Management Of Blood Sugar Control In Type 2 Diabetes Mellitus In Prolanis Working Area Of Tuban Health Center

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Abstract. Diabetes mellitus globally is increasing and most common cause of death. Uncontrolled increases in blood sugar levels can lead to complications and death. A measure to prevent DM complications is to maintain blood sugar levels within normal limits, but many DM patients have difficulty maintaining normal blood sugar. This study aimed to determine the management of controlling blood sugar in type 2 DM patients at Prolanis Health Center Tuban. Descriptive research design with approach crossectional. The study population was all active prolanis participants suffering from type 2 DM at Tuban Health Center, totaling 55 people. Using a total sampling technique and questionnaire instrument. The variable of this study is the management controlling blood sugar. Data analysis uses distribution and frequency tables. The results showed that most (53%) of type 2 DM sufferers at Prolanis Health Center Tuban had sufficient education, almost half (49%) of type 2 DM sufferers had adequate medical nutrition therapy, most (76%) of type 2 DM sufferers lacking in physical exercise, the majority (73%) of type 2 DM patients are not compliant in pharmacological interventions.The management of controlling the 4 pillars of blood sugar has not been fully carried out properly. Education and medical nutrition therapy are sufficient categories because most DM sufferers are elderly, and they have difficulty receiving and understanding knowledge. Meanwhile, most physical exercise and pharmacological interventions are lacking and disobedient, due to lack self-awareness the importance of exercise and drug consumption. This can lead to uncontrolled blood sugar and complications of DM.

Keywords: Management Diabetes Mellitus, Blood Sugar

1 INTRODUCTION

Non-communicable diseases are the leading cause of high mortality globally (Ariana et al, 2019). The third goal of the Sustainable Development Goals (SDGs) is to reduce one-third of premature deaths caused by non-communicable diseases by 2030 (prima e. However, the facts found that non-communicable diseases, one of which is diabetes mellitus, are increasing globally and nationally the disease that causes the most deaths and cases (Roifah et al, 2019). Patients with diabetes mellitus (DM) are at risk of complications and death if blood glucose levels increase without control (Fardiansyah, MA, 2020). Keeping blood sugar levels within the normal range is a way to avoid diabetic complications, but many patients with diabetes mellitus struggle to maintain normal blood sugar (Trisnadewi, NW, 2018).
The International Diabetes Federation (IDF) records that 537 million adults suffer from diabetes which has caused 6.7 million deaths. Indonesia ranks fifth, with 19.47 million people suffering from diabetes and is sixth on the list of the number of deaths due to diabetes reaching 236 thousand (IDF, 2021).
The prevalence of diabetes mellitus according to the findings of doctors or health workers in Indonesian people aged 15 years and over from 0.7% in 2007 increased to 1.5% in 2013 and increased again in 2018 to 2.0 (Kemenkes RI, 2018)

Table 1. Number of people with diabetes mellitus in East Java province and Tuban health center

Year	Number of people with diabetes mellitus	
	East Java	Tuban Health Center
2019	841,994	689
2020	875,745	688
2021	929,810	726

Source: East Java Health Office and Tuban Health Center for 2019-2021 (Dinkes Tuban, 2020)

Data on diabetes mellitus in Tuban Regency, according to BPS (Kemenkes RI, 2018) is included in the percentage of the 15 most common diseases in Tuban Regency in 2021, namely 9.50% and in 2022 it will increase to 10.80% (BPS, 2020).

In Indonesia, diabetes complications include 60% neuropathy, 20.5% coronary artery disease, 15% diabetic ulcers, 10% retinopathy, and 7.1% kidney disease. Good blood sugar control can prevent diabetes complications. But the fact is that 70% of patients do not control their blood sugar as recommended. Most patients with diabetes mellitus have uncontrolled blood sugar caused by diets that are not compliant with the doctor's recommendations and irregular medication (Wicaksono,M, 2013)

The data shows that the high number of people with diabetes mellitus and deaths caused by diabetes mellitus are still high when compared to the third goal of the global action plan or the Sustainable Development Goals (SDGs). In addition, there are still many diabetes mellitus patients who do not control blood sugar according to recommendations it can cause complications. Data on diabetes mellitus sufferers at the Tuban Health Center were found to be mostly type 2 Diabetes Mellitus.

Lifestyle is the dominant thing that triggers type 2 diabetes mellitus (Murtiningsih et al, 2021). Diabetes Mellitus cannot be cured but can be controlled through blood sugar levels[13]. Patients with type 2 diabetes mellitus are mostly unable to control their glucose levels even though effective treatment is available (Lanra et al, 2019). If blood sugar is not controlled and managed properly, it can cause chronic complications. Uncontrolled blood sugar can have short-term effects for diabetics, including hypoglycemia and hyperglycemia, as well as long-term effects on the eyes, skin, bones, feet, heart and kidneys (Casqueiro et al, 2012).

The Indonesian government's efforts to control chronic diseases are carried out through the Chronic Disease Management Program (Prolanis) to optimally improve the quality of life of BPJS participants with a history of chronic diseases such as diabetes and high blood pressure[15]. For type 2 diabetes sufferers, there are four recommended pillars of managing blood sugar control including education, Medical Nutrition Therapy (TNM), physical exercise, and pharmacological interventions (Ladyani et al, 2010).

Education in diabetes control is the main basis for building the knowledge and skills of diabetes mellitus patients (Arimbi et al, 2020). The role of the nurse is very important as an educator in informing the importance of controlling blood sugar in people with diabetes mellitus, so that they can change the patient's behavior to minimize the patient's bad blood sugar levels (Chawla et al, 2019). Knowledge, belief, and positive attitude, availability of necessary facilities and infrastructure, and motivation are factors that influence the behavior of diabetes mellitus patients in controlling blood sugar levels (Arimbi et al, 2019).

2 INTRODUCTION

The design of this study was descriptive. The study population consisted of all active prolanis participants suffering from type 2 diabetes mellitus at the Tuban Health Center, totaling 55 people. The sample size is 55 people using the Total Sampling technique. The variables in this study are blood sugar control management which included education (knowledge), medical nutrition therapy, physical exercise, and pharmacological interventions. Retrieval of data with questionnaires and descriptive analysis using frequency tables.

3 RESULT

Table 2. Distribution of Knowledge/Education about Diabetes Mellitus to Patients with Type 2 Diabetes Mellitus at Prolanis Health Center Tuban in June 2023

Education	Frequency (n)	Percentage (%)
Good	21	38%
Enough	29	53%
Less	5	9 %
Total	**55**	**100%**

Table 1 shows that a small proportion of type 2 diabetes mellitus patients at the Tuban Health Center still have less education, namely as many as 5 people (9%) about diabetes mellitus.

Table 3. Distribution of Medical Nutrition Therapy for Type 2 Diabetes Mellitus Patients at Prolanis Health Center Tuban in June 2023

Medical Nutrition Therapy	Frequency (n)	Percentage (%)
Good	18	33%
Enough	27	49%
Less	10	18%
Total	**55**	**100%**

Table 2 shows that a small proportion of type 2 diabetes mellitus patients at the Tuban Health Center are still lacking in medical nutritional therapy for diabetes mellitus, namely as many as 10 people (18%).

Table 4. Distribution of Physical Exercise for Type 2 Diabetes Mellitus Patients at Prolanis Health Center Tuban in June 2023

Physical training	Frequency (n)	Percentage (%)

Good	13	24%
Less	42	76%
Total	**55**	**100%**

Table 3 shows that the majority of type 2 diabetes mellitus patients at the Tuban Health Center are still lacking in doing physical exercise, namely 42 people (76%).

Table 5. Distribution of Pharmacological Interventions for Type 2 Diabetes Mellitus Patients at Prolanis Health Center Tuban in June 2023

Pharmacological Interventions	Frequency (n)	Percentage (%)
Compliant	15	27%
Non-Compliant	40	73%
Total	**55**	**100%**

Table 4 shows that the majority of type 2 diabetes mellitus patients at the Tuban Health Center had non-adherent pharmacological interventions, as many as 40 people (73%).

4 DISCUSSION

4.1 Education about diabetes mellitus Type 2 Diabetes Mellitus Patients at Prolanis Health Center Tuban

The results showed that a small proportion of people with type 2 diabetes mellitus education at the Prolanis Health Center in Tuban had less education about diabetes mellitus.

Education on the 4 pillars of management to control diabetes mellitus is the main basis for the treatment and prevention of diabetes mellitus. Through education, it is expected to increase the knowledge and skills of people with Diabetes Mellitus in carrying out self-care. Education about a healthy lifestyle must be provided to prevent and manage Diabetes Mellitus holistically (Perkeni, 2015).

The benefits of education lead to a longer and better quality of life, fewer complications, less financial burden and independent living (Previarsi et al, 2020). The educational materials provided cover the course of diabetes, diabetes control, exercise and regular diet, as well as treatment.

Type 2 diabetes mellitus patients in the working area of the Tabanan II Health Center found that most respondents had good education about diabetes mellitus (Mahardika et al, 2021).

The results of the research obtained at the Tuban Health Center showed that a small proportion of people with type 2 diabetes mellitus at the Tuban Health Center had less education. Based on age characteristics, this is because most of the respondents are in the late elderly category, namely in the age range of 46-65 years. The mental development that a person acquires matures with age, which has an impact on the knowledge he acquires. However, the ability to remember and absorb knowledge will decrease with age. Differences in perceptions in understanding something are also obstacles. Apart from that, elderly people will also find it difficult to understand and answer the questions given.

Entering old age, parents face many problems, one of which is cognitive problems. Beliefs about something that are achieved through thinking processes begin with the acquisition of knowledge and are processed through activities such as remembering, analyzing, understanding, evaluating, imagining, and speaking. This thinking process is usually called cognitive intelligence (Putri, DE, 2020).

4.2 Medical Nutrition Therapy for Type 2 Diabetes Mellitus at the Tuban Health Center Prolanis

The results showed that almost half of type 2 diabetes mellitus patients at the Prolanis Health Center in Tuban had sufficient medical nutrition therapy and a small proportion still had insufficient medical nutritional therapy.

The diabetes mellitus diet is a medical nutritional therapy that is highly recommended to maintain blood sugar levels within normal limits, treat acute complications, and improve overall health (Gray et al, 2019). Patients with diabetes mellitus need to be emphasized on the importance of diet. A person's diet includes the amount, time and type of food eaten. An inappropriate eating pattern as suggested, namely the 3J (Schedule, Amount, and Type) can cause blood sugar to get higher (Kongkoli et al, 2019).

Muhammad Luthfi (2022) in his research on diabetes mellitus patients in the working area of the Mungo Health Center showed that the majority of respondents had implemented good diabetes mellitus dietary control (Luthfi et al, 2022).

Half of medical nutrition therapy for type 2 diabetes mellitus patients at the Prolanis Health Center in Tuban is included in the sufficient category. This is because many people with type 2 diabetes mellitus at the Tuban Health Center have not scheduled their daily diet. The goal of medical nutrition therapy is to achieve and maintain blood sugar levels within normal or near normal limits. Unscheduled diet can cause an increase in blood sugar.

In this study, it was also found that a small proportion of people with type 2 diabetes mellitus at the Prolanis Public Health Center in Tuban had insufficient medical nutrition therapy, as many as 10 people. This is because some patients have diabetes mellitus for about 1 year, so they still do not understand the diabetes mellitus diet.

4.3 Physical Exercise for Type 2 Diabetes Mellitus Patients at Prolanis Public Health Center Tuban

The results of the study at the Tuban Health Center showed that most of the respondents lacked physical exercise, namely as much as 76%.

Physical exercise is highly recommended for people with type 2 diabetes because it has long-term benefits that can reduce mortality by 50% to 60% and plays an important role in controlling blood sugar because it is useful in activating insulin sensitivity (Windani et al, 2019).

Physical exercise is a means to control blood sugar in the body (Istiqomah et al, 2022). The recommended regular exercise program is exercising 3-5 days per week for 30-45 minutes, a total of 150 minutes each week, and a break between exercises of no more than two days (Pescatello et al, 2015). Recommended physical exercises include brisk walking, leisurely cycling, gymnastics, leisurely running and swimming .

The results of a study conducted on type 2 diabetes mellitus patients at Prolanis Health Center Tuban showed that most sufferers did physical exercise in the less category and people with diabetes mellitus rarely exercised because most of type 2 diabetes mellitus sufferers at Prolanis Health Center Tuban were in the late elderly category. The elderly are usually weaker and more susceptible to diseases that can reduce their ability to exercise such as brisk walking, leisurely cycling, gymnastics, jogging regularly (3-5) times a week and within 30-45 minutes. Patients with type 2 diabetes mellitus at the Tuban Health Center Prolanis said that they do routine exercise every time they take part in Prolanis activities at the Tuban Health Center once a month. Execution of gymnastics is one of the recommended sports for people with type 2 diabetes mellitus with routine time intensity. Awareness of people with diabetes mellitus in doing routine exercise and independent exercise at home is still lacking, so most people with type 2 diabetes mellitus at the Tuban Health Center Prolanis are still lacking in physical activity.

4.4 Pharmacological Intervention in Type 2 Diabetes Mellitus Patients at Prolanis Health Center Tuban

The results of research conducted at the Tuban Health Center, most of the prolanis participants with type 2 diabetes mellitus have pharmacological interventions that are not compliant. Oral antidiabetic medication is a pharmacological intervention that helps activate insulin which is needed by people with type 2 Diabetes Mellitus, especially when they are sick or stressed because they have to overcome insulin resistance and control blood glucose levels properly (Krentz Aj, Bailey CJ, 2005).

Pharmacological therapy is given in conjunction with a diet and physical exercise program, known as a healthy lifestyle. Patient compliance which is the main component of therapy, affects the success of treatment. People with diabetes mellitus can improve their medication adherence to maximize their therapy and prevent complications (Williams et al, 2014).

The success of diabetes control is determined by high adherence to treatment, which aims to prevent complications due to diabetes. Even though it requires a high level of treatment adherence, in reality patient compliance with exercise alone is not enough. Factors for non-compliance with taking medication include forgetting, not taking medication according to a doctor's prescription, mislabelling, taking too much medication, and making it difficult to monitor patients (Desakari, KN, 2020).

Diabetes mellitus patients at the Yogyakarta Special Region Health Center showed that all diabetes mellitus patients had a low level of compliance (Rasdianah et al, 2016).

The results of a study conducted at the Tuban Health Center showed that most people with type 2 diabetes mellitus were in the non-adherent category of pharmacological interventions. This is because most of the respondents did not take medication because they felt that their blood sugar was normal and their bodies were healthy. In addition, support from the family is lacking so that sufferers often forget to take medication.

Compliance with pharmacological interventions is also one of the factors related to controlling blood sugar levels in people with diabetes mellitus. Patients with diabetes mellitus who fall into the non-adherent category in pharmacological interventions have poor control of blood sugar levels.

5 CONCLUSION

Based on the results of the research that has been done, the following conclusions can be drawn:

1. Most patients with type 2 diabetes mellitus at the Prolanis Health Center in Tuban have sufficient education about diabetes mellitus
2. Nearly half of type 2 diabetes mellitus patients at the Prolanis Health Center in Tuban have medical nutrition therapy which is in the sufficient category
3. Most patients with type 2 diabetes mellitus at the Prolanis Health Center in Tuban do physical exercise in the less category
4. Most patients with type 2 diabetes mellitus at the Prolanis Health Center in Tuban are not compliant with pharmacological interventions

6 SUGGESTIONS

From the research results obtained, suggestions that can be submitted are as follows:

1. The Tuban Community Health Center is improving health promotion programs, especially regarding the 4 pillars of management of controlling blood sugar in people with type 2 diabetes mellitus.
2. Patients with type 2 diabetes mellitus are advised to adhere to the 4 pillars of management to control blood sugar which include education, medical nutritional therapy, physical exercise and pharmacological intervention.

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