FREQUENCY OF DIABETIC PERIPHERAL NEUROPATHY IN PATIENTS WITH NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS.

Emaan Fatima Qureshi[1], Muzaffar Ali Shaikh[2], Madiha Shah[3], Muhammad Hammad Jawaid[4], Maarij Hassaan Qureshi[5], Razia Hanif Memon.[6]

ABSTRACT:

Introduction: Diabetes Mellitus is a globally prevalent non-communicable disease involving hyperglycaemia and altered metabolic control, with high associated morbidities and mortalities. Diabetic neuropathies are commonly occurring complications among diabetic patients, out of which up to 50% may be asymptomatic. **Objective:** To determine the frequency of diabetic peripheral neuropathy (DPN) among patients newly diagnosed with Diabetes mellitus Type 2 **Design:** This was a hospital-based, cross sectional descriptive study to determine the frequency of DPN among patients newly diagnosed with Diabetes mellitus Type 2 **Place of Study:** Department of Medicine (OPD and inpatient), Liaquat University Hospital, Hyderabad/Jamshoro. **Duration of Study: S**ix month period from 01-06-2019 to 01-12-2019 **Methodology:** Non-probability consecutive sampling was utilized for sample collection. Inclusion criteria were: Patients of both genders, between age 30 years and 60 years, newly diagnosed with Diabetes Mellitus Type 2. i.e. the fasting serum glucose level above 126 mg/dl along with HbA1c levels above 6.5% was considered as Diabetes mellitus., who were agreeable to take part in the study after informed consent. Exclusion criteria were pregnant women, patients with chronic lumbar pain, neurological findings indicative of myelopathic involvement or relevant radiculopathies, as well as patients with altered consciousness or who were inarticulate and unable to collaborate with neurological evaluation. The collected data was entered in SPSS (for version 20) and analysed accordingly. **Results:** 150 patients were recruited in this study. There were 60.7% male and 39.3% female patients. The mean age of the patients was 44.8±7.70 years. DPN frequency among patients newly diagnosed with Diabetes mellitus Type 2 was 39.3%. **Conclusion:** Our figuresemphasized the necessity for rigorous programs aiming at early identification of DPN and patient education in diabetic patients with associated co-mordbities such as altered lipid metabolism, cardiac dysfunction or eye involvement.

Key Words: Diabetic peripheral neuropathy, Type 2 Diabetes mellitus, Diabetic neuropathies

1. FCPS –II Resident, Medical Unit 3, LUMHS Jamshoro.
2. Professor and Chairman Medicine Department LUMHS Jamshoro.
3. Assistant Professor, Department Of Medical Unit 3, Liaquat University of Medical Sciences.
4. Lecturer Bilawal Medical College Jamshoro.
5. House Officer Medical Unit 1 LUMHS Jamshoro.
6. Senior Registrar Medical Unit 3. LUMHS Jamshoro.

Corresponding Author: Madiha Shah, Assistant Professor, Department of Medical unit 3, Liaquat University of Medical Sciences. Email; madihashah@gmail.com

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INTRODUCTION

Diabetes Mellitus is a globally prevalent non-communicable disease involving hyperglycemia and altered metabolic control, with high associated morbidities and mortalities. Currently, 415 million people are affected worldwide by Diabetes mellitus (DM) and it is expected that this number will increase to an astonishing 642 million by 2040. 1 in every 11 adults worldwide is diabetic and 50% of these adults with Diabetes mellitus are undiagnosed.As of 2015, there are currently over 7 million patients affected by Diabetes mellitus in Pakistan. Approximately 86,364 patients died of Diabetes mellitus alone in 2015 and this number is increasing [1]. Diabetic peripheral neuropathy (DPN) varies significantly in terms of its prevalence as per different studies, ranging from 8% to 59% [2].The reported prevalence for DPN in patients newly diagnosed with Diabetes mellitus Type 2 is 16.8%. [3]. Certain chronic complications particularly neuropathies are the most commonly occurringin diabetic patients, out of which up to 50% may be asymptomatic. A study in the American Diabetes Association reported the DPN prevalence to be 22% in certain patients diagnosed w[i]th Type 2 DM 4.

DPNmay manifest as existence of ulceration, absent ankle reflexes, impaired dorsal column sensation, and positive monofilament test. It aggravatespotential risk of acquiring infection& foot ulcers alongside risk of non-traumatic amputations, potentaitinglong term morbidity & disability [5] which is a point of concern for public health and healthcare agencies and need for advocating timely screening for DM plus associated complications and communal disease burden [6].Timely diagnosis, increased patient

awareness and regular monitoring of serum glucose screening are absolutely vital [7].

Broadly speaking, three components are vital in DPN management: Glycemic control, Foot care &pain relief. The American Diabetes Association issued a statement in 2005 recommending that firstly, DM patients with symptomatic DPN should have target glycemic control stabilized [8]. A 2012 systematic review revealed that this led to significant positive changes in proxy measures of DPN[9]. Additionally, patients ought to regularly examine their feet for evidence of break in the skin, any developing callus, and initial signs of inflammation around digits and nails. The physician also has a duty to carry out detailed evaluation and examination at each visit for DPN. Finally, symptomatic DPN patients should be managed in a methodical, one by one approach[8]. Before any pharmacological intervention, alternate causes of the symptoms need to be excluded. Medication for painful DPN includes certain antidepressants (e.g., amitriptyline, among others), anticonvulsants (e.g., pregabalin, sodium valproate) and capsaicin cream [10,11]. Other possible options include lidocaine patch, alpha-lipoic acid, isosorbide dinitrate topical spray and transcutaneous electrical nerve stimulation, and finally, surgical decompression.

Despite the large number of studies on Diabetes mellitus, to date, the local literature regarding DPN among newly diagnosed DM type 2 patients is scarce. Thus, this study is aimed to explore the magnitude of DPN so that the patients can be properly screened, identified early, and managed accordingly.

MATERIAL & METHODS

This was a hospital-based, cross sectional descriptive study to determine the frequency of diabetic peripheral neuropathy (DPN) among patients newly diagnosed with Diabetes mellitus Type 2 over a six month period from 01-06-2019 to 01-12-2019 in Department of Medicine (OPD and inpatient), Liaquat University Hospital, Hyderabad / Jamshoro. Non-probability consecutive sampling was utilized for sample collection. Following informed consent, the data was noted on pre-determined proforma. Inclusion criteria were: Patients of both genders, between age 30 years and 60 years newly diagnosed with Type 2 Diabetes mellitus .i.e. the serum fasting sugar level above 126 mg/dL along with HbA1c levels above 6.5% was considered as Diabetes mellitus. Who were agreeable to participate in the study after informed consent? Exclusion criteria were pregnant women, patients with chronic lumbar pain, neurological findings suggestive of myopathic involvement or relevant myelo/radiculopathies, as well as subjects with altered consciousness, Glasgow Coma Scale scoreless than 15 or who were inarticulate and unable to collaborate with neurological evaluation. The composed dataset was entered in SPSS (for version 20.0) and analysed accordingly. The frequency and percentage was calculated for gender, residence (urban or rural), hypertension, smoking, obesity, diabetic retinopathy, hyperlipidemia, diabetic nephropathy and DPN. The mean and standard deviation (SD) was obtained for all relevant quantitative data i.e. age, fasting blood sugar plushemoglobin A1C (HbA1c). Stratification regarding age, gender, urban or rural hypertension: smoking, obesity, diabetic retinopathy, hyperlipidemia and diabetic nephropathy was done to see the effect on outcome and to adjust for effect modification. The post stratification Chi-square test was utilized for categorical variables at 95% confidence interval and the p-value ≤ 0.05 was considered as statistically significant.

TABLE 1: FREQUENCY OF DIABETIC PERIPHERAL NEUROPATHY (DPN) AMONG NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS BY AGE, GENDER, OBESITY, HYPERTENSION, DIABETIC RETINOPATHY AND HYPERLIPIDEMIA STATUS

VARIABLE PARAMETER	DIABETIC PERIPHERAL NEUROPATHY		Total	P-value
	Yes	No		
AGE IN YEARS				0.0005
≤ 40	18(36%)	32(64%)	50	
41-50	15(25%)	45(75%)	60	
>50	26(65%)	14(35%)	40	
GENDER				0.0005
Male	51(56%)	40(44%)	91	
Female	8(13.6%)	51(86.4%)	59	
OBESITY				0.034
<27.5 (kg/m^2)	22(30.6%)	50(69.4%)	72	
≥27.5 (kg/m^2)	37(47.4%)	41(52.6%)	78	
HYPERTENSION				0.0005
Yes	52(63.4%)	30(36.6%)	82	
No	7(10.3%)	61(89.7%)	68	
DIABETIC RETINOPATHY				0.0005
Yes	32(65.3%)	17(34.7%)	49	
No	27(26.7%)	74(73.3%)	101	
SMOKING				0.005
Yes	25(56.8%)	19(43.2%)	44	
No	34(32.1%)	72(67.9%)	106	
HYPERLIPIDEMIA				0.548
Yes	47(38.2%)	76(61.8%)	76	
No	12(44.4%)	15(55.6%)	15	

RESULTS

150 patients who had been recently diagnosed with Type 2 DMtook part in this study.

The DPN frequency among study samplewas 39.3% (n=59). The mean patient age was 44.8±7.7 years. The mean fasting blood sugar was 140.0±9.4 and mean HbA1c was 7.05±0.3. There were 60.7% majority of male (n=91) and 39.3% female (n=59) patients. Rural and urban cases were 50.7% (n=76) and 49.3% (n=74), respectively. 82 patients (54.7%) had hypertension, 49 (32.7%) had diabetic retinopathy, 44 (29.3%) were smokers each, and 58 (38.7%) had diabetic nephropathy from among total patients. The association of diabetic peripheral neuropathy and age was shown to be significant (p=0.0005). DPN was found to occur more in males which was significant (p=0.0005.) Frequency of DPN was also associated with obesity which was significant (p=0.034), urban versus rural residence (p=0.0005), as well as presence of hypertension (p= 0.0005), as demonstrated in Table 1. Frequency of DPN was also significant in patients with DM (p=0.0005) plus smokers (p=0.005). Diabetic retinopathy was not significantly associated with patients who had hyperlipidemia (p=0.548).

DISCUSSION

Diabetes mellitus (DM) is an ongoing public health burden with numerousobstacles and an increasing occurrence. Progressive urban lifestyles have led to sedentary habits, high calorie foods, and psychosocial stresses [12].Additionally, Pakistan urban areas have high exposure to contaminants and pollution which enhance risk. In developed Caucasian countries, Diabetestends to affect older age group above 65 years; but developing countries have cases between 45 to 64 years [13]. The prevalence of DM Type 2in patients between ages 30 to 50 years is also higher in developing countries[14]. Furthermore, prospective Asian studies opineregarding obesity, which is directly related to the frequency of hypertension, DM Type 2 and high lipid levels [15]. In our study out of 150 cases, 52% were obese and 20.67% were hypertensive. A University of Glasgow study suggested thatmales were more liable to receive type 2 DM diagnosis in comparison to female [16]. Our results are in concordance of this study. Out of 150 patients, there were 60.7% males and 39.3% were females.Frequency of DPN among newly diagnosed type 2 DM was 39.3%. We detected a high frequency of DPN in newly diagnosed DM patients. DPN was associated with advancing age and symptom periods, before DM was diagnosed as we found that rate of DPN was raised in patients above 50 years old. The results agree with Middle Eastern countries research, in which DPN prevalence was 45%, 31.9%, 25.6% and 29.2% in Saudi Arabia, Iran, United Arab Emirates (UAE) and India, respectively [17,18]. Our data showed that DPN was greaterin patients with retinopathy complications associated with DM i.e. 65.3%. Previous studies demonstrated that DM patients having additional micro- and macrovascular complications were more likely to have DPN [19,20]. This can be due to overlapping pathogenic pathways secondary to toxic hyperglycemia causing growing thickness of endo-neural blood vessels, advanced glycation end products accumulation (AGEs), polyol pathway activation and oxidative stress[21,22]. Other authors reported that patients with lipid disorders were 2.2 times more likely to have DPN [19,23]. Current data backs the principle that metabolic syndrome plus high BMI potentiate DPN risk. In contrast to this, our study reports that it was not statistically significant with patients who had hyperlipidemia.

CONCLUSION

Our results reinforced the need for rigorous agenda spursuing prompt DPN detection and rapidapplication of patient education particularly those with comorbidities and risk factors such as dyslipidemia along with cardiac and eye complications in chronic DM patients. Moreover, initial actions to prevent DPN by putting into practice lifestyle changes such as healthy diets and physical fitnessideally ought to beimplemented to delay such an incapacitating complication.

CONFLICT OF INTEREST

There is no conflict of interest to be declared.

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