

Risk Factors and Prevalence of Diabetic Foot Problems for Ulceration in Adult Type 2 Diabetes Patients Attending a Diabetic Clinic at a Tertiary Centre in Muzaffarpur

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ABSTRACT

Aim: The main objective of the study is to determine risk factors and prevalence of diabetic foot problems for ulceration in adults with type 2 diabetes mellitus (T2DM) attending a diabetic clinic at a tertiary care in Muzaffarpur.

Method: This descriptive, cross-sectional, observational study was carried out in the tertiary private diabetic clinic at Muzaffarpur in North Bihar. 238 T2DM patients were examined of which 91 was reported as diabetic foot ulcers (DFUs). By using a pre-tested structured questionnaire Patients were interviewed to document clinical history and by using SPSS 16.0 software all Statistical analysis was performed. By monofilament testing and vibration sensation testing Neurological evaluation of the feet was done and by checking dorsalis pedis and posterior tibialis pulses peripheral arterial occlusive disease was assessed.

Result: Mean duration of diabetes was 6.7 ± 2 years and mean age of participants was 49.6 ± 11.4 years. Regarding risk of ulceration at foot, 30 (32.9%) had absent foot pulses in either foot, 19 (21.3%) had absent vibration sense at the first metatarsal head of either foot while 30 (31.6%) had monofilament defined neuropathy. Significantly more people who had had who had long duration of diabetes than comparatively newer ones (12.2 ± 8.1 vs 7.9 ± 6.2 , $p = 0.002$), absent vibration sense (51.0% vs 7.9%, $p = 0.000031$) and absent pedal pulses (68.2% vs 18.7%, $p = 0.00019$) had neuropathy.

Conclusion: A high prevalence of foot ulcers was confirmed among North Bihar rural diabetic patients. To enable early identification of DFU and timeous management, there should be

routine assessment of foot at risk of ulceration in diabetic clinics. Duration of diabetes, age, blood sugar levels and rural location were identified as important risk factors.

Key words: Diabetes, Peripheral Neuropathy, Peripheral Vascular Disease, Diabetic foot ulcer, Risk factors.

INTRODUCTION

Around the world the 20% of people and in advanced world like in Europe near about 5% people are suffering from a common metabolic disorder called Diabetes mellitus. [1] Because of longer life expectancy and changing habits of diet by 2030, 366 million can be effect by this metabolic disease. [2]

Foot complications is one of the major complication that affecting the person with diabetes most as compare to other macro and micro vascular complication of diabetes. [3] Diabetic foot lesions imposing a heavy economic burden on the patient's family and individual quality of life and in turn causes significant health and socioeconomic problems to the society. [4] Morbidity and mortality of patients with diabetes mellitus, contributed by foot ulcers significantly. Long term hospitalization and carry the risk of limb amputation most of the time requires for the diabetic patients with foot ulcers. [5] Foot complications are considered one of the most expensive diabetes complications to treat and are very common in diabetic patients. [6]

The cost of treating diabetic foot is increasing day by day and it even getting costlier in some part of India like in Bihar. About 20% to 33% of costs related to diabetes mellitus are used for treatments of diabetic foot. [7,8] For predicting future disease progression and establishing a health care budget, information about the epidemiology of peripheral arterial disease associated with DFU is likely to be crucial.

The main objective of the study is to determine risk factors and prevalence of diabetic foot problems for ulceration in adults with type 2 diabetes mellitus (T2DM) attending a diabetic clinic at a tertiary care in Muzaffarpur.

METHOD

This descriptive, cross-sectional, observational study was carried out in the tertiary private diabetic clinic at Muzaffarpur in North Bihar. 238 T2DM patients were examined of which 91 was reported as diabetic foot ulcers (DFUs). By using a pre-tested structured questionnaire Patients were interviewed to document clinical history and by using SPSS 16.0 software all Statistical analysis was performed. By monofilament testing and vibration sensation testing Neurological evaluation of the feet was done and by checking dorsalis pedis and posterior tibialis

pulses peripheral arterial occlusive disease was assessed.

Diabetic patients who had traumatic ulcer due to car accident and those diabetic patients who were severely ill and unable to communicate throughout the study period were excluded. Data were collected using a structured and pretested questionnaire via face-to-face interview, a record review, and direct observation of patient. The questionnaire was prepared in English and then translated to local language (Hindi) then back to English to keep its consistency.

By using 5.07/10g monofilament, sensation was evaluated. By using a 128Hz tuning fork, Vibration sense was tested. Based on the presence or absence of foot pulses Diagnosis of peripheral vascular occlusive disease was done.

Variables having p value ≤ 0.2 in the bivariate analyses were fitted into multiple logistic regression models to control the effects of confounding. A variable with a p value of 0.05 was considered a significant predictor.

RESULT

Demographic details were presented in table 1. Mean duration of diabetes was 9.7 ± 2 years and mean age of participants was 49.6 ± 11.4 years. Among 91 subjects, 38 (42%) was male.

Table 1: Demographic data and clinical characteristics (n = 91).

Variable	Male (N=38)	Female (N=53)	P value
Mean Age (Years)	52.1±10.8	43.7±12.3	0.001
BMI (Kg/m ²)	27.2	23.8	0.003
Duration of T2DM (Years)	10.5±3.1	9.8±2.9	0.021
HbA1c (%)	7.9±1.3	8.2±1.5	0.001
Insulin Dose (IU/Day)	49.8±13.4	42.4±12.6	0.001
Hypertension (%)	32 (84%)	48 (91%)	0.028
Smokers (%)	35 (90%)	23 (43%)	0.042
Alcoholic (%)	21(55%)	2 (4%)	0.022
Footwear Habits			
Outdoors Only	35 (90%)	49 (93%)	0.023
Outdoors and Indoors	18 (47%)	9 (17%)	0.028
Hardly wears	3 (8%)	4 (8%)	0.011

Regarding risk of ulceration at foot, 30 (32.9%) had absent foot pulses in either foot, 19 (21.3%) had absent vibration sense at the first metatarsal head of either foot while 30 (31.6%) had monofilament defined neuropathy.

Table 2: Foot abnormalities

Foot at risk characteristic	Frequency	Percentage
Absent foot pulses in either foot	30	32.9
Absent vibration sense at the first metatarsal head of either foot	19	21.3
Monofilament defined neuropathy	30	31.6

Significantly more people who had had who had long duration of diabetes than comparatively newer ones (12.2 ± 8.1 vs 7.9 ± 6.2 , $p = 0.002$), absent vibration sense (51.0% vs 7.9%, $p = 0.000031$) (Figure 1) and absent pedal pulses (68.2% vs 18.7%, $p = 0.00019$) had neuropathy (Figure 2). The details was furnished in table 3.

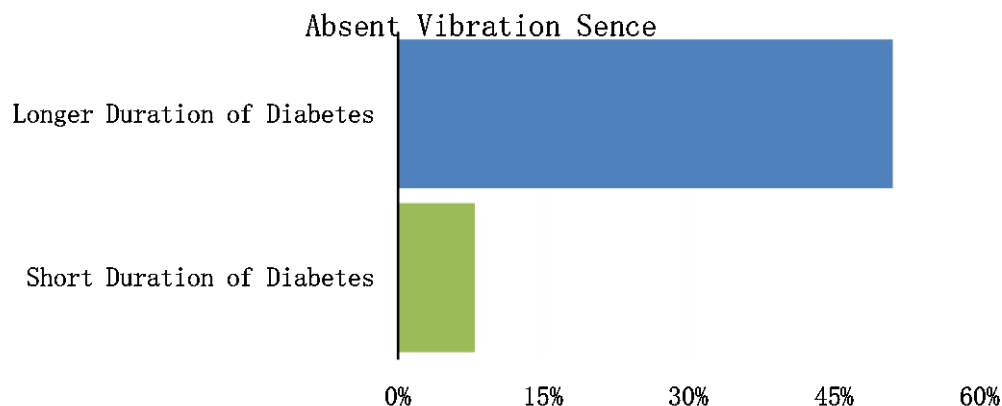


Figure 1: Absent vibration sense in long and short duration of Diabetes

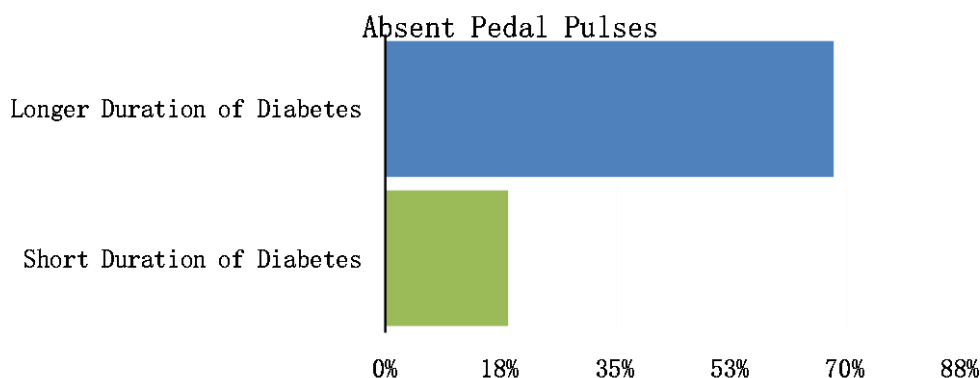


Figure 2: Absent pedal pulses in long and short duration of Diabetes

Table 3: Comparison between participants with and without neuropathy.

Variable	Neuropathy	No Nuropathy	P value
Age	53.3±11.2	44.9±12.7	0.081
Duration of Diabetes	12.2 ± 8.1	7.9 ± 6.2	0.002
Absence of Pedal Pulse	20 (68.2%)	6 (18.7%)	0.00019
Absence of Vibration Sense	16 (51%)	2 (7.9%)	0.000031

DISCUSSION

Risk factors and prevalence of DFU are not well documented in Bihar. In this observational study almost 91 cases has selected for the progressive investigation to find out the prevalence of the foot problems which leads to further diabetic complications. It has been observed that there was more number of female participants compared to male participants. It has been observed like some other study done earlier that the most prominent risk

factor, which is obesity, is more common in women. [9]

From the trial it has observed that 8% of both male and female participants hardly were footwear and a good percentage of people were not using footwear even when they are at their home. This was quite surprising as for diabetes patients it is compulsory to use footwear in both cases of indoor and in outdoors and due to poor wound healing, this poses a risk of injury to the feet which is very undesirable in

diabetes. It has already documented that this problem is quite common in middle or low income country. [10] It has been already documented that 88.6% failing to get appropriate size footwear and poor foot practices included 89.2% not receiving advice when they bought footwear. [11]

Regarding peripheral neuropathy 31.6% had monofilament defined neuropathy while 21.2% had absent vibration sense. Peripheral neuropathy is generally associated with age, male gender, glycemic control, duration of diabetes or smoking. [12]

According to this observational study, 32.9% participants had absent foot pulses in both feet, regarding pedal pulses. Between males and females, there was no significant difference in absent foot pulses observed in this study.

Health education which can have a positive impact on prevention of DFU, overestimating PN in a resource limited setting might lead to enhanced screening. More sensitive methods for evaluating PVD such as Doppler are more effective but in a resource limited setting.

CONCLUSION

A high prevalence of foot ulcers was confirmed among North Bihar rural diabetic patients. To enable early identification of DFU and timeous management, there should be routine assessment of foot at risk of ulceration in diabetic clinics. Duration of diabetes, age, blood sugar levels and rural location were identified as important risk factors.

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