ORIGINAL ARTICLE

THE FREQUENCY OF SENSORY NEUROPATHY IN DIABETIC PATIENTS WITH FOOT ULCERS ADMITTED TO THE DEPARTMENT OF MEDICINE OF A TERTIARY CARE HOSPITAL

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ABSTRACT

OBJECTIVE: This study aims to determine the frequency of peripheral sensory neuropathy in diabetic patients with diabetic foot ulcers, admitted to the Department of Medicine, Khyber Teaching Hospital, Peshawar.

MATERIALS AND METHODS: This descriptive Cross-sectional study was conducted from 26/11/2019 to 26/5/2020, in the Department of Medicine, Khyber Teaching Hospital, Peshawar. Approximately 150 patients aged 14-70 years of both genders, suffering from Type 1 and Type 2 diabetes mellitus for at least 2 years, and fulfilling our inclusion criteria, were included. All diabetic patients with diabetic foot ulcers were examined for the presence or absence of sensory neuropathy, but nerve conduction studies confirmed the final diagnosis. All the information collected on proforma was analyzed.

RESULTS: In our study, 21% of patients were in age 20-40 years, 37% of patients were in age 41-60 years, and 42% of patients were in age 61-70 years. Eighty-nine (59%) patients were male while 61 (41%) patients were female. Thirty-nine percent of patients had diabetes for 20 years or more. Approximately 25% of patients had sensory neuropathy.

CONCLUSION: The frequency of peripheral sensory neuropathy was present in 25% of our diabetic patients with diabetic foot ulcers.

KEYWORDS: Sensory neuropathy, Diabetes Mellitus, Diabetic foot ulcer.

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INTRODUCTION

Diabetes Mellitus is defined as a metabolic syndrome due to deficiency, resistance to the action of insulin, or both, resulting in impaired metabolism of carbohydrates, fats, proteins, water, and electrolytes. [1] Chronic hyperglycemia results in various microvascular and macrovascular complications leading to damage ophthalmological, neurological, cardiac, and renal complications. [2] The prevalence of diabetes amongst adults over 18 years of age has almost doubled from 4.7% in 1980 to 8.5% in 2014. [3]

Asians, from Pakistan, India, and China, have a higher prevalence as compared to Caucasians. About, 425 million people in the world had diabetes in 2017 and the number is expected to rise to 629 million by 2045, according to International Diabetes Federation (IDF). In Pakistan diabetes is a major health issue, 6.94% of the Pakistani population has diabetes, and is likely to increase to 8.45% by the year 2045 according to International Diabetes Federation. [4] The Diabetic foot ulcer is a serious complication resulting from chronic uncontrolled Diabetes Mellitus, which may lead to amputation of the foot or even leg of variable length.

Diabetic foot ulcer is defined as the presence of a full-thickness lesion distal to the ankle. Peripheral neuropathy, mechanical changes in the bony architecture of the foot, and atherosclerotic peripheral arterial disease play an important role in the development of diabetic foot ulcer. [5, 6] Currently global prevalence of Diabetic foot ulcer is 6.3%, whereas local studies show prevalence from 7% to 11.36%.

The most common ulcers are Neuropathic ulcers due to tissue damage resulting from an imbalance of mechanical weight applied to a foot, plus loss of pain, touch, proprioception, pressure, and vibration senses. Peripheral sensory neuropathy (PSN) occurs due to damage to the entire nerve cells or nerve fibers only. The patient may be symptomatic or asymptomatic.

The prevalence of Diabetic peripheral sensory neuropathy varies from 9.6 to 88.7% in different populations. In a local study from Islamabad, the prevalence of sensory neuropathy in diabetic foot ulcer patients was re-

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ported to be 94.5%. [7] The rationale of the study is to find out the frequency of sensory neuropathy in our patients presenting with diabetic foot ulcers. This would help us to find those diabetic patients who have sensory neuropathy; the more intense control of glycemic status will prevent the development of neuropathic and other complications.

MATERIAL AND METHODS

This descriptive cross-sectional was conducted from 26/11/2019 to 26/5/2020, in the Department of Medicine of Khyber Teaching Hospital, Peshawar, after approval from IREB. We include 150 patients, as sample size by using a 25.64% prevalence of peripheral sensory neuropathy in diabetic patients with diabetic foot ulcer, 95% confidence interval, and 5% margin of error according to the WHO formula of sample size determination.[8] We included all the patients aged between 14-70 years of both genders, diagnosed with both type 1 and type 2 diabetes mellitus for at least 2 years.

We included only admitted patients, who were examined and later confirmed to be having neuropathy by doing nerve conduction studies from the same center to avoid bias in the study. Patients with systemic illnesses that can cause neuropathies like Vitamin B12 deficiency, chronic liver disease, chronic renal failure, hypothyroidism, vasculitides, malignancies, or leprosy were excluded from the study to avoid sample bias.

Patients taking medicines that may cause neuropathy like lead, Phenytoin, Cisplatin, Vincristine, amiodarone, isoniazid, dapsone, etc. were also excluded from the study. After the age of 70 years, idiopathic neuropathy is common, so patients more than 70 years old were also excluded. After detailed history and meticulous clinical examination, those patients had clinical signs of neuropathy, and nerve conduction studies were done. All information was collected on Preformed attached proforma for analysis by the statistical package for social sciences (SPSS) version 20. P value was calculated by using the Chi-square test and a value less than or equal to 0.05 was taken as significant. All data was presented in the form of tables and graphs.

RESULTS

Finally, we include 150 patients, Table 1, shows the age distribution, the mean age of our patients was 55 years with a standard deviation ± 12.12, and 89 (59%) patients were males while 61 (41%) patients were females. Only 58 (39%) patients had diabetes for 20 years. Sensory neuropathy was present in 37(25%) of our patients.

DISCUSSION

Diabetes Mellitus is one of the leading health problems all over the world. The majority i.e., 79% of our patients were above 40 years of age, mean age of our patients was 55 years with a standard deviation ± 12.12, Table 1. Our study correlates closely with studies done by Jember G who reported a mean age of 49 with SD ± 14.3 years[9] and Rage M had reported the mean age of their patients as 51 years with SD ± 7.22.[10] Sensory Neuropathy was present in 25% of our patients who presented with Diabetic foot ulcers, Table 3. Jember G has reported a prevalence of 52.2% while the global estimates of Diabetic peripheral sensory neuropathy prevalence vary widely from 9.6 to 88.7% in different populations.[8] However, local data from the Islamabad region has been reported to be 94.5% and Khawaja N et al. have reported a figure of 39.5%. [7] So the frequency of Peripheral sensory Neuropathy was much lower in our patients, the reason may be population difference. In our study 89 (59%) patients were males while 61 (41%) patients were females, Table 2; this figure very closely matches the figures of 57% males and 43% females as reported by Rage M et al.[10] In our study 25.81% of patients with T1DM and exactly 24.36% of T2DM patients had sensory neuropathy while Rage M et al has reported that 10% patients with T1DM and 30% of patients with T2DM having sensory peripheral neuropathy. So, our figures are closely matched, while the figure of 14.4% as reported by Ahmad SR et al is quite low. In our patients, 37.83% of patients who had Diabetic Neuropa-

Table 1: AGE DISTRIBUTION

S No.	AGE in groups	Frequency	Percentage
1	20-40 years	32	21%
2	41-60 Years	55	37%
3	61-70 Years	63	42%
Total		150	100%

Table 2: GENDER DISTRIBUTION

S No.	Gender	Frequency	Percentage
1	Males	89	59%
2	Females	61	41%
Total		150	100%

Table 3: SENSORY NEUROPATHY DISTRIBUTION

S No.	SENSORY NEUROPATHY	Frequency	Percentage
1	Yes	37	25%
2	No	113	75%
Total		150	100%

Table 4: STRATIFICATION OF SENSORY NEUROPATHY FOR THE DURATION OF DIABETES MELLITUS

SENSORY NEUROPATHY	≤ 20 years	> 20 years	Total	P value
Yes	14	23	37	0.9050
No	44	69	113	
Total	58	92	150	

thy, had a history of Diabetes for less than20 years, while 62.16% had Diabetes for more than 20 years, but Ahmad SR has reported that there was no correlation of sensory neuropathy with duration of diabetes (P = 0.995). [11]

CONCLUSION

Our study concludes that the frequency of peripheral sensory neuropathy was 25% in diabetic patients admitted to Khyber Teaching Hospital with diabetic foot ulcers. However, this study was conducted in one small center, in a single population, so to get proper information about the whole of the country we need to conduct such studies in the rest of the country.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Iqbal S: Concept, planning, study design, study conduction, critical review, analysis, manuscript writing.

Shah BM: Critical review, discussion, interpretation, manuscript writing, study conduction.

Ullah N: Analysis, critical review, study conduction.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.