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The Relationship of Risk Factors with the Incidence of Diabetic Ulcers in Patients with Type 2 Diabetes Mellitus at RSUD UNDATA

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ABSTRACT:

Background: Type 2 d abetes mellitus is a metabolic disease that can cause various complications, one of which is diabetic ulcer. The incidence of diabetic ulcers in patients with type 2 diabetes mellitus at RSUD Undata is still relatively high. Risk factors such as age, duration of diabetes, gender, smoking, hypertension, hyperglycemia, and obesity are thought to contribute to the incidence of diabetic ulcers.

Objective: This study aims to determine the relationship between risk factors and the inc dence of d abeti ulcers in patient's with type 2 diabetes mellitus at RSUD Undata.

Methods: This study used an observational analytic quantitative design with a cross-sectional method. The study sample consisted of 45 patients with type 2 diabetes mellitus who were admitted to RSUD Undata in the period December 2024 to February 2025. Data were collected using a *total sampling* model through interviews and medical records, then analyzed using the chi-square test to determine the relationship between the independent and dependent variables.

Results: The results showed that there was no significant relationship between age (p=0.705), duration of diabetes (p=0.092), gender (p=0.833), smoking (p=0.363), hypertension (p=0.832), hyperglycemia (p=0.064), and body mass index (p=0.348) with the incidence of diabetic ulcers in patients with type 2 diabetes mellitus.

Conclusion: There is no significant relationship between the risk factors studied and the incidence of diabetic ulcers in patients w th type 2 diabetes mellitus at RSUD Undata. Further research with a larger population and longitudinal design is needed to obtain more accurate results.

KEYWORDS: Type 2 diabetes mellitus, diabetic ulcer, risk factors.

INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by increased blood sugar levels due to impaired insulin secretion or function[1,2]. Complications from this disease are very diverse, including retinopathy, nephropathy, and neuropathy, as well as cardiovascular disease[3]. One form of complication that is often encountered is diabetic ulcers[2]. The high prevalence of diabetes mellitus, as reported by the IDF in 2021, causes a high incidence of complications such as peripheral neuropathy and peripheral vascular disorders that contribute to the risk of chronic wounds[4,5]. The purpose of this study was to determine the risk factors associated with the prevalence of diabetic ulcers in patients with type 2 diabetes at Undata Hospital, Central Sulawesi.

RESEARCH METHODS

This study used a quantitative analytical approach through a cross-sectional study design[6,7]. This study involved 45 patients with type 2 diabetes mellitus who were hospitalized or outpatients at Undata Hospital from December 2024 to February 2025. The sampling technique was carried out by taking the entire population. Structured interviews and examination of medical records were the ways to obtain data. SPSS version 30 was used to analyze data through the chi-square test by evaluating the relationship between the incidence of diabetic ulcers and risk factors including age, gender, duration of suffering, obesity, hypertension, hyperglycemia, and smoking habits.

RESULTS AND DISCUSSION

1. Overview of Risk Factors for Diabetic Ulcers

This study aims to determine the risk factors associated with the occurrence of Diabetic Ulcers in patients with type 2 diabetes at Undata Hospital, Central Sulawesi. These risk factors include: age, gender, duration of diabetes mellitus, body mass index, hypertension, hyperglycemia and smoking behavior. The results are as follows :

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Table 1. Overview of Respondents' Risk Factors for Diabetic Ulcers in Inpatients and Outpatients at UNDATA Hospital

Variable	Category	Frequency	Percentage
Age	>40 years old	41	91.1%
	<40 years old	4	8.9%
	Total	**45**	**100%**
Gender	Male	22	48.9%
	Female	23	51.1%
	Total	**45**	**100%**
Long Suffering	>10 years old	23	56.7%
	<10 years old	22	43.3%
	Total	**45**	**100%**
Body Mass Index	Not Obese	30	66.7%
	Obesity I	13	28.9%
	Obesity II	2	4.4%
	Total	**45**	**100%**
Hypertension	There is	25	55.6%
	There isn't any	20	44.4%
	Total	**45**	**100%**
Hyperglycemia	>200 mg/dL	31	68.9%
	<200mg/dL	14	31.1%
	Total	**45**	**100%**
Smoke	There is	14	31.1%
	There isn't any	31	68.9%
	Total	**45**	**100%**

Source: primary data, 2025

This table displays an overview of the characteristics of the respondents, including age, gender, duration of diabetes, nutritional status based on body mass index (BMI), as well as hypertension, hyperglycemia, and smoking habits. Most patients were over 40 years old (91.1%), with a slightly higher percentage of women than men (51.1%). More than half of the respondents had had diabetes for more than 10 years. The majority were not obese (66.7%) and did not have a smoking habit (68.9%). Meanwhile, 55.6% of respondents were known to have hypertension, and 68.9% had hyperglycemia with blood sugar levels exceeding 200 mg/dL.

2. Relationship of Risk Factors for Diabetic Ulcers

After knowing the description of risk factors for diabetic ulcers, researchers conducted an analysis to determine the relationship between risk factors and the incidence of Diabetic Ulcers in type 2 diabetes patients at Undata Hospital, Central Sulawesi. The results are as follows:

Table 2. Relationship of Risk Factors for Diabetic Ulcers in Inpatients and Outpatients at UNDATA Hospital

Variable	Category	Diabetic Ulcer		Total	*P-Value*
		Diabetic Ulcer	Non Diabetic Ulcer		
Age	>40 years old	14	27	41	0.705
	<40 years old	1	3	4	
	Total	15	30	45	
Gender	Male	7	15	22	0.833
	Female	8	15	23	
	Total	15	30	45	
Long Suffering	>10 years old	5	12	17	0.092
	<10 years old	10	18	28	
	Total	15	30	45	
Body Mass Index	Not Obese	9	21	30	0.348
	Obesity I	6	7	13	
	Obesity II	0	2	2	
	Total	15	30	45	
Hypertension	There is	8	17	25	0.832
	There isn't any	7	13	20	
	Total	15	30	45	
Hyperglycemia	>200 mg/dL	13	18	31	0.064

	<200mg/dL	2	12	14	
	Total	15	30	45	
Smoke	There is	6	8	14	0.362
	There isn't any	9	22	31	
	Total	15	30	45	

Source: primary data, 2025

This table presents the results of the chi-square test between the incidence of diabetic ulcers and various risk factors studied. None of the risk factors were found to have a p value <0.05. Thus, it can be concluded that there is no significant relationship between age, gender, duration of diabetes, obesity, hypertension, hyperglycemia, or smoking habits with the incidence of diabetic ulcers.

Based on the results of the study, most respondents were over 40 years old and had suffered from diabetes for more than 10 years[8]. Factors such as gender, duration of diabetes, nutritional status based on body mass index (BMI), hypertension, and blood glucose levels were analyzed as potential risks for diabetic ulcers[9]. However, statistical analysis using the chi-square test showed that there was no statistically significant relationship between these factors and the incidence of diabetic ulcers ($p > 0.05$). These results indicate that these factors are not direct determinants, although in theory they contribute to risk factors[10]. In further discussion, the patient's occupation and education level were also analyzed[9]. Patients with low education levels and jobs with low physical activity such as housewives and civil servants showed a higher proportion of ulcers[11]. This supports previous findings stating that health knowledge and physical activity play an important role in preventing diabetes complications[8].

CONCLUSION

This study concluded that there was no significant relationship between age, gender, duration of diabetes, obesity, hypertension, hyperglycemia, and smoking habits with the incidence of diabetic ulcers in type 2 diabetes mellitus patients at Undata Hospital. Although the statistical results showed no significant relationship, these factors still need to be considered in clinical practice considering their impact on the patient's long-term health condition. Further research with a larger sample size and using a longitudinal design is needed to strengthen these findings. In addition, educational efforts related to the implementation of a healthy lifestyle and optimal diabetes management need to be improved, especially in groups with low education levels and less physically active jobs.

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