

# Awareness about peripheral diabetic neuropathy among physical therapists in twin cities

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## Author's Contribution

<sup>1</sup> Substantial contributions, conception of design, acquisition, analysis and interpretation of data

<sup>2</sup> Drafting, revising critically and intellectual content

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## A B S T R A C T

**Objective:** The main purpose of this study was to create awareness of holistic Screening approach about Peripheral Diabetic Neuropathy among Physical Therapists in Twin Cities. A descriptive cross-sectional study conducted at hospitals of Rawalpindi and Islamabad for of 6 months.

**Methodology:** A descriptive cross-sectional survey was carried out and non-probability purposive sampling technique was used to collect data from 110 Physical Therapists (58.1% females and 41.8% Males. A specified semi structured questionnaire was used to collect data from Physical Therapists.

**Results:** This study was carried out on 110 Physical Therapists. Results of our study showed that 94 (85.5%) Physical Therapists screened patients with different modalities such as 7 (6.4%) used touch perception, 6 (5.5%) used pain perception, 2 (1.8%) used vibration perception and only 1 (.9%) used ankle deep tendon reflex. 97 (88.2%) Physical Therapists assessed pain by different methods such as Pin prick method was used by 67 (60.9%) therapist, VAS was used by 15 (13.6%) therapists, 87 (79.1%) Physical Therapists assessed touch sensation. 21 (19.1%), used cotton ball, 5 (4.5%) used manual touch while 41 (37.3%) were having no specific response.

**Conclusion:** It is concluded that Physical Therapists of twin cities are aware of basic screening steps for Peripheral Diabetic Neuropathy and they utilize appropriate tool/modalities for assessing sensations and motor reflexes. This highlight the up to date evidence-based knowledge of PT working in twin cities.

**Keywords:** Peripheral diabetic neuropathy, physical therapists, musculoskeletal, neuromuscular, visual analogue scale

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## Introduction

Globally, Diabetes is the major healthcare problem in the 21st century. Worldwide people affected by diabetes is predicted to become twice between 2000 to 2030 and expected to reach up to 366 million.<sup>1</sup> Diffuse damage to peripheral nerve fibers occurs due to Peripheral Neuropathy. Quality of life is commonly affected by Peripheral Diabetic Neuropathy and studies suggest that it affect one out of every five patients. In spite of high number, it remains underdiagnosed and undertreated. Furthermore, 31 - 92% of the patients with diabetes suffer from Peripheral Diabetic Neuropathy. Researches stated

that 16 - 34% of patients with diabetes have neuropathic symptoms in peripheries. Regarding the type of diabetes, the type 2 diabetes is more prevalent among females.<sup>2</sup> Symptoms and severity of diabetes vary from patients to patients but commonly involved symptoms are abnormal hot and cold sensation in distal to proximal with stock and glove pattern, altered sensations like numbness, paresthesia and tingling. These symptoms have debilitating effects that can alter the quality of life and sleep pattern.<sup>3</sup> Diabetic foot ulcer is a major risk factor in a diabetic patient and the most common complications are

diabetic neuropathy and peripheral vascular disorder. In Western countries, diabetes is the most common cause of neuropathy in 50 % of type 1 and type 2 diabetic patients. 15% of patients with a smoking history, genetically poor glycemic control has diabetic foot ulcers and also suffer from diabetic retinopathy.<sup>4,5</sup>

Neuropathic Pain Scale helps in the diagnosis and is also used to identify the severity of Diabetes. Different instruments like MNSI “The Michigan Neuropathy Screening Instrument” and screening tools like “Neuropathy Disability Score” are widely used for Peripheral Diabetic Neuropathy. Management to control any type of diabetes and its symptoms usually involves risk factors control, pain management and good glycemic control. Peripheral Diabetic Neuropathy is a foremost challenge in health sector to deal with and that’s why 39% of cases are untreated. Symptomatic treatment basically focuses to modify the severity of pain and to improve the standard of living by improving physical activity. Nerve fibers involvement are also associated with Peripheral Diabetic Neuropathy.<sup>3</sup>

The management of foot ulceration is associated with the risk factors, educating patients and regular follow up. Various instruments such as 10 grams of monofilament, vibration via 128 Hz of tuning fork are used to assess foot ulcers/deformities. Previous medical/surgical history, pin prick method, vascular assessment methods like pulse palpation, ankle reflexes and Ankle Brachial Index (ABI) are also helpful in finding foot involvement in diabetes.<sup>4</sup> Modification in diet and exercise are used as preventive measures to control progression and severity of diabetes. Worldwide studies suggest that swimming had beneficial effects on Peripheral Diabetic Neuropathy and help to improve activity of daily livings (ADLs). Weight loss is a key factor to control progression of symptoms of diabetes such as thermal hyperalgesias and tactile allodynia.<sup>6,7</sup> In 2013, study conducted on risk factors associated with diabetic foot ulcers by Hajieh Shahbazian concluded that advancing age, prolonged duration of diabetes, lack of training/physical activity, increase level of HbA1c are common risk factors in Peripheral Diabetic Neuropathy.<sup>4</sup>

In 2014, a study conducted In India, at a tertiary care hospital on prevalence and associated risk factors of type 2 Diabetes described that type 2 Diabetes is more common in North India such as (29.2%). This study also

suggested that timely screening along with preventive measures would be helpful for early intervention.<sup>8</sup> Another study conducted in Malaysia showed high prevalence of diabetic end stage complications, it also evaluate awareness of diabetes peripheral neuropathy among certain specialists such as physical therapist.<sup>9</sup> A cross sectional survey conducted by Carlos Tomas Ibarra et.al; on type 2 diabetes to identify the ratio of peripheral symptoms among type 2 diabetes and identified that approximately 70% of patients have symptoms of Peripheral Diabetic Neuropathy and these symptoms have a direct relationship with disease’s duration.<sup>10</sup> Therefore, in our study, we have made an attempt to assess the awareness of Peripheral Diabetic Neuropathy among Physical Therapists in twin cities.

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## Methodology

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A descriptive cross-sectional survey is carried out and non-probability purposive sampling technique is used to collect data from 110 Physical Therapists (PTs). Sample selection was done on the basis of their availability and accessibility. Sample size was calculated through the standard software “Rao soft”. A specified semi-structured questionnaire was designed based on 5 demographic questions and 12 questions of rapid assessment of PTs to collect data from PTs. Pilot study was conducted to assess the validity of Questionnaire. Questionnaires distributed among the PTs of Twin cities hospitals. The study conducted in accordance with the research ethics. The confidentiality of the participant’s data was maintained throughout the research.

Questionnaire tells about the awareness of basic screening steps for peripheral diabetic neuropathy and how PTs utilize appropriate tool/modalities for assessing sensations and motor reflexes. This highlight real time evidence-based knowledge of PTs working in twin cities. Visual analogue scale (VAS) was used to measure the intensity of pain. Pain was the most common sensation being screened for Peripheral Diabetic Neuropathy and pinprick found to be most commonly applied method for assessing pain. Likewise, pain (by pin prick, VAS), touch (by brush), temperature and vibration (by tuning fork), proprioception (by specific movements) and ankle reflexes (by hammer) were also screened for Peripheral Diabetic Neuropathy.

Data analysis was done through Statistical package for social sciences (SPSS) version 20.0 to obtain values of frequencies, mean, and standard deviation of descriptive analysis conducted. The questions regarding awareness of Peripheral Diabetic Neuropathy and screening of pain, touch, temperature, vibration, proprioception and ankle reflexes for Peripheral Diabetic Neuropathy were also included in the questionnaire.

## Results

This study was carried out among 110 PTs. out of 110 PTs, 64 (58.2%) were females, whereas 46 (41.8%) were males. Out of 110, 32 (29.1%) were working in Govt. setup, 31 (28.2%) were in semi Govt. setup and 47 (42.7%) were having their own private clinical setups. This survey showed the clinical experience of the PTs. Out of 110 PTs, 15 (13.6%) were having experience of 1 to 6 months, 30 (27.3%) were working from 7 to 12 months, 3 (2.7%) had experience from 13 to 18 months, 23 (20.9%) were having experience from 19 to 23 months and 39 (35.5%) had worked for more than 2 years.

53 (48.2%) PTs out of 110 assess 5 Diabetic patients per day. 45 (40.9%) PTs assess 5 to 10 diabetic patients per day and 12 (10.9%) PTs assess more than 10 patients per day. 104 (94.5%) out of 110 PTs said 'Yes' and 6 (5.5%) PTs said 'No' regarding the patient referral. 19 (17.3%) patients were with musculoskeletal complications, 55 (50.0%) patients were with neurological complications and 36 (32.7%) patients were with other complications (Table 1).

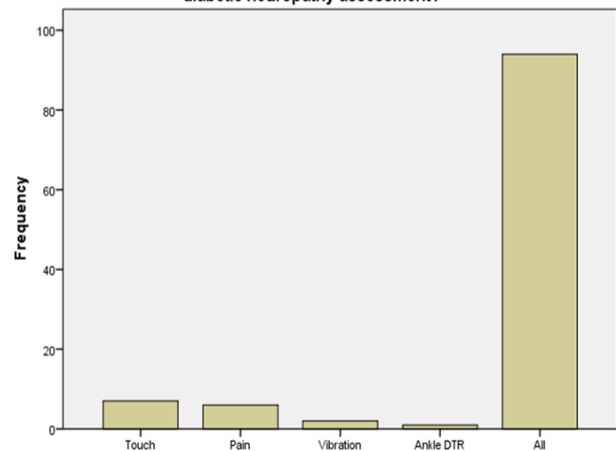
**Table 1: Diabetic's patient complications, assessment and referral to physical therapists**

Variables		Frequency	Percentage
Patient assessed per day	5	53	48.2
	5-10	45	40.9
	> 10	12	10.9
Diabetic patient referral to Physical therapists	Yes	104	94.5
	No	6	5.5
Complications of patients with diabetic neuropathies	Musculoskeletal problem	19	17.3

	Neurological problem	55	50.0
	Others	36	32.7
<b>Total</b>		100	100

About 94 (85.5%) out of 110 PTs screen patients with all sensory motor modalities, whereas 7 (6.4%) use touch perception, 6 (5.5%) use pain perception, 2 (1.8%) of them use vibration perception and 1 (.9%) uses ankle deep tendon reflex (Figure 1).

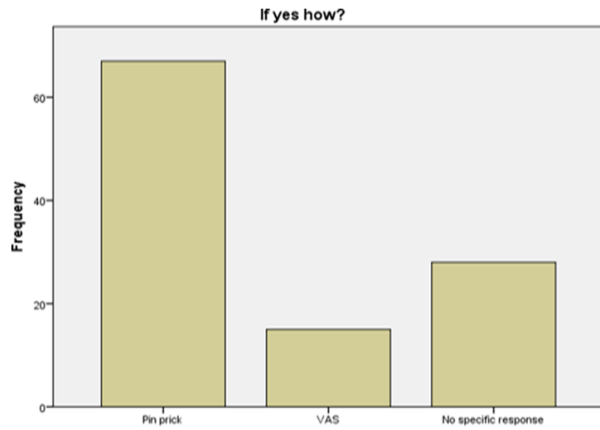
Which sensory motor modality should be preferred for screening peripheral diabetic neuropathy assessment?



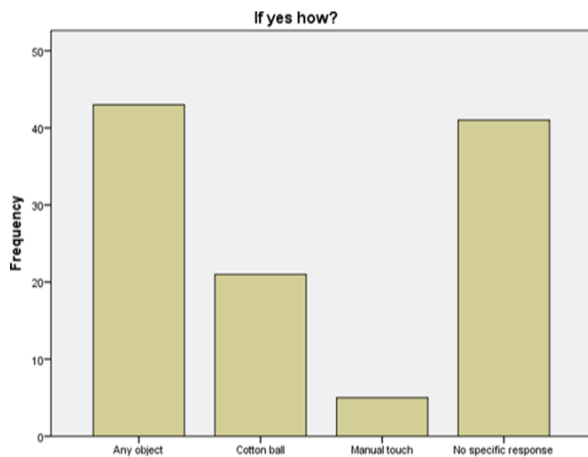
**Figure 1: Screening of Diabetic Neuropathy**

Pin prick method used by 67 (60.9%) out of 110 PTs to assess pain perception, VAS is used by 15 (13.6%) of them and remaining 28 (25.5%) have given no specific response (Figure 2). 43 (39.1%) out of 110 use any object to assess touch perception, cotton ball is used by 21 (19.1%), 5 (4.5%) use manual touch whereas 41 (37.3%) were having no specific response (Figure 3).

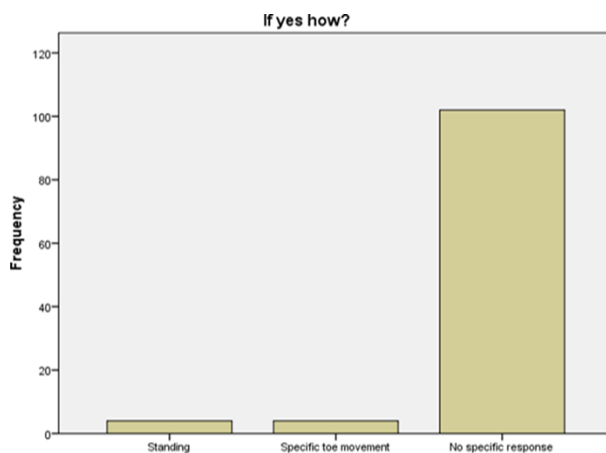
Most of the PTs, 102 (92.7%) out of 110 don't have any specific response. 4 (3.6%) assess by ankle proprioception through standing and specific toe movement respectively (Figure 4).



**Figure 2: Assessment of pain perception of Diabetic Neuropathy**

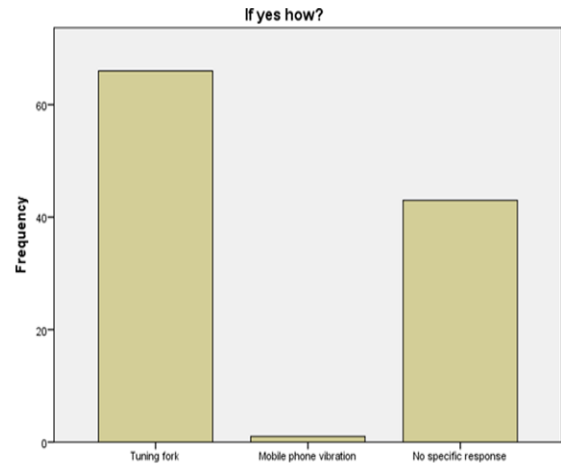


**Figure 3: Sensory assessment of Diabetic Neuropathy**



**Figure 4: Proprioceptive gait assessment**

Vibration sensation is assessed by 71 (64.5) PTs, whereas 39 (35.5%) PTs they don't use it (Figure 5).



**Figure 5: Assessment of Vibration sensation of Diabetic Neuropathy**

## Discussion

The recent study concluded that 52 (47.3) PTs screened diabetic patients daily. About 94 (85.5%) screened patients with all sensory motor modalities, whereas 7 (6.4%) used touch perception, 6 (5.5%) used pain perception, 2 (1.8%) of them used vibration perception and only 1 (0.9%) used ankle deep tendon reflex. 97 (88.2%) PTs assessed pain. Pin prick method was used by 67 (60.9%) Therapist to assess pain perception, VAS was used by 15 (13.6%) PT, 87 (79.1%) PTs assessed touch sensation. 43 (39.1%) used any object to assess touch perception, cotton ball was used by 21 (19.1%), 5 (4.5%) used manual touch whereas 41 (37.3%) were having no specific response.

In Canada, a study conducted by Bruce A. Perkins et al; on examination of peripheral neuropathy suggests that pain can be screened by vibration and superficial sensation.<sup>11</sup> Regarding the sensation of pain and diagnosis electrophysiological tests can be used, but superficial diagnosis also played its role. Their results also support the recent study such that pain is most common screening tool and physiotherapist assessed it by vibration and pin prick method.<sup>11</sup> Another research conducted in UK by Tom Cash, et al concluded that in busy diabetic clinics noninvasive methods to assess pain played vital role.<sup>12</sup> Their findings support the recent study

as in twin cities PTs also used noninvasive methods like vibration, pin prick to assess pain. These methods are helpful in early screening of symptoms and formulation of treatment plan.<sup>12</sup> In USA, Jennifer J. Brown et al; concluded that superficial screening methods are used worldwide for the early screening and management of diabetic neuropathy. Vibration by tuning fork is useful but certain other tools are required to differentiate pain. Same findings are obtained in present research.<sup>13</sup>

In Brazil, a study conducted to assess the role of PTs in diabetic clinics. Findings showed that early recovery of patient can be achieved by early screening and involvement of physical therapy interventions. Proprioceptive sensations are easily investigated by thermal and tactile methods. These methods are cheap, avoid further neuronal damage and well understood by patients and therapist itself. Our results also showed the same finding.<sup>14</sup> Researches enlightened that symptoms of peripheral diabetic neuropathy can be facilitated by physical therapy interventions. Early mobilization and sensory alterations can be achieved successfully through physical therapy management. In Pakistan, there is a lack of certain studies so it is a need of hour to conduct further studies to evaluate the effects of physical therapy on peripheral diabetic neuropathies.<sup>15</sup> We highly recommend further studies on Peripheral Diabetic Neuropathy.

## Conclusion

It is concluded that PTs of twin cities are aware of basic screening steps for Peripheral Diabetic Neuropathy and utilize appropriate tools/modalities for assessing sensations and motor reflexes. This highlight the up to date evidence-based knowledge of PTs working in twin cities. Pain is the most common sensation being screened for PDN and pinprick found to be most commonly applied method for assessing pain. Likewise touch, temperature, vibration, proprioception and ankle reflexes are also screened for PDN.

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