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Prevalence of Diabetic Foot Ulcers Among Diabetes Patients in Indonesia: A Systematic Review

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ABSTRACT

Introduction: Diabetic Foot Ulcers (DFUs) represent one of the most severe and costly complications of diabetes mellitus (DM), contributing substantially to increased morbidity, mortality, and healthcare expenditure, both in Indonesia and globally. **Methods:** A systematic literature search was conducted using PubMed, ScienceDirect, ProQuest, Google Scholar, and the Indonesian Journal Portal (Garuda), following the PRISMA 2020 guidelines. The review included open-access primary studies published between January 2015 and October 2025 that reported the prevalence of DFUs among patients with diabetes in Indonesia. Data from four eligible studies were extracted and critically appraised using the Joanna Briggs Institute (JBI) Critical Appraisal Toolsforprevalence studies.

Results: The reported prevalence of DFUs ranged from 9.08% to 16.2% in tertiary referral hospitals and approximately 12% in regional hospitals. DFUs accounted for more than 15% of diabetes-related hospital admissions. Furthermore, the rate of non-traumatic lower-limb amputations among patients with DFUs ranged between 14% and 30%.

Conclusion: DFUs remain a common complication of diabetes and a major contributor to diabetes-related morbidity in Indonesia. These findings highlight the urgent need to strengthen preventive strategies, routine screening, and multidisciplinary management of diabetic foot conditions nationwide.

KEY WORDS: Diabetic Foot Ulcer, Prevalence, Diabetes Mellitus, Indonesia, Systematic Review.

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I. INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia and continues to be a leading cause of preventable morbidity and mortality worldwide [10]. Among its chronic complications, Diabetic Foot Ulcer (DFU) is considered one of the most disabling and economically burdensome conditions. DFU is clinically defined as a full-thickness wound penetrating the dermis, typically occurring below the ankle in individuals with diabetes [1]. Globally, it is estimated that approximately 19% to 34% of individuals with diabetes will develop a DFU at some point during their lifetime [7].

Indonesia has been identified by the International Diabetes Federation (IDF) as one of the countries with a rapidly increasing diabetes burden [2]. This growing prevalence of DM is directly associated with a rising incidence of chronic complications, including DFUs. Available local evidence indicates that DFUs account for a substantial proportion of non-traumatic lower-extremity amputations and represent a leading cause of hospitalization among patients with diabetes [5,7].

Despite its clinical significance, epidemiological data on DFU prevalence in Indonesia remain fragmented and are predominantly derived from hospital-based studies. Therefore, this systematic review aims to synthesize available open-access evidence published over the past decade to provide a more integrated overview of DFU prevalence in Indonesia. The findings are expected to support evidence-based nursing interventions and inform health policy development [3].

II. METHOD

A systematic review design focusing on the prevalence of diabetic foot ulcers in Indonesia. The reporting process adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines [3]. Studies were included based on the PEO framework (Population, Exposure, Outcome):

- **Population (P):** Adult patients diagnosed with type 1 or type 2 diabetes mellitus receiving care in healthcare facilities in Indonesia.
- **Exposure (E):** Assessment or estimation of diabetic foot ulcer prevalence.
- **Outcome (O):** Reported prevalence of DFUs expressed as percentages or ratios.
- **Additional Criteria:** Full-text, open-access articles published in either English or Indonesian between January 2015 and October 2025.

Exclusion criteria included narrative reviews, case reports, studies focusing solely on risk factors or management without reporting prevalence, and studies conducted outside Indonesia. A comprehensive search was performed across PubMed, ScienceDirect, Google Scholar, and the Indonesian Journal Portal (Garuda). The search strategy combined Medical Subject Headings (MeSH) and free-text terms as follows:("Diabetic Foot Ulcer" OR "Diabetic Foot") AND ("Prevalence" OR "Epidemiology") AND ("Indonesia"). Extracted data included authorship, year of publication, study location, study design, sample size, population characteristics (inpatient or outpatient), and reported DFU prevalence. Methodological quality was evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Tools for prevalence studies [3]. Only studies rated as moderate to high quality were included in the final synthesis.

III. RESULTS

A total of four studies met the inclusion criteria. Most employed cross-sectional or retrospective designs and were conducted in tertiary referral hospitals and regional hospitals across Java, Sumatra, and Sulawesi, reflecting major diabetes referral centers in Indonesia [4,6].

3.1 Estimated Prevalence of Diabetic Foot Ulcers

The prevalence of DFUs varied considerably across regions and clinical settings:

- **Inpatient Settings:** Studies focusing on hospitalized patients with diabetes reported relatively high prevalence rates. A study from Surabaya (2016–2018) reported that DFUs accounted for 9.08% of all hospital admissions among patients with type 2 diabetes [4]. Similarly, a tertiary hospital in Semarang reported a DFU prevalence of 16.2% among admitted diabetes patients [5]. These findings indicate that DFUs represent a major cause of severe diabetes-related morbidity requiring intensive hospital care.
- **Outpatient and Regional Settings:** Prevalence estimates in broader or outpatient populations were generally lower but remained clinically significant, ranging from approximately 7.3% to 15% of the total diabetes population [6,7].

3.2 Amputation Rates and Other Clinical Outcomes

A concerning consensus emerged regarding the high rate of lower-extremity amputations. Across studies, the proportion of patients with DFUs undergoing major or minor amputations ranged from 14.11% to 30% [5,7]. Additionally, DFU-related mortality was reported to be as high as 40.93% in one hospital-based study [4].

IV. DISCUSSION

The high prevalence of DFUs in Indonesia, as demonstrated in this review, underscores a significant public health challenge. The concentration of reported cases in tertiary hospitals and the consistently high amputation rates suggest that many patients present at advanced stages of disease [5,9]. Contributing factors may include limited patient awareness, inadequate routine foot screening at the primary care level, and barriers to accessing multidisciplinary foot care services [11].

Nurses play a critical role in addressing these gaps. Positioned at the frontline of diabetes care, nurses are well placed to conduct DFU risk screening using simple tools such as the 10-g monofilament, provide structured foot-care education, and advocate for early intervention strategies [9]. The disproportionately high amputation rates in Indonesia, compared with many high-income countries, highlight systemic shortcomings in the implementation of effective preventive protocols.

Limitations: Although this review provides a comprehensive overview, the findings should be interpreted cautiously due to heterogeneity among studies in terms of design, DFU definitions, and clinical settings. Restricting inclusion to open-access sources may also introduce publication bias. Consequently, a meta-analysis was not feasible, and a narrative synthesis was deemed the most appropriate approach.

V. CONCLUSION

Diabetic foot ulcers exhibit a substantial prevalence in Indonesia and are associated with alarming rates of amputation and mortality. This disease burden necessitates immediate and coordinated action.

Recommendations for Nursing Practice and Health Policy:

1. **Standardized Screening:** Health authorities should mandate routine, standardized diabetic foot screening—using validated tools such as monofilaments—conducted by nurses at every diabetes-related healthcare visit, particularly within primary care settings [9].

2. **Structured Education Programs:** Nurse-led health education initiatives should be intensified to improve patient knowledge and self-care practices related to diabetic foot prevention [11].
3. **Future Research:** Further studies should prioritize nationally representative, community-based epidemiological research employing standardized diagnostic criteria to generate more accurate prevalence estimates [3].

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VII. DISCLOSURE

The authors declare that there are no conflicts of interest related to the publication of this article. This systematic review was conducted independently without any financial, commercial, or institutional influence that could have affected the study design, data collection, analysis, interpretation, or reporting of the findings.

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