

Comparison of Screening Modalities for Peripheral Neuropathy in Persons with Diabetes, Dar es Salaam, Tanzania

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Background: Peripheral neuropathy (PN) is the major risk factor for diabetic foot ulcers (DFU) in patients with diabetes (DM) in Dar es Salaam, Tanzania. Because DFUs are associated with substantial morbidity and mortality in this patient population, sensitive screening methods for PN are desirable to identify at-risk persons. We carried out this study to determine the optimal method for PN screening using four different modalities: monofilament (MF), vibration perception threshold (VPT), hot/cold perception threshold (HCPT), and the Ipswich Touch Test (IpTT). **Methods:** We studied consecutive diabetes clinic attendees in Dar es Salaam. IpTT involved touching the tips of the 1st, 3rd, and 5th toes and hallux dorsum with index finger tip for 1-2 s. Pressure sensation was assessed with 10-g MF; VPT by biothesiometry; and HCPT was ascertained in toes, heel, and plantar surfaces with sensitometer. IpTT was carried out by a single trained nurse and at home by a designated relative. McNemar's test was used to test concordance between screenings tests. **Results:** 671 individuals were screened: 579 (86%) ethnic Africans, 8% Asian Indians, 6% Arabs. Median age: 52 (range: 17-90) yrs; median duration of diabetes (DOD): 5 (range: 1-40) yrs. Table 1 shows how PN prevalence varied with DOD.

Screening method	<2yrs	2-5 yrs.	>5 yrs.
HCPT	85%	89%	92%
VPT	34%	39%	66%
MF	36%	32%	44%
IpTT (nurse)	4%	3%	16%
IpTT (relative)	9%	5%	13%

Using HCPT as gold standard, the sensitivity of VPT for each quartile was 37%, 41%, 69%, respectively; the corresponding sensitivity of MF was 40%, 36%, and 47%, respectively. There was 100% congruence for IpTT (nurse) vs. IpTT (relative) in PN ascertainment. **Conclusion:** HCPT is a better gold standard than VPT, MF, or IpTT for ascertaining DFU risk. VPT was superior to MF only in later stages of diabetes. Although we showed that the IpTT was not useful as a screening test for PN because of relatively low sensitivity, we showed that relatives of persons with diabetes can be easily trained to use it as a tool in economically less-developed regions.