

ORIGINAL ARTICLE

Frequency of Peripheral Neuropathy in Newly Diagnosed Type 2 Diabetes Presenting in a Tertiary Care Hospital of Lahore

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ABSTRACT

Background: Among the common complications of diabetes, neuropathy has its place. About 50% of diabetics suffer from this complication. It is one of the most common cause of elevated morbidity mortality in diabetics. Duration of diabetes, its control and association with other micro vascular complications can result in an raised incidence of neuropathy in patients.

Aim: To find frequency of peripheral neuropathy in newly diagnosed type 2 diabetes in a tertiary care hospital.

Methods: Cross sectional study carried out in newly diagnosed patients with type II Diabetes Mellitus presented at department of Medicine, Fatima Memorial hospital, Lahore. 200 newly diagnosed type II diabetes patients who met the inclusion criteria were selected. Information was recorded on predesigned questionnaire regarding peripheral neuropathy and socio-demographic variables.

Results: The mean age among peripheral neuropathy respondents was 47.05±6.37 years while it was 45.19±6.50 years among not having peripheral neuropathy. Peripheral neuropathy was seen in 42 (21%) respondents while in 158 (79%) there was no peripheral neuropathy. Gender among peripheral neuropathy showed that males were 36 and females were 06 in number; and among non-peripheral neuropathy group there were 135 males and 23 females. Most of the low income respondents were suffering from peripheral neuropathy as compared to other income groups. Post stratification regarding age and gender yields significant results within income groups while the later showed only male respondents were significant.

Conclusion: This study reports that in type 2 diabetic patients diagnosed less than one year back, there is an increased prevalence of peripheral neuropathy. Male respondents were more in number than females but both had shown almost having same occurrence of peripheral neuropathy.

Keywords: Peripheral Neuropathy, Type II Diabetes, Neuropathy

INTRODUCTION

Diabetes mellitus (DM) is a major burden on public health worldwide as well as in Pakistan. The true prevalence is not known. As per WHO facts, 422 million people were suffering from diabetes in 2014 as compare to 108 million in 1980. ¹ Diabetes mellitus prevalence, according to WHO estimates is 8.5% of the world population in 2014². In Pakistan, according to diabetes prevalence survey of Pakistan (DPSP) in 2017, 16.98% prevalence was seen with 9.04% newly diagnosed and approx. 21.9 million were suffering from DM with age 20 & above³. Type 2 diabetes is the most prevalent form of DM⁴.

Diabetes mellitus causes serious complications to the body systems as well. One of these complications is diabetic neuropathy. This is type of nerve damage that can occur mostly in legs and feet. Symptoms include pain, numbness in legs and feet. One of the most common type of diabetic neuropathy is peripheral neuropathy. It is combination of different heterogeneous disorders having wide etiological spectrum. The pathogenesis for diabetic peripheral neuropathy is multifactorial. Signs and symptom

include tingling and burning sensations, moderate to severe pains, loss of reflexes along with loss of balance and coordination etc⁵. They are usually worse at night. More than 60% of diabetics eventually develop neuropathy at some stage of their disease⁶.

The national level data not available, however studies from different hospital shows prevalence of peripheral neuropathy about 32.7% and 74.8% respectively.^{7,8} According to a study done by Mehwish Iftikhar et al in Lahore, Punjab Pakistan and found different variants of neuropathy like burning (62%), numbness (60.9%), tingling (32.6%)⁸.

Lakhiar et al conducted a study in Karachi, Sindh Pakistan and found the prevalence of peripheral neuropathy patients was 32.7%.⁷ Sonalika et al conducted study among Type 2 diabetes in Coastal Karnataka and found prevalence of neuropathy as 41.4%^{9,16}.

Rationale of our study was to screen newly diagnosed Type 2 diabetes to determine the frequency of peripheral neuropathy. It has been known that there may be various risk factors of peripheral neuropathy and has significant impact on life of diabetic patients. But controversial evidence has been noticed from literature which showed the variables significance of association of peripheral neuropathy with various risk factors. Moreover, the above stated studies were obtained from local literature which

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contains ambiguity in results. So we wanted to conduct this study to confirm the extent of problem in local population and implement the results of this study in future. Furthermore strategies could be made to detect positive cases early to decrease the long term morbidity.

The objective of this study was to find the frequency of peripheral neuropathy in newly diagnosed type 2 diabetes presenting in a tertiary care hospital.

OPERATIONAL DEFINITION:

Peripheral Neuropathy: Patients were considered to have Peripheral neuropathy if they had loss of protective sensation in ≥ 8 sites assessed using Weinstein 10g monofilament test (annex) A. 'no' response on touching the filament was labeled as loss of protective sensation.

Newly Diagnosed Type 2 Diabetes Mellitus: Patients having blood sugar random (BSR) >200 mg/dl (milligram/deciliter) diagnosed during last 1 year

METHODOLOGY

It was Cross sectional descriptive study conducted in the Department of Medicine Fatima Memorial Hospital, Lahore for a period of six months. Sample size of 200 patients was calculated with 95% confidence level, 7% margin of error and taking expected percentage of peripheral neuropathy i.e. 32.7%. Sampling technique used was non probability consecutive sampling

Inclusion Criteria: Age from 30-60 years of any gender, Newly diagnosed type II diabetes less than 1 year

Exclusion Criteria: Patient with other diabetes type (I, Juvenile or Gestational) was excluded from this study, Patients with Rheumatoid arthritis, B12 deficiency, chronic musculoskeletal disease, alcohol abuse, Parkinson's disease, hypothyroidism, chronic renal (serum Creatinine >1.3 mg/ μ), or liver failure (AST, ALT >40 Iu/L) and cancer on medical record

Data collection procedure: There were total of 200 type 2 diabetic patients meeting the inclusion criteria coming to outpatient department of Medicine at Fatima Memorial hospital, Lahore were included in the study after informed consent. Demographic information (name, age, education and socioeconomic level) was also noted. Then Semmes Weinstein 10g Monofilaments test was performed as per protocol. Responses were assessed and presence or absence of peripheral neuropathy was noted as per operational definition and all the findings were confirmed by the senior Consultant of the department along with a Consultant Neurologist. All this information was taken on proforma

Data analysis: IBM SPSS version 25.0 was used for data entry and data analysis. Quantitative variable was presented as mean and standard deviation like age. The qualitative variables were presented as frequency and percentage like gender, education, socioeconomic level and peripheral neuropathy. Chi square test was calculated to measure association of variables with peripheral neuropathy with p value ≤ 0.05 was considered as significant. Effect modifiers including age and gender were controlled through stratification. Post stratification chi square test was calculated with p value ≤ 0.05 taken as significant.

RESULTS

The mean age among peripheral neuropathy respondents was 47.05 ± 6.37 years while it was 45.19 ± 6.50 years among not having peripheral neuropathy. **Table 1.** Gender among peripheral neuropathy showed that males were 36 and females were 06 in number; and among non-peripheral neuropathy group there were 135 males and 23 females (Table 1).

Education among peripheral neuropathy group showed that 08 were illiterate, 21 were having middle education, 06 had matric and 07 had higher education while in non-peripheral neuropathy group, there were 01 illiterate, 118 had passed middle, 26 had done matric and 13 had higher degrees (Table 1). Peripheral neuropathy was seen in 42 (21%) respondents while in 158 (79%) there was no peripheral neuropathy.

Peripheral neuropathy was found in 36 males, while 06 females had also peripheral neuropathy whereas 135 males had no peripheral neuropathy and among 23 females there was no peripheral neuropathy. The difference was statistically insignificant (0.965) (Table 1). Low income (<15000) was found in 08 respondents who were suffering from peripheral neuropathy, middle income (15000-50000) having peripheral neuropathy were 21 and remaining 13 having peripheral neuropathy had high income (>50000) while among non-peripheral neuropathy respondents, 12 had Low income (<15000), 117 had middle income (15000-50000) and 29 had high income (>50000). The difference was statistically significant (0.008) (Table 1).

Illiteracy was found in 08 respondents who were suffering from peripheral neuropathy, middle passed having peripheral neuropathy were 21, 06 of the respondents had done matric that were suffering from peripheral neuropathy and remaining 07 having peripheral neuropathy had acquired higher degree while among non-peripheral neuropathy respondents, 01 was illiterate, 118 had passed middle, 26 had done matric and 13 had higher degrees. The difference was statistically significant (<0.001) (Table 1).

In respondent's ≤ 45 years, there were 13 males having peripheral neuropathy and 58 were not having peripheral neuropathy while there were 03 females having peripheral neuropathy and 13 having no peripheral neuropathy. While in respondent's > 45 years, there were 23 males having peripheral neuropathy and 77 were not having peripheral neuropathy while there were 03 females having peripheral neuropathy and 10 having no peripheral neuropathy. Statistically significant difference was not found between the peripheral neuropathy with gender in patients with age ≤ 45 years and with age >45 years. i.e., p -value=0.967 and p -value = 0.995 respectively (Table 2). In respondent's ≤ 45 years, there were 11 respondents not having peripheral neuropathy belonged to low socioeconomic status, 04 having peripheral neuropathy belonged to middle income group and 38 were having no peripheral neuropathy were in the same income group and there were 12 patients having peripheral neuropathy in higher income group and 22 were having no peripheral neuropathy in this higher income group. While in respondent's > 45 years, there were 08 respondents having peripheral neuropathy belonged to low socioeconomic status and 01 in this income group was not having the disease, 17 having peripheral neuropathy belonged to middle income group and 79 were having no peripheral neuropathy in the same income group and lastly there was 01 patient having peripheral neuropathy in higher income group and 07 were having no peripheral neuropathy in this higher income group. Statistically significant difference was found between the peripheral

neuropathy with income in patients with age ≤ 45 years and with age >45 years. i.e., p-value=0.004 and p-value = <0.001 respectively (Table 2).

In male respondent's, regarding ≤ 45 years age; there were 13 respondents having peripheral neuropathy and 58 were not having peripheral neuropathy whereas among >45 year there were 23 respondents having peripheral neuropathy and 77 were having no peripheral neuropathy. While in female respondent's, regarding ≤ 45 years age; there were 03 respondents having peripheral neuropathy and 13 were not having peripheral neuropathy whereas among >45 year there were 03 patients having peripheral neuropathy and 10 were having no peripheral neuropathy. Statistically significant difference was not found between the peripheral neuropathy with age in patients with respect to their gender. i.e., p-value=0.459 and p-value=0.775 respectively (Table 3). In male respondent's, there were 08 respondents having peripheral neuropathy belonged to low socioeconomic status and 09 respondents were having no peripheral neuropathy, 17 having peripheral neuropathy belonged to middle income group and 100 patients were having no peripheral neuropathy belonged to same income group and there were 11 patients having peripheral neuropathy in higher income group and 26 were having no peripheral neuropathy in this higher income group. While in female respondent's, there were 03 respondents having no peripheral neuropathy belonged to low socioeconomic status, 04 having peripheral neuropathy

belonged to middle income group and 17 were having no peripheral neuropathy belonged to same income group and there were 02 patients having peripheral neuropathy in higher income group and 03 were having no peripheral neuropathy in this higher income group. Statistically significant difference was found between the peripheral neuropathy with income in male patients i.e., p-value=0.003 and no difference was found between females and income i.e., p-value = 0.377 (Table 3).

Table-1: Comparison of age, Gender, Education level & Income with Peripheral Neuropathy

		Peripheral Neuropathy		
		Yes	No	
Age	Mean	47.05	45.19	0.088
	SD	6.37	6.50	
Gender	Male	36	135	0.965
	Female	06	23	
Education	Illiterate	08	01	0.001
	Middle	21	118	
	Matric	06	26	
	Higher	07	13	
Income*	Low (<15000)	08	12	0.008
	Middle (15000-50000)	21	117	
	High (>50000)	13	29	
Total		42	158	

Income* in Pakistani Rupees/ month

Table-2: Comparison of Gender with Peripheral Neuropathy Stratified by Age

Age (years)	Gender	Peripheral Neuropathy		Total	p-value
		Yes	No		
≤ 45	Male	13	58	71	0.967
	Female	03	13	16	
>45	Male	23	77	100	0.995
	Female	03	10	13	
≤ 45	Low (<15000)	00	11	11	0.004
	Middle (15000-50000)	04	38	42	
	High (>50000)	12	22	34	
>45	Low (<15000)	08	01	09	0.001
	Middle (15000-50000)	17	79	96	
	High (>50000)	01	07	08	

Table-3: Comparison of Age with Peripheral Neuropathy Stratified by Gender

Gender	Age (years)	Peripheral Neuropathy		Total	p-value
		Yes	No		
Male	≤ 45	13	58	71	0.459
	>45	23	77	16	
Female	≤ 45	03	13	16	0.775
	>45	03	10	13	
Male	Low (<15000)	08	09	17	0.003
	Middle (15000-50000)	17	100	117	
	High (>50000)	11	26	37	
Female	Low (<15000)	00	03	03	0.377
	Middle (15000-50000)	04	17	21	
	High (>50000)	02	03	05	

DISCUSSION

Diabetes mellitus (DM) is a one of the most common endocrine condition and a global health problem. It is associated with many complications, which can be divided into micro and macro vascular complications. The microvascular complications include neuropathy, nephropathy, and retinopathy. Neuropathy is the complication most commonly seen in Medical, Neurology and Endocrine OPD among diabetic patients. There is limited data available on its incidence, prevalence and association in our settings. This was the main purpose of this study, to study and document the prevalence of diabetic neuropathy in newly diagnosed diabetics. In this study, we evaluated the prevalence of the

condition in diabetic patients. We also determined the association of various patient related variables with peripheral neuropathy.

Frequency of neuropathy among newly diagnosed cases of Type 2 Diabetes was found to be 21% in this study. There was another study conducted by Gill HK et al¹⁷ which concluded that 29.2% of the studied population had diabetic peripheral neuropathy, which is different from results of our study. Iftikhar et al in their study demonstrated that 74.8% of patients had neuropathy, it is a significantly high number as compared to our study. These high figures can be explained as in this study, patients with duration of Diabetes of more than 20 years were included¹⁸. Various studies done in different

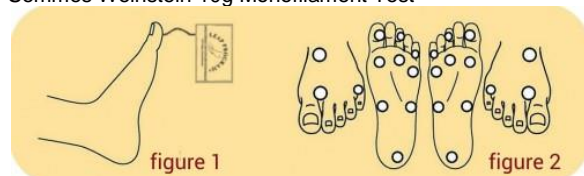
countries of the world including Saudia Arabia and United Arab Emirates have shown the prevalence of diabetic peripheral neuropathy to be 45 and 29.2 percent¹⁹⁻²¹. There are various factors which can explain these differences of figures among different studies. One factor is the type of filament used. Some researchers have used Semmes Weinstein 10g Monofilament Test and others have used a biothesiometer, there sensitivities vary²². There are some studies which have shown interesting results, like those done in Hong Kong and India which showed diabetic nephropathy as the most frequent complication among all the microvascular complications of Diabetes Mellitus^{25,26}.

In current study patients' mean age among peripheral neuropathy respondents was 47.05 ± 6.37 years while it was 45.19 ± 6.50 years among not having peripheral neuropathy; Gender among peripheral neuropathy showed that males were 36 and females were 06 in number; and among non-peripheral neuropathy group there were 135 males and 23 females. No notable impact of age or sex was found in our study however a study completed by Gogia et al found that male had a higher incidence in Bansal et al found that there was no significant difference among members of both genders^{28,29}.

CONCLUSION

This study reports high prevalence of peripheral neuropathy in type 2 diabetic patients diagnosed less than one year back. Male respondents were more in number than females but both had shown almost having same occurrence of peripheral neuropathy. The income of the respondents showed a significant statistical difference with age, education and regarding gender only males had shown difference.

Semmes Weinstein 10g Monofilament Test



Score: _____

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