Proceedings Academic Universitas Jambi
Volume 1, Issue 2, November, 2025

Sociodemographic and clinical profile of diabetic foot ulcer patients at a Referral Hospital in Jambi

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Abstract

Background: Diabetic Foot Ulcer (DFU) is a major complication in diabetes patients, which leads to morbidity with amputation and mortality. This study aimed to assess the sociodemographic and clinical profiles of DFU patients. **Methods:** This was a descriptive retrospective cross-sectional study conducted at Raden Mattaher Regional Hospital, Jambi City. Secondary data were collected from the medical records of DFU patients during the period from January 2024 to December 2024. Patients under 18 years old were excluded. The collected data were analyzed using SPSS version 30. Normality test using Kolmogorov-Smirnov. **Results:** Of 52 DFU patients were included, aged <60 years (63.5%) (55.19 ± 9.36 (Mean ± SD), female (67.3%), married (86.5%), unemployed (75.0%). Most had formal education (88.5%) and were covered by national health insurance (98.1%). Clinically, diagnosed with ulcer 5th grade (40.4%), infection severity were severe (≥ grade 3 (69.3%), diabetes duration (median 9 (min-max; 1 – 18) years, Body Mass Index (BMI) (median 22.40 (min-max; 16.40 – 33.40) kg/m2, HbA1c (11.24 ± 3.07 (Mean ± SD)), non-smokers (82.7%), commorbidities (Hypertension and PAD (76.9%), no amputation (71.2%), length of stay (LOS) (median 7 (min-max; 1 – 35) days. **Conclusion:** This study showed sociodemographic and clinical profile of DFU patients were predominantly middle-aged, female, unemployed, and insured, with a high burden of comorbidities, severe infections, and poor glycemic control. These findings highlight the need for early detection and integrated management strategies to reduce complications.

Keywords: Clinical profile; diabetic foot ulcer; referral hospital; sociodemographic

Cite This Article

Fitrianingsih, Maharini, I., Elisma, Syukri, M., & Putri, C. A. (2025). Sociodemographic and clinical profile of diabetic foot ulcer patients at a Referral Hospital in Jambi. *Proceedings Academic Universitas Jambi*, *1*(2), 913–921.

Editor

I Made Dwi Mertha Adnyana, M.Ked.Trop.

Article info

Received: October 04, 2025. Revised: October 30, 2025. Accepted: November 09, 2025

INTRODUCTION

Diabetic foot ulcer represents a severe and debilitating complication of diabetes mellitus, characterized by full-thickness skin breakdown often associated with underlying neuropathy and peripheral arterial disease (1). This complex etiology frequently leads to protracted healing times, increased infection risk, and a heightened propensity for lower limb amputations (2). The profound impact of diabetic foot ulcers on patient morbidity and mortality underscores the critical need for comprehensive understanding and management strategies (3,4). Globally, diabetic foot ulcers are a leading cause of hospitalizations among individuals with diabetes, imposing substantial psychological, physical, and economic burdens (5).

Diabetic foot ulcer (DFU) represents a debilitating and costly complication of diabetes mellitus. According to the IDF Diabetes Atlas Reports 2025, diabetes-related foot complications continue to rise globally, necessitating multidisciplinary approaches to prevention and management (6). In Indonesia, the growing prevalence of diabetes reported by SKI 2023 indicates an expanding population at risk of DFU, emphasizing the need for strengthened preventive and curative services (7).

Most studies consistently report that patients with diabetic foot ulcers (DFU) have substantially higher rates of amputation and mortality (8–10). A 2024 meta-analysis reported a 31 % cumulative amputation rate, while a large-scale cohort found significant short-term mortality following DFU onset (11). The IWGDF 2023 guidelines emphasize structured risk assessment, standardized wound management, infection control, and vascular evaluation, whereas the PERKENI 2024 guidelines underscore the importance of strict metabolic control to prevent complications (12).

However, there remains a notable evidence gap regarding local sociodemographic and clinical profiles of DFU patients in Indonesian referral centers. Variations in education, occupation, and insurance coverage, combined with clinical heterogeneity in ulcer grade, infection severity, comorbidities, and disease duration, may shape clinical outcomes. Recent studies have identified neuropathy, peripheral arterial disease, anemia, and cardiovascular comorbidities as key predictors of healing failure, amputation, and death (13). A study by Yunir et al. (14) reported that individual at high risk for foot ulcer, particularly those aged over 60 years, had an independently increased likelihood of amputation or mortality.

This study therefore aims to describe comprehensively the sociodemographic and clinical profile of DFU patients treated at a referral hospital in Jambi, Indonesia. The findings are expected to provide a contextual evidence base for optimizing clinical management, tailoring preventive programs, and guiding local health-policy formulation in alignment with the IWGDF and PERKENI recommendations.

METHODS

Study design and setting

This is an observational study using a retrospective cross-sectional design. It was conducted at Raden Mattaher General Hospital, a regional referral hospital located in Jambi, Indonesia. Data for DFU patients were collected from January to December 2024. Infections severity grading based on the IWGDF/IDSA guideline 2023 (15). A total of 52 eligible DFU patients, with ulcers ranging from no infection to severe infection grade, were included in this study. Data were extracted from patient medical records obtained from the admission medical record unit, electronic health records (EHRs). Primary and secondary diagnoses of DFU were accessed from medical records.

Population, samples and sampling

The study population included all patients diagnosed with diabetic foot ulcer (DFU). Eligible participants were those aged >18 years, hospitalized between January and December 2024, and presenting with any ulcer grade and at least one hospital admission. Patients were excluded if their medical records were incomplete, not diagnosed with DFU, or had missing clinical information. Secondary data were extracted from patient medical records, and DFU diagnoses were confirmed using ICD-10 codes E10.5, E11.5, and E11.9. The sample size was calculated for a cross-sectional design using a DFU prevalence (P) of 10.7% (9).

Sociodemographic data

The sociodemographic variables included age, sex, occupation, level of education, marital status and insurance. The clinical characteristics comprised, ulcer grade, infection severity, diabetes type, duration of diabetes and ulcer, body mass index (BMI), HbA1C, smoking status, comorbidities, length of stay, and amputation status. Diabetes mellitus (DM) was diagnosed based on the American Diabetes Association (16) and Indonesian Society of Endocrinology (17) guidelines, defined as fasting plasma glucose ≥126 mg/dL, plasma glucose ≥200 mg/dL two hours after an oral glucose tolerance test, or persistent hyperglycemia requiring medical or nutritional intervention. An HbA1c level >6.5% at admission indicated pre-existing DM, while HbA1c >7% was considered indicative of uncontrolled glycemia (18).

BMI was calculated following the European Society for Clinical Nutrition and Metabolism (19) recommendations and categorized for the Asian population as underweight (<18.5 kg/m²), normal (18.5–22.9 kg/m²), overweight (≥23 kg/m²), or obese (≥25 kg/m²) (20). Ulcer grading and infection severity were determined according to the International Working Group on the Diabetic Foot (21) and the Infectious Diseases Society of America (IDSA) guidelines. Severe DFU was classified as ulcer grade ≥3, while grades 1–2 indicated non-severe or mild-to-moderate infection.

Statistical analysis

Statistical analyses were conducted using IBM SPSS Statistics version 30.0 (Chicago, IL, USA). Sociodemographic characteristics, clinical profiles, and clinical outcomes were summarized descriptively. Normality test using Kolmogorov-Smirnov. Categorical variables were converted into nominal scales and presented as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation (SD). A p-value <0.05 was considered statistically significant.

Ethical concideration

This study has been registered with the number S.391/RSUD.2.1/X/2025 and approved by the ethical committee of Raden Mattaher General Hospital-Faculty of Medicine and Health Sciences Universitas Jambi, number 3063/UN21.8/PT.01.04/2025.

RESULTS

The sociodemographic characteristics of diabetic foot ulcer (DFU) patients at Raden Mattaher Regional Hospital, Jambi, are presented in Table 1. The majority of subjects were female (67.3%) and adults aged under 60 years (63.5%), with a mean age of 55.19 ± 9.36 years (mean ± SD). Most patients were unemployed (75.0%), comprising primarily housewives, retirees, and individuals without formal employment. In

addition, 86.5% were married, 88.5% had completed formal education (elementary to senior high school), and 98.1% were covered by the National Health Insurance (BPJS).

Table 1. Baseline characteristics of the DFU patients

Characteristic	Value (N=52)	%
Sex		
Male, n (%)	17	32.7
Female, n (%)	35	67.3
Age, (Mean ± SD)	55.19 ± 9.36	
Adult (> 18 years), n (%)	33	63.5
Elderly (≥ 60 years), n (%)	19	36.5
Level of Education		
Formal education, n (%)	46	88.5
Uneducated, n (%)	6	11.5
Occupation		
Employee, n (%)	13	25.0
Unemployed, n (%)	39	75.0
Family Status		
Married, n (%)	45	86.5
Widow/Widower/Unmarried, n (%)	7	13.5
Insurance		
National Health Insurance (JKN), n (%)	51	98.1
Private/Individual, n (%)	1	1.9

The clinical characteristics of the subjects, presented in Table 2, show that all patients were diagnosed with type 2 diabetes mellitus (100.0%). Most cases exhibited severe infection (69.3%) and advanced ulcer grade (grade 5, 40.4%). The median duration of diabetes was 9 years (range: 1–18 years). The majority of patients were non-smokers (82.7%) and had comorbid hypertension (38.5%), peripheral arterial disease (PAD) (38.5%), while 23.1% had no comorbidities. The subjects had a median body mass index (BMI) of 22.40 kg/m² (range: 16.40–33.40), corresponding to the normal weight category, and a mean HbA1c level of 8.68 ± 2.43%, indicating poor glycemic control. The median length of hospital stay was 7 days (range: 1–35 days). Regarding clinical outcomes, the majority of patients did not undergo amputation (71.2%).

Table 2. Clinical characteristics of the DFU patients

Characteristic	Value (N=52)	%
PEDIS Grade Ulcer		
Grade 1	1	1.9
Grade 2	10	19.2
Grade 3	19	36.5
Grade 4	1	1.9
Grade 5	21	40.4
Severity of infection		
Mild - moderate, n (%)	16	30.8
Severe, n (%)	36	69.3
Type of Diabetes		
Type 1, n (%)	0	0.0
Type 2, n (%)	52	100.0
Duration of Diabetes, (Median (Min-Max)	9 (1-18)	

Characteristic	Value (N=52)	%
≤ 5 years, n (%)	8	15.4
> 5 years, n (%)	44	84.6
Body Mass Index (Kg/m²), (Median (Min-Max)	22.40 (16.40 – 33.40)	
HbA1C (%), (Mean ± SD)	11.24 ± 3.07	
Smoking Status		
Smoker, n (%)	9	17.3
Non-smoker, n (%)	43	82.7
Comorbidities, n (%)		
Hypertension, n = 205 (96.2%)	20	38.5
Peripheral Artery Disease (PAD), n = 203 (95.3%)	20	38.5
No commorbidities	12	23.1
Length of Stay (LOS) (Days), (Median (Min-Max))	7 (1-35)	
Amputation Status		
Amputation, n (%)	15	28.8
Non amputation, n (%)	37	71.2

DISCUSSION

The sociodemographic profile of the 52 patients with diabetic foot ulcer (DFU) in this study shows that the majority were female (67.3%) with a mean age of 55.19 ± 9.36 years. This finding suggests that DFU most frequently affects adults in their middle to late age, aligning with previous studies reporting that DFU typically develops after prolonged diabetes duration and accumulative vascular and neuropathic complications in patients aged 50–60 years (22,23). Although earlier studies often indicate a predominance among males due to occupational and behavioral risk factors such as smoking and outdoor activity (24,25), the female predominance in this cohort might reflect local sociodemographic differences or greater health-seeking behavior among women in Jambi.

Educational level analysis revealed that 88.5% of the patients had formal education. Education contributes to awareness of foot care and adherence to diabetes management. However, the persistence of DFU despite relatively good educational background may indicate limited diabetes self-management practices, possibly related to poor knowledge translation into behavior or inadequate counseling during clinical visits (26). In terms of employment, 75% of patients were unemployed, consistent with previous findings that DFU often leads to or is associated with loss of productivity and income due to reduced mobility and chronic wound management needs (13). Economic constraints may further limit access to optimal footwear, nutrition, and outpatient wound care.

The majority of participants were married (86.5%), which could provide family support for daily diabetes management. Nonetheless, family support does not always translate into adequate glycemic or wound care control if not coupled with sufficient health literacy. Almost all patients (98.1%) were covered by Indonesia's National Health Insurance (JKN), highlighting the strong role of universal health coverage in providing access to hospitalization for DFU management. This aligns with national data showing that JKN coverage among patients with chronic diseases continues to increase (27). Despite this, the persistence of severe DFU cases in tertiary hospitals suggests that early detection and community-based preventive strategies remain

suboptimal. Overall, these sociodemographic findings emphasize that DFU is predominantly seen among middle-aged to older adults, primarily women, with substantial socioeconomic vulnerability. Enhancing diabetes education, foot-care awareness, and early intervention through primary healthcare facilities could mitigate the progression to ulceration and improve clinical outcomes in this population.

Clinical characteristics

The majority of ulcers were classified as PEDIS grade 5 (40.4%) and grade 3 (36.5%), indicating advanced and complicated ulcers. Severe infection was found in 69.3% of cases, reflecting delayed presentation to tertiary care facilities. These findings are consistent with global reports that severe DFU remains common in developing countries due to late diagnosis, suboptimal foot screening, and poor glycemic control (13,28).

All patients had type 2 diabetes mellitus, with a median duration of 9 years (range 1–18 years), underscoring the chronicity of the disease before ulcer onset. Prolonged duration of diabetes is a well-established predictor of neuropathy and peripheral arterial disease, both of which contribute to ulcer development and impaired healing (26). The mean HbA1c was 11.24 ± 3.07%, indicating poorly controlled glycemia across most patients. This level far exceeds the recommended therapeutic target (<7%) set by ADA and PERKENI guidelines, and it strongly correlates with impaired wound healing and infection persistence (18). The median BMI was 22.40 kg/m², within the normal range, suggesting that poor metabolic control rather than obesity may be the dominant risk factor in this study.

Hypertension and peripheral artery disease (PAD) were the most prevalent comorbidities, each affecting 38.5% of patients. Both conditions are key contributors to reduced tissue perfusion and delayed wound healing. The coexistence of micro- and macrovascular complications highlights the systemic nature of advanced diabetes (29,30). Only 17.3% of patients reported smoking, a figure slightly lower than previous studies in Indonesia, which may be due to the higher proportion of female participants. Nevertheless, smoking remains a significant modifiable factor associated with increased amputation risk (31).

Clinical outcomes

The median length of hospital stay was 7 days (range 1–35 days), comparable to national data for DFU admissions. However, 28.8% of patients underwent amputation, demonstrating the high severity and late stage of presentation. This rate is consistent with previous Indonesian studies reporting amputation rates between 20–35% (32). Factors such as severe infection, high PEDIS grade, long diabetes duration, and uncontrolled HbA1c are well-recognized predictors of amputation and prolonged hospitalization.

Collectively, these findings emphasize that DFU in this cohort remains a major challenge due to delayed diagnosis, inadequate glycemic control, and high comorbidity burden. Strengthening early detection at primary care, integrating foot-care education, and optimizing multidisciplinary management including endocrinology, wound care, and vascular surgery are essential to reduce the risk of severe infection, amputation, and mortality.

Limitation

This study has several limitations. First, the retrospective cross-sectional design restricts the ability to establish causal relationships and is dependent on the accuracy and completeness of medical records, which may introduce information bias. Second, the study was conducted in a single regional referral hospital with a relatively small sample size, limiting generalizability and potentially overrepresenting severe DFU cases typically managed at tertiary care facilities. In addition, socioeconomic factors and diabetes self-care behaviors were not available, limiting analysis of advanced determinants affecting clinical outcomes. Despite these limitations, this study provides important baseline data on the sociodemographic and clinical characteristics of DFU patients in Jambi and highlights priority gaps requiring system-level enhancements in early detection and integrated multidisciplinary management, especially within Raden Mattaher General Hospital as the main referral hospital in Jambi Province.

CONCLUSIONS

This study revealed that diabetic foot ulcer (DFU) patients admitted to the referral hospital in Jambi predominantly consisted of middle-aged females with long-standing type 2 diabetes and poor glycemic control. Most patients presented with severe infection and advanced ulcer grades (PEDIS 3–5), often accompanied by comorbid hypertension and peripheral arterial disease. The relatively high amputation rate (28.8%) and prolonged hospital stay highlight the clinical and economic burden of DFU management in tertiary care. These findings underscore that late presentation, uncontrolled HbA1c, and vascular complications remain critical determinants of poor clinical outcomes. Comprehensive prevention strategies should therefore focus on strengthening early detection of diabetic foot lesions in primary health centers, routine screening for neuropathy and ischemia, and continuous patient education to improve adherence to self-care and glycemic management.

CONFLICT OF INTEREST

The Author(s) declare(s) that there is no conflict of interest.

FUNDING

This work was funded by Faculty of Medicine and Health Sciences Universitas Jambi, for their financial support through Penelitian Terapan Faculty of Medicine and Health Sciences Universitas Jambi Grant No. 357 /UN21.11/PT.01.05/SPK /2025.

DECLARATION OF ARTIFICIAL INTELLIGENCE USE

We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems.

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