

## The Effect of Foot Exercises on Blood Sugar Control Through Education of Families With Diabetes Mellitus in The Medical Surgery Room of Banten Province Hospital

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### ABSTRACT

Diabetes is a chronic metabolic disorder characterized by increased blood glucose (or blood sugar) levels, which over time causes serious damage to the heart, blood vessels, eyes, kidneys and nerves. Type 2 diabetes mellitus is the most common diabetes, which generally occurs in adults, which occurs when the body becomes resistant to insulin or does not produce enough insulin. Treatment that can be done for diabetes mellitus is pharmacological therapy and non-pharmacological therapy. One of the non-pharmacological management of DM is doing foot exercises. According to Riskesdas in 2018, Banten was the province with the highest increase in DM from 2013 to 2018. The prevalence of DM in Banten province was 2.43%. The aim of this activity is to provide knowledge to families and patients about foot exercises for diabetes mellitus sufferers. The activity was carried out at the Banten Regional General Hospital in the medical-surgical room, which was attended by the patient and the patient's family. The method of activity carried out was providing material on the influence of foot exercises on blood sugar control through educating families with diabetes mellitus, demonstrating foot exercise activities for DM sufferers, after that a question and answer session was held, participants were active in asking and answering. The activity took place for one day in June 2024. The results of this activity are that families of patients suffering from Diabetes Mellitus understand that blood sugar can be controlled through foot exercises, families can do foot exercise demonstrations independently and families also understand how to prevent Diabetes Mellitus from occurring. by other family members

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### ARTICLE INFO

#### **Article History :**

*Submitted/Received 23 Aug 2024*

*First Revised 9 Sep 2024*

*Accepted 10 Sep 2024*

*First Available online 21 Oct 2024*

*Publication Date 21 Oct 2024*

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#### **Keyword :**

*Diabetes Mellitus*

*Counseling*

*Diabetes Foot Exercises*

## INTRODUCTION

Diabetes mellitus (DM) is a condition where the body cannot produce the insulin hormone as needed or the body cannot optimally utilize the insulin produced, resulting in a spike in blood sugar levels above normal (Indriyani et al., 2023). Diabetes Mellitus is a collection of symptoms that arise due to increased blood sugar levels due to decreased insulin secretion. Diabetes Mellitus can be said to be a group of metabolic diseases with the characteristics of hyperglycemia which occurs due to abnormalities in insulin secretion, insulin action or both (Rahmawati et al., 2023)

According to *the International Diabetes Federation (IDF)*, in 2021, there were 537 million adults (aged 20 - 79 years) or 1 in 10 people living with diabetes worldwide. Diabetes is the cause of 6.7 million deaths or one death every 5 seconds. IDF stated that Indonesia was in fifth position with the number of people suffering from diabetes at 19.47 million. With a population of 179.72 million, it can be interpreted that the prevalence of diabetes in Indonesia is very high, namely around 10.6%. According to Riskesdas in 2018, Banten was the province with the highest increase in DM from 2013 to 2018. The prevalence of DM in Banten province was 2.43%. The prevalence of Diabetes Mellitus based on doctor's diagnosis in residents of all ages according to districts/cities in Banten Province, in Serang City is 2.48%. The high prevalence rate and predicted incidence of diabetes mellitus in the future shows that diabetes mellitus is a disease that requires serious attention and treatment.

Diabetes mellitus can be treated with pharmacological therapy and non-pharmacological therapy. Non-pharmacological management of DM includes weight control, exercise training and diet (Wibisana & Sofiani, 2017). In managing diabetes, the component of physical exercise or exercise is very important, because its effect can reduce blood glucose levels by increasing glucose uptake by muscles and improving insulin use. One of the sports recommended, especially for elderly patients, is foot exercises, the aim of which is to improve blood circulation and prevent the occurrence of diabetic feet (Indriyani et al., 2023).

Diabetic foot exercises are a form of physical activity given to diabetes mellitus sufferers of all ages, providing foot exercises with the aim of preventing injuries, and allowing blood circulation in the feet to flow smoothly. Apart from that, another function of foot exercises is as a way to facilitate movement of the foot joints. The movements in leg exercises function to train the small muscles of the legs to become stronger and improve blood circulation so that blood flow becomes smooth, which is done in various positions such as sitting, standing or lying down (Rahmawati et al., 2023). So that after giving foot exercises as a form of physical exercise, it will cause an increase in blood flow, the capillary nets will be more open and more insulin receptors will be available, and the receptors will become more active which will have an effect on reducing blood glucose in diabetes patients. Normally after eating, blood glucose levels increase which will be followed by a rapid increase in insulin and decrease after the incoming nutrients are stored. The hormone insulin produced by the pancreas is needed to enter glucose from the blood into cells (Nopriani et al., 2021).

However, in reality there are still many people, families and even DM sufferers who do not fully understand the benefits of these nine physical activities, especially diabetic foot exercises on blood sugar levels. In this case, it can be seen the importance of providing health education to the community, especially to DM sufferers, to increase knowledge about managing DM and skills to stabilize blood sugar levels by demonstrating foot exercise techniques. So in the end it is hoped that sugar levels will remain stable, as well as being a way to prevent wider complications.

Based on the description above, it shows that the community, especially families and individuals or patients treated in the medical-surgical room at the Banten Province Regional Hospital, still do not fully understand the benefits of physical activity, especially diabetic foot exercises on blood sugar levels. Therefore, we feel interested in providing health education regarding DM disease and demonstrating how to do diabetic foot exercises. With the title Community Service "The Effect of Foot Exercises on Blood Sugar Control Through Education of Families with Diabetes Mellitus in the Medical Surgical Room at the Regional Hospital of Banten Province".

Factors that influence the incidence of Diabetes Mellitus type 2 include age, physical activity, exposure to smoke, body mass index (BMI), blood pressure, stress, lifestyle, family history, HDL cholesterol, triglycerides, pregnancy DM, history of glucose abnormalities and other disorders (Azzahra Utomo et al., 2020). However, this is also supported by the existence of risk factors that support the occurrence of T2DM, including: nutritional factors, age, lifestyle, and a history of DM during pregnancy (Nuraini et al., 2023).

Insufficient family support is one of the causes of diabetes mellitus not being treated, and even complications occurring. Conditions that can be said to be serious occur in DM sufferers, namely blood sugar levels that are too low (70 mg/dl) or very high to more than 400 mg/dl (Kurdi & Priyanti, 2019).

## METHOD

This community service aims to provide family empowerment in the management and prevention of diabetes mellitus emergencies. This is done as an effort to increase the family's ability to recognize diabetes mellitus, provide care, prevent complications and emergencies in diabetes mellitus sufferers who live at home with the family. The method used is health education in the form of counseling, diabetes exercise demonstrations and also providing opportunities for patients or families to ask and answer questions. This activity is given to patients and one of their family members (especially those who live in the same house) as many as 9 people. Health education is provided in the form of counseling, simulations and discussions to family members who live with the patient. The counseling carried out consisted of providing material on the effect of foot exercises on controlling blood sugar through educating families with diabetes mellitus. Stages of community service activities related to the benefits of foot exercises for diabetes:

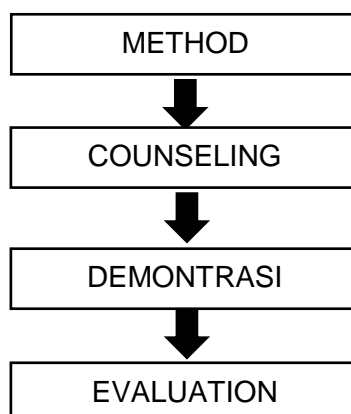


FIGURE 1. Community services stages

The method used in counseling so that the objectives of the activities can be achieved is to arrange a series of activities. The initial stage of the activity begins with counseling carried out, with a lecture method carried out using leaflets and power points. The time used for the lecture was 30 minutes, then the activity continued with a demonstration of diabetes foot exercises which was carried out for 30 minutes. The demonstration activity is expected to provide participants with an initial overview and understanding of DM disease. The demonstration activity is led by a team of extension workers who act as teachers. The teacher acts as a mediator because he can convey things that the participants don't know, so that it becomes new knowledge that is very important for the participants. It is hoped that gymnastics activities that involve the patient's family will be able to remember the gymnastics movements that have been carried out and will be willing to teach them back to the patient. The next activity continued with an evaluation session, this activity was filled with question and answer activities, to measure knowledge after going through a series of activities.

## RESULTS AND DISCUSSION



This Community Service activity was carried out for 1 day on June 12 2024 in the Garuda Medical Surgical Room on the 5th floor of the Banten Provincial Regional Hospital with an implementation period of  $\pm$  1 hour, starting at 10.00 WIB to 11.00 WIB with a total of 9 participants. When carrying out the activity, the patient's family is provided with educational material about the effect of foot exercises on controlling blood sugar in Diabetes Mellitus sufferers as well as a direct demonstration of foot exercises, and leaflets for the patient's family to read. Carrying out this activity can also provide benefits for home supplies by doing it independently. by patients suffering from Diabetes Mellitus assisted by the patient's family who have been educated.


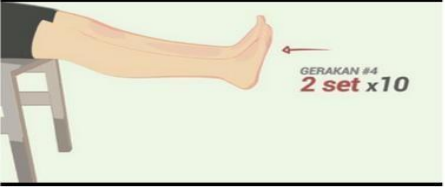
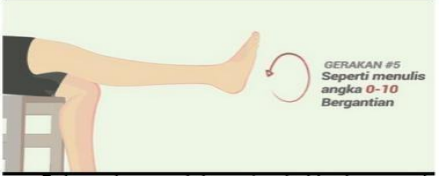


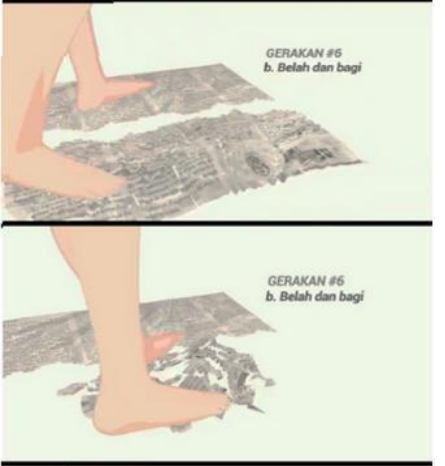
Based on the results of community service activities through education about the effect of foot exercises on controlling blood sugar in the families of patients suffering from diabetes mellitus in the Garuda medical surgical room on the 5th floor of the Banten Province Regional Hospital, it shows that education can increase the knowledge of each patient's family about how foot exercises influence blood sugar control. in diabetes mellitus sufferers. This is illustrated by the evaluation results by measuring the level of knowledge of respondents or patient families through the question and answer method at the beginning before education is provided and at the end of the activity after education is provided.


The question and answer method is used to determine the success of counseling activities by asking questions to the patient's family before and after being given education. From the results of the implementation of the activity, it is known that the level of participation of the patient's family for this activity is quite good. This was seen before during the activities of the patient's family showing a lack of knowledge about foot exercises in patients with diabetes mellitus, when asked questions the family was unable to answer them. Meanwhile, the patient's family showed an increase in knowledge after the education was carried out. Families of patients suffering from diabetes mellitus can answer the questions given and perform foot exercise demonstrations independently.

By holding community service through foot exercise educational activities, it can increase the patient's family's knowledge about the effect of foot exercise on controlling blood sugar in diabetes mellitus sufferers. Providing counseling can have a meaningful influence on the level of knowledge, so that the knowledge possessed can be applied in everyday life (Ratnasari, 2019). When at home, the patient's family can tell and teach diabetic patients to do foot exercises. Foot exercises can be done at home to add more physical activity to your daily activities. Diabetic foot exercise activities are presented in table 1 below.

TABLE 1. Stages of DM Leg Exercises

Stages	Picture
Place the heels of your feet on the floor, then move your toes in an up and down motion, do this 2 sets x 10.	
Lift the sole of your upper foot, resting on your heel, make the movement rotate outwards with movement on the soles of the feet 2 sets x 10 repetitions, make a move this is on left and right feet alternately.	

Stages	Picture
<p>Next, lift both legs parallel, then make the move foot to front And backwards , do this 2 sets x 10.</p>	
<p>The next movement is to lift your legs alignment and movement palm foot to front And to behind do this 2 sets x 10.</p>	
<p>Wrong One foot And lift. So turn towards the wrist foot, This movement is done as if you were writing in the air with your feet , from the numbers 0 to 10 done properly alternate</p>	
<p>Place a sheet of newspaper on the floor, then make the newspaper into a ball using your feet.</p>	
<p>Next, the newspaper ball is opened again using the help of foot movements.</p>	
<p>Split the newspaper into 2 parts, the first part of the newspaper is made into small tears using your foot. Next, the results of the torn first part are collected again.</p>	

Stages	Picture
Move the first piece of torn newspaper to the second piece of newspaper that is still intact, wrap the torn piece until it forms a ball again.	

Foot exercise is one of the important things you can do to help manage diabetes and improve health. This is in line with the opinion of Ginanjar, Y., et al (2022) that the benefits of leg exercises are that they can reduce blood sugar levels and reduce cardiovascular risk factors. This way blood sugar levels can fall. Apart from that, it is in line with the opinion of Lemone *et al* (2016) that exercise can increase physical fitness, improve emotional states, control body weight. These results are also supported by the results of previous research conducted by Susanto, G., & Wahyudi, D. A. (2023). where the results of his research stated that leg exercises can increase muscle work to make them more active and reduce blood sugar levels, this can occur due to the regularity of respondents in doing exercise. leg exercises to reduce blood sugar levels.

The family plays a very important role in the treatment process, because the family will help a lot in providing care. Therefore, the family's ability to provide care is very necessary for DM sufferers at home. Health education *is* increasing a person's abilities and knowledge through practical learning techniques or instructions with the aim of changing or influencing human behavior. According to WHO, one strategy to achieve behavior change is by providing information to increase knowledge so as to raise awareness and can be done by providing health education (Notoatmodjo, 2014). Health education that is carried out well will be able to influence a person's level of knowledge regarding the matter being taught. Good knowledge can change attitudes towards positive things.

## CONCLUSION

Community service through this education can increase the knowledge of families of patients suffering from diabetes mellitus. It can be seen from the results of the evaluation of this activity that families of patients suffering from diabetes mellitus understand that blood sugar can be controlled through foot exercises, families can carry out foot exercise demonstrations independently and families also understand how to prevent diabetes mellitus from being experienced by other family members. Families are expected to be able to carry out what has been conveyed during education.

## AUTHOR CONTRIBUTIONS

This activity involves teams working together so that this service runs smoothly. Sonia Aprilia and Umi Kulsum acts as an activity proposer, writer, idea initiator, carries out community service and compiles activity results. NS. Imas Sartika, S.Kep., M.Kep played a role in providing direction and suggestions.

## THANK-YOU NOTE

We express our thanks to Garuda medical surgical room, 5th floor, Banten provincial hospital, who have worked together to make this activity possible. Thank you to other parties who cannot be mentioned one by one.

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