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Clinical profile of diabetic foot ulcer patients in referral hospital Jambi: A sectional study

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Abstract

Background: Diabetic foot ulcer (DFU) is a chronic complication of diabetes mellitus (DM) and remains a significant challenge in morbidity, mortality, and disability among diabetic patients. This study aims to identify the sociodemographic and clinical characteristics of hospitalized DFU patients at Raden Mattaher General Hospital, Jambi.
Method: This retrospective cross-sectional study was conducted at Raden Mattaher General Hospital, Jambi, Indonesia. A total of 31 patients data were collected from the medical records of DFU patients hospitalized at Raden Mattaher General Hospital in 2022. The variables observed were age, sex, residence, comorbidities, type of DM, random blood glucose levels (RBG), amputation rate, mortality, and length of stay (LOS).
Results: The mean age of DFU patients was 55.6 ± 12.6 years, with females accounting for the majority (67.7%). Most patients lived outside Jambi City (74.2%), with more than one comorbidity (48.4%). All patients had type 2 diabetes mellitus (100.0%) with RBG level of 303.8 ± 205.8 mg/dL (mean±SD), amputation rate (19.4%), mortality rate (12.9%), and the mean LOS was 10.3 ± 6.9 days.
Conclusion: This study indicates that most DFU patients have multiple comorbidities and poorly controlled blood glucose levels, which contribute to a higher risk of amputation, mortality, and prolonged hospitalization.

Keywords: clinical profile; diabetes mellitus; diabetic foot ulcer; hospitalization; referral hospital

INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that occurs when the pancreas produces less insulin or the body cannot use insulin effectively (1). International Diabetes Federation (IDF) data in 2021 reported that the global prevalence of DM was 10.5%, affecting approximately 537 million adults aged 20–79 years, estimated to be 12.2% or 783 million people with diabetes by 2045. The prevalence of DM in Indonesia was 10.8%, attempting the 5th highest position with people with diabetes in 2021 (19.5 million people), estimated to be 28.6 million people by 2045 (2). Based on data from the Public Health Agency Province of Jambi in 2022, the prevalence of DM was 6.05%, with Jambi City in the highest position at 46.1%. Meanwhile, it also had the lowest percentage of patients receiving standard health services, with only 60.42% (3).

Poor management of diabetes mellitus (DM) can lead to both acute and chronic complications. Diabetic foot ulcers (DFU) are the most common complication of DM, which leads to long-term hospitalization among diabetic patients (4). The global prevalence of DFU is 6.3%, based on a large sample involving over 800,000 individuals. The highest prevalence was reported in North America (13.0%), which is higher compared to Asia (5.5%). The results of this study provide valuable insights for the management of DFU (5). In Indonesia, the prevalence of DFU is 15%, with an amputation rate (30%) and a mortality rate (32%). The number of DFU cases in

Indonesia was 8.4 million in 2001, which elevated to 14 million in 2006 (6).

The lifetime recurrence rate of diabetic foot ulcers (DFU) is approximately 50–70% within a 5-year period, about 84% DFU patients had lower limb amputations (84%)(7). Amputation is a clinical outcome of DFU, with 14.3% of death within a year after amputation, and 37% death within three years post-amputation (4). A study conducted at Cipto Mangunkusumo Hospital (RSCM) in Jakarta reported that DFU patients with severe infections and coronary artery disease (CAD) had the risk of death is a 5.202 times compared to non severe infection or CAD. Dyslipidemia was also found to increase the risk of death by 2.309 times. This study highlighted that the factors affecting mortality in DFU patients include the severity of infection, coronary artery disease, and dyslipidemia (8). Currently, DFU remains a major challenge, being one of the leading causes of morbidity, mortality, and disability among diabetic patients. This can trigger a serious threat to national health and economic development (9). In Indonesia, DFU continues to be a complex problem that is still poorly managed(10). However, global epidemiological studies on DFU are relatively rare (5). This aim of this study is to identify sociodemographic and clinical profile of DFU patients in regional referral hospital in Jambi Province.

METHOD

This is an observational study with a retrospective cross-sectional design. The ethical clearance for this study was approved by the ethical committee Raden Mattaher Regional General Hospital (RSUD) Jambi with number S.162/SPE/I/2025. The study was conducted at Raden Mattaher Regional General Hospital (RSUD) Jambi from February to March 2025. The data used in this study are secondary data obtained from the medical records of hospitalized diabetic foot ulcer (DFU) patients in 2022.

The population of this study includes all hospitalized DFU patients at RSUD Raden Mattaher Jambi in 2022. The sampling method used was consecutive sampling, resulting in a total sample size of 31 patients. The inclusion criteria were DFU patients whom hospitalized aged 18 years and older, with or without comorbidities. The exclusion criteria were DFU patients under 18 years old and incomplete medical record data. Data analysis was performed using univariate analysis to describe the frequency distribution and proportions of the studied variables, including age, gender, residence, comorbidities, type of diabetes mellitus, random blood glucose level, amputation, mortality, and length of hospital stay.

RESULTS

This study includes 31 patients hospitalized under-diagnosed diabetic foot ulcer (DFU) patients at Raden Mattaher Regional General Hospital (RSUD) Jambi in 2022. The sociodemographic data of DFU patients as seen in Table 1.

Characteristics	Total, n (%) (n = 31)
Sex	
Male	10 (32.3)
Female	21 (67.7)
Age, n (%), Mean ± SD	**55.6 ± 12.6**
18-40 years	5 (16.1)
41-60 years	17 (54.8)
≥ 61 years	9 (29.0)
Residence	
Jambi city	8 (25.8)
Outside Jambi	23 (74.2)
Comorbidity	
No commorbid	11 (35.5)
1 commorbid	5 (16.1)
>1 commorbid	15 (48.4)

Table 1. Sociodemographic characteristics of DFU patients

The majority of DFU patients hospitalized at RSUD Raden Mattaher were Type 2 Diabetes Mellitus (100.0%), with over

80% with no amputation and mortality status, as seen in Table 2.

Table 2. Clinical characteristics of DFU patients

Characteristics	Total, n(%) (n = 31)
Type DM	
Type 1	0 (0.0)
Type 2	31 (100.0)
Random Blood Glucose (RBG), n (%), (Mean ± SD)	**303.8 ± 205.8**
≥ 200 mg/dL	21 (67.7)
< 200 mg/dL	10 (32.3)
Amputation	
Yes	6 (19.4)
No	25 (80.6)
Mortality	
Yes	4 (12.9)
No	27 (87.1)
***Length of Stay* (LOS) days, Mean ± SD**	**10.3 ± 6.9**

DISCUSSION

Based on Table 1 shows that diabetic foot ulcer (DFU) patients were predominantly female, accounting for 67.7%, while males made up 32.7%. This finding is consistent with the study by (8) which reported 52.1% female and 46.9% male patients, as well as the study by (11), found 57.69% female and 42.31% male patients. However, it differs from the findings of (12), where DFU patients were predominantly male (61.50%), and (13), who also reported a higher proportion of male patients (52.2%). The higher prevalence of DFU among males has been attributed to factors such as reduced joint mobility, greater plantar pressure, and lower foot care awareness compared to females (14). However, once neuropathy or other risk factors develop, females are known to have an equal risk of developing DFU as males (15).

The average age of DFU patients was 55.6 ± 12.6 years (mean ± SD), consistent with the study of reported that the majority of DFU patients were over 50 years old with a mean age of 59.65 ± 10.83 years. This may occur because the risk of developing DFU increases with age, which is closely associated with a longer duration of diabetes mellitus (16). The most common age group among DFU patients was middle adulthood (41–60 years), in line with the study of (17), who reported that 46.44% of DFU patients were middle-aged adults between 45 and 60 years. According to (16), middle-aged adults with DFU are more likely to experience foot infections, hospitalizations, and DFU recurrence compared to older adults. Most DFU patients lived outside Jambi City (74.2%), while 25.8% were residents of Jambi City. This is likely because many patients admitted to RSUD Raden Mattaher are referrals from primary and secondary healthcare facilities outside Jambi City.

The referral healthcare system aims to provide better quality healthcare services to patients (18). Most DFU patients had more than one comorbidity (48.4%), consistent with the findings of (8), who reported that nearly all hospitalized DFU patients had more than one comorbidity.

Based on Table 2, in this study, all DFU patients were diagnosed with type 2 diabetes mellitus (100.0%), a percentage similar to that reported by (8), who found that 98.5% of DFU patients had type 2 diabetes mellitus. This may be due to the much higher incidence of type 2 diabetes compared to type 1 diabetes, in line with International Diabetes Federation (IDF) data in 2021, which reported that more than 90% of people with diabetes have type 2 diabetes (2). The mean initial random blood glucose (RBG) level among DFU patients was 303.8 ± 205.8 mg/dL (mean ± SD), with 67.7% of patients having an RBG ≥ 200 mg/dL, indicating that the majority had poorly controlled blood glucose levels. This finding is comparable to (8), who reported a mean RBG of 251.72 ± 154.42 mg/dL, with 53.3% of patients having an RBG ≥ 200 mg/dL, and (13), who reported a median RBG of 232 mg/dL (range 60–713 mg/dL). This means that the random blood glucose level in this study was higher than that reported in the RSCM study, which could be influenced by several factors, including the quality of hospital services. A study by (19) stated that

clinical pharmacy services provided by pharmacists could optimize patient therapy; patients receiving clinical pharmacy services showed improvement in fasting blood glucose control 11-fold higher than those who did not receive such services. Poorly controlled high blood glucose levels can promote the growth of pathogenic anaerobic bacteria in the plasma, which may eventually lead to diabetic foot ulcers (20).

The amputation rate in this study was 19.4%, whereas the study by (8) reported a higher amputation rate of 44.8%. Amputation rates among DFU patients reported in various studies range from 5.2% to 34.9%, attributed to multiple factors (21). A study by (22) identified factors associated with diabetic foot amputation, including osteomyelitis, ulcer and infection severity, chronic kidney disease, ulcer location at the forefoot, and peripheral artery disease. Nevertheless, differences in amputation rates may also be influenced by variations in genetic profiles, treatment protocols, study designs, and culture characteristics of populations.

Most patients hospitalized with lower-grade ulcers did not require amputation, which correlates positively with the lower amputation rate observed, as amputation is generally needed for patients with more severe ulcers. Other factors influencing the decision to perform amputation in DFU patients include socioeconomic conditions and psychological aspects of the patient. In some cases, patients refuse amputation due to concerns about their future quality of life and the persistent negative stigma in Indonesian society toward individuals with disabilities.

The mortality rate in this study was 12.9%. This result is in line with the mortality rate reported by (8) (13.5%) also identified coronary artery disease (CAD) as a significant factor influencing mortality in DFU patients. In contrast, the study by (11) reported a higher mortality rate of 42.31%. A study by (23) reported 199 deaths among 666 subjects, with a five-year mortality rate of 24.6% and a ten-year mortality rate of 45.4%. A higher mortality rate may be attributed to patients admitted to the hospital already with severe infection and serious complications (11). DFU patients are known to have high mortality rates and lower life expectancy. Age, chronic kidney disease (CKD), and low serum albumin levels are identified as risk factors for mortality (23).

In this study, the average length of hospital stay for DFU patients was 10.3 ± 6.9 days (mean ± SD). This result is similar to previous studies, (24) (8.7 days) and (25) (16.6 days). Variations in the length of stay are influenced by multiple factors, including ulcer severity, infection severity, and the presence of other complications experienced by the patients (26).

This study has several limitations that must be acknowledged. First, it is a retrospective cross-sectional study using secondary data from the medical records related to challenges in controlling information bias, such as incomplete sociodemographic and clinical data. Second, the data were limited to one year and collected from only one hospital. Nevertheless, this study has the benefit of being conducted at RSUD Raden Mattaher Jambi, a regional referral hospital in Jambi Province. Therefore, the inpatient DFU patient profile at RSUD Raden Mattaher in 2022 is sufficient to represent the characteristics and clinical profiles of DFU patients in Jambi province.

CONCLUSIONS

This study shows that the majority of DFU patients had comorbidities and poorly controlled blood glucose levels, contributing to a higher risk of amputation, mortality, and prolonged length of stay (LOS). Research on the profile of DFU patients contributes more benefits to hospital's evaluation of DFU management. Further studies are needed to comprehensively identify patient characteristics, clinical profiles, and factors affecting clinical outcome of DFU patients.

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