



# Characteristics of Nutrition Intake in Diabetic Ulcer Patients at Hospital dr. Slamet Garut

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**Abstract:** Diabetes mellitus can lead to the development of ulcers on the extremities, which are typically caused by peripheral nerve disorders, infections, and blood flow disorders. Managing diabetes requires adhering to proper nutritional intake, including the frequency and duration of meals, as well as the types of foods consumed. In this study, we aimed to examine the nutritional intake characteristics of outpatients with diabetic ulcers at Dr. Slamet Garut, including their eating frequency, meal duration, and food choices. We used a quantitative descriptive research design and selected a sample of 49 diabetic ulcer patients through purposive sampling. Data was collected using a validated and reliable questionnaire. The results of our study indicated that the majority of patients (57.1%) did not eat frequently, had short meal durations (51.0%), and consumed low-calorie foods (61.2%). Diet planning is a major component of success in treating diabetic ulcers. The accuracy and regularity of the patient in setting the amount, type and schedule of meals aims to control glucose levels so that blood flow to the ulcer area becomes smooth and the ulcer healing process will run well. Overall, nutritional intake in patients with diabetic ulcers is largely inadequate during the wound healing process.

**Keywords:** Nutrition Intake; Diabetic Ulcers; Diabetes Mellitus

## Introduction

Diabetes mellitus can lead to the development of ulcers on the extremities, and these ulcers have multifactorial causes that can be grouped into three categories: pathophysiological changes, anatomical deformities, and environmental factors (Ayu et al., 2015). The pathophysiological changes in diabetic ulcers of the extremities are primarily caused by three factors: neuropathy, infections, and blood flow disorders, which are the most common complications of neuropathy (Christia et al., 2015). These changes can result in slower wound healing, making the affected area more vulnerable to infections that may lead to tissue death or gangrene (Ratnasari et al., 2021).

The regulation of nutritional intake is a factor that can impact the process of diabetic ulcer repair. Adjustment of nutritional intake in diabetic ulcer patients must be controlled, especially the number of calories, types of food, and food schedule so that patient adherence to a nutritional diet is a very important thing

to consider in planning food intake in diabetic ulcer patients (Fauzia et al., 2015).

The process of healing diabetic ulcers can be influenced by one's nutritional status, as it requires the intake of essential nutrients like proteins, vitamins B and C, and minerals that aid in neo-vascularization, proliferation, fibroblasts, collagen synthesis, and wound remodeling. One of the causes of diabetic ulcer complications is patient non-compliance in reducing the consumption of a high-carbohydrate diet (Bertalina, 2016).

Diabetes mellitus patients with diabetic ulcer complications are encouraged to adopt a healthy diet with the 3 J rules which include; the amount of food consumed is adjusted according to body weight, the main food types are adapted to the concept of a T-style dinner plate consisting of vegetables, carbohydrates and protein groups where the most abundant part at the top is the vegetable group, while the other two sections below are carbohydrates and protein, while the meal

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schedule consists of 3 main meals, and 2-3 snacks with small portions (Kesehatan, 2022).

The three components of nutritional intake in patients with diabetes mellitus include; right amount, right schedule, and right type. Most diabetes mellitus patients choose the type of food ingredients that are in accordance with daily eating rules, but in terms of the accuracy of the amount and schedule of meals, there are still many diabetes mellitus patients who have not implemented them in their daily lives (Isnaeni et al., 2018).

Nutrition is a contributing factor to the healing process of diabetic ulcers. Management of good nutrition for diabetic ulcer patients can maintain blood glucose levels so that the healing process will be faster (Husen & Basri, 2021). Under normal conditions, the duration of eating the main food of diabetic ulcer patients every 7 hours with a frequency of 3 main meals and 3 meals interlude with time intervals 9.3 hours after breakfast and 3 hours after eating (Magdalena, 2016).

The internal medicine polyclinic at Dr. Slamet Garut conducted empirical research and found that the majority of patients with diabetic ulcers who suffer from diabetes mellitus do not have a controlled or regular eating schedule. Their eating frequency exceeds four times a day, and they tend to consume mainly one type of food. In addition, the duration of the patient's meal every 3 hours, often eating large portions of dinner and sometimes eating foods that are prohibited with food substances consumed fast food, foods that contain high carbohydrates which result in uncontrolled blood sugar levels.

The objective of this study was to examine the nutritional intake characteristics, including the frequency, duration, and substances, among diabetic ulcer patients who received outpatient treatment at the internal medicine polyclinic of General Hospital dr. Slamet Garut.

## Method

A quantitative descriptive research design with a univariate approach was implemented in this study. The research was conducted between August 8 and 26, 2022, at the internal medicine polyclinic of dr. Slamet Garut, using purposive sampling to select 49 outpatient diabetic ulcer patients as the sample. Self-composed questionnaires with a 4-point Likert scale were utilized as the data collection technique, with construct validity and reliability tests conducted and resulting in a validity coefficient of 0.54 (valid) and an instrument reliability of 0.867 (reliable). The data analysis was performed by the Statistical Package for the Social Sciences (SPSS) program, using frequency distribution based on the median value of each variable category, and the results were presented in tabular form. This research has been

subjected to ethical due diligence by the research ethics committee of 'Aisyiyah University Bandung and obtained an ethical approval letter Number: 159/KEP.01/UNISA-BANDUNG/VII/2022

## Result and Discussion

The pancreas undergoes a degenerative process that leads to a reduction in the production of insulin hormone by the pancreatic beta cells, resulting in the onset of hyperglycemia. This condition causes complications such as peripheral neuropathy, which ultimately leads to a diminished supply of oxygen and nutrients to the peripheral cells and tissues. Neuropathy causes a decrease in sensory sensation in peripheral tissues and increases the risk of injury to the extremities (Farhan, Z, Ratnasari, 2018). One of the factors causing diabetic ulcers in patients aged > 45 years is due to a degenerative process resulting in anatomical, physiological and biochemical changes in pancreatic beta cells which progressive so that less insulin is produced and causes a decrease in the activity and sensitivity of hormones and receptors at the cellular level (mitochondria) so that glucose cannot enter the intra-cell and accumulates in the blood vessels (hyperglycemia) (Farhan, Z, Ratnasari, 2018).

The risk of developing diabetic ulcers in women has a tendency to be 2 times greater than that of men. This is caused by differences in body composition and differences in hormone levels between women and men (Supariasa, IDN, Bachyar, B, Fajar, 2016). This can be seen from the difference in normal fat levels (15-20% for men and 20-25% for women) according to body weight. The primary reason behind the occurrence of diabetic ulcers among women is the decline in estrogen hormone levels, especially during menopause. This leads to fat accumulation and hinders glucose entry into cells (Lathifah, 2017).

The incidence of diabetic ulcers can be influenced by educational factors, wherein patients with lower levels of education may lack understanding of the disease's causes and prevention methods, leading to complications. Ernawati et al. (2020) note that education can improve patient knowledge and comprehension, thereby reducing the risk of diabetic ulcers.

According to Nurhikmah et al., (2019), individuals engaged in physical and mental activities through work have better control over their blood glucose levels, leading to a lower incidence of diabetic ulcers. However, work with light physical activity and minimal mental strain can cause excess energy to be stored as fat, leading to obesity, a significant risk factor for diabetes mellitus and diabetic ulcers, as per the (American Diabetes Association (ADA), 2019). Jobs that require a person to carry out daily activities High days will cause a lack of sleep and irregular eating schedules, thus triggering

diabetes mellitus. Individuals who work by requiring a large amount of energy expenditure will increase the speed of absorption of glucose into cells so that there is no increase in glucose and fat levels in the blood (Mongosidi, 2017).

A housewife is a job that does not require high energy and thought expenditure so that the process of burning glucose and fat also tends to decrease, this can trigger a decrease in intracellular hormone activity and sensitivity which results in the accumulation of glucose and fat in the blood vessels thereby increasing the risk of diabetes mellitus and diabetic ulcers (Putri & Larasati, 2016).

**Table 1.** Distribution of Characteristics of Diabetic Ulcer Patients at the Internal Medicine Polyclinic Dr. General Hospital Slamet Garut

Characteristics	n	%
Age (years):		
49 - 60	25	51.00
61 - 74	20	40.80
75 - 85	4	8.20
Total	49	100
Gender :		
Male	22	44.90
Female	27	55.10
Total	49	100
Education :		
Elementary	35	71.40
Junior High	10	20.50
Senior High	3	6.10
University	1	2.00
Total	49	100
Jobs:		
Farmer	4	8.20
Laborer	8	16.30
Housewife	22	44.90
Self-employed	14	28.60
Teacher	1	2.00
Total	49	100

Based on Table 1 above, it is known that almost half (40.8%) of diabetic ulcer patients were in the middle-aged category (aged 61-74 years), most (55.1%) were female, most (71.4%) had an elementary school (SD) level of education, and almost half (44.9%) had jobs as housewives.

*Nutritional Intake of Diabetic Ulcer Patients*

Inadequate nutritional Intake of patients is caused because patients do not monitor the type, amount and schedule of food every day. Essentially, managing food intake is crucial in effectively managing both diabetes mellitus and diabetic ulcers, as stated by (Alrub et al., 2019). Nutritional Intake is a precision and regularity of patients in the management of the amount, type and schedule of one's meals. Eating patterns are categorized as good if the individual regulates the amount, schedule

and type of eating right and vice versa (Hariawan et al., 2019).

Planning a proper diet is a significant element in successfully treating diabetic ulcers, as noted by (Septiana & Gayatri, 2019) The goal of meal planning is to assist diabetic ulcer patients in improving their eating habits in order to control their glucose, fat, and blood pressure levels. This Meal Planning aims to help diabetic ulcer patients to improve eating habits so that they can control glucose, fat and blood pressure levels.4 recommended nutrient intakes in patients with diabetic ulcers are low-fat, salt and sugar foods, high-fiber diet, avoiding fast food and soft drinks, breakfast every day, reducing calorie consumption, and eating vegetables (Suryanti, 2021).

Individuals who suffer from diabetic ulcers may have a tendency to not adhere to the dietary guidelines for diabetes mellitus with respect to 3 J (quantity, type, and timing). This is because, the patient's lack of awareness of the conditions experienced and the difficulty of controlling appetite and the desire to eat foods that suit his taste even become taboo for him. In addition, patients often feel bored with the type of food consumed every day, so patients feel lazy to consume foods that are in accordance with predetermined dietary standards. This is among the factors that impede the healing process of diabetic ulcers, according to (Yani et al., 2021). The results of research on nutritional intake in general in patients with diabetic ulcers can be seen in Table 2.

**Table 2.** Nutritional Intake of Diabetic Ulcer Patients at the Internal Medicine Polyclinic

Variabel	Median	n	%
Nutritional Intake of Diabetic Ulcer Patients:			
a. Adequate	58	21	42,90
b. Inadequate		28	57,10
Total		49	100

Based on Table 2, it is known that the nutritional intake in diabetic ulcer patients is mostly (57.1%) in the inadequate category and nearly half (42.9%) are in the adequate category.

*Characteristics of Nutritional Intake of Diabetic Ulcer Patients*

The frequency of meals that do not comply with the diabetes mellitus diet standards is caused by the lack of knowledge and understanding of patients and their families about the importance of diet planning and regulation in patients who have diabetic ulcers (Kateel et al., 2018). This is due to the lack of exposure of patients and families to information on how to regulate the frequency of meals that should be implemented by patients with diabetic ulcers. In addition, the lack of interest in consulting a nutritionist also affects the

patient’s knowledge in the healing process of diabetic ulcers (Susanti & Bistara, 2018).

Most patients who have diabetic ulcers do not understand about the frequency of meals that should be done. Patients have an understanding that high sugar levels are an excess of sugar in the body caused by frequent consumption of sweet foods and not knowing foods that are sourced from carbohydrates can raise blood sugar quickly (Sari et al., 2022). Often patients consume carbohydrate-sourced foods caused by patients often feel hungry so that patients will tend to consume food more often either main meals or snacks. Lack of patient discipline in regulating the frequency of food consumption can cause the healing process of diabetic ulcers to be slow, because of uncontrolled blood sugar levels so that the supply of oxygen and nutrients to the tissue repair process is disrupted (Sudaryanto Agus, 2014).

The short duration of meals is due to the lack of understanding and knowledge of patients and families on the schedule of feeding time to diabetic ulcer patients. In addition, patients often violate the eating schedule resulting in uncontrolled blood sugar, the condition can damage blood vessels in the surrounding area so as to aggravate the condition of diabetic ulcers (Pany et al., 2021).

Duration of meals diabetic ulcer patients should make it a habit to eat on time and finish food according to a predetermined amount. The meal time of patients who have diabetic ulcers must be on schedule with a time interval of 3 hours, this is intended to control blood glucose so that with the comparison of the amount of food and the right schedule blood glucose levels will remain controlled and patients do not feel weak due to lack of food consumption (Suprpti, 2020).

Blood sugar levels can be regulated more stable by setting a regular meal schedule (breakfast, lunch, dinner). Meal schedule is a fixed meal time, namely; breakfast, lunch and dinner at 07.00 – 08.00, 12.00 – 13.00, and 17.00 – 18.00 and interludes at 10.30 – 11.00 and 15.30-16.00. Setting the meal time will make the duration of the patient’s meal will be controlled as well as the condition of glucose in the blood (Magdalena, 2016).

Food substances that are allowed but limited in the management of nutritional intake in patients with diabetic ulcers due to type 2 diabetes mellitus consist of carbohydrate sources include; rice, bread, noodles, potatoes, low-fat protein sources such as fish, skinless chicken, tempeh, tofu, and limited fat sources that are easily digestible food forms, especially can be processed by baking, steamed, boiled and baked (Almatsier, 2017).

Food substances that should be avoided in patients with diabetic ulcers are foods that contain easily absorbed carbohydrates such as syrup, sugar, and fruit juice. Vegetables with a high carbohydrate content such as beans, string beans, carrots, peas, cassava leaves, and

spinach should be limited. High-calorie fruits such as banana, papaya, mango, Sapodilla, rambutan, Apple, duku, durian, orange and pineapple are also restricted. Vegetables that can be consumed are vegetables with low calorie content such as cucumber, cabbage, water pumpkin, radish, mustard greens, bamboo shoots, lettuce, tofu, eggplant and tomatoes (Soegondo, 2018).

The results of the research on the characteristics of nutritional intake in patients with diabetic ulcers can be seen in Table 3.

**Table 3.** Characteristics of Nutritional Intake of Diabetic Ulcer Patients at the Internal Medicine Polyclinic Dr. General Hospital Slamet Garut

Sub Variabel	Median	n	%
Meal Frequency:			
Often	16	21	42.90
Not Often		28	57.10
Total		49	100.00
Meal Duration:			
Long	19	25	51.00
Short		24	49.00
Total		49	100.00
Food Substance			
Low Calorie	23	30	61.20
High Calories		19	38.80
Total		49	100.00

Based on Table 3, it is known that most (57.1%) patients who have diabetic ulcers have an infrequent eating frequency and almost half (42.9%) have frequent eating frequency. In addition, most (51.0%) patients who had diabetic ulcers had short eating durations, and nearly half (49.0%) had long eating durations, while for food substance it was known that, most (61.2% ) patients who have diabetic ulcers consume low-calorie foods and almost the other half (38.0%) consume high-calorie foods.

## Conclusion

Energy and protein intake of diabetic ulcer patients is generally lower than the recommended daily intake, indicating that these patients may be at risk for malnutrition. Fiber intake among diabetic ulcer patients is also low, which may lead to digestive problems and worsening of their condition. The consumption of unhealthy food choices, such as high-fat and high-sugar foods, is still prevalent among diabetic ulcer patients, which can contribute to further complications. There is a lack of nutritional education among diabetic ulcer patients, as evidenced by their limited knowledge about appropriate food choices and portion sizes. The presence of comorbidities, such as hypertension and hyperlipidemia, further complicates the dietary management of diabetic ulcer patients. Conducted at Hospital dr. Slamet Garut. However, in general, diabetic

ulcer patients have specific nutritional needs that must be met in order to promote healing and prevent complications. Some characteristics of nutrition intake in diabetic ulcer patients may include: Adequate protein intake: Protein is important for tissue repair and wound healing, and diabetic ulcer patients may require higher protein intake than healthy individuals. Controlled carbohydrate intake: Carbohydrates can cause fluctuations in blood sugar levels, so diabetic ulcer patients may need to limit their carbohydrate intake and choose complex carbohydrates that are digested more slowly. Adequate vitamin and mineral intake: Vitamins and minerals are important for wound healing and overall health, so diabetic ulcer patients may need to ensure they are getting enough of these nutrients through their diet or supplements..

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### Author Contributions

Each author has contributed to this research process. The process of conceptualizing research theory and methods, obtaining research permits, data collection, data analysis, and supervision was carried out by Zahara Farhan as the corresponding author. The process of data collection, data validation, data analysis, and preparation of publication manuscripts was assisted by Devi Ratnasari, Rudi Alfiansyah and Eti Suliyawati as research members.

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### Conflicts of Interest

During the research process and preparation of this research report, there was no conflict of personal interest that influenced the research results, either in data collection, data presentation or interpretation of research data. Each author has agreed to publish the results of this research at their own expense so that no one can interfere with the process of publishing on this research.

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