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**Behavior of Diabetic Ulcer Prevention in Diabetes Mellitus Patients at Gading Public Health Center, Surabaya**

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**ABSTRACT**

**Background:** Diabetes mellitus is a significant health issue that can lead to serious complications, including diabetic ulcers. Many diabetes mellitus patients in Indonesia still lack knowledge about how to prevent diabetic ulcer complications due to insufficient understanding, attitudes, and preventive actions. **Object:** This study aims to examine the behavior of diabetic ulcer prevention among patients with diabetes mellitus. **Method:** This research employs a descriptive design. The population consists of 50 patients with diabetes mellitus who visited the Gading Public Health Center in Surabaya within one month. The sample size for this study is 50 respondents, selected using non-probability sampling. The variable is the behavior of patients with diabetes mellitus, encompassing three domains: knowledge, attitudes, and actions. Data collection was conducted using questionnaires, and the data were analyzed descriptively, with results presented in frequency distribution tables. **Results:** The results showed that 4 DM patients (8%) exhibited good preventive behavior, 32 DM patients (64%) Sufficient behavior, and 14 DM patients (28%) demonstrated poor behavior. This study indicates that the majority of patients with diabetes mellitus exhibit moderate preventive behavior regarding diabetic ulcers. **Conclusion:** Patients with diabetes mellitus and their families are encouraged to practice proper foot care.

**Keywords:** Behavior, Diabetic Ulcer, Diabetes Mellitus

**BACKGROUND**

Currently, diabetes mellitus has become a serious health problem (Le Mone, 2020). Patients with diabetes mellitus are at risk of developing diabetic ulcers, as they are prone to infections closely associated with the proliferation of germs in environments with high glucose levels (Roza et al., 2022). The occurrence of diabetic ulcers is due to patients with diabetes mellitus not regularly monitoring their blood sugar levels, poor foot care, and inappropriate footwear use. Many diabetic patients in Indonesia are still unaware of how to prevent diabetic ulcer complications due to a lack of knowledge, attitude, and preventive actions regarding diabetic ulcers. Poor preventive behavior

is a contributing factor to the development of diabetic ulcers (Rahmasari R et al., 2023).

According to the International Diabetes Federation (IDF), the number of diabetes patients in Indonesia is increasing rapidly. In 2021, there were 19.5 million diagnosed cases, and it is estimated to reach 28.6 million by 2045 (DitjenP2P, 2024). According to data from the Ministry of Health (2021), the number of diabetic ulcer patients in Indonesia is 2.6 million people, with an amputation rate of 30% and a prevalence of around 15% (Madani et al., 2024). As reported by the East Java Provincial Health Office, the number of diabetes mellitus cases In East

Java Province in 2021, there were 929,535 cases; of this number, 867,257 patients, or 93.3%, had been diagnosed and received medical treatment (East Java Health Office, 2022). In the East Java Health Profile 2022, Surabaya ranked as the regency/city with the highest number of diabetes mellitus patients in East Java Province, with a figure of 96,280 patients. Based on data obtained from Gading Community Health Center in Surabaya in 2022, there were 2,988 people suffering from diabetes mellitus. Recent research shows that the mortality rate due to diabetic ulcers is as high as 50% within a 5-year period (Supriyadi & Dewi, 2023).

The spreading of damaged or infected skin to the underlying tissue, even into the bone, is a sign of diabetic ulcers (Putri & Purwanti, 2024). Diabetic ulcers have effects that can cause infections to spread rapidly and become deeper, potentially leading to amputation (Rahmadani, 2023). Life experiences involving ulcer wounds can certainly affect the psychology of individuals with diabetes mellitus. Patients with diabetes mellitus who have complications from diabetic ulcers may experience stress due to changes in roles within the family or workplace and require significant treatment costs, which can impact the family's economy. In addition, the sufferers will experience physical impairments in daily life. Everyday issues such as pain, disability due to amputation, and appearance-related problems caused by a lack of confidence in one's physical condition (Madani et al., 2024).

Efforts that patients can make to prevent diabetic ulcers include patient adherence to care or managing themselves by routinely monitoring blood glucose levels through disciplined diet, regular exercise, proper footwear selection, wound prevention, and foot care (Marbun, 2021).

Social support from family and healthcare professionals is also necessary to support patients in preventing diabetic ulcers. Nurses play a special role in patients with diabetes mellitus by caring for diabetic patients to increase knowledge, develop skills, cultivate attitudes to improve quality of life, reduce or prevent complications, and provide self-care for diabetic patients (Syakura, 2022). Knowledge about how to care for diabetes mellitus can change a person's attitude and habits in preventing diabetes complications. Knowledge can help patients with diabetes mellitus improve their quality of life because it enables them to understand the attitudes and actions that must be taken to prevent the occurrence of diabetic ulcer complications (Putri & Purwanti, 2024).

## RESEARCH METHODS

The research design used in this study is a descriptive design with a case study approach. Population In this study, the subjects were patients with Diabetes Mellitus at the Gading Health Center in Surabaya City over a period of 1 month. The sample in this study consisted of 50 patients with Diabetes Mellitus. The sampling technique used in this study was total sampling. The research variable was the behavior of preventing diabetic ulcers in patients with Diabetes Mellitus. Data collection instruments used a questionnaire. The questionnaire contained assessments of three domains, namely knowledge, attitude, and practice. After the data were collected, they were processed through editing, coding, scoring, and tabulating. For research ethics, this study used informed consent, anonymity, and confidentiality.

## RESULT AND DISCUSSION

**Table 1.**

Distribution of Characteristics in Diabetes Mellitus Patients at Gading Health Center Surabaya, February 2025

No	Characteristics of Respondents	Frequency	Percentage (%)	
1	Gender	Male	15	30
		Female	35	70
2	Age	40-50 year	11	22
		51-60 year	24	48
		> 60 year	15	30
3	Education	SD	14	28
		SMP	23	46
		SMA	13	26
4	Long suffering from diabetes	1-5 year	31	62
		6-10 year	16	32
		>10 year	3	6

In Table 4.1, it is found that the majority of diabetes mellitus patients are female, totaling 35 patients (75%). The age characteristic of diabetes mellitus patients shows that most are aged 51-60 years, totaling 24 patients (48%). The

educational background of the patients indicates that most have completed junior high school, totaling 23 patients (46%). Similarly, the duration of suffering from diabetes mellitus is 1-5 years, totaling 31 patients (62%).

**Table 2.**

Knowledge of Diabetes Mellitus Patients at Gading Health Center Surabaya in Preventing Diabetic Ulcers in February 2025

Knowledge	Frequency	Percentage (%)
Good	4	8
Sufficient	25	50
Lacking	21	42
<b>Total</b>	<b>50</b>	<b>100</b>

In Table 4.2, it was found that 25 patients with diabetes mellitus (50%) had knowledge in the moderate category.

**Table 3**

Attitudes of Diabetes Mellitus Patients at Gading Health Center Surabaya in Preventing Diabetic Ulcers in February 2025

Attitude	Frequency	Percentage (%)
Good	4	8
Sufficient	35	70
Lacking	11	22
<b>Total</b>	<b>50</b>	<b>100</b>

Table 4.3 shows that as many as 35 patients with diabetes mellitus (70%) have attitudes in the moderate category.

**Table 4.**

Actions of Diabetes Mellitus Patients at Gading Public Health Center, Surabaya in Preventing Diabetic Ulcers, February 2025

Action	Frequency	Percentage (%)
Good	8	16
Sufficient	31	62
Lacking	11	22
<b>Total</b>	<b>50</b>	<b>100</b>

Table 4.4 shows that as many as 31 actions in the moderate category. diabetes mellitus patients (62%) had

**Table 5.**

Diabetic Ulcer Prevention Behavior at Gading Surabaya Health Center in February 2025

Behavior	Frequency	Percentage (%)
Good	4	8
Sufficient	32	64
Lacking	14	28
<b>Total</b>	<b>50</b>	<b>100</b>

In Table 4.5, it was found that as many as 32 patients with diabetes mellitus (64%) had diabetic ulcer prevention behaviors in the fair category.

### Discussion

The results of the study showed that the knowledge of patients with

diabetes mellitus regarding the prevention of diabetic ulcers was obtained from 25 patients (50%) in the moderate category. This is because some patients were not yet aware of how to inspect their feet, maintain foot hygiene, and choose appropriate footwear. This is due to nearly half of the patients having last attended only junior high school. This study is in line with

previous research conducted by Ningrum et al. (2021), which showed that 42 patients, or the majority (70%), had sufficient knowledge in behaviors to prevent diabetic ulcers. Knowledge is influenced by two factors: formal and non-formal education. The higher a person's education and experience, the broader their knowledge. The knowledge a person possesses can affect their mindset in taking action (Nur Nadiela et al., 2024).

The results of the study showed that the knowledge of patients with diabetes mellitus regarding the prevention of diabetic ulcers was obtained from 25 patients (50%) in the moderate category. This is because some patients were not yet aware of how to inspect their feet, maintain foot hygiene, and choose appropriate footwear. This is due to nearly half of the patients having last attended only junior high school. This study is in line with previous research conducted by Ningrum et al. (2021), which showed that 42 patients, or the majority (70%), had sufficient knowledge in behaviors to prevent diabetic ulcers. Knowledge is influenced by two factors: formal and non-formal education. The higher a person's education and experience, the broader their knowledge. The knowledge a person possesses can affect their mindset in taking action (Nur Nadiela et al., 2024). Some patients with junior high school education receive health information from healthcare workers, but among them, it is still difficult to apply it. Good knowledge about ulcer prevention in diabetic patients serves as a means to support patients in managing their disease throughout their lives.

The results of the research conducted showed that 21 patients (42%) had a low level of knowledge. This is because some patients were not yet aware of how to examine their feet, maintain foot hygiene, and choose appropriate footwear. This is due to a portion of the patients having a low level of education. Previous research conducted by Redho & Septinawati (2023) showed that the

frequency distribution of knowledge among diabetes mellitus patients at Air Melok Health Center was 34.2% in the low category. Knowledge is influenced by two factors, namely formal and non-formal education. The higher a person's education and experience, the broader their knowledge. The knowledge a person possesses can affect their way of thinking in performing actions (Nur Nadiela et al., 2024). Patients with low education levels find it difficult to understand information and practice diabetic ulcer prevention in daily life. A lack of patient knowledge about diabetic ulcer prevention, such as not wearing proper footwear and improper foot care techniques, is one of the factors contributing to the development of diabetic ulcers.

The research results indicate that the knowledge of patients with diabetes mellitus regarding the prevention of diabetic ulcers was found in only 4 patients (8%) in the good category. This is because some patients knew how to conduct foot examinations, adhered to foot hygiene, and chose appropriate footwear. Most patients with good knowledge had a high school education. Previous research conducted by Redho & Septinawati (2023) showed that the knowledge frequency distribution at Puskesmas Air Melok mostly fell into the good category, with 25 patients (65.8%). Knowledge is influenced by two factors: formal and non-formal education. The higher a person's education and experience, the broader their knowledge. The knowledge someone possesses can influence their thinking patterns when taking actions (Nur Nadiela et al., 2024). Diabetic patients with higher education will find it easier to obtain and accept information about preventive behaviors for diabetic ulcers. People with higher education have the opportunity to be exposed to various information. The more information they receive, the better their level of knowledge.

Research data showed that the attitude of patients with diabetes mellitus

towards the prevention of diabetic ulcers included 35 patients (70%) in the moderate category. This study is in line with previous research conducted by Nur Nadiela et al. (2024) which indicated that 45.9% of patients with diabetes mellitus had a moderate attitude towards the prevention of diabetic ulcers. A person's attitude is greatly influenced by the knowledge they possess. With good knowledge, diabetic patients will think and make efforts to avoid complications or at least reduce the severity of their disease (Wulandari et al., 2023). Patients with diabetes mellitus are at high risk of developing complications if they do not care for their feet properly due to lack of knowledge. There are still patients who believe that minor foot wounds do not need immediate treatment and will heal on their own, not realizing that daily foot examinations can reduce the risk of developing diabetic ulcers.

Research data shows that the attitude of patients with diabetes mellitus regarding the prevention of diabetic ulcers consisted of 11 patients (22%) in the poor category. This is because some patients pay insufficient attention to daily foot examinations, maintaining foot hygiene, and choosing appropriate footwear. This occurs because there are still patients with a low level of knowledge about preventing diabetic ulcers. Previous research conducted by Jamil et al. (2021) showed that 8 patients (14.3%) had a poor attitude toward diabetic ulcer prevention. A person's attitude is greatly influenced by the knowledge they possess. With good knowledge, diabetic patients will think and make efforts to avoid complications or to reduce the severity of their disease (Wulandari et al., 2023). The lack of knowledge possessed by diabetic patients will make them unaware and unable to understand how to prevent possible complications. This will affect how patients respond to all matters regarding the complications that occur in

themselves, one of which is diabetic ulcers.

The research results show that the attitude of patients with diabetes mellitus regarding the prevention of diabetic ulcers was classified as good in 4 patients (8%). Previous research conducted by Nur Nadiela et al. (2024) showed an attitude frequency distribution of 8.1% in the good category in the prevention of diabetic ulcers at RSUD Mawardi Solo. A person's attitude is greatly influenced by the knowledge they possess. With good knowledge, diabetic patients will think and make efforts to avoid complications or at least reduce the severity of their disease (Wulandari et al., 2023). Patients with a good attitude tend to pay more attention to small things that happen in their bodies. They are aware that routine daily foot examinations, choosing appropriate footwear, and adhering to foot hygiene are important to prevent diabetic ulcers.

The results of the study on diabetic ulcer prevention actions showed that 31 patients (62%) were in the moderate category. This is because most of the patients took actions such as checking their feet daily, wearing footwear while walking, keeping their feet dry and clean, drying between the toes, and inspecting their footwear before use to ensure there are no foreign objects inside. This study aligns with previous research conducted by Ruli & Suprayitna (2020), which showed that 80% of DM patients' actions in diabetic ulcer prevention behavior were in the moderate category. Knowledge is a very important domain for shaping a person's actions.

A person's knowledge can influence the actions they will take. The better the knowledge possessed by the patient, the better the diabetic ulcer prevention actions performed (Marbun et al., 2022). Preventive measures for diabetic ulcers are important for patients to reduce the risk of diabetic ulcers and

improve the quality of life of diabetic patients. Family support is needed to provide encouragement and motivation to diabetic patients in the prevention of diabetic ulcers. The research results show that preventive actions for diabetic ulcers in 11 patients (22%) fall into the poor category. This is because some patients do not pay enough attention to actions such as checking their feet daily, drying between the toes, and using a dry gauze when the feet are scratched or blistered. This is due to some patients having insufficient knowledge about preventing diabetic ulcers. Previous research conducted by Ruli & Suprayitna (2020) showed that preventive actions for diabetic ulcers in the poor category were 20%.

Knowledge is a very important domain in shaping a person's actions. A person's knowledge can influence their attitudes and the actions they take. The better the knowledge possessed by the patient, the better the preventive actions for diabetic ulcers that are carried out (Marbun et al., 2022). The importance for diabetes mellitus patients to know how to prevent diabetes complications. For diabetic patients, foot care should not only be carried out independently but also requires collaboration with the healthcare team to ensure proper and effective prevention of diabetic ulcers. Research data shows that 8 patients (16%) had good diabetic ulcer prevention practices. This is because some patients are aware and consistently perform daily foot inspections, wear footwear when outside, and always keep their feet clean and dry. A previous study conducted by Wulandari et al. (2023) showed that 57 patients (74%) had good diabetic ulcer prevention practices. Knowledge is a very important domain for shaping an individual's actions.

A person's knowledge can influence their attitudes and actions. The better the knowledge a patient has, the better the diabetic ulcer prevention

measures they will take (Marbun et al., 2022). With good knowledge, patients will be more aware of the importance of diabetic ulcer prevention measures. Continuous education, counseling tailored to the patient's level of understanding, and an empathetic approach will greatly help patients consistently implement ulcer prevention measures.

Diabetes mellitus patients who have adequate behavior regarding diabetic ulcer prevention were 32 patients (64%). This study aligns with a previous study conducted by Manto (2023), which showed that 31 patients (75.6%) had diabetic ulcer prevention behavior categorized as adequate. Several factors influence this behavior, including knowledge, attitude, belief or conviction, values, and traditions. Knowledge, attitude, and actions are interconnected and influence each other; the level of knowledge can affect attitude and actions. Therefore, good knowledge, attitude, and actions in diabetes mellitus patients result in good diabetic ulcer prevention behavior as well (Notoadmojo, 2020). Patients with diabetes mellitus need to be taught proper foot care to prevent diabetic ulcers. In addition, washing the feet correctly is important for diabetes mellitus patients to prevent infection, remove dirt, and detect any wounds on the feet.

Diabetes mellitus patients who have poor behavior regarding the prevention of diabetic ulcers amounted to 21 patients (42%). This is because there are still some diabetes mellitus patients who have insufficient knowledge, attitudes, and actions. Previous research conducted by Manto et al. (2023) showed poor diabetic ulcer prevention behavior in 10 patients (24.4%). Factors influencing this behavior include knowledge, attitude, beliefs, values, and traditions. Knowledge, attitude, and actions are interconnected and influence

each other; the level of knowledge can affect attitude and actions (Notoadmojo, 2020). Maximum support from family and healthcare workers is important to provide to patients in preventing diabetic ulcers. Healthcare workers play a role for diabetic patients in increasing knowledge, developing skills, improving quality of life, and reducing and preventing further diabetic complications.

Research data that has been conducted on preventive behavior for diabetic ulcers in patients with diabetes mellitus showed that 4 patients (8%) fell into the good category. This is because only a few patients have good knowledge, attitudes, and preventive actions against diabetic ulcers. A previous study conducted by Faswati et al. (2023) indicated that patients with diabetes practicing prevention of diabetic ulcers were 2 patients (8.7%) in the good category. Several factors influence this behavior, including knowledge, attitudes, beliefs or convictions, values, and traditions. Knowledge, attitudes, and actions are interconnected and mutually influence one another; the level of knowledge can affect attitudes and actions.

Therefore, good knowledge, attitudes, and actions in patients with diabetes mellitus result in good preventive behavior against diabetic ulcers as well (Notoadmojo, 2020). Patients with good behavior understand that daily routine foot examinations, selecting appropriate footwear, and maintaining foot hygiene are important to prevent diabetic ulcers. By practicing proper diabetic ulcer prevention behaviors, it is expected that patients with diabetes mellitus can avoid diabetes complications, particularly diabetic ulcers.

## CONCLUSION

The conclusions that can be drawn based on the study results on the Behavior

of Preventing Diabetic Ulcers in Patients with Diabetes Mellitus at Gading Surabaya Community Health Center are that the knowledge of patients with diabetes mellitus about preventing diabetic ulcers is half in the sufficient category. The attitude of patients with diabetes mellitus in preventing diabetic ulcers is mostly in the sufficient category. The actions of patients with diabetes mellitus in preventing diabetic ulcers are mostly in the sufficient category.

## SUGGESTION

The behavior of patients with diabetes mellitus in preventing diabetic ulcers is mostly in the sufficient category. It is hoped that with this research, patients with diabetes mellitus will continue to improve their knowledge by seeking more information and being able to maintain a positive attitude. This study is expected to help diabetes mellitus patients improve their knowledge, develop positive attitudes, and consistently follow treatment, regular check-ups, and proper foot care. Education plays an important role in shaping these behaviors. The findings can support the development of health programs and strengthen patient involvement in preventing diabetic ulcers. Future researchers may add more behavioral variables to produce more accurate results and provide useful data for further studies.

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