

Surgical Amputation for Diabetic Foot Ulcer and Various Risk Factors – Prospective Research**Sandhyarani Latchamsetty¹, Kuna Madhuri Devi², Yerramsetti Atchyuth Ramaiah³, Sirigineedi Veerabhadrrao⁴**¹Associate Professor, Department of General Medicine, Government Medical College, Srikakulam²Associate Professor, Department of General Surgery, Government Medical College, Srikakulam³Associate Professor, Department of Anaesthesia, Rangaraya Medical College, Kakinada⁴Associate Professor, Department of General Surgery, Government Medical College, Srikakulam

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Conflict of interest: Nil

Abstract:**Introduction:** Diabetic foot ulcer (DFU) is an important complication of diabetes mellitus (DM). With this a study was conducted to find different risk factors of DFA.**Methods:** It was a prospective research conducted in government Medical College, Srikakulam. Study was conducted for a period of 6 months, from January to June 2022. Study protocol was approved by Institutional ethical committee. An informed written consent was taken from study participants. Adults ≥ 31 years, both gender those identified diabetic foot (DF) attended to general medicine and general surgery departments were included. Blood sample was collected by venue puncture, serum was used for glucose estimation. Then the individuals were referred to general medicine to confirm the diabetes status. After this, amputation was done as per the institutional guidelines. Data was presented in mean and percentage.**Results:** Total 124 members were included, gender wise, there were 59% (73) female and 41% (51) male; the male female ratio was 0.7. Age wise, majority (30.7%; 38) were in ≥ 71 years group, mean age was 58.3 years. When the duration of DM was considered, the incidence of DFU was found to be prevalent (26.6%; 33) in 6 – 10 years duration.**Conclusion:** DFU stand out as one of the prevalent, severe, and economically burdensome complications of DM. Significant risk factors identified include male gender, prolonged duration of DM, and an age exceeding 40 years. It's important to note that this study has limitations, such as not taking into account Body Mass Index (BMI) and socioeconomic status.**Keywords:** Diabetes, Gender, Member, Factor.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

The global prevalence of diabetes mellitus (DM) is on the rise, and it is anticipated to increase from 5.1% to 7.7% by the year 2030, leading to a surge in associated morbidity rates. [1] India surpasses all other countries in the world with an estimated 74 million diabetic patients. [2] Due to increased blood glucose concentration, the infection rate is high among the DM individuals.

Among the complications of diabetes, Diabetic foot ulcer (DFU) is arguably the most dreaded, being linked to substantial morbidity and mortality. DFU is defined as any foot ailment stemming directly from the diabetic condition or its enduring complications. Throughout their lifespan, the majority of DM individuals experience the development of foot ulcers, significantly impacting their quality of life. Despite numerous advancements in diabetic foot care over time, a

considerable number still advance to undergo lower extremity amputation (LEA). [3]

Factors contributing to the risk of DFU comprise male gender, diabetes duration for > 10 years, peripheral neuropathy, abnormal foot structure (including bone changes, calluses, and thickened nails), peripheral arterial disease, smoking, history of ulcers or amputation, and compromised glycemic control. [4] With this a study was conducted to find different risk factors of DFA.

Methods

It was a prospective research conducted in government Medical College, Srikakulam. Study was conducted for a period of 6 months, from January to June 2023. Study protocol was approved by Institutional ethical committee. An informed written consent was taken from study participants.

Adults ≥ 31 years, both gender those identified diabetic foot (DF) attended to general medicine and general surgery departments were included. The study excluded patients with ulcers related to trauma and other neurological pathologies.

After recruiting the participant in the study, detailed clinical history was collected. All the findings were recorded in the study proforma. The study was clearly explained in the local language. The participants were allowed to ask doubts. After clarifying all the doubts beyond the knowledge attempted for blood sample collection.

Blood sample was collected by venue puncture by following the universal safety precautions in heparin anticoagulant tube. It was centrifuged at 3000rpm for 10 mnts. The serum was used for glucose estimation. Blood parameters were estimated by automated analyser as per the manufacturer instructions as well as by using standard guidelines. [5] After getting blood parameter the individuals were referred to general medicine to confirm the

diabetes status. After this, amputation was done as per the institutional guidelines

Statistical Analysis: The data were analysed using SPSS version 21. It was presented in mean and percentage. Chisquare test was used for statistical analysis and $P < 0.05$ were considered to be statistically significant.

Results

Total 124 members were included in this research. Gender wise, there were 59% (73) female and 41% (51) male; the male female ratio was 0.7. Age wise, majority (30.7%; 38) were in ≥ 71 years group 38 (37%) followed by 51 – 60 years (22%; 27) and lowest number in 31 – 40 years (8.9%; 11) (Table 1); the mean age was 58.3 years. When the duration of DM was considered, the incidence of DFU was found to be prevalent (26.6%; 33) in 6 – 10 years duration and the incidence was lowest (3.2%; 4) those with 21 – 25 years duration of DM (Table 2).

Table 1: Age wise incidence of DF among the study members

Age	Number	%
31 – 40	11	8.9
41 – 50	25	20.1
51 – 60	27	22
61 – 70	23	18.5
≥ 71	38	30.7
Total	124	100

Table 2: Duration of diabetes among the study members

Duration in years	Number	%
1 – 5	18	14.5
6 – 10	33	26.6
11 – 15	26	21
16 – 20	21	17
21 – 25	4	3.2
≥ 26	22	17.8
Total	124	100

Discussion

India holds the highest global diabetic population, constituting one-sixth of all diabetic patients worldwide. [6] While diabetes impacts various systems over time, the morbidity and mortality associated with foot ulcers and their complications are particularly devastating. [7] The pathophysiology of DFU revolves around a triad of neuropathy, peripheral arterial disease, and concurrent secondary bacterial infection. Peripheral neuropathy may result in intrinsic muscle atrophy and bring about functional anatomical alterations in the foot. [8] The estimated global prevalence rate of DFU is higher, standing at 6.3%. [9]

In this study total 124 members with DFU were included. Gender wise, there were 59% (73) female and 41% (51) male; the male female ratio was 0.7.

Age wise, majority (30.7%; 38) were in ≥ 71 years group 38 (37%) followed by 51 – 60 years (22%; 27) and lowest number in 31 – 40 years (8.9%; 11) (Table 1); the mean age was 58.3 years. Singh A et al. study revealed that the majority of patients were aged between 45 – 64 and male to female ratio of 2.28. [10] Yerat et al. study also demonstrated a male preponderance, with a ratio of approximately 1.5:1, comprising around 60.5% male subjects and 39.5% females, with a mean age of approximately 54.9 years. [11] The reason for this difference remains unclear. One potential explanation for the correlation between male gender and amputation incidence could be attributed to a lower standard of foot care among male patients compared to their female counterparts. This may be due to men being less vigilant in inspecting their feet and tending to seek medical attention later than women when

encountering foot issues. Typically, women exhibit a higher motivation to prioritize and maintain their health compared to men. [12]

In this study, when the duration of DM was considered, the incidence of DFU was found to be prevalent (26.6%; 33) in 6 – 10 years duration and the incidence was lowest (3.2%; 4) those with 21 – 25 years duration of DM (Table 2). In the literature also duration of DM was also declared to be the risk factor for DFU. [13, 14] Prolonged uncontrolled blood glucose levels were only reported cause for this. All the study members were underwent amputation as per the protocol and recovered well.

DFU stand out as one of the prevalent, severe, and economically burdensome complications of DM. Significant risk factors identified include male gender, prolonged duration of DM, and an age exceeding 40 years. It's important to note that this study has limitations, such as not taking into account Body Mass Index (BMI) and socioeconomic status.

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