

A CROSS SECTIONAL STUDY OF PREVALENCE AND TYPE OF DIABETIC FOOT ULCERS IN TYPE 2 DIABETIC MELLITUS PATIENTS

K. B. Yadavendra Reddy¹, P. Kiran Kumar², M. Asha³, B. Visalakshi⁴, P. Mohini⁵

HOW TO CITE THIS ARTICLE:

K. B. Yadavendra Reddy, P. Kiran Kumar, M. Asha, B. Visalakshi, P. Mohini. "A Cross Sectional Study of Prevalence and Type of Diabetic Foot Ulcers in Type 2 Diabetic Mellitus Patients". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 22, June 01, 2015; Page: 3345-3349.

ABSTRACT: BACKGROUND: Diabetic foot ulcers are common and estimated to affect 15% of all diabetics. In India it is estimated that approximately 40,000 legs are being amputated every year of which 75% are potentially preventable. **METHODOLOGY:** To determine the prevalence of diabetic foot ulcers and the type of ulcers amongst the diagnosed diabetes mellitus patients a prospective study was carried out during the period January 2013 to December 2014 in the department of General medicine, Rajiv Gandhi Institute of Medical Sciences and Medical college, Kadapa, A.P. **RESULTS:** Diabetic foot ulcers were found in 14% diabetes mellitus patients. Neuropathic type of foot ulcer was present in 48.62% of patients (60.5% in male and 18.5% in female). Ischemic type of foot ulcer was present in 18.26% of patients (39.5% in male and 14.06% females). Neuro-ischemic type of foot ulcer was present in 33.12% of patients (21% in males and 46.44% in females). **CONCLUSION:** Neuropathy occurred most frequently either singly or with peripheral vascular disease. General awareness about the disease, early diagnosis and proper management will prevent this dreaded complication.

KEYWORDS: Diabetic foot ulcers, Types, Prevalence.

INTRODUCTION: Diabetic foot is one of the commonest chronic complications of diabetes. Diabetic foot ulcerations are disturbing complication of diabetes that often result in a diminished quality of life of people with diabetes, 15% develop ulcers, 15% of ulcers develop osteomyelitis, and 15% of ulcers result in amputation. It is leading indication for hospital admissions and prolonged stay of diabetic patients. Thus the economic impact is staggering. There is a profound emotional loss and bereavement for the patient, society and for the government.

Evidence in the literature suggests that the early detection and treatment of diabetic foot complications could reduce the prevalence of diabetic ulcers and inturn the limb amputations. This study was intended to determine the prevalence of diabetic foot ulcers amongst the diabetes mellitus patients.

MATERIAL AND METHOD: This study was conducted prospectively from January 2013 to December 2014. A total of 1260 patients with diabetes mellitus from in patients and outpatients department of medicine & Surgery, RIMS Medical College, Kadapa were screened for diabetic foot ulcers.

INCLUSION CRITERIA: (1) patients diagnosed as per American Diabetic Association criteria i.e, FBS>126mg/dl and 2hr PPBS >200 mg/dl.¹ (2) Diabetic foot ulcers was operationally defined as a breach on the normal skin occurring as induration, ulceration or change of colour on the foot for

ORIGINAL ARTICLE

duration equal to or more than two weeks. For each of the recruited subjects, a history was obtained including the age, gender, marital status, residence. Smoking, alcohol use, occupation, presence of trauma at onset of ulcer and progression was asked for. The duration of the foot ulcer and patient's awareness of the presence of the ulcer was noted. The presence of intermittent claudication and neuropathic pains was noted. A physical examination was then performed. Both feet were examined and the site, state and the stage of foot ulcers were documented.² The lesions were staged on the Wagner's classification³ as follows.

- Stage 0 – Foot at risk
- Stage 1 – Superficial ulcer
- Stage 2 – Deep ulcers without bone involvement or abscess.
- Stage 3 – Abscess with bone involvement (as shown by x-ray)
- Stage 4 – Localised gangrene (eg, toe (s), heel)
- Stage 5 – Gangrene of whole foot.

The classic triad of neuropathy, ischaemia, infection characterize the diabetic foot. Diabetic foot is mainly classified into two types. Neuropathic foot in which neuropathy dominates and neuroischemic foot in which occlusive vascular disease dominates.

Peripheral neuropathy⁴ was assessed by elucidating pain, vibration, pressure sensations and ankle reflex, Perception of pain by application of pinprick on various sites on the feet was tested and noted as absent or present .The presence or absence of vibration sense using the 128 Hz tuning fork on the medial and lateral malleoli. The pressure sensation (monofilament testing) was done using 10g monofilament (a normal person should be sensitive to the monofilament that buckles at a force of 10g). Examining the deep tendon reflexes, the Achilles tendon reflex was tested using a standard patella hammer and technique and graded as either present (normal), detectable only after enhancement, or absent.

Thereafter, the neurological disability scoring (NDS)⁵ system was used and was awarded to each foot according to the neurological findings and the total score was calculated and range of neuropathy was graded as per the total score.

Table 1 – NDS scoring System				
	Right		Left	
	Normal	Abnormal	Normal	Abnormal
Sensations :				
Pain (Pin Prick)	0	1	0	1
Vibration(tuning fork)	0	1	0	1
Pressure (monofilament)	0	1	0	1
Reflex:				
Achilles tendon reflex :	Present 0 Reinforced 1 Absent 2		Present 0 Reinforced 1 Absent 2	
Range of neuropathy score : 0 – 10				
0-2 = No neuropathy				
3-5 = Mild neuropathy				
5-8 = Moderate neuropathy				
>9 = Severe neuropathy				

ORIGINAL ARTICLE

Peripheral vascular disease examination was done calculating the API index with sphygmomanometer⁶

OBSERVATIONS: 1260 patient with proven diabetes mellitus were screened and 90 patients (14%) were found to have diabetic foot ulcers. The mean ages of males and females found in the study were 53 years and 50 years respectively. History of smoking was present in 60.5% of patients, of them 99% were male and only 1 % were females which is statistically significant.

Mean duration of foot ulcers disease was 3 months. The duration of foot ulcers in females was 25 weeks and comparatively longer than in males which was 20 weeks. Hypertension was more common in males (60%) than females (50%) which was statistically significant. The body mass index were Higher in female patients. Most of the diabetic foot ulcer patients (82%) needed insulin for control of their blood sugar. Most of the patients (53.12%) had stage 2 ulcer.

Neuropathic type of foot ulcer was present in 48.62% of patients (60.5% in male and 18.5% in female). Ischemic type of foot ulcer was present in 18.26% of patients (39.5% in male and in 14.06% females). Neuroischemic type of foot ulcer was present in 33.12% of patients (21% in males and 46.44% in females).

DISCUSSION: Among persons diagnosed as having diabetes mellitus, the prevalence of foot ulcers is 4% to 10%, and the lifetime incidence may be as high as 25%.⁷ The prevalence of diabetic foot ulcers amongst diabetic patients in this study was 14% which is comparable to 15% found in studies in Nairobi⁸ and 15% found in a community study in Cape Town, South Africa. Studies in the UK found prevalence of 5% and 7.4%. Prevalence of DFUs among diabetic patients was 14.30% in a study conducted in North India which is nearer to our study.⁹

The mean age of the patients was 52 years. Mean age of male patients was 53 years and females was 50 years which are lower than the values found in study in Nairobi.

Causative risk factors of neuropathy (48.62%) and vascular dysfunction (18.26%) and neuroischaemic (33.12%) were found as similarly seen in other studies albeit in different proportions. Exclusive vascular dysfunction occurred in 18.26% compared to 48.5% found by Nyamu et al. this study used exclusive clinical method to evaluate both neuropathy and peripheral vascular disease which may be either a weakness (limit broader compatibility of results) or strength (a more practical scenario in a resource poor setting) of this study.

The mean duration of ulcers of females is observed to be longer (25 weeks) compared to males (20 weeks). Similar finding is observed by Nyamu et al in Nairobi. Stage 4 ulcer is more common in females (11.11%) than males (5%) and stage 5 ulcer is present in 2.77% of female patients but not in male patients. Women still remain underprivileged in this environment where upon most of them are dependents on husbands for. Poor Patients are at higher risk of poor healing and landing into amputation.

CONCLUSIONS: In conclusion, diabetic foot ulcers occurred at a prevalence of 14% in the group of diabetic patients. Neuropathy occurred most frequently either singly or with peripheral vascular disease.

ORIGINAL ARTICLE

Early detection and surveillance of potential risk factors for ulceration can decrease the frequency of ulcer development. Patients should be educated regarding the importance of maintaining good glycemic control, wearing appropriate footwear, avoiding trauma and performing frequent self examinations.²

Understanding the diabetic foot, proper examination of feet, investigations to classify the foot ulcers and proper management techniques using team approach with preventive steps will play big role in limb salvage and prevention of limb amputation.

REFERENCES:

1. American Diabetes Association. Diagnosis and Classification of Diabetes Mellitus. Diabetes Care. 2010; 33(Suppl 1): S62-S69. doi: 10.2337/dc10-S062
2. Bild DE, Selby JV Sinnock P.Browner WS, Braveman P.Showstack JA – Lower extremity amputation in people with diabetes; epidemiology and prevention. Diabetes Care 1989; 12: 24-31.
3. A Review of the Pathophysiology, Classification, and Treatment of Foot Ulcers in diabetic patients. Warren Clayton, Jr., MD and Tom A. Elasy, MD, MPH.
4. Adams and Victor's manual of neurology, 8th edn A H Ropper and Robert H Brown.
5. Diabetes Care. 2000 Jun; 23(6): 750-3. Diabetic neuropathy examination: a hierarchical scoring system to diagnose distal neuropathy Meijer JW¹, van Sonderen E, Blaauwwinkel EE, Smit AJ, Groothoff JW, Eisma WH, Links TP.
6. Khan TH, Farooqui FA, Niazi K. Critical Review of the Ankle Brachial Index. Current Cardiology Reviews. 2008; 4(2): 101-106. doi: 10.2174/157340308784245810.
7. Preventing foot ulcers in patients with diabetes. Singh N, Armstrong DG, Lipsky BA JAMA. 2005 Jan 12; 293(2): 217-28
8. Nyamu PN, Otieno CF Amyoeo EO, Mliligeyo SO – Risk factor and prevalence of diabetic foot ulcers at Kanyatta National Hospital, Nairobi. East Afr Med J 2003; 80: 36-43.
9. Shailesh K. Shahi M.Sc.1, *Ashok Kumar M.Sc., Ph.D; Sushil Kumar M.Sc., Ph.D.; Surya K Singh MBBS, MD, DM, Sanjeev K. Gupta MBBS, MS, DNB, FRCS, T.B Singh M.Sc., Ph.D. - Prevalence of Diabetic Foot Ulcer and Associated Risk Factors in Diabetic Patients From North India. The Journal of Diabetic Foot Complications, 2012; Volume 4, Issue 3, No. 4, Pages 83-91.

ORIGINAL ARTICLE

AUTHORS:

1. K. B. Yadavendra Reddy
2. P. Kiran Kumar
3. M. Asha
4. B. Visalakshi
5. P. Mohini

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of General Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa, A. P.
2. Final Year Post Graduate, Department of General Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa, A. P.
3. Final Year Post Graduate, Department of General Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa, A. P.

4. Final Year Post Graduate, Department of General Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa, A. P.
5. Second Year Post Graduate, Department of General Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa, A. P.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. K. B. Yadavendra Reddy,
D. No. 3-139,
Christian Lane,
Kadapa – 516001.
E-mail: yaduhuf@gmail.com

Date of Submission: 21/05/2015.
Date of Peer Review: 22/05/2015.
Date of Acceptance: 25/05/2015.
Date of Publishing: 01/06/2015.