



**LONG SUFFERING RELATIONSHIP TO SELF MANAGEMENT
BEHAVIOR AND COMPLICATIONS IN TYPE 2 DIABETES MELLITUS
SUFFERERS**

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ABSTRACT

Diabetes mellitus is a long-term chronic disease and has a high risk of complications. So to prevent complications, continuous self-management is needed. This will affect the success of preventing complications in DM patients, especially those who have been diagnosed for a long time. The purpose of this study was to determine the relationship between the duration of suffering and self-management behavior and disease complications in type 2 DM patients. This research method is quantitative research with a cross-sectional approach. The population of this study was 85 respondents with a research sample of 67 respondents. The research sample was taken using purposive sampling technique. The study was conducted in the Bunut Health Center Work Area in July 2024. Data were analyzed using the Chi-Square test. The results of the study showed that there was a relationship between the duration of suffering and self-management behavior with a p-value of 0.001 (<0.05), and there was a relationship between the duration of suffering and disease complications with a p-value ≤ 0.001 (<0.05). The conclusion of this study is that the longer a patient suffers from diabetes mellitus, the more it will affect the patient's motivation in carrying out self-management, which will have an impact on increasing glycemic status which will have an impact on the occurrence of disease complications.

Keywords: complications; diabetes mellitus; self management

How to cite (in APA style)

Ulfa, H. Z., Wardoyo, E., & Dijaya, J. I. (2024). Long Suffering Relationship to Self Management Behavior and Complications in Type 2 Diabetes Mellitus Sufferers. *Indonesian Journal of Global Health Research*, 6(S5), 153-162. <https://doi.org/10.37287/ijghr.v6iS5.4501>.

INTRODUCTION

Diabetes mellitus is a long-term chronic disease characterized by high blood glucose levels caused by insulin resistance, insulin dysfunction or even both (Tang et al., 2023). Long-term chronic diseases such as diabetes mellitus require good self-management in terms of controlling diabetes mellitus such as understanding diabetes, blood glucose control, diet compliance, physical activity compliance, and compliance with taking medication (Sorensen et al., 2020). Self-management is a demand that requires diabetes mellitus sufferers to apply it in daily life for a long period of time (Lambrinou et al., 2019). Poor self-management in diabetes mellitus sufferers can result in damage to the sufferer's organs, increase disease complications such as retinopathy, neuropathy, nephropathy and so on, disability and even death (Sasombo et al., 2021). Poor self-management occurs due to a lack of motivation and understanding of sufferers regarding the goals of disease management, which will lead to non-compliance in disease management (Yulianti & Anggraini, 2020). This can be caused by several factors, one of which is the duration of the disease or the length of time suffering from diabetes mellitus (Ningrum et al., 2019).

In 2021, the International Diabetes Federation (IDF) reported that the global prevalence of diabetes reached 10.5% or 536.6 million cases. Arab countries, North Africa and the West Pacific are ranked first and second with the highest prevalence of diabetes among 7 regions in

the world, namely 12.2% and 11.4% (Sun et al., 2022). In 2023, diabetes mellitus cases in Indonesia will reach 13% or 35 million of the 270 million population in Indonesia. DKI Jakarta Province has a prevalence of DM cases of 3.4%, East Kalimantan with a figure of 2.3%, DI Yogyakarta with a figure of 2.4%, Lampung 1.4% (Ministry of Health of the Republic of Indonesia, 2022). Data on diabetes mellitus coverage in Lampung Province shows that the most cases are in Bandar Lampung City with 18,644 people, East Lampung Regency with 13,062 people, Central Lampung Regency with 11,871 people and Pesawaran Regency with 3,182 people (Riskesdas, 2018).

Diabetes mellitus cannot be reversed, but it can be controlled and complications can be prevented with self-management (Urata et al., 2019). Self-management is one of the 6 elements of chronic disease care, by involving sufferers themselves in carrying out self-care. Diabetes mellitus sufferers who have good self-management will be able to make more optimal lifestyle choices (Siminerio et al., 2009). Compliance is an important part of success in managing chronic diseases (Lachaine et al., 2013). One of the predisposing factors that can influence the success of self-management in diabetes mellitus patients is the duration or duration of suffering from diabetes mellitus. Long-term diabetes mellitus sufferers lack motivation to make efforts to prevent increases in blood sugar both pharmacologically and non-pharmacologically (Suryati et al., 2019). Diabetes sufferers with poor motivation will experience poor self-management in meeting the demands of lifestyle changes such as ignoring health checks, non-compliance with diet, non-compliance with physical activity, forgetting to take medication (Cumayunaro, 2019). Individuals who experience chronic illness for a long time will have an impact on their experience and knowledge in treating diabetes mellitus, where the longer they suffer from diabetes mellitus, the more the individual's motivation will decrease due to the patient's boredom in undergoing this therapy (Indra et al., 2023). The duration or length of time suffering from diabetes mellitus shows how long the sufferer has had diabetes mellitus since the diagnosis was made. However, long-term diabetes mellitus accompanied by a healthy lifestyle will result in a good quality of life so that it can prevent long-term complications (Lian, 2023).

Previous research shows that there is a relationship between the length of suffering and the incidence of diabetes mellitus complications with a p value of 0.017. The long duration of suffering from diabetes mellitus will cause a continuous state of hyperglycemia which initiates hyperglycolia. Chronic hyperglycolia has the potential for disease complications (Moewardi, 2023). The results of a presurvey conducted on 10 respondents with a duration of suffering from diabetes mellitus > 5 years stated that they felt hopeless and bored in managing their lifestyle and continuously taking medication but never getting better. Of the 8 respondents, 5 of them experienced complications from neuropathy, 3 people and 2 people nephropathy. Apart from that, there were 2 respondents who had suffered from diabetes mellitus < 5 years who stated that they always followed recommendations for self-management. Based on several literatures that have been conducted, many previous studies have discussed the length of suffering from diabetes mellitus on complications and quality of life. However, there has been no research that discusses how long suffering from diabetes mellitus can have an impact on self-management behavior and its complications. Based on the existing background, this study aims to analyze the long-term relationship between diabetes mellitus and self-management behavior and complications in type 2 diabetes mellitus sufferers.

METHOD

Respondents in this study were selected according to predetermined inclusion and exclusion criteria. The inclusion criteria in this study were type 2 DM patients residing in the Bunut Community Health Center area, aged >18 years, willing to be respondents. The exclusion criteria for this study were patients who experienced decreased consciousness, patients who could not read and write. The population in this study were all type 2 Diabetes Mellitus patients in the Bunut Community Health Center working area, totaling 85 respondents. The sample for this research consisted of 67 respondents taken using the Slovin formula. This research instrument uses an observation sheet which includes the respondent's personal data, age, gender, address and length of suffering and data on the incidence of complications as well as the Diabetes Self Management Questionnaire (DSMQ-16). The Diabetes Self Management Questionnaire (DSMQ-16) is a questionnaire developed by the Research Institute of the Diabetes Academy Mergentheim which contains 16 questions that focus on self-management in diabetes mellitus patients related to diet, physical activity, medication and blood sugar control. This questionnaire has been tested for validity by Fuadi (2018), results of the validity test of the DSMQ questionnaire with ($r_{table} = 0.374$) the results showed that from 14 questions there were 2 invalid question items namely questions number 4 ($r = -0.171$) and number 9 ($r = -0.044$), but because the substance of the question is deemed important, the item is not removed, however correct the sentence structure. The results of the reliability test showed that Cronbach's r Alpha was 0.641 (r Alpha > 0.374), so the questionnaire The DSMQ is said to be reliable. The data that has been collected will be checked by checking the accuracy of filling out the questionnaire to make it easier to analyze the data using univariate analysis and bivariate analysis. Univariate analysis was used to see the frequency distribution of duration of suffering, self-management behavior and complications of diabetes mellitus. Bivariate analysis was used to see whether there was a relationship between length of suffering, self-management behavior and disease complications. The statistical test used in this research used the Chi-Square test.

RESULT

Table 1.
Characteristics of Respondents

Characteristic	f	%
Gender		
Male	18	26,9
Female	49	73,1
Age		
46-50	13	19,4
51-55	11	16,4
56-60	16	23,9
61-65	20	29,9
66-70	7	10,4
Types of Complication		
Nephropathy	2	2,99
Neuropathy	9	13,4
Coronary heart	5	7,5
Strokes	3	4,5
No Complications	48	71,7

Based on table 1, it was found that there were 18 male respondents (26.9%) and 49 female respondents (73.1%). Most of the respondents in this study were female. Based on the results it is stated that 13 people aged 46-50 years (19.4%), 11 people aged 51-55 (16.4%), 16 people aged 56-60 (23.9%), 20 people aged 61-65 (29.9%) and 7 people aged 66-70 (10.4%). In this

study, all respondents fell into the elderly category. Based on the results, it was found that 2 people (2.99%) experienced nephropathy complications, 9 people had neuropathy (13.4%), 5 people had coronary heart disease (7.5%), 3 people had stroke (4.5%). %) and 48 people (71.7%) did not experience complications. In the results of this study, there were 9 respondents with neuropathy complications (13.4%).

Table 2.
Distribution and Frequency of Long Suffering from Diabetes Mellitus

Frequency of Long Suffering	f	%
< 5 tahun	28	41,8
> 5 tahun	39	58,2

Based on the results in table 2, it is known that the number of respondents who have suffered from diabetes mellitus for <5 years is 28 respondents (41.8%) and the number of respondents who have suffered from diabetes mellitus for <5 years is 39 (58.2%).

Table 3.
Frequency Distribution of Self Management Behavior

Self Management Behavior	f	%
Good	16	23,9
Enough	34	50,7
Not Enough	17	25,4

Based on table 3, the results show that the number of respondents who have good self-management behavior is 16 respondents (23.9%), respondents who have sufficient self-management behavior are 34 respondents (50.7%), respondents who have poor self-management behavior. as many as 17 respondents (25.4%).

Table 4.
Frequency Distribution of Disease Complications

Disease Complications	f	%
There Are Complications	19	28,4
No Complications	48	71,6

Based on table 4, data shows that 19 respondents (28.4%) had disease complications and 48 respondents (71.6%) did not have complications.

Table 5.
Correlation of Length of Suffering on Self Management Behavior in Type 2 Diabetes Mellitus Patients

Length of Suffering	Self Management Behavior						Total	P-Value	
	Good		Enough		Not Enough				
	f	%	f	%	f	%			
Long	4	5,97	20	29,82	15	22,41	39	58,2	0.001
Short	12	17,93	14	20,88	2	2,99	28	41,8	

Table 6.
Relationship Between Duration Of Suffering And Complications In Type 2 Diabetes Mellitus Patients

Patients								
Length of Suffering	Complications				Total		P-Value	Odd ratio
	There is		There isn't any					
	f	%	f	%	f	%		
Long	19	28,4	20	29,8	39	58,2	0,001	0,513 (0,378-0,696)
Short	0	0	28	41,8	28	41,8		

Based on the results of table 6, it shows that there is a relationship between the length of suffering and the incidence of complications with a p-value ≤ 0.001 (< 0.05), which means that H_a is accepted and H_0 is rejected. The results of this study stated that there were 19 respondents who had been diagnosed with disease complications for > 5 years. Disease complications recorded in this study were neuropathy, nephropathy, coronary heart disease and stroke. 20 respondents who were diagnosed with diabetes mellitus > 5 years did not experience complications. This is because some respondents maintain their diet, physical activity patterns, diligently take medication and control blood sugar

DISCUSSION

The incidence of diabetes mellitus occurs due to premenstrual syndrome and post-menopausal factors due to a decrease in the hormones estrogen and progesterone which results in the accumulation of body fat resulting in decreased sensitivity to insulin (Rif'at et al., 2023). Apart from hormonal mechanisms, other factors that cause diabetes mellitus in women are often excessive body weight and lack of exercise (Arania et al., 2021). Women have a high risk of experiencing obesity. At the age of 45 years, women will lose 30-50% of muscle mass which can cause a lack of calorie consumption, so that every food they eat will turn into fat which will accumulate into cholesterol, where cholesterol is a risk factor for diabetes mellitus. This is in line with previous research which shows that the prevalence of diabetes mellitus is greater in female respondents than in male respondents (Veridiana & Nurjana, 2019).

As age increases, it causes changes in the body's metabolism, especially in carbohydrates and the release of insulin, thereby inhibiting the release of glucose in cells. Apart from that, accompanied by genetic factors and an unhealthy lifestyle in the past over a long period of time, it will have an impact on diabetes mellitus (Rosita, 2022). Once a person reaches the age of over 40 years, blood glucose levels will increase by 1-2 mg% per year when fasting and will increase by around 5.6-13 mg% 2 hours after eating. This is in line with previous research which shows that the age of most respondents affected by diabetes mellitus is ≥ 45 years (Gunawan & Rahmawati, 2021). Complications of diabetes mellitus can result from several factors, namely genetics, environment, lifestyle and poor self-management (Wijaya, 2021). Peripheral neuropathy occurs due to abnormal vascularization of the nerves, causing damage to the capillaries. Diabetes mellitus patients who have a long duration of time will be at risk of developing neuropathy due to chronic hyperglycemia which damages blood capillaries and nerve fibers (Putri & Waluyo, 2019).

In addition, the results of this study showed that 5 respondents (7.5%) with diabetes mellitus had complications of coronary heart disease. Previous research stated that suffering from diabetes mellitus for a long time has an impact on coronary heart disease because plaque formation occurs slowly. Diabetes mellitus also causes abnormalities in lipid metabolism processes, obesity, systemic hypertension and increased thrombogenesis (Pakaya, 2022). Another complication found in this study was ischemic stroke in 3 respondents (4.5%). Diabetes mellitus will cause thickening of the walls of large blood vessels in the brain, resulting in vasoconstriction or narrowing which ultimately causes disruption of vascularization to the brain and causes infarction of brain cells (Letelay et al., 2019).

Furthermore, in this study 2 respondents (2.99%) had nephropathy complications. Uncontrolled diabetes mellitus can cause chronic complications, both microvascular and macrovascular. One of the microvascular complications is diabetic nephropathy. Diabetic nephropathy is a disorder of decreased renal vascular function caused by impaired carbohydrate metabolism which is common in patients with diabetes mellitus (Athifah, 2024).

The duration of diabetes mellitus indicates the period of time the patient was diagnosed with diabetes mellitus. Long suffering is correlated with the occurrence of complications. However, long suffering accompanied by a healthy lifestyle can prevent long-term complications (Lathifah, 2017). Length of suffering is a term used to express the time span when a sufferer was first diagnosed, expressed in years. The presence of diabetes mellitus will affect glucose control, diet, physical activity, medication and foot care caused by beta cell damage that occurs as the duration of diabetes mellitus increases (Darmayanti et al., 2021).

Self-management of diabetes mellitus through several aspects such as education, diet, physical activity, medication and routine blood sugar control (Ernawati et al., 2021). This research shows that the majority of respondents have sufficient self-management behavior. This is because several aspects of self-management are not fulfilled, such as the habit of not recording blood glucose levels, not participating in physical activities too often, rarely checking blood glucose and sometimes eating sweet foods. This is in line with previous research which states that sufferers who comply with medical treatment from doctors will have low motivation in fulfilling self-management from other non-pharmacological aspects such as diet programs, especially in meeting carbohydrate intake needs (Klinovszky et al., 2019).

High blood sugar levels over a long period of time or chronic uncontrolled hyperglycemia can cause microvascular complications such as diabetic retinopathy, neuropathy, nephropathy, blindness and amputation. Apart from that, macrovascular complications such as myocardial infarction, congestive heart failure and even death (Blaibel et al., 2024). Chronic hyperglycemia will have an impact on the body's metabolism, thereby affecting various tissues and organs of the body (Llaguno de Mora et al., 2019). The results of this study show that the majority of respondents had neuropathy complications. Most respondents complained of numbness, tingling and numbness in the lower extremities or feet. This is in line with previous research which states that neuropathy is one of the complications that occurs in diabetes mellitus patients, especially peripheral neuropathy. Pathophysiologically, neuropathy is characterized by widespread metabolic damage or inflammation that affects the peripheral nerves resulting in damage to the nerves in transmitting motor and sensory impulses (Galiero et al., 2023). Researchers assume that diabetes mellitus is a disease that has various kinds of complications, both microvascular and macrovascular.

Based on the results of this research, it was found that there was a relationship between length of suffering and self-management behavior with a p-value of 0.001 (<0.005), which means that H_a was accepted and H_0 was rejected. This research shows that the majority of respondents who have long been diagnosed with diabetes mellitus have sufficient self-management behavior. In this study, 39 respondents with long-term diabetes mellitus were in the long category, most of whom had sufficient self-management behavior, 20 respondents. Several respondents stated that they understood the things that must be considered in managing diabetes mellitus, such as reducing the habit of eating sweet foods, exercising diligently, regularly checking blood glucose levels, and regularly taking medication. However, when implementing self-management, feelings of boredom and decreased motivation in carrying it out often arise. Several respondents stated that sometimes they consume quite a lot of sweet foods and only do exercise once a month such as prolanis and rarely check their blood sugar. Respondents also stated that they took medication by increasing the dose independently, which is usually done when they have consumed large amounts of sweet foods.

The duration of suffering from diabetes mellitus has an influence on self-management behavior. Diabetes mellitus sufferers who have been diagnosed for a long time have a greater understanding of the importance of self-management behavior (Ningrum et al., 2019). However, the longer a person suffers from a chronic illness, the worse it will have on self-management. Someone who undergoes treatment for a long time can feel bored and frustrated with the burden of treatment and care, so they decide to stop treatment therapy (Arindari et al., 2021). This is in line with previous research which states that the longer respondents suffer from diabetes mellitus, the less frequently they undertake other non-pharmacological treatments such as physical activity and diet (van Puffelen et al., 2020).

Researchers assume that patients who have had diabetes mellitus for a long time have a better understanding than diabetes patients who have just been diagnosed with diabetes mellitus. However, considering that diabetes mellitus management must be carried out throughout life or over a long period of time, it often causes feelings of boredom and this includes high blood glucose levels, sometimes not causing significant symptoms. The duration of suffering is the time when the patient was first declared to have diabetes mellitus. The longer you suffer from diabetes mellitus, the longer the patient will experience chronic hyperglycemia which will cause diabetes mellitus complications if it is not accompanied by good self-management (Suryati et al., 2019). Long suffering is associated with glycemic control which is associated with beta cell dysfunction that develops over time, so a regular treatment regimen is needed (Ghabban et al., 2020). Researchers assume that the duration or length of time suffering from diabetes mellitus has an influence on the incidence of complications in diabetes mellitus patients. Chronic hyperglycemia without treatment will affect organ metabolism, which will have an impact on the emergence of complications.

CONCLUSION

Long suffering from diabetes mellitus will influence motivation in implementing self-management. This will have an impact on the success of self-management so that it will have a further influence on complications of diabetes mellitus. Conditions of chronic hyperglycemia and continuous irregularity of treatment carry a risk of disease complications that can cause mortality and morbidity. It is hoped that future researchers can analyze further regarding increasing motivation in self-management of diabetes mellitus patients, especially in patients who have been diagnosed with diabetes mellitus for > 5 years.

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