

**Foot Ulcers and Risk Factors Among Diabetic Patients**

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**Abstract**

**Introduction:** Diabetes Mellitus (DM) is one of the most widespread non communicable diseases across the world. Two types of complications are encountered usually with DM: microvascular and macrovascular.

**Material and Method:** Hospital based prospective study. 100 patients reporting to the General Surgery dept. within study duration and eligible as per inclusion criteria will be included in the study.

**Results:** 62.0% patients were having peripheral neuropathy, 67% were having >10 years of diabetes, 46% were having peripheral arterial disease, 41% were having history of prior ulceration, 32% patients were having diabetic Charcot joint & 29% were having uncontrolled hyperglycemia.

**Conclusion:** Diabetes Mellitus is a lifelong disease and diabetic foot complications can be life threatening, physically incapacitating, costly to treat and result in extensive morbidity.

**Keywords :** Diabetes, foot ulcers, neuropathy.

**Introduction**

Diabetes mellitus is as old as man kind and perhaps humans know it from early ages. It is one of the most deeply studied disease and is still un-understandable

ailment that human deal with. As we are digging deeper into the molecular basis of the disease mind boggling results are coming out. It is not a single disease but a constellation of diseases that it gives birth to i.e. the complications.

Diabetes mellitus is characterized by chronic hyperglycemia and disturbance of carbohydrate, fat & protein metabolism associated with absolute or relative deficiency in insulin secretion and/or insulin action.<sup>1</sup>

Diabetes is known for its micro & macro vascular complications like retinopathy, neuropathy, cardiovascular & peripheral vascular disease. One of the most devastating complications of diabetes is 'Diabetic Foot' which is responsible for > 50% non-traumatic major limb amputations.<sup>2</sup>The World Health Organization (WHO) defines diabetic foot as the lower limb of a diabetic patient that has the potential risk of pathologic consequences, including infection, ulceration and/ or destruction of deep tissues associated with neurological abnormalities, various degree of peripheral neuropathy, vasculopathy and superimposed infection are mainly responsible foot ulceration. Ulcers which develop are difficult to treat due to poor wound healing which results from a combination of neuropathy, ischemia and hyperglycemia.

An inciting event such as unnoticed trauma through which micro-organisms gain entry, sluggish leukocyte response and high sugar content leads to destruction of proper host defense mechanisms which spread in subcutaneous and sub facial planes to the deeper tissues. Superficial ulcers are mainly colonized by staphylococcus aureus and/or streptococcus pyogenes while deep infections like osteomyelitis and abscesses result from a combination of aerobic and anaerobic micro-organism (gram positive cocci, gram negative bacilli like Escherichia coli, Proteus and Klebsiella asp. and anaerobes including bacteroids and Peptostreptococci.)<sup>3,4,5</sup>

**Materials & Method**

**Study design:** Hospital based Cross sectional study.

**Study duration:** Six months

**Study place:** Dept. of Surgery

**Sample size:** 100 patients reporting to the Surgery dept. within study duration and eligible as per inclusion criteria

**Inclusion Criteria:** All patients of Diabetic foot who gave informed verbal consent

**Exclusion Criteria:**Diabetic foot associated with venous ulcers and lymphedema.

**Study Methodology:** After obtaining permission of Institutional Ethical Committee and obtaining informed verbal consent from eligible study participants, all details of patients along with relevant investigational details were recorded in questionnaire.

**Data analysis:** Data thus collected were entered into excel and were then analyzed with help of EPI-Info software through tables, diagrams and appropriate statistical test wherever required.

**Results**

Table-1: Distribution of cases according to Age (N=100 cases)

Means age ( years)	61.20
SD	16.59

In present study, mean age was 61.20±16.59 Yrs

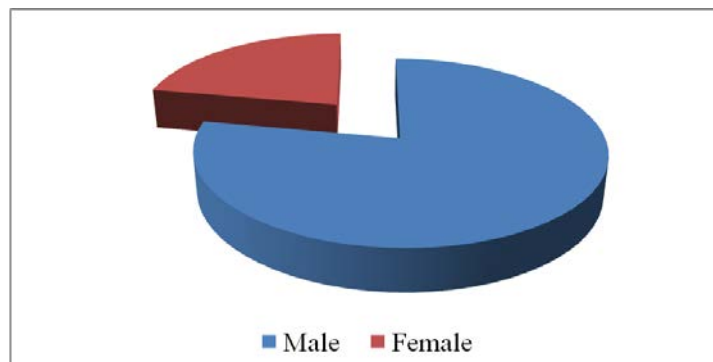


Table-2: Distribution of cases according to risk factors responsible for ulceration:

Risk Factor	No.	(%)
Peripheral neuropathy	62	62.0
Foot Deformity	31	31.0
Diabetic Charcot Joint	32	32.0
Trauma	9	9.0
Improperly fitted shoes	11	11.0
Peripheral Arterial Disease	46	46.0
Callus	17	17.0
H/O Prior Ulceration	41	41.0
Higher Plantar Foot Pressure	19	19.0
Limited joint mobility	33	33.0
Uncontrolled hyperglycemia	29	29.0
Chronic Renal Insufficiency	5	5.0
Diabetes duration (>10 yrs)	67	67.0
Older Age	8	8.0
Poor Foot Hygiene	27	27.0

Above table shows that 62.0% patients were having peripheral neuropathy, 67% were having >10 years of diabetes, 46% were having peripheral arterial disease, 41% were having history of prior ulceration, 32% patients were having diabetic Charcot joint & 29% were having uncontrolled hyperglycemia.

### Discussion

In the present study, mean age was 61.20±16.59 Yrs and maximum 64% patients belonged to age group was 51-70 years. Wheel Lock <sup>6</sup> did a study which revealed that the youngest age with diabetic foot was 32 years and the oldest age was 89 years. Mayfield et al <sup>7</sup> did a study on sex wise distribution of diabetic foot which included 32 males and 29 females.

In our study 62.0% patients were having peripheral neuropathy, 67% were having >10 years of diabetes, 46% were having peripheral arterial disease, 41% were having history of prior ulceration, 32% patients were having diabetic Charcot joint & 29% were having uncontrolled hyperglycemia. Foot ulcers among diabetics are a major cause of mortality and morbidity and also a huge financial burden on health care services as inadequate and improper treatment could result in development of gangrene leading to limb amputations and sometimes even death. The significance lies in the fact that identification of risk factors is important to screen high-risk patients to prevent development of foot ulcers and its associated morbidity.<sup>8</sup> The greatest risk factors for developing foot ulceration are neuropathy, arterial disease, foot deformity and peripheral neuropathy accounting for 80% of diabetic persons with foot ulcers. The contributing factors are poor glycemic control and microvascular disease.<sup>9</sup>

### Conclusion

Diabetes Mellitus is a lifelong disease and diabetic foot complications can be life threatening, physically

incapacitating, costly to treat and result in extensive morbidity.

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