) is characterized by the presence of neuropathic symptoms and signs in individuals with diabetes, after excluding other potential causes of neuropathy. Hence; the present study was conducted for assessing diabetic neuropathy among type 2 diabetic patients. **Materials & methods:** 150 Patients of either sex diagnosed with type 2 diabetes mellitus of any duration were enrolled. The diagnosis of type 2 diabetes was done according to the criteria laid down by American Diabetic Association. A case record form of each patient was filled which contained the patients detailed diabetes profile including their age, sex, duration of diabetes, their personal habits smoking, dietary habits, medical history and treatment taken. Each patient was assessed for peripheral neuropathy using a neuropathy symptom score (NSS) questionnaire and physical examination. A NSS of three or more were considered abnormal. Neuropathic deficits in the feet were determined using the NDS (neuropathy disability score). NDS of 5 or more was indicative of existence of moderate or severe neuropathy. All the results were analyzed by SPSS software. **Results:** A total of 150 patients were evaluated. Mean age of the patients was 55.9 years. 70 percent of the patients were males. Duration of diabetes was less than 5 years, 5 to 10 years and greater than 10 years in 28 percent, 36.67 percent and 35.33 percent of the patients respectively. NSS score was abnormal in 36.67 percent of the patients. NDD score was abnormal in 14 percent of the patients. Significant correlation of neuropathy with duration of diabetes was seen. **Conclusion:** DPN is a common and costly disease. Over the past decade, there have been great strides in understanding the underlying pathophysiology and the interplay of metabolic risk factors. Implementing strategies that target these modifiable risk factors will require fundamental social changes and may necessitate major public health initiatives.

Key words: Diabetic neuropathy, Diabetes

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This article may be cited as: Sachan D. Diabetic neuropathy among type 2 diabetic patients: An observational study. J Adv Med Dent Sci Res 2016;4(2):321-324.

INTRODUCTION

Diabetic neuropathy (DN) is characterized by the presence of neuropathic symptoms and signs in individuals with diabetes, after excluding other potential causes of neuropathy. The most prevalent form of DN is distal symmetrical neuropathy, which accounts for approximately 75% of cases. In contrast, asymmetrical neuropathies may affect cranial nerves, thoracic nerves, or limb nerves and typically present with an acute onset due to ischaemic infarction of the vasa nervosa.^{1, 2} In diabetic patients, the presence of asymmetric neuropathies warrants further investigation for possible entrapment neuropathy. Diabetic amyotrophy, once thought to stem from metabolic alterations and later linked to ischaemia, is now believed to be primarily associated with immunological changes. The diagnostic process for

DN involves the assessment of symptoms and signs, quantitative sensory testing, nerve conduction studies, and autonomic testing, with a recommendation to utilize at least two of these five methods for clinical diagnosis.^{3, 4}

It is estimated that diabetic neuropathic pain (DNP) develops in 10% to 20% of the diabetic population overall, and can be found in 40% to 60% with documented neuropathy. However, these numbers are likely to be underestimates, as one study showed that approximately 12% of patients with DNP had never mentioned this condition to their doctors. Like other types of neuropathic pain, DNP is characterized by burning, electric, and stabbing sensations with or without numbness. Frequently, patients develop allodynia (painful sensations to innocuous stimuli)

and hyperalgesia (increased sensitivity to painful stimuli). However, less than half are treated for pain, despite many available effective therapies. Fortunately, there are multiple neuropathic pain screening instruments available to aid the clinician in identifying those who would benefit from treatment.⁵⁻⁷ Hence; the present study was conducted for assessing diabetic neuropathy among type 2 diabetic patients

MATERIALS & METHODS

The present study was conducted for assessing diabetic neuropathy among type 2 diabetic patients. 150 Patients of either sex diagnosed with type 2 diabetes mellitus of any duration were enrolled. The diagnosis of type 2 diabetes was done according to the criteria laid down by American Diabetic Association. A case record form of each patient was filled which contained the patients detailed diabetes profile including their age, sex, duration of diabetes, their personal habits smoking, dietary habits, medical history and treatment taken. Each patient was assessed

for peripheral neuropathy using a neuropathy symptom score (NSS) questionnaire and physical examination. A NSS of three or more were considered abnormal. Neuropathic deficits in the feet were determined using the NDS (neuropathy disability score). NDS of 5 or more was indicative of existence of moderate or severe neuropathy. All the results were analyzed by SPSS software.

RESULTS

A total of 150 patients were evaluated. Mean age of the patients was 55.9 years. 70 percent of the patients were males. Duration of diabetes was less than 5 years, 5 to 10 years and greater than 10 years in 28 percent, 36.67 percent and 35.33 percent of the patients respectively. NSS score was abnormal in 36.67 percent of the patients. NDD score was abnormal in 14 percent of the patients. Significant correlation of neuropathy with duration of diabetes was seen.

Table 1: Mean age and SD of the patients of the present study

Age (years)	Number
Mean	55.9
±SD	8.4

Table 2: Distribution of subjects according gender

Gender	Frequency	Percentage
Males	105	70
Females	45	30
Total	150	100

Table 3: Distribution of subjects according duration of diabetes

Duration of diabetes	Frequency	Percentage
Less than 5 years	42	28
5 to 10 years	55	36.67
Greater than 10 years	53	35.33
Total	150	100

Table 4: Distribution of subjects according NSS

NSS	Frequency	Percentage
NSS less than 3 (normal)	95	63.33
NSS 3 or more (abnormal)	55	36.67
Total	150	100

Table 5: Distribution of subjects according NDD

NDD	Frequency	Percentage
NDD less than 5 (normal)	129	86
NDD 5 or more (abnormal)	21	14
Total	150	100

DISCUSSION

Diabetes encompasses a range of metabolic disorders characterized by elevated blood glucose levels, which arise from either insufficient insulin secretion, impaired insulin action, or a combination of both. The persistent hyperglycemia associated with diabetes can lead to long-term complications, affecting various

organs, particularly the eyes, kidneys, nerves, heart, and vascular system. The pathogenesis of diabetes involves multiple mechanisms. These include the autoimmune destruction of pancreatic β -cells, leading to insulin deficiency, as well as various abnormalities that contribute to insulin resistance. The underlying issue in the metabolic disturbances related to

carbohydrates, fats, and proteins in diabetes is the inadequate action of insulin on its target tissues. This inadequate action may stem from insufficient insulin production and/or reduced responsiveness of tissues to insulin at various stages of the hormone's signaling pathways. Often, patients exhibit both impaired insulin secretion and insulin action, complicating the determination of which defect, if any, is primarily responsible for the observed hyperglycemia.⁶⁻⁹ Hence; the present study was conducted for assessing diabetic neuropathy among type 2 diabetic patients.

A total of 150 patients were evaluated. Mean age of the patients was 55.9 years. 70 percent of the patients were males. Duration of diabetes was less than 5 years, 5 to 10 years and greater than 10 years in 28 percent, 36.67 percent and 35.33 percent of the patients respectively. NSS score was abnormal in 36.67 percent of the patients. NDD score was abnormal in 14 percent of the patients. Significant correlation of neuropathy with duration of diabetes was seen. Katulanda P et al assessed the prevalence, patterns and predictors of diabetic peripheral neuropathy in a developing country. In new cases, distal peripheral neuropathy was assessed using the Diabetic-Neuropathy-Symptom (DNS) score, while in those with established diabetes both DNS and Toronto-Clinical-Scoring-System (TCSS) were used. A binary logistic-regression analysis was performed with 'presence of DPN' as the dichotomous dependent variable and other independent co-variants. The study included 528 diabetic patients (191-new cases), with a mean age of 55.0 ± 12.4 years and 37.3% were males, while 18% were from urban areas. Prevalence of DPN according to DNS score among all patients, patients with already established diabetes and newly diagnosed patients were 48.1%, 59.1% and 28.8% respectively. Prevalence of DPN in those with established DM as assessed by TCSS was 24% and the majority had mild DPN (16.6%). The remainder of the abstract is based on subjects with established DM. The prevalence of DPN in males and female was 20.0% and 26.4% respectively. The mean age of those with and without DPN was 62.1 ± 10.8 and 55.1 ± 10.8 years respectively. The majority of those with DPN were from rural-areas (75.3%) and earned a monthly income < Sri Lankan Rupees 12,000 (87.6%). In the binary logistic-regression presence of foot ulcers, female gender and smoking were the strongest predictors followed by insulin treatment, diabetic retinopathy, treatment with sulphonylureas, increasing height, rural residence, higher levels of triglycerides and longer duration of DM.¹⁰ Pawde PP, estimated the prevalence and risk factors of peripheral neuropathy among Type-2 Diabetic patients. Sample Size was 283. A stratified random sampling and convenient sampling was done. The patients were questioned and Examined using a Pre-tested Questionnaire followed by a symptomatic history taking and Clinical Examination. Prevalence of neuropathy among Diabetics was 33.33%.

Hypertensive Diabetics, Diabetes with Dyslipidaemia had a higher risk of developing neuropathy. In this Study, the prevalence of Diabetic-related Neuropathy was 33.33%. The study also showed risk factors for developing neuropathy such as Increasing duration of Diabetes, Comorbid diseases, Low Socio Economic Status.¹¹ Mohan V assessed the current glycemic status and diabetes related complications among type 2 diabetes patients in India. The Alchieve study was an observational study of patients 66,726 with T2DM who were initiated, on or switched to, insulin analogues, alone or in combination with oral glucose lowering drugs at the discretion of their physician in accordance with local, routine clinical practice. This study reports on the participants in India from the Alchieve study. Baseline data of Alchieve study in 20,554 Indian T2DM patients showed that the mean HbA(1c) was 9.2%. Diabetes control was worse in those with longer duration of diabetes (9.9 ± 5.5 years). Use of insulin was clearly suboptimal showing evidence of clinical inertia. The prevalence of both macrovascular and microvascular complications was high due to poor glycemic control. The prevalence of neuropathy was the most common complication followed by cardiovascular (23.6%), renal (21.1%) and eye (16.6%) complications. The prevalence of foot ulcer was 5.1%. Many patients had multiple complications. This emphasized the fact that effective control of T2DM is urgently needed to prevent or reduce the risk of developing the complications of diabetes in Indian T2DM patients.¹²

CONCLUSION

DPN is a common and costly disease. Over the past decade, there have been great strides in understanding the underlying pathophysiology and the interplay of metabolic risk factors. Implementing strategies that target these modifiable risk factors will require fundamental social changes and may necessitate major public health initiatives.

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