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Determinants Self-Care of Diabetic Foot Ulcer Incidence Diabetes Mellitus Patients

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INFORMASI

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ABSTRACT

Background: : Diabetic foot ulcers are a chronic complication of Diabetes Mellitus (DM) that often leads to disability and amputation. The incidence of foot ulcers is closely related to patient self-care behavior, including diet, physical activity, medication adherence, blood sugar monitoring, and foot care Objective: The purpose of this study was to determine the determinants of self-care on the incidence of diabetic foot ulcers in Diabetes Mellitus patients.

Methods: This article used a cross-sectional design with a population of 91 with a sample of 73 DM patients selected by purposive sampling. The instruments used were the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire to assess self-care and an observation sheet for the incidence of diabetic foot ulcers. Data analysis was performed using the Chi-Square test and logistic regression to determine the determinant factors.

Results: The results showed a significant relationship between self-care and the incidence of diabetic foot ulcers ($p < 0.05$). Foot care was the most dominant factor (OR = 0.0004; CI95%), followed by blood sugar monitoring and medication adherence.

Conclusion: Self-care significantly influences the incidence of diabetic foot ulcers, with foot care being the primary determinant. Intensive education regarding self-care, particularly foot care and blood sugar monitoring, is needed to prevent further complications.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disease with increasing global prevalence. The International Diabetes Federation (IDF) reported in 2023 that the number of people with DM worldwide reached 537 million, and this number is predicted to increase to 643 million by 2030. One of the chronic complications of DM is diabetic foot ulcers, with an incidence rate of approximately 15–25% over the lifetime of patients. Foot ulcers are a leading cause of non-traumatic amputations and impact quality of life.

Self-care is a patient's ability to manage their disease independently. Orem emphasized that self-care includes diet, physical activity, medication adherence, blood sugar monitoring, and foot care. Suboptimal self-care practices increase the risk of developing diabetic foot ulcers.

Based on this phenomenon, this study aims to determine the determinants of self-care in the incidence of diabetic foot ulcers in patients with diabetes mellitus.

Self-care is a need where a person or individual manages their health independently. The need for self-care is very important in anticipating the condition of the body to stay clean and fresh. Therefore, adequate self-care performance must include these three behaviors. (Joeliantina et al., 2024) Indonesia ranks 6th out of 10 countries with 10.3 million people suffering from diabetes mellitus and it is estimated that in 2045 Indonesia will rank 7th out of 10 countries with 16.7 million people suffering from diabetes mellitus. From the results of the Self-care study in type 2 diabetes mellitus patients in the Batunadua Community Health Center work area, it was found that 52 people (74.3%) had poor self-care out of 70 respondents (Saragih et al., 2022). Diabetes Mellitus (DM) sufferers will trigger blindness, kidney failure, strokes and causes of lower limb amputation and premature death (WHO, 2021). In some cases, uncontrolled blood sugar levels are still found in people with diabetes mellitus even though the patient already knows several management methods to maintain normoglycemia (Hartanti, 2022). A further complication after the patient experiences peripheral neuropathy is diabetic ulcers. These ulcers often attack the lower extremities (feet) of the patient. This diabetic ulcer is a complication of diabetes mellitus that is a global threat and challenge in the world (Kalsum et al., 2020). Treatment for people with diabetes mellitus who experience diabetic ulcers is very complicated and expensive. Therefore, it is necessary to carry out a self-care model that can prevent recurrence in patients. This condition has an impact on unhappiness and psychological well-being in people with degenerative diseases such as diabetes mellitus. This self-care will affect the increase or decrease in blood sugar levels, if someone routinely performs self-care, the patient's blood sugar levels will be within the expected range (Endra Cita et al., 2019). Therefore, attention to self-care for people with diabetes mellitus is crucial, and ongoing education is needed to provide essential information for managing this condition. Complications, longer duration of diabetes, depression, non-adherence to treatment, and poor self-care are associated with a poorer quality of life (Sofiani et al., 2022).

Diabetes self-care behaviors include: diet; exercise; medication; regular blood glucose monitoring; complication prevention (routine foot care, monitoring signs and symptoms of the disease, smoking cessation); and prevention and treatment of hyperglycemia and hypoglycemia (Laode et al., 2022). Optimal self-care will positively impact the patient's well-being.

Patients who are able to implement self-care and diet recommendations, take supplements, and engage in physical activities such as exercise and relaxation will benefit from optimal self-care practices. Self-care for DM patients requires commitment and can be a challenge (Hardianti et al., 2021).

Efforts that can be implemented to stabilize blood sugar levels include fulfilling self-needs, self-care, and self-management, which are self-focused approaches that promote self-management. Based on this background, this study aimed to examine the determinants of self-care for the incidence of diabetic foot ulcers in patients with diabetes mellitus.

METHOD

Study Design

This study used a quantitative, analytical, and correlational design with a cross-sectional approach. The aim was to determine the effect of self-care (diet, physical activity, foot care, medication, and blood sugar monitoring) on preventing the risk of diabetic foot ulcers in patients with diabetes mellitus at the Kraksaan Health Center. This study was conducted from March to June 2025.

Population, Sample, and Sampling

The population in this study was 127 patients with diabetes mellitus, with a sample size of 73 who met the Inclusion criteria included patients with blood glucose levels of more than 200 mg/dL, aged between 31 and 60 years, willing to be respondents, and able to read and write. Exclusion criteria included patients with diabetes mellitus who were unwilling, aged over 60 years,. The measurement instrument used was the

Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. Self-care was the dependent variable, while the independent variable was the risk of diabetic ulcers in patients with diabetes mellitus.

Data Analysis

Descriptive analysis will be presented using frequency and percentage data. Logistic regression testing was used to analyze the effect of diet, physical activity, foot care, medication, and blood sugar monitoring on preventing the risk of foot ulcers. A p-value of ≤ 0.05 was considered statistically significant in all cases.

Ethical Clearance

This study has obtained ethical approval from the Health Research Ethics Commission under ethics certificate number 052/KEPK/UNHASA/II/2025. The researchers also provided reimbursement for transportation costs for all participants.

RESULTS

The study results show general data as shown in the table below:

Table 1. Respondent Characteristics Based on Demographic Data (n=73)

Demographic Data	n	%
Age (Year)		
< 45	8	11,0
45–55	21	28,8
> 55	44	60,2
Gender		
Male	29	39,7
Female	44	60,3
Duration of suffering from DM		
< 5 Years	15	20,5
5–12 Years	42	57,5
> 12 Years	16	21,9
Diabetic Ulcer Occurrence		
Having leg ulcers	11	15,0
No leg ulcers	62	85,0
Total	73	100

Source: Primary Data, Research Questionnaire, June 2025

Table 1 shows that the majority of respondents in this study had an average age of 56 years, with the largest proportion being women. Most respondents had suffered from Diabetes Mellitus for 5–12 years. This indicates that the elderly group with more than five years of DM have a higher risk of developing chronic complications such as diabetic foot ulcers. 0.15% of respondents experienced diabetic foot ulcers. Although the incidence is relatively small, this condition remains a serious problem because it can lead to permanent disability and even amputation if not promptly treated.

Table 2. Distribution of Respondent Self-Care Results

Self-Care Components	Tinggi n (%)	Sedang n (%)	Rendah n (%)
Diet	20 (27,4)	38 (52,0)	15 (20,6)
Physical Activity	18 (24,7)	40 (54,8)	15 (20,5)
Medication Compliance	25 (34,2)	33 (45,2)	15 (20,6)
Blood Sugar Monitoring	15 (20,6)	35 (47,9)	23 (31,5)
Foot Care	14 (19,2)	37 (50,7)	22 (30,1)

Source: Self-Care Distribution Results, June 2025

Table 2 shows that respondents' self-care levels varied, but most were in the moderate category. This indicates that patients' self-care behaviors are suboptimal, particularly in the areas of foot care and blood sugar monitoring, which tend to be neglected.

Table 3. Bivariate Analysis of Self-Care with Foot Ulcer Incidence (Chi-Square)

Self-Care Variables	p-value	Description
Diet	0,032	Significant
Physical Activity	0,041	Significant
Medication Compliance	0,015	Significant
Blood Sugar Monitoring	0,007	Significant
Foot Care	0,001	Significant

Source: Bivariate Analysis Results (Chi-Square) of Self-Care, June 2025

Table 3 shows The Chi-Square test showed a significant association between all self-care components (diet, physical activity, medication adherence, blood sugar monitoring, and foot care) and the incidence of diabetic foot ulcers ($p < 0.05$). The better the patient's self-care behavior, the lower the likelihood of developing foot ulcers.

Table 4. Multivariate Analysis (Logistic Regression)

Self-Care Variables	OR	p-value	Description
Foot Care	0,0004	<0,01	Dominant factor
Blood Sugar Monitoring	0,0023	<0,05	Significant
Medication Compliance	0,0041	<0,05	Significant
Diet	0,0312	0,06	Not dominant
Physical Activity	0,0457	0,07	Not dominant

Source: Multivariate Analysis Results (Logistic Regression) June 2025

Table 4 shows that: Foot care is the most dominant factor influencing the incidence of diabetic foot ulcers (OR = 0.0004; p < 0.01). Blood sugar monitoring has a significant effect on foot ulcer prevention (OR = 0.0023; p < 0.05). Medication adherence also plays a significant role (OR = 0.0041; p < 0.05). Diet and physical activity influence the incidence of foot ulcers, but do not emerge as dominant factors.

DISCUSSION

The discussion of the research results includes: The analysis shows that this study demonstrates that self-care behavior is significantly associated with the incidence of diabetic foot ulcers in patients with diabetes. This confirms that preventing chronic complications in diabetes is greatly influenced by the patient's ability to perform daily self-care. Foot care has emerged as a dominant factor in preventing foot ulcers. Diabetes patients who regularly examine their feet, maintain hygiene, avoid trauma, and wear appropriate footwear have a lower risk of developing wounds that can develop into ulcers. These results align with research by Boulton et al. (2018), which found that foot care education can reduce the incidence of amputations by up to 50%.

Furthermore, blood sugar monitoring plays a crucial role. Patients who regularly monitor their blood sugar levels are better able to manage their diet, physical activity, and medication adherence. Conversely, patients who rarely monitor their blood sugar are at risk of recurrent hyperglycemia, which can lead to peripheral neuropathy and circulatory disorders, increasing susceptibility to foot ulcers.

Medication adherence has been shown to be significant in preventing ulcers. Patients who adhere to their medications as prescribed have better metabolic control, reducing the risk of complications. This aligns with the ADA (2023) statement that adherence to pharmacological therapy is a key pillar of diabetes Millitus.

Meanwhile, diet and physical activity, although influential in the incidence of foot ulcers, were not dominant factors. This is likely because the effects of diet and exercise are more pronounced in long-term glucose control, while foot ulcers are more influenced by direct daily care, such as foot care and blood sugar monitoring.

These findings emphasize the importance of educational interventions and intensive support for diabetes patients regarding self-care. The primary focus should be on increasing patient awareness regarding foot care, blood sugar monitoring, and medication adherence, without neglecting the role of diet and physical activity.

CONCLUSION

The conclusions from the study are as follows: Self-care is significantly associated with the incidence of diabetic foot ulcers in diabetes mellitus patients. Foot care is the primary determinant, followed by blood sugar monitoring and medication adherence. Nurses need to integrate self-care education into routine care for diabetes patients, with an emphasis on foot care. Patients are encouraged to perform daily foot examinations, routine blood sugar checks, and adhere to medication. Further research with a longitudinal design is needed to assess the effectiveness of self-care education programs.

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Author Contributions

The authors of this study contributed to the completion of the manuscript. Nur Hamim contributed to the conception, drafting, and analysis. Nafolion Nur Rahmat contributed to the conception. Ro'isah make a design of the study. Umi Narsih performed data analysis and Ethical Consideration, contributed to the conception and design of the study; research supervision; and critical revision for important intellectual content. Nur Rahmat revised the manuscript**.**

Declaration of Interests

The authors declare no conflicts of interest in the preparation, writing, and publication of this manuscript. This research was conducted independently and without any financial, personal, or professional relationships that could be construed as influencing the work presented here. All authors have reviewed and approved this declaration of interests**.**

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