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Prevalence of Diabetic Peripheral Neuropathy among Type 2 Diabetes Mellitus Patients in an urban area of Puducherry

Madhumadhi S[1], Arthi M[2], Vijayalakshmi S[3], Vedapriya DR[4], Janani S[5]

Affiliation: 1-Post-Graduate, 2-Assistant Professor, 3-Associate Professor, 4-Professor & Head, 5- Tutor cum Statistician, Department of Community Medicine, Sri Venkateshwaraa Medical College Hospital and Research Centre. Puducherry

***Author for correspondence**: Dr. Madhumadhi. S, Department of Community Medicine, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry – 605 102. Email: tomj8741@gmail.com

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ABSTRACT

Background: Diabetic Peripheral neuropathy has a strong association with development of foot ulcers and non-traumatic amputations. Screening helps in identification of the disease in early stage. **Objective:** To assess the prevalence of Diabetic Peripheral Neuropathy among Type 2 Diabetes Mellitus patients in urban Puducherry. **Methods:** Community based cross sectional study was conducted among 225 known case of Type 2 Diabetes Mellitus in urban Villianur from January 2019 to May 2020. Semmes Weinstein monofilament test and Pre-tested Toronto Clinical Scoring System questionnaire was used to assess the prevalence of Diabetic Peripheral Neuropathy among Type 2 Diabetes Mellitus patients. **Results:** Majority of the participants were females (72%) with their mean age of 58.7±9.9. Prevalence of Diabetic Peripheral neuropathy among the participants was 73%. **Conclusion:** Current prevalence of Diabetic Peripheral Neuropathy was high among the participants hence more emphasis should be added on screening for complication and preventing them.

Key word: Diabetic Peripheral neuropathy, Screening, Semmes Weinstein monofilament, Toronto Clinical Scoring system, Type 2 Diabetes Mellitus.

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INTRODUCTION:

Diabetes Mellitus (DM) is one of the largest global health problems. Consistent raise in the number of people living with both Type 1 (T1DM) and Type 2 Diabetes Mellitus (T2DM) globally causes severe economic burden to both the patients and to the society. [1]

In India, among the two types of DM, increasing trend in prevalence and to its complications reported for T2DM which causes high burden to both the patients and health care system.[1-2] Delay in reporting to health facilities was observed in T2DM with an average time gap of 4 to 7 years from its onset of T2DM, and most commonly presented with complications such as Diabetic Peripheral Neuropathy (DPN), Nephropathy and Retinopathy at the time of diagnosis.[2-3] As per International Diabetic Federation, the global burden of DPN (10.6%) among T2DM accounts higher prevalence than other complications like Nephropathy (5.9%) and Retinopathy (0.8%).[2] Similarly the study on Chennai Urban Rural Epidemiology Study (CURES-55) reports higher prevalence of DPN (26%) in South India among T2DM patients. [4]

DPN is a most common micro-vascular complication of T2DM and mainly affects the peripheral nerves of feet, legs and hands. Members

of an International Consensus Meeting on the outpatient diagnosis and management of DPN agreed on definition of DPN as "the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes after the exclusion of other causes".[5-6] The common reported symptoms of DPN are loss of sensation in the toes, numbness of lower extremities, burning and pricking type of foot pain.[7] DPN has a strong association with development of foot ulcers and non- traumatic amputations. Commonly T2DM patients present to the physician with complications of DPN and ends up in lower extremity amputations and limb loss. [8] Itis mainly due to lack of screening in primary care settings and due to lack of knowledge about the complications of DM among the general public.

The data regarding prevalence of DPN is necessary so that appropriate preventive strategies and treatment can be provided. Hence this study was undertaken with the objective to determine the prevalence of Peripheral Neuropathy among known Type 2 Diabetes Mellitus patients in Urban Puducherry so that the disease can be identified and complications can be prevented at the earliest.

MATERIAL & METHODS

This community based cross-sectional study was conducted over 1 year period from January 2019 to May 2020 in Villianur commune, urban area of Puducherry after obtaining the clearance from the Scientific Research and Institutional Ethical Committee. Ambulant T2DM patients with duration of DM more than 5 years were included in the study, participants with history of chronic neurological diseases and on medications known to impair nerve function were excluded. Sample size was calculated to be 225 with prevalence calculated from the previous study. [4]

Simple random sampling method was adopted to select the wards in Villianur urban commune, Puducherry. Total 4 wards were selected, and each ward was considered as cluster. Using Probability Proportional to Size Sampling (PPS) technique, 56 Diabetes Mellitus patients were included from each ward. Total 225 Diabetes Mellitus patients were included for the study.

House to house survey was conducted to contact the participants. After explaining the purpose of the study to the T2DM patients in local language, written consent was obtained. Information regarding socio-demographic data was obtained. Semmes Weinstein monofilament test and Pre-tested Toronto Clinical Scoring System questionnaire was used to assess the prevalence of DPN among T2DM patients.

Statistical analysis:

Data was entered in Microsoft Excel Sheet and analyzed by SPSS version 23. Prevalence of DPN was expressed as rate. Quantitative variables like age were expressed as mean and standard deviation. Categorical variables like socio - economic status and classification of DPN were expressed in percentage.

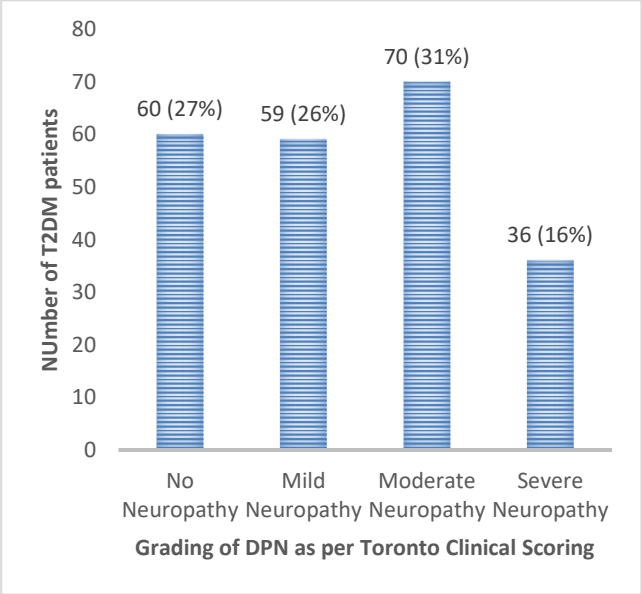
RESULTS

Table 1: Socio-demographic characteristics of the study participants (n= 225)

Characteristics of the respondents	Frequency (n)	Percentages (%)
Age (completed years)		
31-40	07	03
41-50	35	16
51-60	77	34
61-70	73	32
>70	33	15
Socio-Economic Scale (Modified Kuppusamy Scale updated 2020)		
I	15	07
II	69	30
III	94	42
IV	44	20
V	03	01

The mean (SD) age of the study participants was 58.7 (9.9) (Range: 48.8 - 68.6 years) and majority of the participants were females (72%). Around 77 (34%) of the study participants were in the age group between 51-60 years followed by 61-70 years 73 (32%) and41-50 years 35 (16%) respectively and according to Updated Modified Kuppuswamy classification for Socio - Economic Scale 2020 [9], 94 (42%) study participants belonged to Class III followed by 69 (30%) participants in class II, whereas only 3 (1%) participants belonged to Class V socio economic status. (Table 1)

Fig. 1: Grading of Diabetic peripheral neuropathy as per Toronto Clinical Scoring System (n=225)



The overall prevalence of DPN found in this study was 165 (73%) as per screening done by Toronto clinical scoring among T2DM patients with the history of T2DM for more than 5 years. On grading the DPN, one-third (31%) of the T2DM patients had moderate DPN followed by mild (26%) and severe DPN (16%). (Fig.1)

Discussion:

The present study was conducted to estimate the prevalence of DPN among T2DM patients in urban Villianur area, Puducherry. The majority of the T2DM patients in the present study were aged more than 50 years with the mean age of 58. 7 ± 9.9 (Range: 48.8 - 68.6 years) and three fourth of them were females (72%). Similarly, other studies from India also report the similar age group and gender[10-12], this shows the fact that elderly age group was more predisposed to T2DM with increased female preponderance.

Socio-economic status plays an important role in management of T2DM patients for good adherence and compliance of DM drugs. The present study reported nearly half of the T2DM (42%) patients belonged to class III socio economic status as per Modified Kuppuswamy Socio-Economic Scale. Our findings were like study conducted by Geetha A et al. in Kancheepuram.[11]

The common debilitating complication in DM is DPN. Prevalence of DPN as per Toronto Clinical Scoring System in the present study was found to be 73% which was similar to the study conducted by Amour et al. [13] in Tanzania. In contrast, studies conducted in various places of India and other countries reported lower prevalence of DPN. [14-18]Higher difference in prevalence of DPN may be due to variation in duration of Type 2 Diabetes Mellitus, as the current study included Type 2 Diabetes Mellitus patients with treatment history of > 5 years, use of different scales to measure DPN, severity of hyperglycemic status or geographical variations in different studies.

Toronto Clinical Scoring System (TCSS) was used in the present study to grade DPN status and found that 26% had mild neuropathy, 31% had moderate neuropathy and 16% of the study participants suffered from severe neuropathy. Similar findings were observed by Alharbi TJ et al. [19] in Saudi Arabia, whereas study conducted by Abishek R et al. in Chidambaram [20], reported 5%, 3% and 5% of mild, moderate and severe DPN among Diabetes Mellitus patients respectively.

Conclusion: The present study found DPN to be highly prevalent among T2DM patients with the history of taking medicines for more than 5 years. Around 16% of them were having severe DPN as per TCSS. So there is an urgent need to screen all the T2DM patients periodically at primary health centre level using Semmes Weinstein monofilament and TCSS, to identify and grade DPN at earliest in order to prevent further complication. Further studies are required with large sample size to identify the other factors responsible for development of DPN among T2DM patients.

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Conflict of Interest : None

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