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Factors associated with quality of life of diabetic foot ulceration in patients with type 2 diabetes in Depok West Java, Indonesia

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Abstract

Background: The most frequent complication of diabetes mellitus is diabetic foot ulcer. Risk factors that influence the quality of life have diabetic foot ulcer are demographic factors, medical factors and psychological factors. Data for 2015-2020 shows that there were 22,654 diabetic ulcer patients treated in wound care homes. There is at least a preliminary study in several Wound Care Homes in the Depok area which recorded 76 new patients in October-December 2023.
Purpose: To analyze the relationship between the duration of DM, diabetic foot ulcers, and a diagnosis of hypertension with the quality of life of diabetic ulcer patients.
Method: Quantitative research with a cross sectional approach on 30 respondents. The research instrument used a demographic and diabetes quality of life (DQOL) questionnaire. Data were analyzed using univariate and bivariate chi-square tests.
Results: The duration of DM and the patient's quality of life with a p-value of 0.149 (p-value > sig 0.05). The resulting p-value between the duration of diabetic foot ulcer (DFU) and quality of life with a p-value of 0.366 (p-value > sig 0.05). The p-value of has diagnosed with hypertension and the quality of life is 0.01 (<sig 0.05).
Conclusion: There is no relationship between the duration of DM and diabetic foot ulcer on quality of life, but there is a relationship between has diagnosed with hypertension and the quality of life of diabetic ulcer patients.
Suggestion: It is hoped that the results of this research can make a meaningful contribution in providing services to patients by paying attention to quality of life.

Keywords: Diabetes Mellitus; Diabetic Foot Ulcer; Quality of Life.

INTRODUCTION

Diabetes mellitus (DM) is a chronic disease characterized by hyperglycemia due to a lack of insulin (a hormone that regulates blood sugar), low insulin levels or both (Shrivastva, Phadnis, Rao, & Gore, 2020). Diseases related to type 2 diabetes are one of the main causes of death due to non-communicable diseases in Indonesia, reaching around 2.1% of all deaths (Soelistiji, 2015). Diabetes is a health problem that can impact productivity and reduce human resources (Haskas, & Rika, 2021).

Based on data from the World Health Organization (WHO) in 2021, around 422 million people worldwide suffer from diabetes and 230 million suffer from diabetic foot ulcer. According to the International Diabetes Federation (IDF), the 10th edition of the Diabetes Atlas states that 537 million adults (aged 20-79 years) worldwide suffer from diabetes and this number is expected to continue to increase. Based on this data, the number of diabetic foot ulcer have increase to 643 million in 2030 and 783 million in 2014, and 40% of all diabetes have diabetic foot ulcers. Based on the results of a health survey, it was stated

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that 849 people in Indonesia suffer from diabetes. This number is expected to continue to increase along with the increasing number of diabetes (Ministry of Health of the Republic of Indonesia, 2018). The prevalence of diabetes in West Java is 1.74%, less than 2% of the national prevalence, while DM in Depok are 38,479 people (West Java Provincial Health Service, 2022).

High blood sugar levels can cause complications including hypertension, kidney failure, peripheral disease, and foot wounds or diabetic foot ulcer (Fadhilah, 2019). A common complication of diabetes mellitus is diabetic foot ulcer or chronic wounds in the area below the ankles which increase morbidity and mortality. Ulcers are caused by peripheral neuropathy, peripheral arterial disease or a combination of both (Indonesian Endocrinology Society, 2021).

Based on the results of previous research, factors that influence the appearance of foot ulcers or diabetic foot ulcer in DM are long suffering from diabetes > 10 years, cholesterol levels > 200 mg/dl, HDL levels < 45 mg/dl, non-compliance with a diabetes diet, lack of physical activity. , irregular foot care, and use of inappropriate footwear (Maghfuri, 2019; Al Ayed, Ababneh, Robert, Al Misfer, Cruz, Austria, & Al Dawish, 2020). Diabetic ulcer infection can spread quickly and attack deeper tissue, causing amputation and death if not treated seriously (Rahmawati, Puspitasari, Asdie, & Sinorita, 2020). Diabetic foot ulcer will accompany throughout their lives and affect their quality of life (Purwansyah, 2019).

The impact of low quality of life results in decreased self-care, ultimately disrupting glucose balance and increasing the risk of various complications. Complications that often occur if the quality of life is low include heart attacks, kidney failure, hypertension, stroke, neuropathy, leg amputation, and in pregnancies with uncontrolled diabetes it can result in fetal death (Purwansyah, 2019; Rantung, Yetti, & Herawati, 2015; Noor, Zubair, & Ahmad, 2015).

Long time suffering from diabetes is one of the factors that affects the quality of life of diabetic foot ulcer. The longer a person suffers from diabetes, the higher the risk of diabetes complications such as diabetic foot ulcer, thereby affecting a person's quality of life (Restada, Ertana, & Okti, 2016). There are many conditions that can occur that result in the formation of wounds on the feet of diabetics, namely those who have had diabetes for more than 10 years. Long-term diabetes have are at risk of developing ulcer disease, which has an impact on the patient's poor quality of life (Ramadhan, & Marissa, 2015).

Previous research shows that there is a significant relationship between factors that influence the quality of life of DM patients suffering from diabetic foot ulcer, including age, complications experienced, and anxiety. Meanwhile, marital status and length of suffering do not have a significant influence on the quality of life of DM have with diabetic foot ulcer (Utami, 2014).

Based on data from Wound Care Homes (RUMAT) for 2015-2020, there were 22,654 diabetic ulcer patients. A preliminary study conducted at several Wound Care Homes in the Depok area recorded at least 76 new patients in October-December 2023. From the description of this problem, researchers were interested in conducting research on factors related to patient quality of life.

RESEARCH METHOD

Quantitative research with a cross sectional approach to analyze factors related to the quality of life of diabetic foot ulcer patients at Wound Care Homes (RUMAT) in the Depok area which was conducted in December 2023-January 2024. The population of this study were Type 2 DM have with a history of diabetic foot ulcer in October-December 2023. Sample data collection was carried out using accidental sampling technique and a sample of 30 people with diabetic foot ulcers who were actively undergoing wound treatment were obtained.

The sample criteria in this study were diabetes mellitus (DM) patients with diabetic foot ulcer, aged 40-79 years, able to communicate well using Indonesian, and willing to be respondents. The exclusion criteria are DM patients with physical limitations (mute, blind and deaf) and cognitive impairment (dementia).

The independent variable is the patient's quality of life which is measured using the diabetes quality of life (DQOL) questionnaire instrument with a high quality category if the questionnaire score is >44, moderate if the score is 20-44, and low <28. The dependent variable is the duration of diabetic foot ulcer which is measured using a questionnaire on the respondent's demographic data, then categorized into short duration

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if 1-<8 months, medium 8-<16 months, and long duration >16 months. This research was carried out by searching for information on diabetic ulcer patients, conducting interviews with patients, and filling out prepared questionnaires. The data obtained was then analyzed using univariate analysis to describe each variable and bivariate analysis to determine the relationship between the two variables using non-parametric statistical tests (chi-square).

This research has received research permission from the Wound Care Home Institute (RUMAT) with number: 094/RUMI/XII/2023, 27th December 2023.

RESEARCH RESULTS

Table 1. Characteristics of Respondents (N=30)

Variables	Results
Age (Mean±SD)(Range)(Year)	(55.23±8.767)(41-79)
41–50	10/33.3
51–60	11/36.7
>60	9/30.0
Gender (n/%)	
Male	18/60.0
Female	12/40.0
Education Levels (n/%)	
Elementary School	6/20.0
Senior High School	13/43.3
College	11/36.7
Employment (n/%)	
Government employees	4/13.3
Self-employed	12/40.0
Housewife	5/16.7
Diabetes Duration (Years) (n/%)	
1–5	17/56.7
6–10	3/10.0
>10	10/33.3
Duration of Diabetic Foot Ulcer (DFU) (n/%)	
Short	22/73.3
Medium	3/10.0
Long	5/16.7
Has Diagnosed with Hypertension (n/%)	
Has	16/53.3
Has not	14/46.7
Quality of Life (n/%)	
High	16/53.3
Moderate	14/46.7
Low	0/0

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Based on Table 1, it is known that the average age and standard deviation of respondents (55.23 ± 8.767) is in the age range of 41-79 years. The majority of respondents were male 18 (60.0%), most were high school graduates 13 (43.3%) respondents, and 12 (40.0%) respondents worked as self-employed. A total of 17 (56.7%) respondents have DM for 1-5 years, while the majority of respondents have diabetic foot ulcers with a duration of 1-<8 months, 22 (73.3%). Apart from that, 16 (53.7%) respondents also has diagnosed with hypertension and 16 (53.5%) respondents has a high quality of life.

Tabel 2. Relationship Among Diabetes Duration, Diabetic Foot Ulcer (DFU), Hypertension and Quality of Life

Variables	Quality of Life		p-value
	High (n=16)	Moderate (n=14)	
Diabetes Duration (Years) (n/%)			
1–5	10/62.5	7/50.0	
6–10	6/37.5	3/21.4	0.149
>10	0/0	4/28.6	
Duration of Diabetic Foot Ulcer (DFU) (n/%)			
Short	11/68.7	11/78.6	
Medium	1/6.3	2/14.3	0.366
Long	4/25.0	1/7.1	
Has Diagnosed with Hypertension (n/%)			
Has	5/31.3	11/78.6	0.01
Has not	11/68.7	3/21.4	

Based on Table 2, it shows that 10 respondents (62.5%) have diabetes mellitus for 1-5 years. The results of statistical tests using chi-square obtained a p-value of 0.149 > 0.05, which means there is no relationship between the duration of DM and the quality of life of diabetic foot ulcer patients. Respondents have diabetic foot ulcer for a short duration, namely 1-<8 months with high quality of life for 11 respondents (68.7%) and moderate quality of life for 11 respondents (78.6%). The results of statistical tests using chi-square obtained a p-value of 0.366 > 0.05, which means there is no relationship between the duration of diabetic foot ulcer and the patient's quality of life. The majority of respondents has diagnosed hypertension with moderate quality of life, 11 respondents (78.6%). The p-value obtained was 0.01 < 0.05, which means there is a relationship between the diagnosis of hypertension and the quality of life of diabetic foot ulcer patients.

DISCUSSION

The research results showed that the majority of respondents were aged 51-60 years (36.7%). This is in line with previous research which stated that the majority of respondents who experienced diabetic foot ulcer were in the 55-59 year age group, because at that age the body's physiology declines (Hastuti, 2008). Other research states that the characteristics of respondents suffering from diabetic foot ulcer are those aged over 59 years because as they get older their body performance decreases. One of them is a decrease in insulin production which can cause instability in blood sugar levels, even though maintaining stable blood sugar levels is very important in treating diabetic foot ulcer. In addition, there is a decrease in the body's ability to maintain homeostasis, a decrease in the immune system, slow regeneration of body cells, and increased indications of metabolic disorders in the body (Sekhar, Thomas, Unnikrishnan, Vijayanarayana, & Rodrigues, 2015).

The research results showed that 13 respondents (43.3%) had completed high school education. Knowledge is the basis for a person's attitudes or behavior, especially in making efforts to improve health, so that if someone has better knowledge or

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level of education, they can determine the choice of therapy or action to be taken during the treatment and care period (Notoatmodjo, 2012). In line with previous research which found that the level of education will influence the way a person behaves or behaves (Permadani, & Maliya, 2017). Increasing a person's level of education will make it easier for people to understand their own situations and emotions (Al Hayek, Robert, Al Saeed, Alzaid, & Al Sabaan, 2014).

The results of the study reported that 17 respondents (56.7%) have diabetes mellitus for 1-5 years. Based on previous research, the results also show that the average patient suffers from diabetes for less than 5 years, patients usually describe how long the disease lasts based on the time it was diagnosed. This is followed by the concept that teloritis is a long-term complication occurring in the first 5-10 years (Alrub, Hyassat, Khader, Bani-Mustafa, Younes, & Ajlouni, 2019). These results are not in line with research which states that the majority of diabetic foot ulcer have diabetes for >10 years which is influenced by lifestyle and poor diet control which is one of the causes of ulcers (Arianti, 2009). Researchers concluded that the diagnosis of DM was stopped because unclear symptoms could cause complications. Glucose dilution metabolism becomes messy and uncontrolled. This will reduce the patient's quality of life because diabetes mellitus is a disease that cannot be cured but can be controlled.

The results of the study reported that 12 respondents (73.3%) experienced diabetic foot ulcer within a short period of 1-<8 months. This research is in line with previous research which found that the average duration of diabetic ulcer disease was 133 days or less than 8 months. Diabetic foot ulcer are a complication that may occur in those who have had diabetes for more than 5 years (Petersen, Bus, Rothenberg, Linders, Lavery, & Armstrong, 2020). According to previous research, the average number of diabetic foot ulcer in people with type 2 diabetes is more than 5 years. The longer you suffer from the disease, the higher the risk of developing diabetic foot ulcer (Lee, Hani, Cheng, Zainuddin, Singh, & Loh, 2022).

The research results showed that 16 respondents (53.3%) experienced hypertension as a complication of diabetes. Other diseases that occur in diabetic foot ulcer can increase severity and cause healing times to take longer (Jalilian, Sarbarzeh, & Oubari, 2020). Well-controlled blood sugar levels will reduce blood pressure within normal cell limits, so that an increase in blood pressure can be avoided (Jia, & Sowers, 2021). High blood pressure in cases of hypertension is related to increased pressure load on the tubercles in the circulatory system, especially in the peripheral area, sodium and water storage in the bones is usually insufficient. Hypertension is a risk factor for diabetic foot ulcers. Therefore, it is important to control blood sugar levels in diabetes mellitus have to reduce the risk of diabetic foot ulcer and speed up the growth process (Syauta, Hendarto, Mariana, Kusumanegara, & Faruk, 2021).

The results of study showed that, the duration of time the patient have diabetes mellitus based on the chi-square test obtained a p-value of 0.149>0.05, where Ho was accepted which resulted in there being no relationship between the duration of time have DM and the patient's quality of life. However, these results are not in line with research at the Bata Health Center, Makassar City with chi-square test results p-value 0.006<0.05, meaning there is a relationship between the length of time suffering from DM and quality of life. This can be caused because patients are not ready to know that they have diabetes, as a result they are unable to let go of the habits they had before diabetes appeared due to poor diabetes management. Another study obtained chi-square test results with a p-value of 0.041 < 0.05, which means there is a relationship between the length of illness and quality of life, which states that self-care that must be carried out includes maintaining diet, controlling blood glucose, foot care and activity. Physical fitness is an important factor in a patient's quality of life (Paris, Kasim, Basir, & Rahim, 2023). The body cells of patients who have DM for a long time tend to comply with treatment in an effort to improve their health condition so that they can provide the best care for themselves, so that their quality of life does not decrease.

The results of study showed that, the relationship between has diagnosed with hypertension and the quality of life DM patients with diabetic foot ulcer using the chi-square statistical test obtained a p-value of 0.01<0.05. This shows that H_1 is accepted, which means there is a relationship between diagnosed with

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hypertension and the quality of life of diabetic ulcer patients. Diabetes have with complications can worsen their condition, disrupt performance, daily activities, and can reduce their quality of life (Puspaningsih, & Nugraheni, 2018).

The results of this study are in line with previous research which stated that there was a relationship between various types of complications such as hypertension, cataracts, obesity and sexual changes on the quality of life of DM patients. Metabolic disorders can be exacerbated by complications experienced by patients which can cause a decrease in quality of life (Mandagi, 2010). Researchers assume that have complications such as hypertension will have an impact on their quality of life because they will be disturbed in terms of therapy, pain and rest patterns, giving rise to negative feelings about a person's self-image.

CONCLUSION

There was no relationship between the duration of DM and the patient's quality of life with a p-value of 0.149 (p-value > sig 0.05). There is no relationship between the duration of diabetic foot ulcer (DFU) and quality of life with a p-value of 0.366 (p-value > sig 0.05). There is a relationship between has diagnosed with hypertension and the quality of life of diabetic ulcer patients with a p-value of 0.01 (p-value < sig 0.05).

SUGGESTION

It is hoped that the results of this research can make a meaningful contribution in providing services to patients by paying attention to quality of life.

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