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Relationship between self-care level and risk of diabetic foot ulcers (DFU) in diabetes mellitus patients

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Abstract

Background: Diabetic foot ulcers are a serious complication that increases morbidity and amputation risk in patients with diabetes mellitus. Self-care is an important aspect of diabetes management that includes various health behaviours, such as diet, exercise, blood sugar monitoring, medication adherence and foot care.
Purpose: To measures the relationship between the level of self-care of patients with diabetes mellitus (DM) and the risk of diabetic foot ulcers.
Method: This study uses Analytical research methods using a Crossectional study approach. The sample size in this study used total sampling, from January to early March 2025, totalling 66 respondents. Data analysis to find the relationship between variables using non-parametric correlation test analysis, namely Spearman Correlation with a meaning level of 95% (0.05) because the data is ordinal scale.
Results: This study found that based on statistical tests there was a correlation between the level of self-care and the risk of diabetic foot ulcers with a p value of 0.000 <0.05. Spearman's correlation value of 0.521 shows a positive correlation with a fairly strong correlation strength.
Conclusion: The better the level of self-care of type 2 diabetes mellitus patients, the lower their risk of developing diabetic foot ulcers.

Keywords: Diabetic Foot ulcer (DFU); Diabetes Mellitus Patients; Self-care.

INTRODUCTION

Diabetes mellitus is indicated by high blood sugar levels (Kistan, Basri, & Sibulo, 2024; Yang, Miao, Huang, Tsai, Yeh, Su, & Wang, 2019). The prevalence of diabetes mellitus (DM) is a growing global health problem, with a significant impact on health systems worldwide. According to the International Diabetes Federation, 537 million adults globally had diabetes in 2021, projected to increase to 783 million by 2045 (Basri, Kistan, & Sukmawati, 2023). Indonesia is one of the countries with a high prevalence of diabetes, with approximately 10.7 million cases reported in 2018 and expected to increase until 2030 (Li, 2025). The increasing prevalence is largely attributed to lifestyle-like risk factors such as obesity, sedentary lifestyle, genetics and physical inactivity, which are major contributors to type 2 diabetes (Yameny, 2024; Galle, Geraedts, Deijen, Milders, & Drent, 2020).

Complications from uncontrolled diabetes can lead to severe health problems, including cardiovascular disease, kidney damage, and neuropathy (Siam, Snigdha, Tabasumma, & Parvin, 2024). One of the serious complications often experienced by people with DM is diabetic foot ulcers, which can cause high morbidity, disability, and even increase the risk of amputation and death. In Indonesia, the prevalence of diabetic foot ulcers in patients with DM reaches 15%, with an amputation

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rate of 30% and a mortality rate of up to 32%. This condition not only impacts individual health, but also places a significant social and economic burden on patients, families, and the healthcare system (Cahyaningtyas & Werdiningsih, 2022).

Various factors contribute to the high risk of diabetic foot ulcers, including peripheral neuropathy, impaired blood circulation due to peripheral arterial disease, and poor glycemic control (Cahyaningtyas & Werdiningsih, 2022). In addition, low levels of awareness and inadequate foot care practices increase the incidence of foot ulcers in people with diabetes. prevention strategies, including regular diabetic foot screening and self-care at home (Nazier & Karma, 2021).

A diabetic foot ulcer has the potential to become a wound, which if not treated promptly can lead to severe infection, requiring amputation to prevent further tissue damage. The risk of infection increases significantly with delayed treatment. Amputation significantly impacts the patient's quality of life and is associated with increased morbidity and mortality due to complications such as systemic infections (Armstrong & Lipsky, 2004).

Self-care is an important aspect of diabetes management that includes self-monitoring of blood sugar levels, good foot care, dietary monitoring, appropriate physical activity, and medication adherence. Optimal self-care practices can prevent foot wounds, reduce the risk of infection, and reduce the rate of more serious complications such as amputation (Dewi, Widari, Nursalam, Mahmudah, Sari, & Ning, 2023).

However, patients' understanding and adherence to these self-care practices are still low. Various factors, such as the level of knowledge, family support, access to health services, and limited resources, contribute to the ineffectiveness of self-care implementation among people with diabetes (Paudel, Vandelanotte, Dahal, Biswas, Yadav, Sugishita, & Rawal, 2022). A study found that 83.1% of diabetic patients demonstrated good knowledge of diabetes management, yet many did not have an adequate understanding of foot care, risking complications (Ahmed, Jilani, Jabeen, Shah, Naz, Adnan, Islam, & Zaheer, 2025).

Based on the data and facts about the importance of identifying effective interventions in the prevention of Diabetic foot ulcers and so that diabetic patients can carry out better foot care. so the researcher is interested in conducting a study that aims to determine the relationship between the level of self-care and the risk of diabetic foot ulcers in patients with type 2 diabetes mellitus (DM) at Bone Wound Care Centre.

RESEARCH METHOD

This study uses Analytical research using a cross-sectional study approach to explain the relationship between risk factors (independent) and effect factors (dependent) of self-care with the risk of diabetic foot ulcers where researchers make observations or measurements with data collection at one time.

The population in this study were all patients who checked themselves at the Bone Wound Care Centre from January to early March 2025, namely 66 respondents. Determination of the sample in this study using the Total sampling method where the number of samples is the same as the population. The reason for taking total sampling is because the greater the number of samples approaching the population, the smaller the chance of generalization error.

The instrument used to collect data on self-care variables (Independent variable) Diabetes Self Care Activities Scale (DSCA) questionnaire given to each Respondent. This questionnaire contains 15 questions to measure the self-care activities of diabetic patients, consisting of diet, exercise, blood sugar monitoring, medication compliance and foot care carried out seven days earlier. With data interpretation in the categories of good (X ≥66), moderate (33 ≤ X <66) and poor (X <33). While data collection Diabetic Foot Ulcer risk variables (dependent variable) Foot Risk Classification System (DFRCS) questionnaire which contains 11 assessment indicators with categories High risk (score >15), moderate risk (score 8-15), low risk (score <8). The analysis of this study used non-parametric correlation test analysis, namely Spearman Correlation with a meaning level of 95% (0.05) using a computer program in the form of SPSS with data management stages of editing, coding, processing and cleaning. Where this research emphasizes ethical issues which include: Informant Consent, Anonymity, and Confidentiality.

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RESEARCH RESULTS

Table 1. Distribution of Respondents' Characteristics (N=66)

Variable	Results
Age (Mean ±SD)(Range)(Year)	(50.25±8.128) (30-60)
Age (n/%)	
30-35 years	6/9.1
36-41 years	10/15.1
42-47 years	11/16.7
48-53 years	14/21.2
54-59 years	24/36.4
≤ 60 years	1/1.5
Gender (n/%)	
Male	28/42.4
Female	38/57.6
Education (n/%)	
Elementary School	2/3.0
Junior High School	6/9.1
Senior High School	45/68.2
Diploma	3/4.6
Undergraduate	10/15.1
Self-care Lavel (n/%)	
Good	24/36.4
Moderate	30/45.4
Poor	12/18.2
Risk Diabetic Foot Ulcers (n/%)	
High risk	17/25.8
Medium Risk	26/39.4
Low Risk	23/34.8

Table 1 shows that the results of univariate analysis of respondent characteristics with a total of 66 respondents, the average age of respondents in this study was 50.25 with a standard deviation of 8.128, the lowest age was 30 years, and the highest age was 60 years. While the age group of respondents is mostly in the age range of 54-59 years, namely as many as 24 (36.4%). The female gender group is the largest, namely 38 (57.6%). High school education is the most numerous group of 45 (68.2%). The majority of respondents in the self-care category were moderate, namely 30 (45.4%). Most respondents were in the moderate risk diabetic foot ulcer category, as many as 26 (39.39%).

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Table 2. The Relationship between Self-care and The Risk of Diabetic Foot Ulcers (N=66)

Variabel	Self-care level	Diabetic Foot Ulcers
Self-care level		
Correlation Coefficient	1.000	0.521
Sig. (2-tailed)	-	0.000
Diabetic Foot Ulcers		
Correlation Coefficient	0.521	1.000
Sig. (2-tailed)	0.000	-

Table 2 shows that there is a correlation between the level of self-care and the risk of diabetic foot ulcers with a p value of 0.000 <0.05. Spearman's correlation value of 0.521 shows a positive correlation with a fairly strong correlation strength.

DISCUSSION

Based on the findings of this study, it shows that the female gender group is the largest group of respondents with 38 (57.6%) and the largest age group of respondents is 54-59 years. This is in accordance with research conducted previously which found that of the 19 patients with diabetic ulcers, most were at a late age, namely 55 respondents, while based on gender, women were the most respondents, namely 77 respondents with diabetic ulcers (Detty, Fitriyani, Prasetya, & Florentina, 2020). The results of this study are also in line with research conducted at Sidrap District General Hospital, which found that as many as 53 (70%) respondents were female and age was a risk factor with age> 45 years having a 11.183 times greater risk of developing diabetes mellitus (Adri, Arsin, & Thaha, 2020). This is because humans experience physiological decline after the age of 40. Diabetes mellitus often appears after humans enter this vulnerable age. The older the age, the higher the risk of suffering from diabetes mellitus, especially at the age of 45 years.

WHO says that a person aged 30 years and above will experience an increase in blood glucose levels of 1-2 mg/dl/year during fasting and will rise 5.6-13 mg/L1 in 2 hours after eating. While women are more because the sooner women menopause, the more at risk of diabetes mellitus. In post-menopausal women, metabolic disorders, obesity, and steroid hormone disorders increase the incidence of metabolic syndrome, type 2 DM, cardiovascular disease, and malignancies (Fitria, Nur, Marissa, & Ramadhan, 2017). Furthermore, this study found that respondents with a high school education level 45 (68.2%) were the largest group of respondents. This study identified that educational factors influence the level of self-care, because someone who has a higher education seeks to seek recovery so that it does not get worse. This is in accordance with research at the Karangmalang Health Center which stated that on average, patients who have a good level of self-care are patients with moderate to high levels of education (Putri, 2024).

This study also found that the level of self-care with the risk of diabetic ulcers in patients with diabetes mellitus which includes various health behaviours, such as maintaining foot hygiene, choosing the right footwear, conducting regular checks for wounds or changes in the feet, and controlling blood sugar levels through a healthy diet and physical activity, has a significant relationship, namely the better the level of self-care, the lower the risk of diabetic foot ulcers. This is in accordance with research in Surabaya which found that foot self-care management was significantly correlated with the risk of diabetic foot ulcers (DFU) in patients with diabetes mellitus (DM) (Joeliantina, Norontoko, Adinata, Ragayasa, & Hamid, 2024). Statistical analysis revealed a p-value of 0.000, indicating a strong association between effective self-care management and reduced risk of diabetic foot ulcers (DFUs). This study is in line with research conducted in Vietnam, which found that there was an increase in self-care behaviour before and after the intervention for foot care (p = 0.001, and a decrease in the prevalence of risk factors for diabetic foot ulcers with a value (OR: 0.04, 95% CI 0.01 - 0.13, p

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< 0.001) (Nguyen, Edwards, Do, & Finlayson, 2019). This study is supported by research in the working area of the Selabatu Health Center, Sukabumi City, based on the results of statistical tests with chi-square, the resulting P value was 0.000 <0.05 so that it can be concluded that there is a relationship between foot care behavior and the incidence of diabetic ulcers in people with diabetes mellitus (Latifah, Danismaya, & Makiyah, 2023).

Self-care is an important aspect of diabetes management that includes diet, exercise, blood sugar monitoring, medication adherence and foot care. Optimal self-care practices can prevent foot wounds, reduce the risk of infection, and reduce the rate of more serious complications such as amputation. Given the serious impact caused by diabetic foot ulcers, more effective prevention efforts are needed with an emphasis on improving knowledge and self-care skills in DM patients at risk of diabetic foot ulcers.

CONCLUSIONS

The results of this study indicate that self-care has a significant and positive relationship with the risk of diabetic foot ulcers (UKD) in patients with type 2 diabetes mellitus, the better the level of self-care consisting of diet, exercise, blood sugar monitoring, medication compliance and foot care by patients, the lower their risk of developing diabetic foot ulcers. So this study confirms the importance of knowledge and awareness for diabetic patients in improving the implementation of self-care to reduce the risk of diabetic foot complications, improve the quality of life of diabetic patients, and reduce the economic burden caused.

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