

Perception of foot problems among diabetic patients: A cross sectional study

Arijit Chanda, Vageesh Ayyar, J. M. Idiculla, Ganapathi Bantwal

St. Johns Medical College Hospital, Bangalore, India

OBJECTIVE: To assess the prevalence of peripheral neuropathy among diabetic patients attending outpatient clinic, assess the level of awareness about peripheral neuropathy, and the adequacy of physicians foot examination of diabetic patients.

METHODOLOGY: This is a cross-sectional study carried out in the diabetic outpatient clinic of a tertiary level referral center. The population consisted of 67 type 2 diabetic patients, who were selected randomly. Demographic data were obtained from each patient, questionnaire was administered about symptoms of peripheral neuropathy, awareness, and prevention of its complications. In addition, the physician's frequency and adequacy of performing foot examination was assessed. An intensive physical examination looking for peripheral neuropathy was carried out. Modified sensory symptom scoring and neuropathic disability scoring were used to quantify peripheral neuropathy.

RESULTS: The prevalence of peripheral neuropathy was found to be 64.1% in the study group, of which only 35.8% had adequate knowledge about peripheral neuropathy and its prevention. 53.7% of the patients feet were never examined by a physician; 76% of patients were using open type of footwear and only 6% examined the footwear before wearing.

CONCLUSION: These findings indicate an increasing prevalence of diabetic peripheral neuropathy. However, patients did not have adequate awareness of diabetic foot problems and were unaware of complications. Physicians were not examining the feet of their patients and hence were failing to detect foot-related problems.

KEY WORDS: Type 2 diabetes, peripheral neuropathy, patient awareness, physicians adequacy.

Introduction

The diabetic population in India is constantly on the rise.^[1] Peripheral neuropathy is one of the major causes of morbidity and decrease in the physical quality of life among the diabetic population. Amputation of the lower limb is a devastating consequence of diabetic neuropathy, being associated with greater than 65% of nontraumatic amputations of the lower limb. Studies from South India have found that diabetic patients without foot problem spent 9.3% of their total income toward treatment, whereas patients with foot problems had to spend upto 32.3% of their total income on treatment.^[2] Recent data show that 50-60% of type 2 diabetic patients develop peripheral neuropathy. As physicians, our target is to prevent diabetes whenever possible and to minimize complications wherever it is not possible. To achieve this, we felt the need to analyze patient awareness of peripheral neuropathy and its complications and physicians' vigilance to examine patients' feet.

The purpose of the study was to determine the prevalence of peripheral neuropathy among diabetic patients attending an outpatient clinic, the level of patient awareness about peripheral neuropathy and prevention of its complications, adequacy of physicians' foot examination of diabetic patients, and the type of footwear being used by patients. The uniqueness of the study was that we tried to look at the adequacy of physicians' foot examination of diabetic patients, which, to our knowledge, has not been explored earlier.

Methodology

This is a cross-sectional type of study. The study was

carried out in a busy outpatient clinic of a tertiary-level referral center. The study population consisted of 67 type 2 diabetic patients, who were randomly selected to eliminate any bias that might occur. Only type 2 diabetics with minimum 2 years duration of disease were included in the study. Patients with the following seven comorbid conditions did not qualify for the study: HIV infection, renal failure, alcoholism, thyroid dysfunction, liver disease, chronic obstructive pulmonary disease, and patients undergoing long-term corticosteroid therapy. Each of the above conditions could be responsible in causing neuropathy, and could become a confounding factor in the study.

After having randomly selected a patient, they were administered a questionnaire by researchers in a language that the patient could understand. Questions on symptoms were derived from sensory symptom scoring [Table 1].^[3] Patients were asked about burning pain, pricking, or tingling sensation, numbness, deep-aching squeezing pain, shooting, stabbing pain, and about unusual sensitivity in touching feet. The questionnaire also had question on assessing the awareness about peripheral neuropathy and knowledge about prevention of its complications. The patients were also asked about how adequately and how frequently did the attending physician perform foot examination on them.

Following this, an intensive physical examination was carried out, looking for signs of peripheral neuropathy. For quantifying peripheral neuropathy we used neuropathic disability scoring (NDS) [Table 2].^[4] This is a composite scoring system derived from assessment of pain, temperature, vibration sense, and Achilles tendon reflex. A score of 3-5 indicates mild neuropathy, score of 6-8 moderate neuropathy, and a score of 9-10 severe neuropathy-the total score being 10 [Table 3]. Vibration

Table 1: Sensory symptom score

1. Do you experience a deep, aching, tightness, boring, pulling, or squeezing pain in your feet or legs?
2. Do you experience burning pain in your feet or legs?
3. Do you experience a "prickling" or "tingling" feeling with or without an "asleep" feeling in your feet or legs?
4. Do you experience "asleep" numbness, lost sensation, "dead feeling" an anesthetic without prickling in your feet or legs?
5. Do you experience sharp, stabbing, or shooting pain, electrical-shock-like pain, or surges of pain, which lasts seconds to minutes in your feet or legs?
6. Do you experience unusual sensitivity or tenderness when your feet are touched or are used in activities such as walking?

Derived from NTSS-6

Table 2: Neuropathic disability scoring

		Right	Left
VPT 128 Hz tuning fork, apex of big toe; normal = can distinguish vibrating/not vibrating			
Temperature perception on dorsum of the foot Use tuning fork with beaker of ice/warm water	Normal = 0; abnormal = 1		
Pin prick Apply pin proximal to big toenail just enough to deform the skin; trial pair = sharp, blunt; normal= can distinguish sharp/not sharp			
Achilles reflex	Present = 0 Present with reinforcement = 1 Absent = 2 NDS total out of 10		

NDS - Neuropathic disability scoring

Table 3: Neuropathic disability scoring-grading^[6]

0-2	No neuropathy
3-5	Mild neuropathy
6-8	Moderate neuropathy
9-10	Severe neuropathy

sense was analyzed using 128 Hz tuning fork, temperature using cold and warm water in test tubes, and reflexes on the Achilles tendon using a tendon hammer. Symptoms were analyzed using sensory symptom scoring, as shown in Table 1. In addition to this, demographic data were obtained and ankle brachial pressure index (ABPI) of all patients were measured.

Results

The details of demographic data are shown in Table 4. The prevalence of peripheral neuropathy was found to be 64.1%; 64.2% of patients lacked adequate knowledge about peripheral neuropathy and prevention of its complications; 53.7% patients' feet were never examined by a physician and 76% of the patients were using an open type of footwear.

A total of 67 type 2 diabetic patients comprised the study population, the mean age being 54.56 years and mean duration of diabetes being 8.4 years. HbA_{1c} was distributed around the mean of 8.3, and ABPI around 1.02, with the range being 0.7-1.34 [Table 4]. In the early stages of peripheral neuropathy, only symptoms are

Table 4: Patients' characteristics

Total number of patients: 67
Mean age group of patients: 54.56 age (range: 42-73 years)
Mean duration of diabetes: 8.4 years (range: 2-21 years)
Sex ratio: 1.2: 1 (36 males: 31 females)
Type of diabetes: type 2
Mean HbA _{1c} : 8.3, (range: 5.5-11.2)
Retinopathy: 19.4% among the study group
Nephropathy: 7.4% among the study group
Mean ABPI: 1.02 (range: 0.7-1.34)
ABPI - Ankle brachial pressure index

Table 5: Grading of peripheral neuropathy

SSS	Prevalence (%)	Grade
0	41.8	Asymptomatic
1-2	47.8	Intermediate
3-6	10.4	Advanced
NDS (modified)		
3 or greater	41.7	

SSS - Sensory symptom score, NDS - Neuropathic disability scoring

present and signs appear in a later stage. So, if prevalence was to be arrived at, it would have been unjustified using only NDS, as the early cases of neuropathy would be missed. Hence, we considered either significant symptoms, significant signs, or both for diagnosis of peripheral neuropathy. Using both, the prevalence was found to be 64.1% of diabetic peripheral neuropathy among the study population; 58.2% of the patients had symptoms of peripheral neuropathy, 41.7% had signs, and there was an overlap of 35.8% (patients both with signs and symptoms, Figure 1). The prevalence according to the grading is shown in Table 5. There was no significant difference in the prevalence rate between men and women. To educate the patients regarding the risk factors and appropriate management, it was necessary to assess the current knowledge first; 35.8% (i.e., about

one-third of the patients) had adequate knowledge about diabetic peripheral neuropathy and prevention of its complications. The remaining 64.2% lacked this knowledge. An interesting finding of this study was that 53.7% (i.e., about half) of our diabetic patients' feet were never examined by a physician, 16.4% of patients were asked whether they had any problem with their feet, and only 17.95% patients' feet were being regularly examined [Figure 2].

The guideline that "all individuals with diabetes should receive an annual foot examination to identify high-risk conditions"^[5] was not being followed adequately. Duration of diabetes in the study ranged from 2 to 21 years; therefore, all the patients should have received at least two feet examinations, which was not the case in this group of patients. Footwear plays a very important role in this disease characterized by loss of protective sensation. The study revealed that 76% of the patients were using an open type of footwear, making them more vulnerable to injuries, which can lead to non-healing ulcers. To add to this problem, 94% of the patients never examined their footwear before wearing, for any injurious artifact or for the integrity of the footwear.

Discussion

Our study had a few limitations that must be addressed. First, the sample size of the study is quite small, hence the study cannot be generalized to a larger population without a proper population-based study. Second, in the study no sophisticated instruments were used, the findings of peripheral neuropathy may vary marginally if proper calibrated instruments with high specificity and sensitivity are used. Third, the study was carried out in

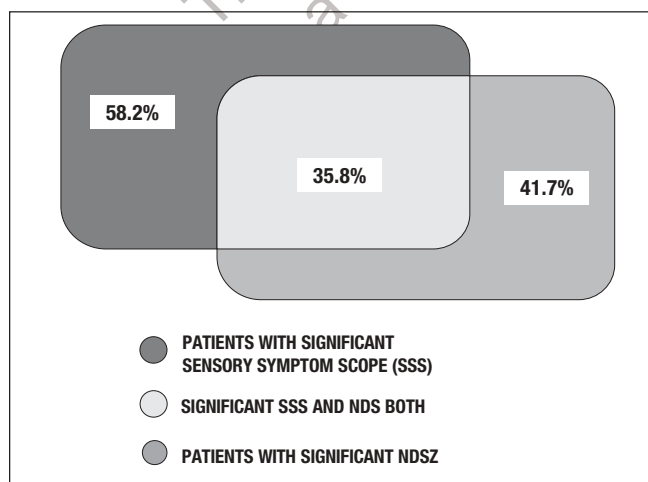


Figure 1: Distribution of peripheral neuropathy symptoms (SSS) and signs (NDS)

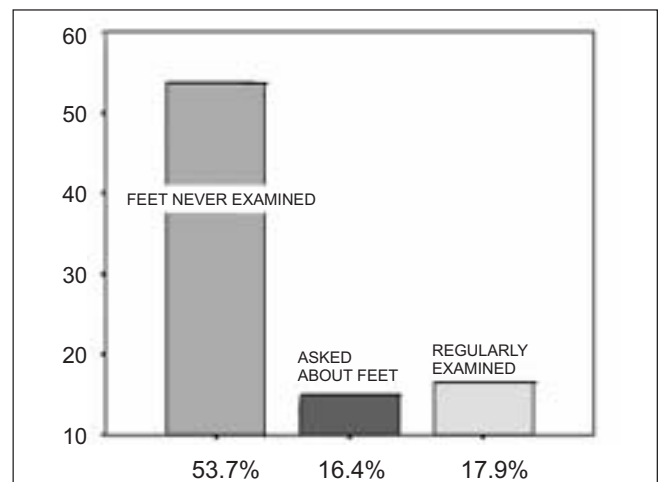


Figure 2: Foot examination by physician

a busy outpatient clinic of a tertiary-care institute with a huge patient load; findings may not reflect that of a small setup with a low patient load. From the study it can be concluded that the prevalence of diabetic peripheral neuropathy is on the rise. Patients were not adequately aware of diabetic foot problems and their complications. Physicians did not adequately examine the feet of their patients and failed to detect foot-related problems. We cannot entirely blame this on the physicians, as the physicians are overloaded with the ever-increasing diabetic population, and do not have enough time to carry out a proper foot examination and counseling.

Our suggestion would be to train a nurse or a paramedical staff to carry out foot examination and counseling in patient-overloaded situations. Primary-care physicians should also be trained to examine and carry out a proper foot examination, as the patients are routinely seen at these centers.

Counseling should be done in follow-ups, encouraging patients to perform a self-examination of the feet, and to report to the physicians any changes or appearance of any new symptoms. Family members should be requested to support the patient in feet examination and care as appropriate.

Poster display in the waiting area of the outpatient clinic would go a long way in educating the patients. Poster should be both in English and local language, more on the animated side, detailing how to check one's feet regularly. What all to look at are as follows: the initial symptoms of peripheral neuropathy, the type of footwear

to be used, and the importance of closed footwear. Also, the posters should have pictures of patients with foot ulcers, and amputation to stress upon them the agony of developing such complications.

Conclusion

There is a need for the physicians to play the greater role in educating and preventing peripheral neuropathy and its complications. The inadequacy in patients' feet examination has to be made up for to detect complications earlier and to prevent the devastating consequences. This, in turn, would reduce the pain and amputation that await the fate of thousands of diabetic patients. "Let's put feet first" and prevent amputation.

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