

# 128 Hz Tuning Fork: A Screening Tool for Diabetic Neuropathy

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**Abstract:- Nerve damage is the most serious complications of diabetes is which results in neuropathy. One of the testing method for neuropathy in patients with a 128 Hz tuning fork. The peripheral neuropathy test identifies neuropathy at earlier stage itself than the monofilament testing. It can be an accurate gauge of somebody's neuropathy and encourage the people to have a considerable blood sugar control to prevent from future problems.**

## I. INTRODUCTION

Diabetic neuropathy is a very common disorder and is defined as clinical symptoms involving peripheral nerve dysfunction in diabetes mellitus patient in whom the other causes of nerve dysfunction in peripheral region have been excluded. There is a higher prevalence 4.3% of diabetes in India compared with the Western countries about 1%–2%. Probably Asian Indians are more prone for cardiovascular mortality and insulin resistance. The incidence of DN in India is not well known, but a study in South India showed 19.1% type II diabetic patients had observed from peripheral neuropathy. Peripheral neuropathy in diabetes patients is a serious complication which accounts for hospitalization more frequently than other complications of and also is the most frequent cause of non-traumatic amputation too. Silent myocardial infarction due to diabetic autonomic neuropathy and shortens the lifespan of patients and resulting in death in 25%–50% patients within 5–10 years of the disorder caused.

## II. DIAGNOSTIC TOOL FOR DN

The tests for screening need to be a reliable, rapid, simple and advocating for anything other than a very simple test paradigms which will be leading to a lack of screening. Several simple sensory tests can be carried out for detecting diabetic neuropathy, for example, the 10 g monofilament test is used to predict the incident diabetic neuropathy. The value of monofilament is that higher insensitivities predict for a high risk of foot ulcers; thus, the practitioner needs to use only a single tool for

screening for diabetic neuropathy and for assessing the risk of foot ulcer. Vibration testing with a 128 Hz tuning fork (timed or number of times felt) has similar discriminating abilities to the monofilament test and is also quick and easy to perform. Assessment of deep tendon reflexes has good test characteristics, although not quite as high as monofilament or vibration testing. Other screening methods, such as the Michigan Neuropathy Screening Instrument, which uses a questionnaire and simple examination procedure have also been validated and are very useful for screening and assessing the severity of neuropathy.

## III. MANAGEMENT

The current approaches to management of diabetic neuropathy condition focusses on improving the glycemic control (particularly in patients with Type 1 DM), the lifestyle modifications which occur mainly in patients with Type 2 Diabetes mellitus and for the management of neuropathic pain. The optimal therapeutic approach for patients with T2DM includes lifestyle interventions, especially exercise and diet coupled with optimal lipid and blood pressure control. Glycemic control with a HbA1c fixed a goal of <6 increases mortality in patients with Type 2 Diabetes mellitus and has least considerable effect on diabetic neuropathy, therefore it's not recommended as standard of care. Rather, good glycemic control as part of a more holistic, personalized approach to the treatment of T2DM is the optimal choice. Many therapeutic interventions have failed; however, several promising therapies are in ongoing clinical trials.

## IV. METHODOLOGY

A Prospective study was conducted on 100 patients for the duration of six months. Patient who had a past experience of type 2 Diabetes Mellitus above ten years were included and patient under the aged of 18 and Patients who have previous effect of diabetic foot ulcers were excluded in the study.

**V. RESULTS**

The study was conducted on 100 patients. Among them, out of which 65 percentage patients were male and 35% patients were female. The age ranged between 30 and 85. (Chart 1)

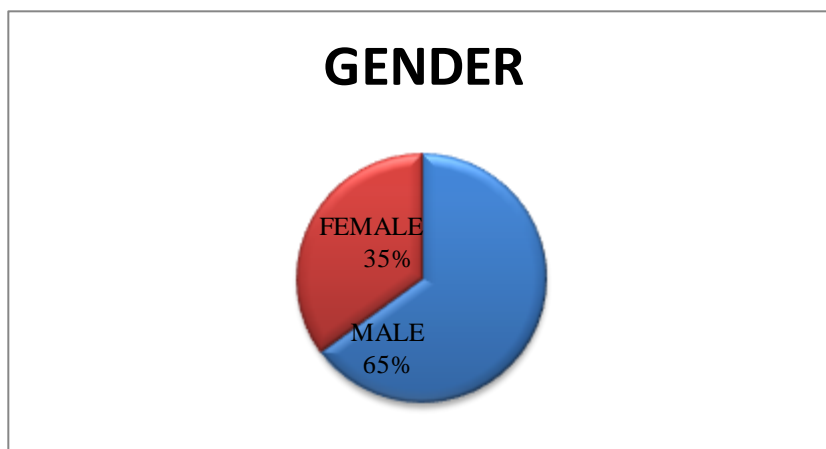


Chart 1: GENDERWISE DISTRIBUTION OF PATIENTS INVOLVED IN THE STUDY

About 67% patients gave history of numbness and pricking pain in feet and the rest of the patients 33% showed no abnormal sensation in their feet. (Chart 2)

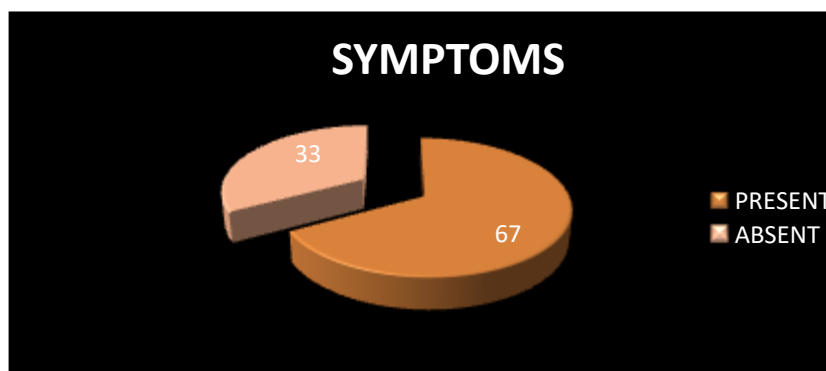


Chart 2: PATIENTS WITH/WITHOUT SYMPTOMS IN PERCENTAGE

The bar diagram shows the duration of diabetes is above 10 years, in that about 57% patients were between 10-15 years and 43% patients were more than 15 years of diabetes. (Chart 3)

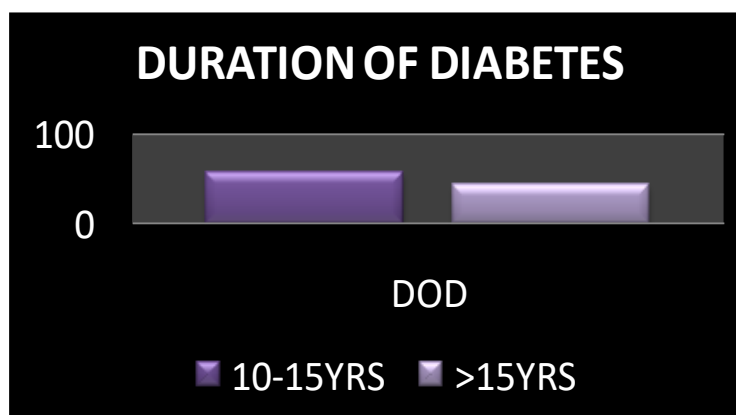


Chart 3: DURATION OF DIABETES

Neuropathy was defined and categorized on the basis of grades. In tuning fork 78% patients results showed positive and 22% patients showed negative results (Chart 4)

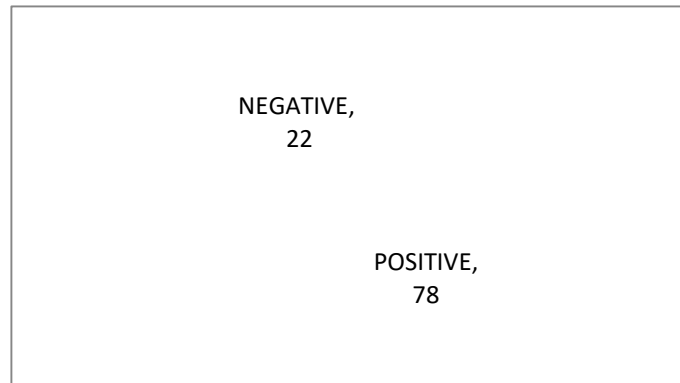


Chart 4: RESULTS OF DIAGNOSIS OF NEUROPATHY IN DIABETES PATIENTS USING TUNING FORK IN %

The Pie chart shows minimum values for both feet in biothesiometer were 15 and maximum was 50 volts. In Biothesiometer, 69% patients could appreciate the stimulus of 5-15 volts and were classified as normal group. The

group of patients whose threshold value was >20 volts were abnormal patients. This group includes 31% patients (Chart 5).

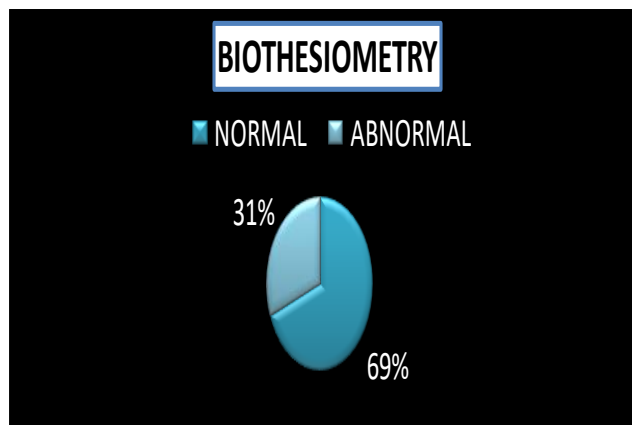


Chart 5: BIOTHESIOMETER VALUES

The bar diagram shows positive predictive value and negative predictive value of neuropathy using Biothesiometry was 85.7 and 82.6 respectively. The

specificity and sensitivity of neuropathy detection for the Tuning Fork is 94.2 and 63.3, using conventional tests as reference standard (Chart 6).

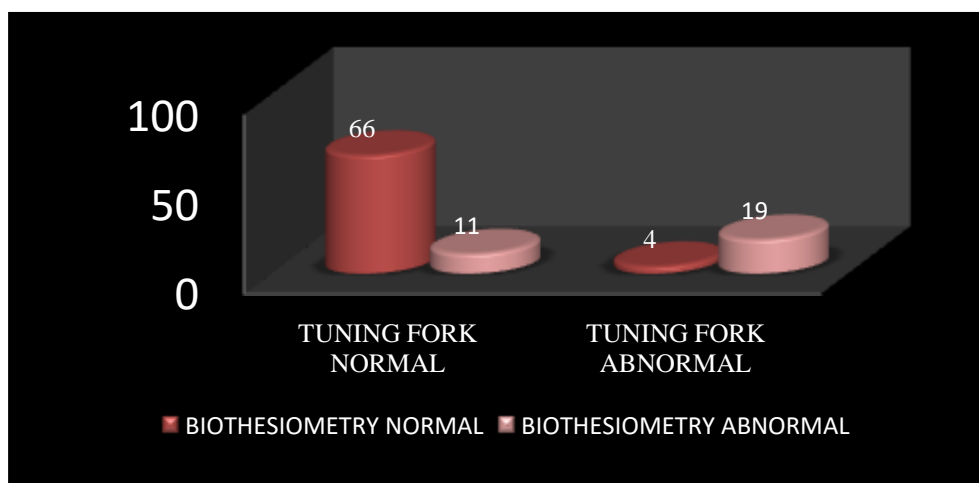


Chart 6: COMPARISON BETWEEN TUNING FORK AND BIOTHESIOMETRY

## VI. CONCLUSION

The TF test reproducible and moreover it is highly accurate. It gives an estimate of the degree of neuropathy in patients with diabetes quantitatively. Diminished vibration sensation on the Tuning Fork test is associated with the increased ulcer risk, and this ulcer risk is detected earlier with the time during fork test than with the monofilament test. The TF test should replace monofilament testing as the initial screening test for Diabetic Peripheral Neuropathy. Thus a tuning fork is a useful screening test for diabetic neuropathy.

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