



Journal Homepage: - [www.journalijar.com](http://www.journalijar.com)

## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/15744  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/15744>



### RESEARCH ARTICLE

#### A CLINICAL STUDY OF DIABETIC FOOT ULCERS AND MANAGEMENT

Chawngthu Vanlalhlua<sup>1</sup> and Samuel Lalruatfala Sailo<sup>2</sup>

1. Associate Professor, Department of Surgery, Zoram Medical College, Mizoram, India.
2. Assistant Professor, Department of Surgery, Zoram Medical College, Mizoram, India.

#### Manuscript Info

##### Manuscript History

Received: 25 September 2022  
Final Accepted: 27 October 2022  
Published: November 2022

##### Key words:-

Diabetic Foot Ulcer, Debridement And Dressing, Gangrene And Abscess, Neuropathy And Vasculopathy

#### Abstract

**Introduction:** Diabetic foot may be defined as a group of syndromes in which neuropathy, ischemia and infection lead to tissue breakdown, resulting in morbidity and possible amputation. Foot problem remains very common in people with diabetes throughout the world, affecting up to 15% of diabetic patients during their life time. The aim of this study is to assess the various presentations of diabetic foot ulcers and surgical management.

**Materials and Methods:** This is a hospital based prospective observational study conducted in 50 patients of diabetic foot ulcers admitted in the department of General Surgery at Zoram Medical College (ZMC), Falkawn, Mizoram during the period of November 2017 to December 2021. All patients with diabetes mellitus suffering from foot ulcers of all age groups, incidental diagnosis of diabetes with foot ulcers, patients with gangrenous foot complicated by diabetes are included. Patients with foot infections or gangrene foot without diabetes mellitus or incomplete treatment are excluded.

**Results:** The commonest presentation in this study is ulcer followed by gangrene and abscess. The most common site of lesion is toes (42%) followed by dorsum of foot (30%) and planter of foot (16%). 72% of patients (36) had neuropathy, 14% had vasculopathy and 10% had both. 30 (60%) patients are healed by debridement and dressing alone, 11 (22%) patients need amputation or disarticulation to heal. Skin grafting is done in 9 patients. No patient dies of the ulcer.

**Conclusion:** Diabetic foot ulcer is a complication of prolonged diabetes mellitus which increases with age and duration of the disease. The surgical management of diabetic foot ulcers should be based on the knowledge of pathophysiology of diabetes and practice of new treatment modalities.

Copy Right, IJAR, 2022,. All rights reserved.

#### Introduction:-

The Diabetic foot may be defined as a group of syndromes in which neuropathy, ischemia and infection lead to tissue breakdown, resulting in morbidity and possible amputation (WHO, 1995). Foot problem remains very common in people with diabetes throughout the world, affecting up to 15% of diabetic patients during their life time<sup>1,2</sup>. Diabetic foot ulcers increases morbidity, high expenditure for therapeutic management and precede amputations in an about 85% of patients. Frequency of lower limb amputation can be lowered by 49-87% by

**Corresponding Author:- Chawngthu Vanlalhlua**

Address:- Associate Professor, Department of Surgery, Zoram Medical College, Mizoram, India.

preventing the development of diabetic foot ulcers<sup>3,4</sup>. Diabetic foot ulcer is the long-term complications of diabetes mellitus affecting 15% of diabetic patients with life time risk up to 25% can be prevented in many cases<sup>5,6</sup>.

The number of people with diabetes worldwide was estimated at 415million in 2005; it is projected to increase to 640million by 2030<sup>7</sup>. Diabetic foot ulcer is considered as a major source of morbidity and a leading cause of hospitalization in patients with diabetes, it is estimated that approximately 20% of hospital admission among patients with diabetes mellitus are the result of diabetic foot ulcer<sup>8</sup>. Previous studies have indicated that diabetic patients have up to a 25% lifetime of developing a foot ulcer<sup>9</sup>. The aim of this study was to assess the various clinical presentations of diabetic foot ulcers and surgical management in our center.

### Materials And Methods:-

This is a hospital based prospective observational study conducted in 50patients of diabetic foot ulcers admitted in the department of General Surgery Unit-II at Zoram Medical College (ZMC), Falkawn, Mizoram during the period of four years from November 2015 to December 2019. All patients with diabetes mellitus suffering from foot ulcers and infections of all age groups, incidental diagnosis of diabetes with foot ulcers, patients with gangrenous foot complicated by diabetes were included. Patients with foot infections or gangrene foot without diabetes mellitus or incomplete treatment were excluded. Before taking up the study, approval for carrying out the research work was obtained from the Hospital Ethical Committee. Informed Consent was taken for each case. Detailed history, thorough physical examination, routine baseline investigations, relevant special investigations choosing the appropriate line of treatment were done. Patients were hospitalized, managed with medical and surgical intervention until discharge from the hospital.

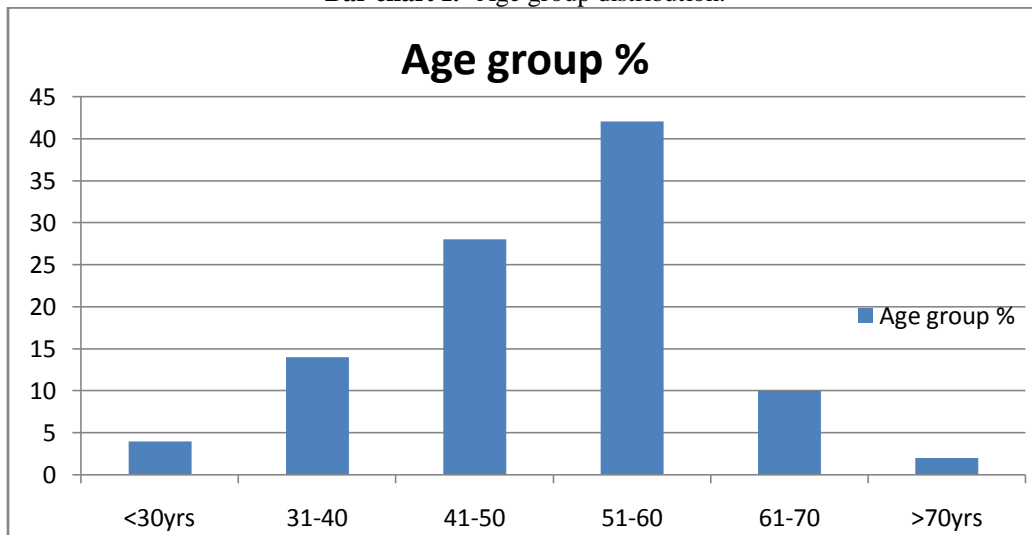
### Results And Observations:-

This is a hospital based prospective observational study conducted in 50patients of diabetic foot ulcers admitted in the department of General Surgery at Zoram Medical College (ZMC), Falkawn, Mizoram during the period of November 2017 to November 2021. The following results and observations weremade.

**Table I:-** Age group distribution.

Age group	No of pts	Percentage
<31yrs	2	4.00%
31-40	7	14.00%
41-50	14	28.00%
51-60	21	42.00%
61-70	5	10.00%
< 70yrs	1	2.00%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Bar chart I:-** Age group distribution.

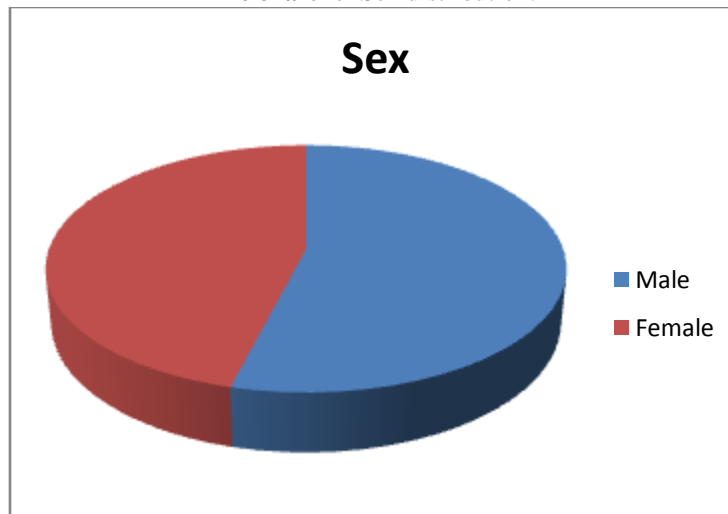


The most common cases were in the age group of 51-60 (42%) followed by 41-50 years (26%). More than half (54%) of the cases were above 50 years of age. The youngest patient was 29 years old and the oldest patient was 79 years old.

**Table II:-** Sex distribution.

Sex	No of pts	Percentage
Male	27	54%
Female	23	46%

**Pie chart I:-** Sex distribution.

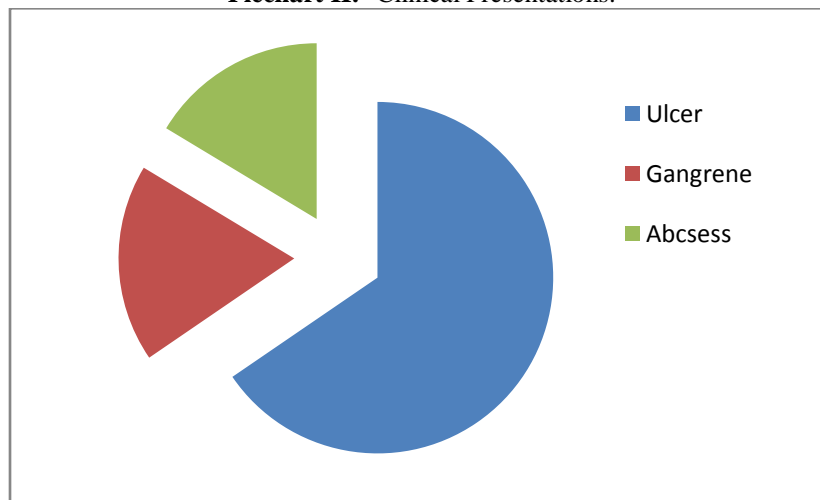


This study included 27 male and 23 female patients.

**Table III:-** Mode of Clinical Presentation.

Presentation	No of Pts	%
Ulcer	36	72%
Gangrene	10	20%
Abscess	9	18%

**Piechart II:-** Clinical Presentations.

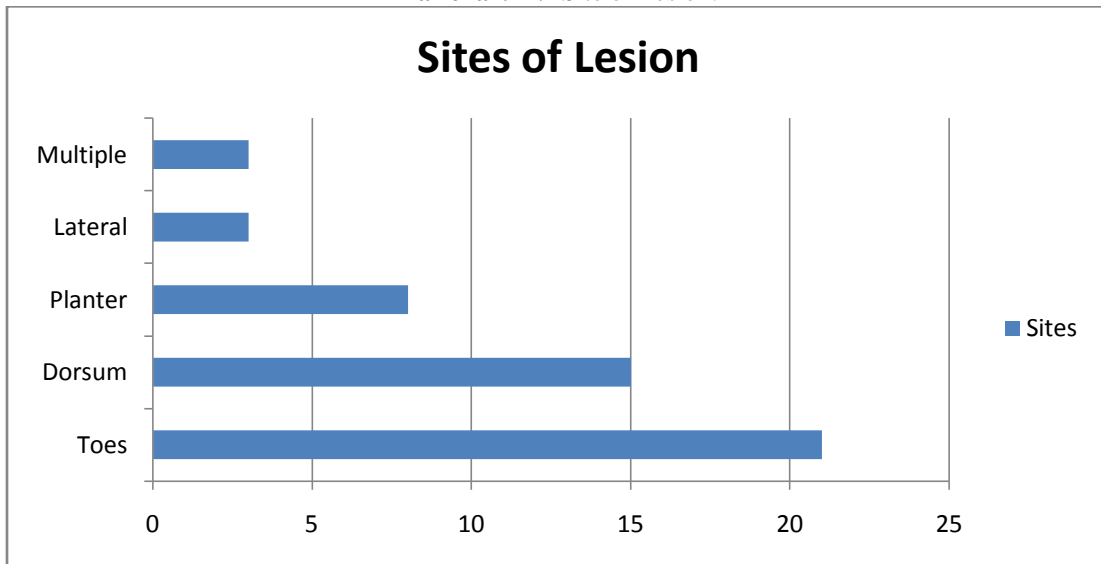


The commonest presentation in this study is ulcer followed by gangrene and abscess

**Table IV:-** Site of Lesion.

Site of lesion	No of Pt	%
Toes	21	42%
Dorsum	15	30%
Planter	8	16%
Lateral	3	6%
Multiple ulcers	3	6%
Total	50	100

**Bar chart II:-** Site of Lesion.

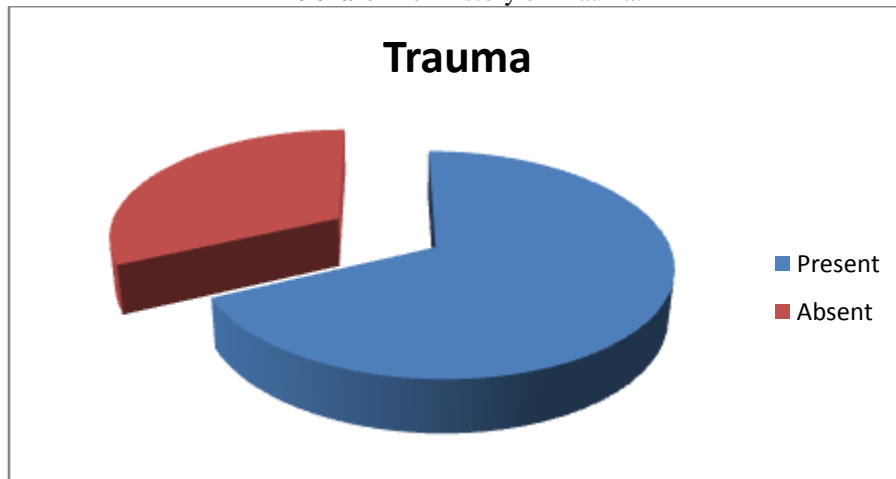


The most common site of lesion was toe, found in 21 patients (42%) followed by dorsum of foot (30%) found in 15 patients. In 8 patients, the planter aspect of foot was involved.

**Table V:-** History of Trauma.

History of Trauma	No of patients	%
Present	34	68
Absent	16	32

**Pie chart III:-** History of Trauma.



In 68% cases, history of trauma like thorn prick, nail prick, shoe bite etc. was present as precipitating factors.

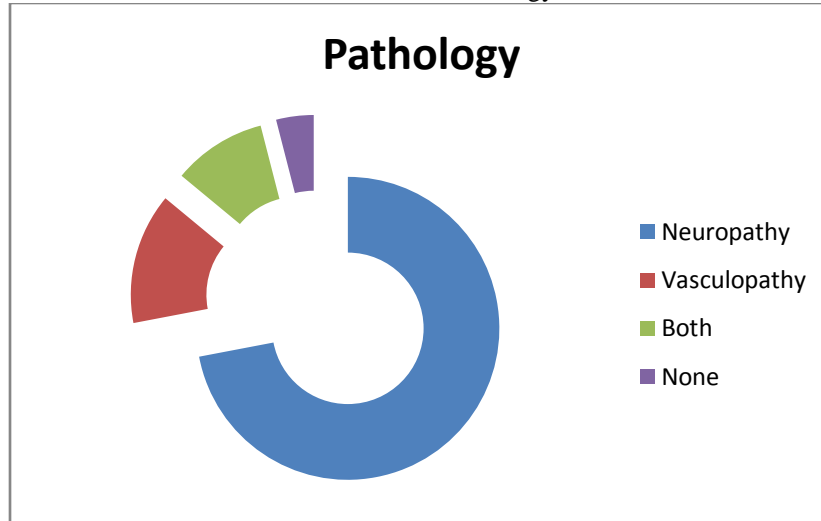
**Pathology:**

72% of patients (36) had neuropathy, 14% had vasculopathy and 10% had both neuropathy and Vasculopathy. In 2 patients (4%), pathology could not be identified.

**Table VI:-** Pathology.

Pathology	No of pts	%
Neuropathy	36	72
Vasculopathy	7	14
Both	5	10
None	2	4

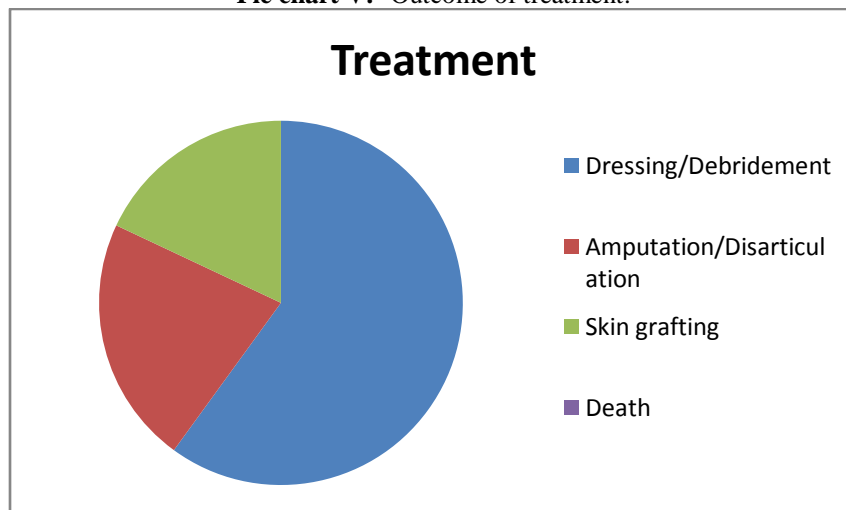
**Pie chart IV:-** Pathology.



**Table VII:-** Outcome of treatment.

Outcome of treatment	No	%
Dressing/Debridement	30	60
Amputation/Disarticulation	11	22
Skin grafting	9	18
Death	0	0

**Pie chart V:-** Outcome of treatment.

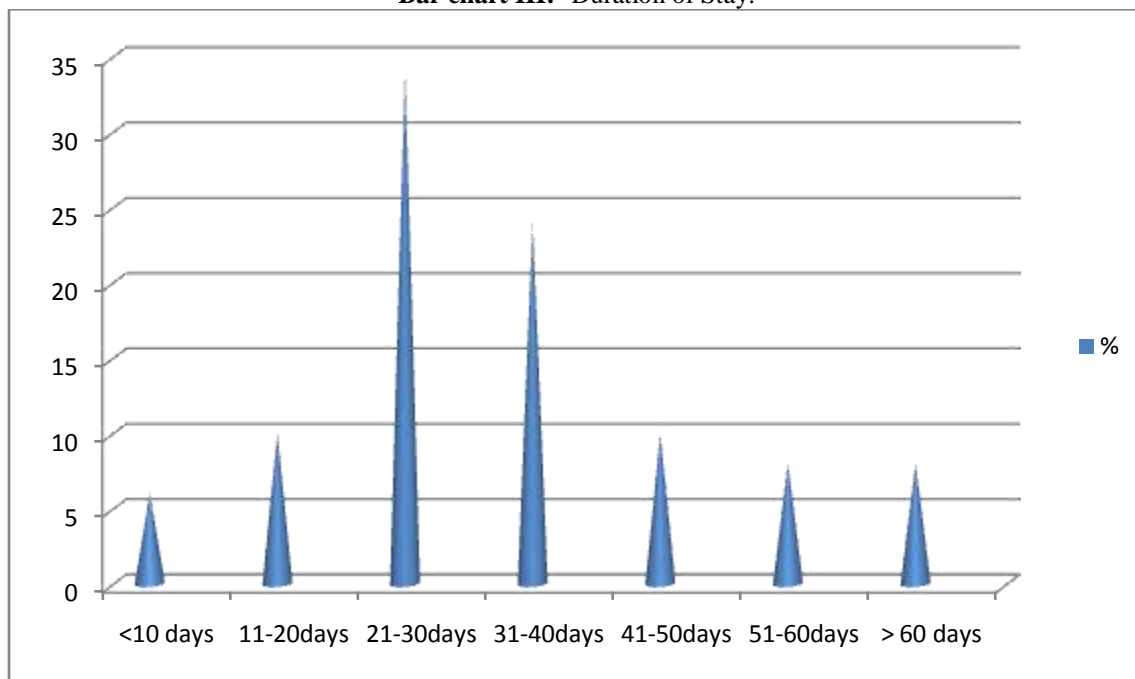


Out of 50 patients, 30 (60%) patients was healed by dressing/debridement alone, 11 (22%) patients needed amputation or disarticulation to heal. Skin grafting was done in 9 patients. No patient died of the ulcer.

**Table VIII:-** Duration of Hospital Stay.

Duration of stay	No of pts	%
< 10 days	3	6%
11-20 days	5	10%
21-30 days	17	34%
31-40 days	12	24%
41-50 days	5	10%
51-60 days	4	8%
>60 days	4	8%
<b>Total</b>	<b>50</b>	<b>100%</b>

**Bar chart III:-** Duration of Stay.



The average duration of hospital stay was 28 days with the maximum number of patients stay in the range of 21-40 days. The minimum days of stay was 7 days and the maximum day of stay was 150 days

### Discussion:-

In this study, the most common cases were in the age group of 51-60 (42%) followed by 41-50 years (26%). More than half (54%) of the cases were above 50 years of age. The major age group presented with diabetic foot ulcer in this study was 51-60 years which is also the common age group in Mayfield et al<sup>10</sup> study. The youngest patient was 29 yrs and the oldest was 79 yrs which is in concordance with the study conducted by WheelLock et al<sup>11</sup> and Mummidi et al<sup>12</sup> where their study of 100 patients showed the youngest 31 yrs and the oldest 80 years.

The present study had more male patients than female in the ratio of 27:23. Male predominance has no clear explanation but may be due to their occupational and recreational activities which result in more stress on the feet.

The commonest clinical presentation in this study is ulcer followed by gangrene and abscess which is comparable with the study of Apelquist et al<sup>13</sup> and Qari et al<sup>14</sup>, in which 59% patients had ulcer in the foot. The most common site of involvement was toe which is comparable to Reiber et al<sup>15</sup> study, where the second most common site was

dorsum of foot which may be different to their findings of plantar aspect of foot. 68% of our cases give history of trauma which is comparable to their series in which 77% of ulcer pathways include trauma.

In our study, 72% patients had neuropathy which is again comparable to the study conducted by Reider et al<sup>15</sup>. Sensory neuropathy can cause loss of variety of sensations like touch, pressure, temperature, vibration, position and pain that may give rise to insensate foot, resulting in repetitive unrecognized trauma and abnormal distribution of pressure on the feet and hence emerged as the principal factor in causing foot ulcer. The majority of patients having neuropathy/Vasculopathy had history of diabetes of more than 5-8 years.

Proper control diabetes is very important in diabetic foot management. Broad spectrum Antibiotic was initially started then changed to specific antibiotic depending on the culture and sensitivity report. 60% cases were healed by debridement and regular dressing with re-epithelialization and had a good prognosis. Amputation, disarticulation and split skin graft were other modes of management. 11 (22%) patients needed amputation or disarticulation to heal. Skin grafting was done in 9 patients. The average duration of hospital stay was 28 days with the maximum number of patients stay in the range of 21-40 days. The minimum day of stay was 7 days and the maximum day of stay was 150 days. There was no mortality in this study

### **Conclusion:-**

Diabetic foot ulcer is a common complication of prolonged diabetes mellitus which increases with age of the patient and duration of the disease. Proper education at high-risk group like self-inspection, foot hygiene, use of suitable footwear, good sugar control, surveillance early recognition and prompt professional treatment are important. The surgical management of diabetic foot ulcers should be based on the knowledge of pathophysiology of diabetes and practice of new treatment modalities.

### **References:-**

1. Bakker K, Riley PH. The year of the diabetic foot. *Diabetes voice*. 2005; 50 (1): 11-14.
2. Nathan DM, Mc Kitrik C, Larkin M. Glycemic control in diabetes mellitus: have changes in therapy made a difference? *Am J Med*, 1996; 100: 157-63.
3. Mayfield JA, Reiber GE, Sanders LJ, Janisse D, Pogach LM. Preventive foot care in people with diabetes. *Diabetes Care*. 2001; 24: S56.
4. International Diabetes Federation: The Global Burden, *IDF Diabetes Atlas*. 2012:5-8.
5. Deribe B, Woldemichael K and Nemera G. Prevalence and factors influencing diabetic foot ulcer among diabetic patients attending Arbaminch Hospital, South Ethiopia. *Journal of Diabetes and Metabolism*, 2014; 5 (1).
6. Teodorescu VJ, Chen C, Morrissey N, Faries PL, Marin ML, Holler LH. Detailed protocol of ischemia and the use of non-invasive vascular laboratory testing in diabetic foot ulcers. *Am Jr of Surgery*, 2004; 187(5):75-80.
7. Indian Podiatry Association: *Diabetic Footcare-Podiatry Course*, 2019; 1-4.
8. Snyder RJ, Hanft JR. Diabetic foot Ulcers – effect QOL, costs, mortality and the role of standard wound care and advanced-care therapies. *Ostomy Wound Manag*, 2009; 55:28-38.
9. Singh N, Amrstrong DG, Lipsky BA: Preventing foot ulcers in patients with diabetes. *JAMA*, 2005; 293: 217- 28.
10. Mayfield JA, Reiber GE, Nelson RG, Greene T> A foot risk classification system to predict diabetes amputation in Pima Indians. *Diabetes care*, 1996; 19(7): 704-9.
11. WheelLock PC, Gibbons GW, Cambell D. A study of Foot Lesions in Diabetes. *Ann Surg*. 1969; 99: 776 -7.
12. Mummididi DS, Dugar D, Mishra RK, Mohapatra JS, Houghton T. Clinico Pathological Study: Management of Diabetic Foot and its Complications. *J Pharm Biomed Sci*. 2015; 5(4): 308-11.
13. Apelquit J, Castenfors J, Larsson J, Stentrom A, Agardh CD. Wound classification is more important than site of ulceration in the outcome of diabetic foot ulcers. *Diabet Med*. 1989; 6(6): 526-30.
14. Quari FA, Akhar D. Diabetic foot: Presentation and Treatment. *Saudi Medical Journal*. 2000; 21(5): 443-6.
15. Reiber GE, Lipsky BA, Gibbons GW. The burden of diabetic foot ulcers. *Am J Surg*. 1998; 176(2): 510-5.