

Original Article

Peripheral Neuropathy among Patients with Diabetes Mellitus: Use of Douleur Neuropathic Questionnaire

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Abstract

Objective: To find out the prevalence of diabetic peripheral neuropathy in patients with diabetes mellitus.

Methodology: It was an observational study conducted on a sample of 150 subjects who were enrolled by a convenient random sampling technique. Patients with a history of diabetes for more than 5 years and of 30-85 years of age from both genders were included. Patients with a history of surgery, frozen shoulder psychological issues, and kidney problems were excluded. Data were collected from Allama Iqbal Memorial Hospital & Islam Central hospital, Sialkot using Douleur neuropathic DN 4 questionnaire, and questions about age, lifestyle, glucose level, hypoesthesia, and gender were added. Data were analyzed by SPSS 20.

Results: Out of 150 patients with DM, 49 were males and 101 were females. Active lifestyle was found in 53.33% and 46.67% were physically inactive. Higher glucose levels were found in 53.33% of males and 46.67% of females. In 38 (25.3%) individual's upper limb was involved and in 112 (74.7%) lower limb was involved. Out of 150 subjects, 138 (92%) had a score above 4.0 and thus had peripheral neuropathy. A positive correlation between lifestyle and peripheral neuropathy was found by applying Pearson chi-square and the p-value was 0.000.

Conclusion: Diabetic peripheral neuropathy is the major complication of diabetes mellitus affecting both males & females. Numbness and burning sensations are most commonly reported & mainly in the lower extremity.

Keywords: Peripheral neuropathy, diabetes mellitus, Douleur neuropathic DN 4 questionnaire.

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Introduction

Diabetes mellitus affects various systems of the

body. It can damage the retina if remain untreated and leads to blindness. It also affects the nerves, blood vessels, and digestive system of the body.¹ One of the serious complications of DM includes peripheral neuropathy. Peripheral neuropathy leads to various systems damage but most commonly it involves the foot region and causes ulceration. If the ulceration gets worse it may lead to the amputation of the lower limb which will greatly affect the quality

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of life and a major disability for the person.² Peripheral neuropathy is seen in the later stages of DM when the disease gets advanced and glucose levels remain high. The prevalence of peripheral neuropathy is more in insulin-dependent diabetes mellitus patients as compared to insulin-dependent diabetes mellitus patients. Long-standing diabetes mellitus along with peripheral neuropathy results in persistent pain in the body.³ Diabetic Peripheral neuropathy greatly disrupts the daily functional activities of individuals. Symptoms of peripheral neuropathy reduce the quality and expectancy of life. The caudal areas of the body are mainly affected by neuropathy. Decreased immunity and strength of the body in the geriatric population make them more susceptible to infections of the feet.⁴ Patients with diabetic peripheral neuropathy (DPN) experience pain, poor proprioception, change in temperature sensation, and often paraesthesia. The neuropathy initially involves the lower extremities in which legs and feet are commonly affected.⁵ Patients with DPN require close monitoring of their feet and lower extremities. Patients who do not take care of their feet and do not visit the hospital for a routine check-up are more prone to infection in their feet and if the infection does not resolve it may lead to amputation.⁶ A recent study showed that the prevalence of people having DNP is increasing day by day. The results were drawn after an assessment of a large number of patients with DPN. Symptoms were found to progress if left untreated.⁷ Symptoms of DPN could be mild moderate or severe. It is commonly observed, that the majority of the patients present with symptoms but the severity of the symptoms is mild. Almost both types of patients with DM show some intensity of symptoms but patients with type II DM show more urinary incontinence than type-I DM.⁸ DPN mostly presents with pain and paraesthesia. It greatly affects the quality of life by decreasing the strength of the body and making the patient unable to perform various tasks.⁹

According to a study by Gordon A et al, half of the population was diagnosed with DPN, and patients with type I DM were more prone to the symptoms such as pain, numbness, paraesthesia, and needle-like sensations. Ulceration of the foot more commonly affects type II diabetic patients.¹⁰ Tesfaye S, et al conducted research to see how patients with DM can be protected from developing infection along with neuropathy. According to them, glycaemic control by medications, diet, and regular exercise along with glycogen levels should be monitored regularly.¹¹ Fleming Tet al stated that Diabetes mellitus is now a worldwide problem, especially in western countries but growing roots in Pakistan as well.¹² Zafar j et al explained that Diabetes-related health complications, especially diabetic neuropathy and diabetic retinopathy have rapidly increased in the past few years.¹³ Among the complications of diabetes mellitus, DPN is the cause of most amputations in Pakistan, resulting in disability.

Therefore, the main objective of the current study was to find out the frequency of diabetic neuropathy in diabetic patients in Punjab, Pakistan. This study will help in knowing the depth of the problem in our setup and thus can help the clinicians to guide their patients regarding preventive measures.

Methodology

This was a cross-sectional study conducted from July to September 2018 after ethical board approval by SCPT I.R.B wide letter no. IRB-SCPT-DPT-117-2018 DATED 5th June 2018. The sample size was calculated by using open EPI. 150 patients with type I diabetes mellitus were selected by convenient random sampling. Data was collected from Allama Iqbal memorial hospital Sialkot, Islam centre, Sialkot. Patients with at least 5 years history of type II DM and aged between 30-85 years of either gender were included. Patients with a history of surgery, frozen shoulder psychological issues, and kidney problems were excluded. Douleur neuropathic (DN 4) questionnaire 14 was used as a data instrument to collect the data. DN 4

questionnaire is composed of two parts; patient interview and patient examination. Both parts have two questions each. The total score is 10 and a score ≥ 4 is considered positive for peripheral neuropathy. A few questions about demographics, blood glucose levels, and physical activity were also added. Patients with at least 5 years history of type-I DM and age between 30-85 years of neuropathy in adults and older adults. An informed consent document was signed by all the participants and their confidentiality was maintained.

Results:

150 patients with type IDM of different age groups were enrolled; out of them, 32.7% were males and 67.33% were females. Active lifestyle was found in 76.6% of individuals and 67% were physically inactive. The demographic data of the participants were expressed in table 1.

In our study, 46.6% of females and 53.3% of males

Table 1: Demographics of the participants

	N=150	
	Frequency	Percentage
Gender		
Male	49	32.70%
Females	101	67.30%
Age		
30-40	12	8%
41-55	83	55.33%
56-70	42	28%
71-85	13	8.67%
Involved side		
Right	99	66%
Left	46	34%
Involved limbs		
Upper limb	38	25.33%
Lower limb	112	74.67%

had higher glucose levels. The findings of the DN 4 questionnaire are expressed in table 2. In 38 (25.33%) individual's upper limb was involved and in 112 (74.67%) lower limb was involved. Out of 150 subjects,

138(92%) had a score ≥ 4.0 and they were labelled as having peripheral neuropathy. The frequency of the total score of DN 4 questionnaire is expressed in figure 2. A positive correlation between lifestyle and peripheral neuropathy by applying Pearson chi-square and the p-value is .000.

Table 2: Results of Douleur neuropathic (DN 4) questionnaire.

Sensation	Status	Frequency (Percentage)
Burning	Yes	110 (73.3%)
	No	40 (26.7%)
Numbness	Yes	125 (83.3%)
	No	25 (16.66%)
Painful cold	Yes	58 (38.67%)
	No	92 (61.33%)
Shock like sensations	Yes	69 (46%)
	No	81 (54%)
Itching sensations	Yes	64 (42.66%)
	No	81 (54%)
Tingling sensations	Yes	95 (63.33%)
	No	55 (36.67%)
Pins & Needles	Yes	104 (69.33%)
	No	46 (30.66%)
Hypoesthesia	Yes	89 (59.33%)
	No	61 (40.66%)
Pain on brushing	Yes	62 (41.33%)
	No	88 (58.66%)

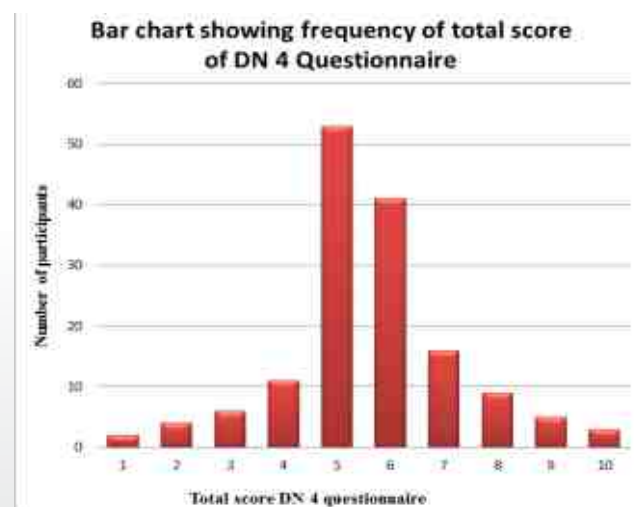


Figure 1: Frequency of total score of DN 4 Questionnaire.

Discussion

Diabetic neuropathy if not treated well with preventive measures or medications the infection caused by neuropathy will spread and the patient will need to have an amputation. An increase in body weight and a sedentary lifestyle were the main factors that led to an increase in the prevalence of diabetes mellitus.¹⁵

The main objective of the current study was to find out the prevalence of diabetic peripheral neuropathy, the result of our study depicts that majority of the diabetic patients suffered from peripheral neuropathy as they were going toward old age and prevalence is high in patients with a sedentary lifestyle and not involving exercise as a part of their daily routine. Symptoms of pain, and paraesthesia most commonly affected the lower limb. In our study, the lower limb was more frequently involved which is supported by other studies as well.¹⁶ The most common symptoms were electric shock-like sensations and pain affecting mainly the lower limbs.

In a systematic review published in 2014, cardiac autonomic neuropathy (CAN) was found to be common but overlooked complication and responsible for morbidity and mortality among subjects with DM. CAN may lead to the development of tachycardia, cardiac myopathy, exercise intolerance, and postural hypotension. Lifestyle modification and glycaemic control might prevent the progression of CAN.¹⁷

The limitation faced by the researchers during this study was the non-cooperative behavior of patients and ethical and cultural limitations. There is a need to spread awareness about health-related risk factors to the general population, especially in the development of diabetes mellitus in order to prevent its complications later in life.

Conclusion

This study has concluded that DPN can affect both genders. The majority of the patients complained about burning sensation and numbness and some

also reported painful cold, itching, and shock-like sensation. The most commonly involved region was the lower extremity.

Conflict of Interest

None

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None

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Authors Contribution

IA: Conceptualization of study

MAA: Literature Search

BW: Critical Revision, Final Approval

MT, AT: Data Collection and Analysis

All authors are equally accountable for accuracy, integrity of all aspects of the research work.