



## A PROSPECTIVE STUDY ON EPIDEMIOLOGY, MICROBIOLOGY AND CLINICAL OUTCOME OF VARIOUS DIABETIC FOOT INFECTION IN J.A. GROUP OF HOSPITALS SETTING

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### ABSTRACT

**Background-** About one fourth of patients with Diabetes have risk of developing foot ulcer. Over half of these foot ulcers may develop infected foot ulcers and may even need hospitalization for treatment. Prompt treatment and suggested lifestyle practices, people with diabetes can avoid or delay the development of complications. **Objectives-** To study about epidemiological factors related to diabetic foot infection such as age, sex, duration of diabetes, relation to ongoing retinopathy and nephropathy. **Methods-** Detailed history and thorough clinical examination was done in all cases. Documentation was done using proforma which includes like presenting complains, demographic data, occupation, education status and regarding all clinical findings, investigation done and management given to the patients involve in this study, along with their written consent of willing to get involved in this study **Conclusion-** In our study there was marked male predominance. 65% patients presented with forefoot ulcers and 41% had associated diabetic neuropathy.

### KEYWORDS :

#### INTRODUCTION

The term —Diabetes Mellitus is derived from a Greek word which means to go through or a Siphon and the word mellitus is derived from a Latin word honey, describing the sweet odour of the urine.<sup>1</sup> The incidence of diabetes mellitus is increasing globally.<sup>2</sup> Patient with diabetes have 12% to 25% life time risk of developing a foot ulcer.<sup>3</sup> Four categories of diabetes are recognized. Type 1, formerly insulin-dependent diabetes mellitus (IDDM),<sup>4</sup> is an autoimmune disease affecting the pancreas.<sup>5</sup> Individuals with type 1 diabetes are more prone to ketosis and unable to produce endogenous insulin.<sup>6</sup> Type 2, formerly non-insulin dependent diabetes mellitus (NIDDM), accounts for 90% to 95% of diagnosed cases.<sup>7</sup> Type 2 diabetes is characterized by hyperglycemia in the presence of hyperinsulinemia due to peripheral insulin resistance.<sup>8</sup> Gestational as well as genetic defects, endocrinopathies, certain drugs such as steroids are recognized as other types of diabetes.<sup>9</sup> Diabetes is associated with numerous complications related to microvascular, macrovascular, and metabolic etiologies. The complications involve cerebrovascular, cardio-vascular systems, and peripheral arterial disease; retinopathy; neuropathy, nephropathy and diabetic foot disease.<sup>10</sup> The risk for amputation among people with diabetes is 25 times more than that among people without diabetes.<sup>11</sup> Prompt treatment and suggested lifestyle practices, people with diabetes can avoid or delay the development of complications. Amongst major complications, foot problems pose great danger to quality of a life and a socioeconomically draining proposition.<sup>12</sup> Globally, 70 % of people loose their limbs because of diabetes.<sup>12</sup> Amongst people with known diabetes prevalence rate of diabetic foot disease is 25%.<sup>13</sup> About one fourth of patients with Diabetes have risk of developing foot ulcer. Over half of these foot ulcers may develop infected foot ulcers and may even need hospitalization for treatment.<sup>14,15</sup> About 20% of infected foot ulcers may get amputated. Each year, in about 85% of non-traumatic amputations, diabetes is the leading cause.<sup>16</sup> The mortality and morbidity rate are also high due to Diabetic foot ulcer. In India, more than 32 million people have diabetes and of these, roughly 40,000 lower limb suffer amputation on annual basis.<sup>16</sup> People diagnosed with diabetic foot ulcer often

develop depression due to prolonged wound healing time recurrence, lifelong consumption of medications, socioeconomic dependency and life style limitations.<sup>17</sup> Also they feel that they lose their self-esteem due to loss of economic productivity, independence related to restricted movements and disfigurement of body profile.

#### MATERIAL AND METHODS

After obtaining approval from ethical committee, the present study was conducted on consecutive diabetic patients came to surgery OPD in with complaints of ulcer/welling/gangrene/ over foot/toe/leg + foot/ankle, and admitted in surgery ward Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) in time period between January 2021 to June 2022. A total of 100 cases of diabetic foot ulcer were analysed.

#### Method Of Collection Of Data

Detailed history and thorough clinical examination was done in all cases. Documentation was done using proforma which includes like presenting complains, demographic data, occupation, education status and regarding all clinical findings, investigation done and management given to the patients involve in this study, along with their written consent of willing to get involved in this study. Only those who fulfilling the inclusion criteria i.e foot ulcer with diabetes are included in study.

After admission in surgery ward, detailed clinical histories of the patients are taken and these patients are subjected to some tests needed for the study under all ethical consideration like age, sex, blood pressure (BP), marital status, educational level, body mass index (BMI), occupation, residency (rural/urban), smoking status, alcohol status, type of diabetes, diabetes duration, duration of hospital stay, type of diabetes treatment (medical or surgical intervention), presence of diabetic retinopathy, diabetic nephropathy, prior history of DFU or amputation, present foot ulcer , awareness about self foot care and hygiene and use of footwear for walking. Complete blood picture, Random blood sugar, Fasting blood sugar, post prandial blood sugar, urine ketones,

culture sensitivity of pus or wound slough, X-ray of affected limb and other clinical examination also required to rule out other possible factors contributing in diabetic foot like peripheral arterial pulses and limb sensations. Appropriate treatment to the given patients according to grading of ulcer and ulcer is graded according to sign and symptoms, on basis of X- ray of affected limb, condition of artery of the affected limb local examination of ulcer like location of ulcer, floor of ulcer, presence of slough, edge of ulcer, base of ulcer, involving of surrounding or underlying structure. Glycemic control of the patient was done as per the instruction of ht medicine department. Patients initially given broad spectrum antibiotics then followed by culture specific antibiotics in then combination as per protocol, debridement of slough and pus, incision and drainage, fasciotomy, debridement followed by split skin grafting, below knee amputation, above knee amputation, above ankle amputation, below ankle amputation, toe disarticulation. Dressings were done every day or as per wound status. Wounds were assessed for the need for surgical intervention by local and general examination. Patients are taught about foot care to prevent ulcer on foot and post operative care of wound and graft after being discharged. Patients advised for prosthesis according to need of the patient and were given physiotherapy of involved limb and also taught use of crutches and artificial limb.

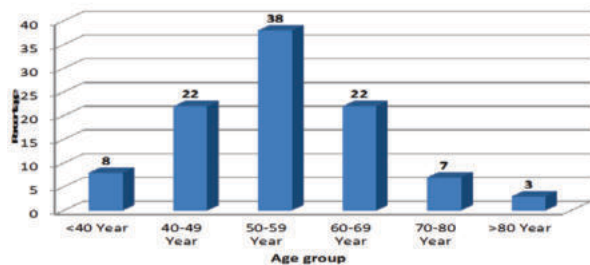
**Data Analysis:**

Evaluation of study data in electronic form will require performing additional statistical analyses. Data will be composed in suitable spreadsheet i.e., excel, Epi info or SPSS were used for data analysis f. Various test will be applied to compare two groups by Chi-square test, unpaired t test, odds ratio by the statistical software. Significance level was decided be 95% confidence interval level (p<0.05). Data may be described as a frequency (Percentage) distribution as well in mean±SD were used for data description and depicted via suitable statistical graphs.

**OBSERVATION AND RESULTS**

A total of 100 cases of diabetic foot wound were studied from January 2021 to June 2022 in Department of Surgery JAH hospital and G.R. Medical College, Gwalior. The results observed in the study are as follows.

**Graph 1: Age wise distribution of study participants**

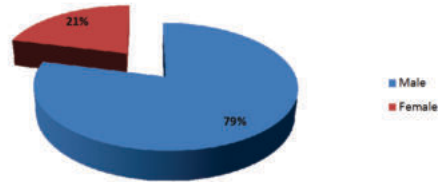


**Table 2: Gender wise distribution of study participants**

Gender	N	%
Male	79	79%
Female	21	21%
Total	100	100%

In our study of 100 patients were there was marked male predominance in diabetic foot wound. Out of 100 cases, 89 (79%) were male and 21 (21%) were female. Therefore male: female ratio was 3.7 : 1.

**Graph 2: Gender wise distribution of study participants**

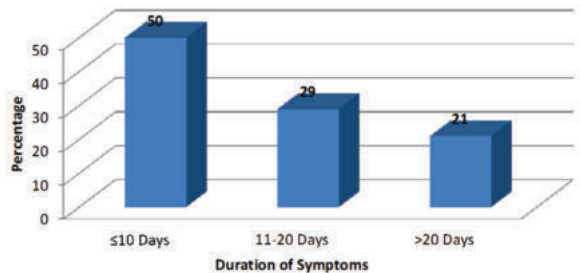


**Table 4: Distribution of study participants according to Duration of Symptoms**

Duration of Symptoms (Days)	N	%
≤10 Days	50	50%
11-20 Days	29	29%
>20 Days	21	21%
Total	100	100%
Mean ±SD	14.34±9.62	

In our study of 100 patients, 50(50%) presented with duration of symptoms within 10 days and 29(29%) within 11-20 days and 21(21%) with >20 days of duration of symptoms.

**Graph 4: Distribution of study participants according to Duration of Symptoms**

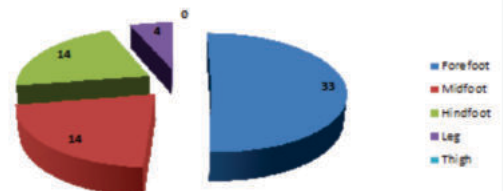


**Table 8: Distribution of study participants according to Location of ulcer**

Location of Ulcer	N	%
Forefoot	33	50.7%
Midfoot	14	21.5%
Hindfoot	14	21.5%
Leg	4	6.15%
Thigh	0	0%
Total	65	100%

In our study out of 100 patients, 65 patients presented with ulcer in which 33(50.7%) occurred in forefoot and no one presented ulcer in thigh.

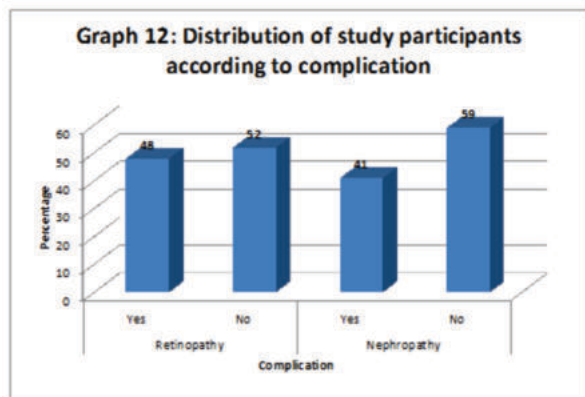
**Graph 8: Distribution of study participants according to Location of ulcer**



**Table 12: Distribution of study participants according to complication**

Complication		N	%
Retinopathy	Yes	48	48%
	No	52	52%
Nephropathy	Yes	41	41%
	No	59	59%
Total		100	100%

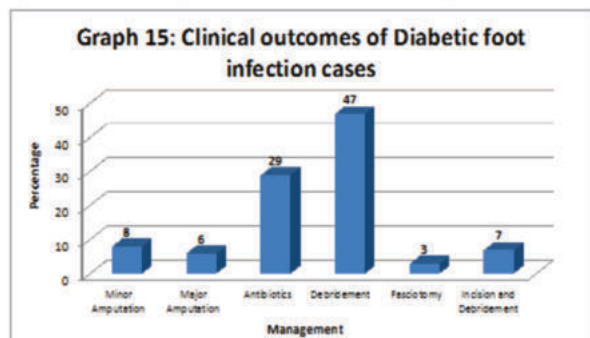
Above table shows that out of 100 patients of diabetic foot wound 48 (48%) were associated with retinopathy and 41(41%) were associated with Diabetic Nephropathy.



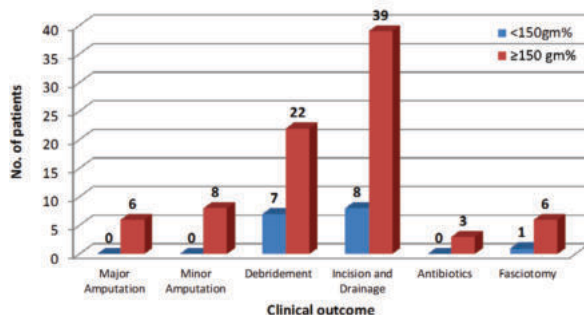
**Table 15: Clinical outcomes of Diabetic foot infection cases**

Management	N	%
Minor Amputation	8	8%
Major Amputation	6	6%
Antibiotics	29	29%
Debridement	47	47%
Fasciotomy	3	3%
Incision and Debridement	7	7%
Total	100	100%

Above table shows that most of the patients were treated with surgical intervention. Out of 100 patients 47(47%) were treated with surgical debridement and 7 (7%) with incision and drainage and 29(29%) patients were managed conservatively. 14(14%) patients who did not took proper precautions and treatment and cure undergone complications and were amputated. out of 14 patients 8 patients had rays amputation, 4 had symes and lisfranc amputation and 2 had below knee amputation.



**Graph 26: Association between Clinical outcome and Random Blood Sugar level**



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