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RESEARCH

Identification of Foot Complaints in Patients with DM, Descriptive Study

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ABSTRACT

Diabetic foot ulcers (DFUs) are a common complication of diabetes mellitus (DM) and cause significant morbidity and mortality. Diabetic feet exhibit various structural and functional changes compared to non-diabetic feet. The purpose of this study was to identify foot complaints commonly experienced by patients with DM. This study employed a descriptive design with a cross-sectional approach. The sample size was 200 adult patients with DM selected using a purposive sampling technique. Patients with DM were asked to provide written consent before completing the questionnaire. This study used descriptive analysis, using a frequency distribution table. Data on foot complaints of patients with DM showed that numbness or thickening of the feet was present in 28.5%, tingling in 32.5%, and numbness in the feet was less common, with only 7.0% reporting consistent experience. Meanwhile, 13.0% experienced itchy feet, and only 3.0% reported persistent reddish feet. Blackish feet, a more serious condition, were recorded with 12.5% reporting persistent blackness. Swelling in the feet was reported by 6.0% and pain in the feet was reported by 15.0%. All patients with diabetes in the study experienced complaints in their feet, some even having more than one foot complaint. Among these foot complaints, numbness/thickness, tingling, and pain are common among patients with diabetes. Patients with DM should receive accurate information to identify foot complaints of developing Diabetic foot ulcer and to prevent them by performing proper and regular foot care.

Keywords: Diabetic foot, foot complaints, diabetes mellitus.

INTRODUCTION

Diabetes mellitus is a serious condition in which elevated blood glucose levels occur, which, if left untreated for a long time, can lead to complications and be life-threatening. [1]. The criteria for a diagnosis of DM are glycohemoglobin (A1c) levels ≥ 6.5%, fasting plasma glucose ≥ 7.0 mmol/l (126 mg/dl) or 2-hour postprandial plasma glucose ≥ 11.1 mmol/l (200 mg/dl), and patients with classic symptoms of hyperglycemia or hyperglycemic crisis, random plasma glucose ≥ 200 mg/dl (11.1 mmol/l) [1].

Diabetic foot ulcers (DFUs) are a common complication of diabetes mellitus and cause significant morbidity, mortality, and healthcare expenditure. [2] [3] [4]. Based on data from the International Diabetes Federation in 2015, an estimated 9.1-26.1 million people worldwide will develop DFUs each year, and it is estimated that 19-34% of patients with diabetes will likely develop DFUs in their lifetime. [5]. Patients with DFUs were also found to have a 2.5-fold increased risk of death compared to diabetic patients without foot ulcers. [4]

The diabetic foot exhibits a variety of structural and functional changes compared to the non-diabetic foot. These changes include musculoskeletal, dermatological, vascular, and neurological adaptations [6]. Musculoskeletal changes include intrinsic muscle atrophy, limited joint mobility, changes in foot shape, and the development of ankle equinus [6] [7]. Chronic diabetes causes a variety of changes that weaken this protective barrier. Diabetes-related autonomic dysfunction reduces sweat production in the feet, making them susceptible to fissures and xerosis [6]. People with diabetes are at increased risk of developing peripheral arterial disease (PAD), which is characterized by atherosclerotic obstruction of the arteries supplying blood to the lower extremities. Diabetic neuropathy is a common neurological complication of diabetes, with up to 50% of cases remaining asymptomatic. Large-fiber neuropathy causes painless paresthesias, decreased vibration sensation, impaired joint position sense, decreased

touch and pressure sensation, and absent or diminished ankle reflexes. Peripheral neuropathy typically begins in the distal toes and progresses proximally [6].

Self-care is a decision-making process influenced by reflection. Self-care theory is broader than symptom theory; however, we acknowledge the powerful influence of symptoms on self-care decision-making. Symptoms themselves can be indicators of bodily changes, but research has confirmed that disease changes do not always cause symptoms. We also note that symptoms may or may not accurately reflect objective changes in chronic diseases, as detecting and interpreting bodily changes is a complex and imprecise process. That is, some people may not notice disease changes through objective measures because they do not detect or interpret those changes as symptoms. Conversely, symptoms may increase in frequency and/or intensity in the absence of objective changes in disease [8] [9].

Patients must know about proper foot care and be able to apply it appropriately and regularly. Existing research shows that, in general, patients with diabetes who experience foot ulcers still have inadequate foot self-care practices, and most also have low self-confidence. [10]

Based on this information, DM patients are highly susceptible to developing complications of DFU if they fail to promptly recognize the developing signs and symptoms associated with the disease. Research exploring the symptoms and complaints experienced by DM patients is still limited, so further studies are needed to provide patients with information as a precautionary measure. These symptoms and complaints can be prevented or slow down the progression of DFU if patients practice proper and regular foot care.

The purpose of this study was to identify foot symptoms or complaints commonly experienced by DM patients, such as tingling, numbness, decreased sense of touch, itching, redness, blackness, swelling, and pain.

METHOD

This study employs a descriptive design with a cross-sectional approach. This study will identify the research subjects and will not involve interventions. The population in this study was all DM patients at community health centers in East Surabaya. The sample size was 200 adult patients with DM selected using a purposive sampling technique. Inclusion criteria for this study were patients with DM for more than one year, no aphasia, no mental disorders, and age >30 years. Data collection was conducted from June to August 2024. Patients with DM participating in this study were asked to provide written informed consent before completing the questionnaire. The data on characteristics included age, gender, education, occupation, marital status, and blood glucose levels. These data were collected using a questionnaire modified from the Integrative Assessment Form of Patients with DM. [11]. Data on foot complaints included: numbness/thickness, tingling, itching, redness, blackness, swelling, and pain. This study used descriptive analysis, namely a frequency distribution table.

RESULT

Characteristics

The characteristics of this study indicate that the majority of patients with diabetes mellitus were between 56 and 65 years of age and were predominantly female (73.5%). Furthermore, the majority of patients were unemployed and married. Educational data showed that most had a primary education. Patients with diabetes mellitus in this study had blood glucose levels >200 mg/dL, a condition that requires careful attention as it can increase the risk of complications (Table 1).Table 1. Description of Characteristics of Diabetes Mellitus Patients (n=200)

Characteristics	**Frecuencyi (f)**	**Percentage (%)**
Age (years)		
36-45	17	8.5
46-55	47	23.5
56-65	84	42
>65	52	26
Gender		
Laki	53	26.5
Perempuan	147	73.5
Ocupation		
Swasta	15	7.5
Wirausaha	29	14.5
Pensiunan	12	6
Tidak Bekerja	139	69.5
Lainya	5	2.5
Education		
No	15	7.5
Elementary	55	27.5
Junior High School	37	18.5
Senior High School	67	33.5
Colledge	26	13
Marital Status		
Yes	163	81.5
No	6	3
Widow	31	15.5
Blood sugar level (mg/dl)		
<=200	59	29.5
>200	141	70.5

Foot Complaints

This sub-chapter describes a detailed analysis of the foot complaint variables. Each variable has been clearly defined in the methodology. The analysis begins with a basic statistical description of the data, including frequency distributions and percentages.

This study revealed a variety of clinical complaints from respondents. For numb or thick feet, the data showed that 57 respondents (28.5%) experienced this condition constantly, while 95 respondents (47.5%) never experienced it.

Tingling feet were also quite common, with 65 respondents (32.5%) reporting this condition permanently and 67 respondents (33.5%) never experiencing tingling. Numb feet were less common, with 157 respondents (78.5%) never experiencing it, and only 14 respondents (7.0%) consistently reporting it. Meanwhile, 26 respondents (13.0%) experienced itchy feet continuously, while 144 respondents (72.0%) never experienced them. In terms of redness of the feet, 182 respondents (91.0%) never experienced this condition, and only six respondents (3.0%) reported persistent redness. Black feet, a more severe condition, were reported by 168 respondents (84.0%), but 25 respondents (12.5%) consistently experienced black feet. Swelling in the feet was reported by 166 respondents (83.0%), while 12 respondents (6.0%) experienced persistent swelling. Finally, foot pain was reported by 30 respondents (15.0%) as a constant issue, while 110 respondents (55.0%) never experienced any pain.

Table 2. Description of Foot Complaints

Type of Foot Complaint	Category									
	No		Rarely		Sometimes		Often		Always	
	f	%	f	%	f	%	f	%	f	%
Numbness/ Thickness	95	47.5	17	8.5	17	8.5	14	7	57	28.5
Tingling	67	33.5	32	16	24	12	12	6	65	32.5
Numbness	157	78.5	15	7.5	7	3.5	7	3.5	14	7
Itching	144	72	15	7.5	8	4	7	3.5	26	13
Redness	182	91	6	3	3	1.5	3	1.5	6	3
Blackness	165	82.5	3	1.5	3	1.5	4	2	25	12.5
Swelling	166	83	14	7	3	7	5	2.5	12	6
Pain	110	55	30	15	20	10	10	5	30	15

DISCUSSION

Data on the characteristics of DM patients in this study included age, gender, occupation, education level, and marital status. These demographic characteristics are important to explore to understand the respondents' social and economic backgrounds, which may influence the study's results. The age distribution of respondents reflects the generational range of participants in this study, providing an overview of the age groups most affected or most active in the context studied. Sex was identified to assess gender distribution and examine possible differences in responses or conditions between men and women. Information on respondents' occupations provided insight into their level of economic involvement and dominant types of daily activities. Respondents' educational attainment was found to be linked to their level of knowledge and awareness, which may, in turn, influence their behavior and choices. Finally, marital status was assessed to evaluate social conditions that may impact respondents' social support, responsibilities, and life priorities.

Based on the results of this study, it shows that patients with DM are at risk of developing DFU, because some patients have complaints in the feet, such as numbness/thickness, tingling, itching, redness, blackness, swelling, and pain, where these complaints can influence DM patients to seek foot care. No research shows what complaints and foot conditions encourage DM patients to seek foot care. Existing research indicates that complaints and foot conditions contribute to the development of DFU. The results of a multivariate analysis of the study by Rina et al. (2016) showed that there are six variables proven to be associated with the occurrence of diabetic foot in patients with type 2 diabetes mellitus, namely age ≥45 years, male gender, hypertension, having a smoking habit, having a deformity in the foot and having a history of ulceration in the foot. [12].

Individuals with type 1 diabetes for 5 years and all individuals with type 2 diabetes should be assessed annually from the time of diagnosis for diabetic peripheral neuropathy (DPN) using a medical history and simple clinical tests [13]. Symptoms vary depending on the type of sensory fiber involved. The most common initial symptoms are caused by small fiber involvement and include pain and dysesthesia (an unpleasant burning and tingling sensation). Large fiber involvement can cause balance problems, numbness, and loss of protective sensation (LOPS). LOPS indicates distal sensory polyneuropathy and is a risk factor for diabetic foot ulceration [14].

Research shows that out of 100 patients with DM, most have poor knowledge about diabetic neuropathy. Furthermore, patients also have several foot complaints. The most common complaints reported are tingling, numbness, pain, and burning sensations in the soles of the feet [15].

Diabetic foot ulcers are a significant physical, psychological, and financial burden for patients and the healthcare sector. Studies have shown that 15% of people with diabetes face a lifetime risk, and approximately 20% of patients with diabetes are hospitalized due to diabetic foot ulcers. Diabetic foot ulcers act as an antecedent to the development of gangrene, and lower limb amputations are performed 20 times more frequently in people with diabetes than in those without diabetes if necessary treatment is not provided [2] [16] [17].

Any complaints or symptoms experienced by patients with diabetes should prompt them to pay closer attention to their condition and adhere to their disease management plan. By managing their condition appropriately and regularly, they can prevent the development of diabetes complications. Several studies have shown that patients with diabetes still have limited knowledge and skills in foot care [18][19].

CONCLUSION

All patients with diabetes in the study experienced foot complaints, with some even having more than one complaint. These complaints included numbness, tingling, itching, redness, blackness, swelling, and pain in the feet. Numbness/thickness, tingling, and pain were the most common complaints among patients with diabetes. Patients with diabetes should receive accurate information to recognize these complaints as signs and symptoms of developing foot disease (DFU) and to prevent them by practicing proper and regular foot care.

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The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments. Avoid expressions such as “One of us (S.B.A.) would like to thank ... .” Instead, write “F. A. Author thanks ... .” In most cases, sponsor and financial support acknowledgments are placed in the unnumbered footnote on the first page, not here.

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