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Association Between Duration And Symptoms in Patients With Diabetic Neuropathy.

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ABSTRACT :

Introduction: High blood sugar level leads to Diabetic Neuropathy.[1] The average time gap between the onset of Diabetes and its detection in an individual is 4 -7 years.[2].

Methodology: It was a population-based cross-sectional study conducted usinga purposive sampling method on 50 samples of patients who were diagnosed with Diabetes Mellitus and Diabetic Neuropathy according to Michigan Neuropathy Screening Instrument and HemoglobinA1C, admitted in I.P.D and Neurophysiotherapy O.P.D at tertiary care hospital for the duration of 1 year. Asymptomatic diabetic patients, patients with severe neurological, musculoskeletal, or cardiac problems, non-co-operative patients, and patients with poor mental status were excluded from the study. Ahmednagar Neuropathy Screening Instrument Scale (ANSI) was administered on the patients.

Results: Data was analyzed by using ANOVA test which shows that mean value of total score of symptoms on ANSI for the duration of 0-5 years is 6.15, which goes on increasing as the duration increases, and it is 36 for the duration of 30 years of Diabetic Neuropathy which reveals that as the duration increases, the severity of symptoms also goes on increasing. So, the final result is that there is a positive correlation between duration and symptoms in patients with Diabetic Neuropathy.

Conclusion: Diabetic Neuropathy consumes more time to show its physical symptoms in patient, i.e., the longer the duration of having diabetic neuropathy, the more symptoms appear in the patients. As the coefficient is significant, the present study concluded that there is an association between duration and symptoms in patients with diabetic neuropathy.

Keywords: *Diabetes, Diabetic Neuropathy, Association, Symptoms, Duration.*

Introduction:

Diabetic Neuropathy is one of the most common complication of Diabetes Mellitus. It is called as nerve injury which is associated with the duration and HbA1C levels of diabetes[3].Distal Peripheral Neuropathy (DPN) is most common type in which nerves of legs and feet are more commonly involved. Global prevalence is 8.8% among adults, with the number expected to rise to 10.4% by 2040. The overall prevalence of DPN was 39.3% in rural southern Indian individuals, amongst them 28.9% in males and 10.4% in females when the study was done to see the distribution of peripheral neuropathy according to different variables.[4] However, in surveys of Indian patients, the prevalence has ranged from 26% to 31%.[5]

The prevalence of Diabetic Neuropathy among diabetics in Ahmednagar city by using Michigan Neuropathy Screening Instrument (MNSI) was found to be 6.25 % for pure neuropathy and is 42.70 % for patients with only significant clinical examination[6]. Diabetic neuropathy depends upon the duration of Diabetes and uncontrolled high blood sugar levels. Over time, uncontrolled high blood

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sugar level damage nerves and interfere with their ability to send signals, leading to diabetic neuropathy. The duration of Diabetic Neuropathy varies from months to years[3]. A lower prevalence of polyneuropathy in those with a duration of DM < 5 years and highest in those with a duration of DM > 15 years[7] .

Motor symptoms seen in Diabetic Neuropathy include reduced ankle jerks and loss of muscle strength. Sensory symptoms of Diabetic Neuropathy include pins and needle-type sensations, uncomfortable tingling, temperature, and vibration sense. These patients have feet dry and crackled, skin may become numb, and nerves get damaged, and because of this, you may not notice when you step on something sharp. The first sign of diabetic neuropathy is the presence of albumin in the urine. The screening for diabetic neuropathy was conducted using Ahmednagar Neuropathy Screening Instrument Scale(ANSI). The ANSI scale is highly reliable; a score of 45 shows 83% of sensitivity and 50% sensitivity. The ANSI is a validated tool used for the early detection of diabetic neuropathy, which consists of five components, i.e., muscle strength, reflexes, sensations, symptoms, and appearance of feet. By taking physical assessments on the patients, we can early detect diabetic neuropathy, and it helps to prevent its further complications. After summing up the score of all the components, the total score of ANSI is 68. The result shows that the higher the score, the more the severity of diabetic neuropathy.

The consequences of diabetic neuropathy can be described in the context of functional impairment, activity limitations, and participation restrictions, as well as personal and environmental factors according to the International Classification of Functioning (ICF). Patients with Diabetes with peripheral neuropathy have reduced gait speed, increased stance time, reduced cadence, short stride length, and higher variability in step length as compared to healthy individuals. Reduction in ankle moment and ankle strength was seen in these patients[1].In some diabetic patients, after a certain duration, there is development of diabetic neuropathy, but it is not necessary that all the diabetic patients show signs and symptoms of neuropathy after a certain duration; therefore, the objective of the study was to find out the relationship between the duration and symptoms in patients with diabetic neuropathy.

Methodology :

It was a population- based cross-sectional study. The purposive sampling method was used to conduct the study; about 50 samples were taken to come to a conclusion during the study duration of 1 year. The present study was conducted among patients with Diabetic Neuropathy admitted in I.P.D and Neurophysiotherapy O.P.D at tertiary care Hospital, as well camp patients were included in the study. Written informed consent was taken from all the participants. We included both the males and females of age between 25 – 70 years who were diagnosed as Diabetes and Diabetic Neuropathy patients according to MNSI and HbA1C test.Asymptomatic diabetic patients, patients with severe neurological, musculoskeletal, or cardiac problems, non-co-operative patients, and patients with poor mental status were excluded. Age and Gender wereindependent variables, and duration and symptoms of diabetic neuropathy were dependent variables.

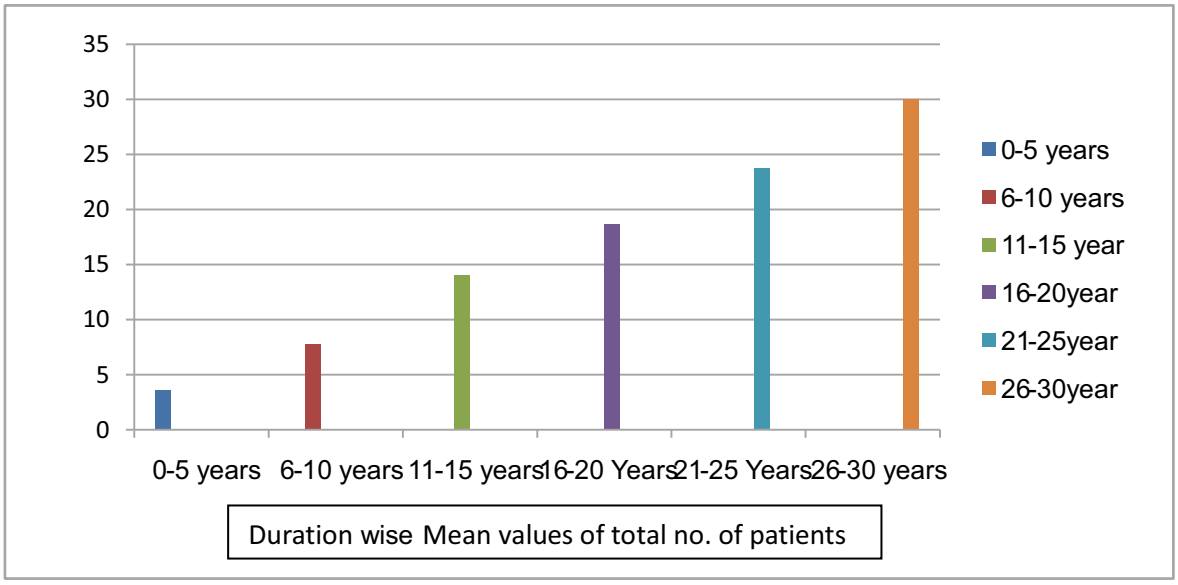
Procedure: Ethical Committee Approval was obtained from the IEC prior to beginning the study. Screening was done as per inclusion and exclusion criteria. The data collection sheet and consent form was filled by patients. An orientation was given regarding the purpose, procedure and benefits of the study to the patients. The components of the scale were performed on the patients in clinical setup. Age from 25- 70 years of patients were included who are of diabetic neuropathy were. Ahmednagar Neuropathy Screening Instrument was administered to patients with Diabetic Neuropathy, and data was analyzed by ANOVA test.

Statistical Analysis: Data was analyzed by using a statistical ANOVA test. Mean and Percentile values were also calculated.

Result: The study was conducted on 50 patients, out of which 21 and 29 were males and females, respectively; the scale was performed on those patients who were willing to participate and have been suffering from diabetic neuropathy for the past 30 years of duration.

Table 1 : Shows Baseline characteristics of diabetic Neuropathy patients

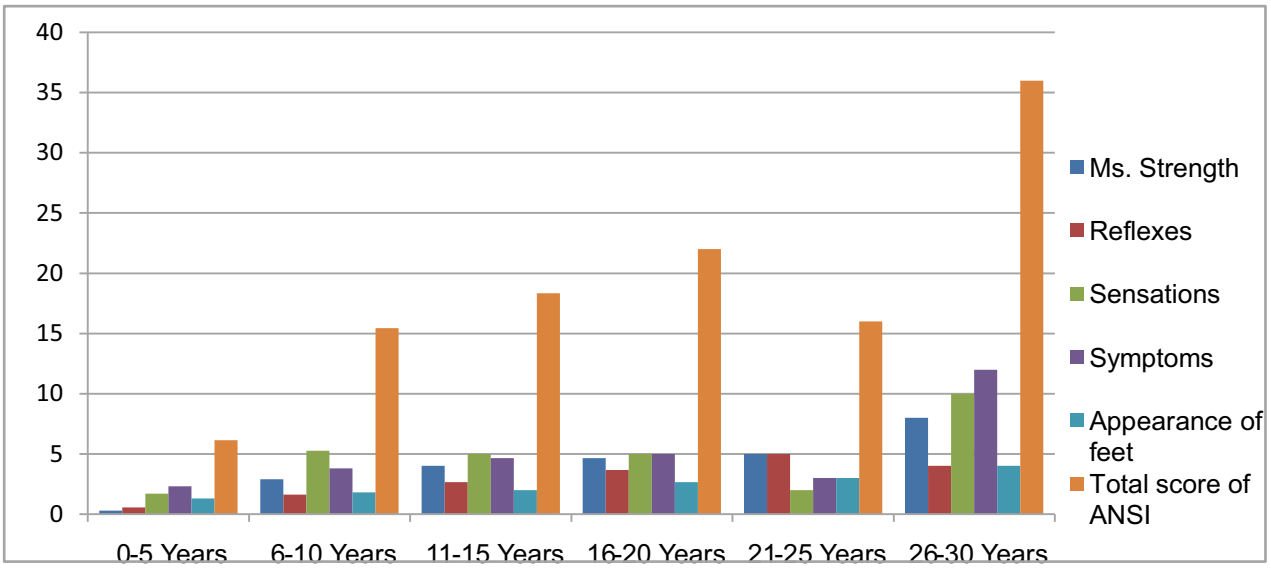
Sr. no	Details		No of patients	Average mean values
1.	Gender	Males	21 (42%)	
		Females	29(58%)	
2.	Duration (years)	0-5 years	20	3.55
		6-10 years	11	7.72
		11-15 years	06	14
		16-20 years	06	18.6
		21-25 years	04	23.75
		26-30 years	02	30



Graph 01 : Shows Durationwise mean values of diabetic neuropathy patients in each age group.

Table 02 : Shows symptomatic distribution of diabetic neuropathy patients according to duration

			ANSI Components				
Sr.No	**Duration**	**Mean values of Total score of symptoms on ANSI**	**Muscle Strength**	**Reflexes**	**Sensation**	**Symptoms**	**Apperance of feet**
1.	0-5 years	6.15	0.3	0.55	1.7	2.3	1.3
2.	6-10 years	15.45	2.90	1.63	5.27	3.81	1.81
3.	11-15 years	18.33	4	2.66	5	4.66	2
4.	16-20 years	22	4.66	3.66	5	5	2.66
5.	21-25 years	16	5	5	0	3	3
6.	26-30 years	36	8	4	10	12	4



Graph 02 - Shows representation of symptomatic distribution of diabetic neuropathy patients according to duration

Discussion:

This study aimed to find out the relationship between the duration and symptoms in diabetic neuropathy patients. To accomplish the aim, 50 patients who were diagnosed with diabetes mellitus and diabetic neuropathy according to HbA1C and MNSI were recruited on which ANSI was applied. It included the patients who have been suffering from diabetic neuropathy for the past 30 years and were classified into 6 groups according to the duration of diabetic neuropathy. Graphs were plotted by calculating their average mean values of duration. The total score of the Ahmednagar Neuropathy Screening Instrument is analyzed in relation to the duration of Diabetes, which shows that the average mean values of the total score of the Ahmednagar Neuropathy Screening Instrument go on increasing as the duration of Diabetes increased, i.e., severity of symptoms of diabetic neuropathy is directly proportional to the duration of Diabetes.

The mean value of each component of the Ahmednagar Neuropathy Screening Instrument is then analyzed in relation to the duration, and it shows that all components show higher scores on the ANSI as the duration of Diabetes increases. Patients who were diabetic for less than 5 years, having good muscle strength as graded on ANSI score sheet but then as the duration goes on increasing muscle strength deteriorates because patients with Diabetes mellitus are prone to muscle loss as duration increases. Diabetic Neuropathy is one of the most common complications of Diabetes Mellitus. It is called as nerve injury which is associated with the duration and HbA1C levels of Diabetes.[3] Diabetes is caused by the insufficient action of the insulin hormone, which promotes the proliferation of cells [6]. Insufficient action of insulin has been thought to result in suppression of growth and proliferation of muscle cells, which in turn contribute to the decline in skeletal muscle mass and strength too[6]. All other components of ANSI, such as reflexes, sensation , symptoms, and appearance of feet, show the same relationship with the duration of Diabetes, i.e., as duration increases, all these components show more scores on the ANSI score sheet, which indicates these components deteriorate in proportion to duration. Uncontrolled high blood sugar damages nerves and interferes with their ability to send signals. It also weakens the walls of small blood vessels that supply the nerves with oxygen and nutrients, due to which patients get diminished reflexes, abnormal sensations, and symptoms[6]. Dry feet or ulcers are also directly proportional to the duration, which means due to longer duration, the nerves and other soft tissues lose their ability to heal themselves. The total duration of diabetic neuropathy was 9 years since the diagnosis of Diabetes.

As per the investigation, patients who were suffering from Diabetic Neuropathy since last 1 -30 years were included in the study, ANSI was administered on these patients and it came to know that more the duration of diabetic neuropathy, more symptoms will be appeared. The duration of diabetic neuropathy varies from months to years.

Limitation:

As the ANSI is the scale which is performed on the patients in clinical setup and as it is physical assessment tool so due to Covid 19 we were unable to collect more samples and this was major limiting factor during the study.

Conclusion:

Diabetic neuropathy is a problematic complication of Diabetes. It consumes more time to show its physical symptoms in patient, i.e., the longer the duration of having diabetic neuropathy, the more symptoms appear in the patients. As per the conclusion, study reveals that there is association between duration and symptoms in patients with Diabetic Neuropathy.

Declaration by Authors

Ethical Approval: Approved

Acknowledgment: None

Conflict of Interest: There are no conflicts of interest to declare.

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