

## Original Research Article

# KNOWLEDGE OF PATIENTS WITH DIABETES MELLITUS ABOUT DIABETES NEUROPATHY SYMPTOMS

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### Abstract

**Background:** Diabetes Mellitus (DM) is a metabolic disease characterized by high blood glucose levels or hyperglycemia, which in the long term can cause complications both macrovascular and microvascular. Diabetic Neuropathy (ND) is one of the many complications experienced by patients with DM.

**Objectives:** This study aimed to determine the level of knowledge of patients with DM about ND symptoms at Community Health Center Pacarkeling Surabaya.

**Methods:** This study used a descriptive research method with a cross-sectional approach. A large sample of 100 adult patients with DM. A purposive sampling technique was used. The instrument of this study was a questionnaire. Data analysis used descriptive analysis with frequency distribution tables.

**Results:** This study showed that most respondents (65%) had less knowledge about ND symptoms, and almost all patients had foot complaints. The most complaints were 98% complaining of tingling feet and 75% complaining of numb feet. Data characteristics of respondents showed that 45% of patients were 56-65 years old, 68% were female, 41% had junior high school education, and 55% were not working. Other data show 86% of patients have a duration of DM of <10 years, the treatment used was 77% taking oral antidiabetic drugs, and 68% have a history of heredity.

**Conclusion:** Patients with DM in research have a risk of developing diabetic foot ulcers because they have reduced knowledge and foot complaints related to ND. Patients must know the signs and symptoms of ND and foot care correctly. As part of the health staff, nurses must educate patients with DM regularly and appropriately.

**Keywords:** *Diabetes Mellitus, Diabetic Neuropathies, Hyperglycemia*

## INTRODUCTION

Diabetes Mellitus is a metabolic disease characterized by high blood glucose levels or *hyperglycemia* due to lack of insulin secretion, impaired insulin activity, or both (Federation International Diabetes., 2019; Soelistijo, S. A., et al., 2019). Diabetic neuropathy (DN) is one of the chronic microvascular complications that can occur in DM patients. Diabetic neuropathy is the presence of symptoms and/or signs of peripheral sensorimotor dysfunction and autonomic nerves (Labib et al., 2023; Rachmantoko et al., 2021). The number of people with DM in Indonesia tends to increase in prevalence from 2007, 2013, and 2018 (Kemenkes RI, 2021; Kementerian Kesehatan RI, 2018). Diabetes mellitus sufferers experience diabetic neuropathy as much as 25% in the world. In Indonesia, people with diabetes mellitus experience diabetic neuropathy 54% (Labib et al., 2023).

Factors that can be a risk of neuropathy complications in diabetes mellitus patients are diet, physical activity, long-suffering, and medication adherence (Labib et al., 2023; Putri et al., 2020; Rahmawati & Hargono, 2018). Other studies that show risk factors for diabetic neuropathy in women are long-suffering from DM, history of contraceptive use, and glycemic control. (Ibrahim et al., 2022). The duration of diabetes and hemoglobin A1c (HbA1c) levels (a measurement of glycated hemoglobin instead of average daily glucose levels) or hyperglycemia are also significant predictors of diabetic neuropathy (Balgis et al., 2022; Feldman et al., 2020). This hyperglycemia can be controlled by implementing a diabetes self-management program regularly.

Neuropathic diabetic symptoms may be asymptomatic but may also occur with pain. Symptoms that can be felt by patients with DM who experience DN are: Sensory disorders always appear more often than motor disorders and have been seen at the beginning of the disease. Generally, symptoms such as pain, paraneesthesia, and loss of feeling arise at night.

Neuropathic pain significantly impacts the patient's quality of life, primarily causing considerable disruption to sleep, daily activities, and enjoyment of life (Labib et al., 2023; Rachmantoko et al., 2021).

DM patients must be able to manage existing risk factors to immediately recognize the signs and symptoms of DN and not progress to DN. Prevention strategies for developing DN, such as glycemic control, lifestyle modification, foot care, and the importance of early diagnosis, should be carried out by patients with DM (Smith et al., 2022). Patients with DM often do not realize any complaints or symptoms of diabetic neuropathy complications, only realize after complaints of pain and have developed into ulcers. Often, patients seek the help of medical personnel when pain has appeared (Rachmantoko et al., 2021). This may be due to the patient's limited knowledge of the signs and symptoms of DN.

Based on these data, research is needed to explore the extent of patient knowledge in recognizing DN-related symptoms. This knowledge is required as a form of patient awareness to detect DN symptoms as early as possible. Diabetes mellitus patients who have good knowledge will have awareness of the disease. The patient will participate in the management of the disease to achieve optimal control and minimize the occurrence of complications.

**Objective(s):** The aim of this study is to assess the knowledge of diabetes mellitus patients about DN so that patients can recognize, prevent, or slow down the development of DN.

## METHODS

### *Study Design*

This study was descriptive research with a cross-sectional approach.

### *Setting*

The research was conducted at the Pacarkeling Surabaya Health Center from August 2022 to April 2023.

*Research Subject*

The sample in this study was 100 DM patients who checked into the Community Health Center Pacarkeling Surabaya, which was selected using the purposive sampling technique. The inclusion criteria set were patients with DM, over 35 years old, and able to communicate well.

*Instruments*

The instrument of this study was a questionnaire containing data on the characteristics adopted from the Form of the integrative assessment of patients with diabetes mellitus DM patients which include Age, gender, Education, Occupation, duration of DM, medications used, and Family History (Joeliantina et al., 2021). Data knowledge of patients with DM about signs and symptoms of DN developed from (National Clinical Programme for Diabetes, 2021) and (Joeliantina et al., 2022). All eligible participants were asked to complete a self-administered questionnaire. Before patients fill out questionnaires, researchers explain the purpose of the study and ensure written consent was obtained and patient participation was voluntary.

*Data Analysis*

Data analysis in this study was a descriptive analysis by presenting patient characteristic data in the form of frequency and percentage on the frequency distribution table. The assessment of knowledge was categorized into 3, which is good if you get a score of  $\geq 76$ , enough  $\geq 56 - 75$ , and less  $< 56$ .

*Ethical Consideration*

Ethical approval had been obtained from the Poltekkes ethics institution of the Ministry of Health Surabaya No. EA/1792/KEPK-Poltekkes\_Sby/V.2023.

**RESULTS**

The data showed that the characteristics of patients with DM were the

highest proportion (45%) of patients in the range of 56-65 years, 68% were female, almost half (41%) had junior high school education, and most (55%) patients were not employed. Almost all (86%) patients had a duration of DM of  $< 10$  years, the treatment used was 77% taking oral antidiabetic drugs, almost half (68%) patients had a history of heredity and 36% had a history of descent from their mothers (table 1).

Data on foot complaints in patients with DM can be seen in Table 2. DM patients may experience 1 or more complaints of the feet. The most common complaints experienced by patients are tingling (98 people), numb feet (77 people), and decreased sensitivity of the feet to touch. Patients who experienced.

Table 1. Characteristics of patients with DM (n=100)

Characteristic	Frequency	Percentage (%)
<b>Age (years)</b>		
36-45	14	14
46-55	27	27
56-65	45	45
>65	14	14
<b>Gender</b>		
Male	32	32
Female	68	68
<b>Education</b>		
Elementary	27	27
Junior high school	41	41
Senior high school	28	28
Bachelor	4	4
<b>Work</b>		
Civil servants	3	3
Self-employed	22	22
Entrepreneurial	20	20
Does not work	55	55
<b>Duration of DM</b>		
$\leq 10$	86	86
$> 10$	14	14
<b>Drugs consumed</b>		
Oral	77	77
Insulin	11	11

Combination	12	12
<b>Hereditary history</b>		
Yes	68	68
No	32	32

Table 2. Foot complaints experienced by patients with DM

Foot Complaints	Frequency	Percentage (%)
Numb	75	75%
Tingling	98	98%
Around the feet are not felt to the touch	40	40%
Pain	15	15%
The soles of the feet are hot	8	8%

Table 3 Knowledge of patients with DM about the symptoms of Diabetic Neuropathy

Knowledge	Frequency	Percentage (%)
Good	35	35
Enough	0	0
Less	65	65

**DISCUSSION**

This study has identified patients' knowledge of DN symptoms. Peripheral neuropathy is the most common form of DN found in people with DM (Federation International Diabetes., 2019). Most DM patients have poor knowledge of DN symptoms. Patients do not understand that this foot complaint is an early sign and symptom of DN events. DM patients in this study all had complaints in the foot area such as numbness, tingling, decreased sensitivity to taste, pain, and burning on the soles of the feet. Neuropathic diabetics may be asymptomatic and may be accompanied by the presence of pain referred to as neuropathic diabetic pain. Symptoms of neuropathic diabetic pain vary, such as intermittent or continuous burning, prickling, tingling, numbness, and sensations of heat, cold, or itching. Symptoms develop in a distal to proximal distribution, generally starting in the legs (Rachmantoko et al., 2021). Patients with DM can have 1 or more symptoms. This

condition can trigger the development of DN which can progress to diabetic foot ulcers which is one of the long-term complications of DM (Putri et al., 2020).

Knowledge is the result of "knowing" and this happens after people have sensed a particular object. This sensing occurs through the five human senses (Rachmawati, 2019). In patients with DM, the patient's knowledge will affect the patient's behavior in self-care. Based on existing research, the knowledge of patients with DM about foot care is still low (Hartono et al., 2020). The knowledge of diabetes mellitus patients in the working area of the Tanah Kali Kedinding Surabaya Health Center about foot care and diabetic foot exercises mostly has sufficient knowledge and a small part has less knowledge (Suryandari & Joeliantina, 2020). Knowledge in patients with type II diabetes mellitus is influenced by several factors including age, occupation, and level of education (Hartono et al., 2020). Patients who have less knowledge will have low awareness about the condition of their bodies. This is because individuals do not realize the signs and symptoms of diabetes at the beginning of the course of the disease but begin to feel the signs and symptoms of diabetes when complications have occurred. Prolonged hyperglycemia can cause signs and symptoms of DN, if this is ignored by patients with DM it can trigger the onset of diabetic foot ulcers. So that the patient's knowledge about the recognition of signs and symptoms of DN must continue to be improved.

Data on the characteristics of patients with DM in this study showed that most of them were at the age of > 55 years, female gender, had a high school education and did not work. DM patients in the study had a DM duration of more than 10 years and had a history of heredity. The majority of patients with these characteristics have less knowledge about the symptoms of DN. Other studies have shown that gender, duration of illness, occupation, place of residence, education level, having DFU, and history of hospitalization,

amputation, and complications have significant associations with knowledge (Pourkazemi et al., 2020). Other studies have also shown that patients' knowledge is influenced by age, education, occupation, and duration of DM (Hartono et al., 2020). These characteristic data also can be one of the factors for the development of DN as a complication of DM. Some studies show a significant positive linear trend between the age of the patient, the duration of diabetes, and the chances of developing Diabetic Peripheral Neuropathy (Balgis et al., 2022; Bansal et al., 2014; Salawu et al., 2018).

In old age, there is a decrease in function in many organs of the body, especially in patients with DM. As you get older, the flexibility of blood vessels will decrease, so it can affect the vascularization of body organs. The duration of suffering from diabetes causes chronic hyperglycemia in patients whose blood sugar levels are not controlled. Chronic hyperglycemia causes the underlying microangiopathy of neuropathy. In patients newly diagnosed with DM, less than 10% experienced symptoms of clinical neuropathy. So the longer a person suffers from DM, the longer the process will be and aggravate the occurrence of nerve cell damage (Amelia et al., 2019).

Based on these data, patients with DM in this study have a risk of experiencing diabetic ulcers so they need to get proper knowledge about DM complications that may develop, especially DN complications. Information about the signs and symptoms of DN is important so that patients can take precautions against diabetic ulcers and can manage DN symptoms appropriately. In addition, information about foot care is needed so that patients with DM who have foot problems can manage it well. Patients with DM still have a lot wrong in doing foot care. They don't check the condition of the feet every day, cut the wrong toenails, don't move the feet every day, and use powder to keep the feet dry (Hartono et al., 2020). Therefore, increasing

respondents' knowledge about the independent efforts of diabetes mellitus patients in dealing with diabetic neuropathy is very necessary, because good knowledge will encourage respondents in their actions to make efforts in dealing with diabetic neuropathy. With a simple and correct knowledge base, it is expected that diabetes mellitus patients will behave and act more positively in dealing with complications of diabetic neuropathy. Education from health workers is very important in improving the patient's glycemic control and avoiding complications of DN.

## CONCLUSION

This study has identified the knowledge of patients with DM about DN symptoms and complaints experienced related to DN. Most patients have poor knowledge of DN symptoms. Patients with DM who have a good knowledge of DN can recognize, prevent, and slow the onset of complications. Almost all patients have complaints about their feet. The most common complaints experienced by patients are tingling and numbness in the legs. In addition, some patients experience leg pain at night and decreased sensitivity in the feet. The complaint is a sign of DN. Education with appropriate methods about DM complications especially DN and treatment is needed to increase the knowledge of patients with DM so that they can prevent or manage complications.

## SUGGESTIONS

Data that has been obtained in research can be used by nurses to complete assessment data as part of the nursing care process. More study was required to enhance the behavior of diabetic foot patients in managing their feet on their own, in both the injury-free and injured cases.

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#### AUTHOR CONTRIBUTION

**Anita Joeliantina:** Concepts, design, literature search, data analysis, manuscript preparation, manuscript editing, and manuscript review

**Sintya Zahratul:** Data collection, literature search, manuscript preparation, and manuscript editing.

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