Research Article

iMedPub Journals
www.imedpub.com

Journal of Obesity & Eating Disorders
ISSN 2471-8203

2023
Vol.9 No.3:150

Knowledge about the Risk Factors of Peripheral Diabetic Neuropathy in Type 2 Diabetic Patients

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Received date: March 31, 2023, Manuscript No. IPJOED-23-16208; **Editor assigned date:** April 03, 2023, PreQC No. IPJOED-23-16208 (PQ); **Reviewed date:** April 18, 2023, QC No. IPJOED-23-16208; **Revised date:** May 30, 2023, Manuscript No. IPJOED-23-16208 (R); **Published date:** June 07, 2023, DOI:10.36648/2471-8203.9.3.152

Citation: Deshpande P, Poovishnudevi T (2023) Knowledge about the Risk Factors of Peripheral Diabetic Neuropathy in Type 2 Diabetic Patients. J Obes Eat Disord Vol:9 No:3

Abstract

Background: Diabetes is a disease which occurs when your blood glucose is too high. Normal blood sugar level should be less than 140 mg/Dl (7.8 mmol/L). A reading of more than 200 mg/dL (11.1 mmol/L) after 2 hours indicates diabetes. The risk factors for diabetes are ethnicity, age, obesity, physical inactivity, unhealthy diet, in addition to genetics and family history. Diabetic peripheral neuropathy is defined as the presence of symptoms and signs of peripheral nerve dysfunction in people with diabetes. The symptoms of peripheral diabetic neuropathy includes numbness, tingling sensation, sharp pain, muscle weakness, extreme sensitivity to touch and serious foot problems like ulcers, infections, bone and joint damage. So the aim of the study is to assess the knowledge about the risk factors of peripheral diabetic neuropathy in type 2 diabetic patients.

Methods: The study consisted of type 2 diabetes population and sample size was selected on the basis of inclusion and exclusion criteria. 152 participants were included in this survey with sample size 63. A specially designed questionnaire was made to collect the data.

Results: Out of total 152 participants, 122 (80%) people have good knowledge and 30 (20%) have poor knowledge of peripheral diabetic neuropathy with mean knowledge score of 7.2 ± 2.8.

Conclusion: Hence majority of participants had good knowledge and are aware about the risk factors of peripheral diabetic neuropathy and some participants had poor knowledge and are not aware of peripheral diabetic neuropathy.

Keywords: Diabetes; Diabetic peripheral neuropathy; Tingling sensation; Numbness; Ulcers

Introduction

Diabetes is a condition that occurs when your blood glucose, is too high. Normal blood sugar level should be less than 140 mg/dL (7.8 mmol/L). Interpretation of more than 200 mg/dL (11.1 mmol/L) after two hours indicates diabetes [1].

Type 2 diabetes is also called non-insulin dependent diabetes mellitus. In this fat, liver and muscle cells does not respond to insulin known as insulin resistance [2]. As a result blood sugar does not get transported into these cells to be stored for energy and builds up in the bloodstream known as hyperglycaemia.

In type 2 diabetes, the pancreatic beta cell, which releases insulin, becomes impaired and tissues develop insulin resistance [3]. The symptoms of type 2 diabetes are an increased thirst, passing more urine than normal, constantly feeling lethargic, sudden unexplained weight loss, slow healing cuts and wounds, blurred vision due to the lens of the eye becoming dry.

Peripheral diabetic neuropathy is defined as the presence of symptoms and signs of peripheral nerve dysfunction in people with diabetes [4]. The risk factors of peripheral diabetic neuropathy are poor blood sugar control, obesity, smoking and kidney disease.

The prevalence of peripheral diabetic neuropathy in Indian population ranges from 21.3% to 34.5% in type 2 diabetic patients.

The symptoms of peripheral diabetic neuropathy are numbness or reduced ability to feel pain or temperature, tingling or burning sensation, sharp pains or cramps, muscle weakness, extreme sensitivity to touch, serious foot problems such as ulcers, infections, bone and joint damage [5]. Type 2 diabetes leads to peripheral diabetic neuropathy when high blood sugar levels damage nerves not in your extremities but also in other body parts. This means one may not feel heat, cold, or pain in the feet, legs, or hands. The overall peripheral neuropathy prevalence among patients with diabetes is high (40.3%) and patients with type 2 diabetes (42.2%) are more often affected than those with type 1 diabetes (29.1%) diabetic peripheral neuropathy prevalence increases with age and diabetes duration and is already high (35.0%) following type 2 diabetes diagnosis [6]. It eventually affects nearly 50% of adults with diabetes during their lifetime and is substantial morbidity including pain, foot ulcers and lower limb amputation. The estimates in 2019 showed that 77 million individuals had

diabetes in India, which is expected to rise to over 134 million by 2045. Type 2 diabetes, which accounts for the majority of cases, can lead to multiorgan complications [7].

Complications of peripheral diabetic neuropathy are hypoglycaemia, loss of a toe, foot or leg, urinary incontinence, sharp drops in blood pressure, digestive problems, sexual dysfunction and increased or decreased sweating.

Knowledge about the risk factors of peripheral diabetic neuropathy in type 2 diabetic patients should be there to prevent further complications like foot ulceration and lower limb amputation that is removal of limb [8].

The benefits of having knowledge about the risk factors of peripheral diabetic neuropathy decreases the risk of having peripheral diabetic neuropathy in type 2 diabetic patients.

Materials and Methods

This is a study of assessing knowledge about the risk factors of peripheral diabetic neuropathy in type 2 diabetic patients. This study was conducted in krishna institute of medical sciences 'Deemed to be' university, Karad. 152 participants took part in the study mentioned above [9].

The study population included both males and females and were selected by the inclusion criteria, which included subjects between age group of 20-80 years and people suffering from diabetes and willing to participate in the study, voluntary provide their socio demographic information and were willing to answer questions about knowledge related to peripheral diabetic neuropathy were included.

Individuals below age of 20 years or above 80 years and those already suffering from mental health problems or any critical problem and those unable to provide appropriate information were excluded.

The knowledge was assessed by a questionnaire which included 2 parts and 15 contents (5 items on sociodemographic characteristics and 10 questions on knowledge).

Data was obtained from the responses that were received. Participants who responded correctly to 50% or more of knowledge questions were considered having adequate knowledge about peripheral diabetic neuropathy, whereas those who scored <50% were considered having poor knowledge towards peripheral diabetic neuropathy [10-14].

Each correct response was scored as "1" and for any incorrect response a score of "0" was given [15]. Knowledge score of individuals were calculated and summed up to give the total knowledge score.

Results

A total of 152 participants completed the questionnaire. Out of total 152 participants, 92 (60.5%) were male and 60 (39.4%) were female [16]. Majority of participants, were in age group 51-80 years and were 91 (59.8%), age group of 31-50 years were 46 (30.2%), age group of 21-30 were 11 (7.23%) and some participants were in age group of >80 years were 4 (2.63%) (Tables 1 and 2).

Table 1: Survey based on age.

Age	Frequency	Percentage
21-30	11	7.23%
31-50	46	30.20%
51-80	91	59.80%
>80	4	2.63%

Table 2: Survey based on gender.

Gender	Frequency	Percentage
Male	92	60.50%
Female	60	39.40%

Out of total 152 participants, 101 participants (66.4%) were aware that chronic diabetes can cause peripheral diabetic neuropathy and 51 participants (33.5%) were not aware. 112 participants (73.6%) were aware that sensory loss is an alarming symptom of peripheral diabetic neuropathy and 40 participants (26.3%) were not aware. 132 participants (86.4%) were aware that chronic diabetes can lead to complications in other body parts and 21 participants (13.8%) were not aware. 98 participants (64.4%) were aware that mortality % increases with peripheral diabetic neuropathy and 55 participants (36.1%) were not aware [17]. 79 participants (51.9%) were aware about the signs and symptoms of peripheral diabetic neuropathy and 74 participants (48.6%) were not aware. 99 participants (65.1%) had good knowledge that peripheral diabetic neuropathy is painful and disabling and 54 participants (35.5%) had poor knowledge [18]. 120 participants (78.9%) were aware that

	peripheral diabetic neuropathy?				
10)	Do you know that peripheral diabetic neuropathy can only be managed but not cured?	109	71.70%	47	30.90%

Table 4: Survey with different variables.

Sr. no.	Variables	Mean ± SD	P Value
1)	Age		
	21-30	14.09 ± 3.41	0.0197
	31-50	13.23 ± 2.89	0.0006
	50-80	12.27 ± 2.60	<0.0001
	>80	13 ± 4.76	<0.0001
2)	Residence		
	Urban	25.36 ± 3.80	>0.10
	Rural	13.79 ± 11.20	<0.0001
3)	Gender		
	Male	12.51 ± 2.64	<0.0001
	Female	12.82 ± 2.98	<0.0001
4)	Diabetes (Duration in years)		
	0-30	12.41 ± 2.71	<0.0001
	30-60	13.31 ± 3.94	0.0001

Discussion

The results of this study show an good level of knowledge among the study population. Out of total 152 participants, 122 (80%) had good level of knowledge about peripheral diabetic neuropathy. This finding is higher than study reported by Pradeepa, et al.; Rani, et al. The difference may be because the participants had better access to health education. However, this finding was higher compared to study reported by Candrilla, et al.; Herman, et al. This difference might be due to the difference in sample size and source population of the study (Table 5).

Table 5: Knowledge among the study population.

Sr. no.	Questions		Mean ± SD	P Value
1)	Are you aware that uncontrolled diabetes can cause peripheral diabetic neuropathy?	Yes	11.20 ± 1.39	<0.0001
		No	15.66 ± 2.68	0.0171

2)	Is sensory loss an alarming symptom of peripheral diabetic neuropathy?	Yes	11.61 ± 1.95	<0.0001
		No	15.75 ± 2.79	>0.10
3)	Do you know chronic diabetes can lead to complications in other body parts?	Yes	16.95 ± 2.76	>0.10
		No	12.06 ± 2.26	<0.0001
4)	Do you know mortality % increases with peripheral diabetic neuropathy?	Yes	4.61 ± 2.78	0.0379
		No	8.72 ± 1.42	<0.0001
5)	Do you know the signs and symptoms of peripheral diabetic neuropathy?	Yes	5.32 ± 2.77	0.0003
		No	9.05 ± 1.21	<0.0001
6)	Is peripheral diabetic neuropathy painful and disabling?	Yes	4.73 ± 2.89	0.0284
		No	8.61 ± 1.57	<0.0001
7)	Do you know continuing the habits like alcoholism and smoking can lead to peripheral diabetic neuropathy?	Yes	3.62 ± 2.83	0.0248
		No	8.23 ± 1.85	<0.0001
8)	Do you know that peripheral diabetic neuropathy if not treated can lead to complications like amputation that is removal of limb?	Yes	3.63 ± 2.72	>0.10
		No	8.26 ± 1.85	<0.0001
9)	Do you know regular exercise can delay the progression of peripheral diabetic neuropathy?	Yes	2.06 ± 2.29	0.0925
		No	7.87 ± 2.16	<0.0001
10)	Do you know that peripheral diabetic neuropathy can only be managed but not cured?	Yes	4.84 ± 2.98	0.0018
		No	8.25 ± 2.05	<0.0001

About more than half of the population 101 (66.4%) heard of peripheral diabetic neuropathy at least once before. This finding was higher than the study conducted by Gudala, et al.; Boulton, et al. This difference may be due to difference in access to

health education of the participants [19]. In this study, about 79 (52%) correctly answered the signs and symptoms of peripheral diabetic neuropathy; this finding was highest compared to the study conducted by Rani, et al., in which only 20% of the participants correctly answered the signs and symptoms of peripheral diabetic neuropathy. The possible reason for the may be due to differences in socio demographic and access to peripheral diabetic neuropathy learning opportunities.

In this current study about 101 (66.4%) participants were aware that uncontrolled diabetes can cause peripheral diabetic neuropathy, which was highest compared to by Pradeepa, et al., where 40% were aware that uncontrolled diabetes can cause peripheral diabetic neuropathy [20]. This may be due to differences in access to health education. However, in the study conducted by Rani, et al., only 40% participants correctly responded to the complications of peripheral diabetic neuropathy which if not treated can lead to amputation. While in this study, 119 (78%) participants correctly responded to the complications of peripheral diabetic neuropathy.

However, in this study about 136 (89%) participants correctly responded and had knowledge that regular exercise can delay the progression of peripheral diabetic neuropathy, while, in the study conducted by Candrilli, et al., 50% participants correctly responded.

This may be due to difference in educational status and health education knowledge about peripheral diabetic neuropathy. However, the knowledge score of this study was almost equal to the study conducted by Ghosal, et al., which was 88% [21].

Out of a total of participants, 79% participants had knowledge and correctly responded that bad habits like alcohol and smoking can lead to peripheral diabetic neuropathy, which was higher than the study conducted by Pradeepa, et al., where only 50% had good knowledge. However, 109 (72%) of the participants in this study had knowledge that peripheral diabetic neuropathy can only be managed but not cured, which was higher than the study conducted by Happich, et al., where only 40% participants had knowledge. This difference might be due to the difference in sample size and source population of the study.

Conclusion

Hence majority of participants 122 (80%) had good knowledge and are aware about the risk factors of peripheral diabetic neuropathy and some participants 30 (20%) had poor knowledge and are not aware of peripheral diabetic neuropathy.

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