Comparative Study of Physical Activity: Chronic Disease Management Program (Prolanis) Exercises on Diabetes Mellitus of Type 2

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Abstract

Fatigue, weakness and various musculoskeletal problems in people with type 2 diabetes (T2DM) can be overcome by regular, low-impact physical activity. The Indonesian government has a Physical Activity; Chronic Disease Management Programme (Prolanis) that can overcome musculoskeletal problems while maintaining stable blood glucose levels in T2DM. This study is qualitative phenomenology with a population of T2DM patients actively visiting the Aek Habil Health Centre area in Sibolga City, the research was conducted for approximately six months. Participants were six samples divided into two groups, purposive sampling technique, data collection process through interviews, observation and documentation methods, analysis and testing using triangulation, aiming to compare T2DM patients who follow physical activity; prolanis with patients who do not follow the programme. Results and conclusions: There were no differences in health complaints and differences in blood glucose levels in the two groups of participants, there were differences in physical description and quality of life in the group that did not participate in prolanis physical activities. Suggestion: It is necessary to evaluate and approach to improve the programme for T2DM patients who do not do physical activity; prolanis exercise.

Keywords: DMT2, Exercises (Prolanis), Physical activity

INTRODUCTION

According to statistics from the World Health Organization (WHO), 366 million individuals worldwide are currently affected by diabetes mellitus (DM). This condition poses a substantial threat not only to public health but also to economic development. Consequently, concerted efforts are imperative to effectively manage this disease, with the promotion of a balanced diet and regular physical activity being paramount at all stages of life. By the year 2030, Indonesia is projected to see an increase of 21.8 million cases of DM, marking a substantial rise from the 8.4 million cases recorded in 2000. This trend positions Indonesia fourth in the number of individuals with DM among the most populous countries, following the United States, China, and India, (Rahmawati et al., (2020). The International Diabetes Federation (IDF) in Safitri *et al*., (2022) has identified diabetes as one of the fastest increasing global health crises in the 21st century, especially diabetes mellitus (DM) type 2. Amrullah (2020) posits that the global prevalence of diabetes mellitus (DM) is approximately 230 million, with an estimated annual growth rate of 3% (approximately 7 million individuals).

According to Safitri *et al*., (2022), the incidence of diabetes mellitus in various developing countries is persistently increasing due to shifts in lifestyle, encompassing increased consumption of fast food, high-fat foods, reduced physical activity, and excessive food intake.

Glucose is an important source of energy for the brain, and insulin is needed to transport glucose from the bloodstream into cells for energy production. When blood sugar levels are uncontrolled or fluctuating, it can lead to severe damage to different organs and even death. People with type 2 diabetes often have unstable blood sugar levels, which can be due to an unbalanced lifestyle and lack of physical activity. Regular moderate exercise can improve the sensitivity of insulin receptors, leading to better conversion of glucose into energy. Physical activity plays a crucial role in stabilizing blood sugar levels in individuals with type 2 diabetes (Dewi *et al*., 2022). The most significant risk factors for diabetes, particularly Type 2 diabetes, are an unhealthy lifestyle which includes a lack of physical activity, an unbalanced diet, and obesity. Managing these risk factors is crucial for diabetes management. Nonpharmacological treatment is the first step in managing diabetes, and it involves meal planning and physical activity. The American Diabetes Association (2022) recommends engaging in physical activity at least 3-4 times a week for 75 minutes. Regular and effective exercise can help prevent diabetes-related problems by lowering blood glucose levels. Exercise plays a vital role in diabetes therapy as it increases glucose uptake by muscles and promotes insulin use, reducing the risk of complications. Komaruddin (2020), Physical activity also directly impacts the rate at which muscles recover blood sugar levels. During exercise, muscles utilize stored glucose, which leads to the uptake of glucose from the bloodstream and a subsequent reduction in blood glucose levels. This effect has the potential to improve overall blood glucose control.

Physical activity Physical activity constitutes one of the four pillars of diabetes treatment to type 2 diabetes mellitus (T2DM), which aims to regulate blood glucose levels. This is in addition to the other significant pillars of education, nutritional therapy, and pharmacological therapy, (Istiqomah & Yuliyani, 2022). Jati *et al.* (2023), suggest that lack of physical activity, defined as less than 30 minutes per day or less than three times per week, can lead to fat accumulation in the body and insufficient insulin production that impairs the conversion of glucose to energy. This can lead to elevated blood glucose levels of T2DM. Similarly, Latifah *et al*., (2022), regular physical activity has numerous benefits for individuals with type 2 diabetes, including the regulation of blood sugar levels, weight loss, and improved overall health. Engaging in exercise or physical activity regularly has been found to decrease insulin resistance and increase the body's utilization of insulin. These activities can be performed for up to 30 minutes without experiencing tiredness or sickness. A specific example of a beneficial

exercise program is PROLANIS, a Chronic Disease Management Program provided by the Indonesian government. This program is designed for the elderly and involves regular and purposeful physical activity. Researchers have found that PROLANIS exercises can have a positive impact on reducing blood sugar levels in diabetic patients.

Prolanis is a proactive approach integrated with the health system, involving participants, health facilities, and BPJS Kesehatan as part of an effort to maintain the health of BPJS Kesehatan participants suffering from chronic diseases.The goal is to achieve optimal quality of life with effective and efficient health service costs. The Prolanis Implementation Manual delineates a series of activities, including medical consultations, training of Prolanis participants, SMS reminders, home visits, group activities (e.g., gymnastics), and health status monitoring.The effectiveness of this program is measured by the proportion of enrolled participants who attend primary health care facilities (FKTP), achieve "good" results in specialized examinations for T2DM and hypertension according to relevant clinical guidelines, and are prevented from developing complications from their underlying diseases, (Aodina, 2020). As stated by Wedyarti *et al.,* (2020) the chronic diseases included in Prolanis are hypertension and type 2 diabetes mellitus. A chronic disease is defined as a medical condition that persists over an extended period and necessitates long-term treatment. Hypertension and diabetes mellitus are colloquially referred to as "silent killers" due to the fact that they often manifest without any overt symptoms. Consequently, a significant proportion of individuals affected by these conditions receive inadequate treatment at a late stage. Prolanis exercise is an initiative designed to prevent and maintain optimal health through the engagement in appropriate physical activity. As stated by the Ministry of Health (2018) in Handayani *et al*., (2023) regular Prolanis exercises can be beneficial for enhancing overall health and managing non-communicable diseases. The benefits of Prolanis exercise include the maintenance of good health and the prevention of chronic diseases such as hypertension, diabetes mellitus and heart disease.

A study conducted by Widianingtyas *et al*., (2020) that participating in a diabetes management program called Prolanis is associated with higher levels of self-efficacy in individuals with type 2 diabetes. The study revealed that 86% of participants had a high level of self-efficacy, indicating their confidence in managing their disease effectively. Self-efficacy is important for performing actions such as maintaining a healthy diet, exercising regularly, taking medication as prescribed, caring for foot health, and controlling blood glucose levels. Additionally, research by Dewi & Mugiarso (2020), found that participating in Prolanis also has a significant impact on controlling blood sugar levels in individuals with T2DM. Herni *et*

al., (2023), these findings highlight the positive relationship between involvement in a diabetes management program like Prolanis and increased self-efficacy, as well as improved blood sugar control in individuals with type 2 diabetes.

The aforementioned explanation provides evidence that regular physical activity, such as that carried out in the Prolanis exercise program, can maintain a healthy body and regulate blood sugar levels. Zahalka *et al.*, (2023) posit that physical exercise can provide health benefits for individuals at risk of developing diabetes and those who have been diagnosed with the disease.It is not uncommon for individuals with T2DM to engage in excessive physical activity every day, whether intentionally or not. However, excessive physical exertion can lead to fatigue, which, in turn, can result in impaired physical mobility and discomfort among individuals with T2DM. Yaxin Bi *et al*., (2021), identified five main factors that contribute to fatigue in individuals with T2DM: sociodemographic factors, clinical disease factors, inflammatory factors, psychological factors, and behavioral and lifestyle factors. These factors are the most common causes of fatigue in housewives with T2DM. Individuals with T2DM who are also housewives often engage in excessive activity and mobility on a daily basis, as they are responsible for managing all household tasks. This heightened activity can lead to fatigue and exhaustion, which, in turn, can precipitate significant complications in individuals with T2DM. In line with previous opinions, Farhan & Zahira (2020) emphasized that family history, physical activity, age, stress, blood pressure, weight and cholesterol levels also influence blood sugar levels and fatigue in T2DM. Based on the things mentioned above, the researcher wants to compare housewives with T2DM who do physical activity; Prolanis exercises with T2DM mothers who do not do physical activity; Prolanis exercises.

METHODS

This study employs a comparative qualitative methodology. The objective of this study was to undertake a comparative analysis of two groups of participants with T2DM who engaged in physical activity, specifically Prolanis exercises, and a control group of participants who did not engage in physical activity, specifically Prolanis exercises, within the working area of Puskesmas Aek Habil Sibolga City. The study population comprised housewives with T2DM who engaged in physical activity, namely Prolanis exercises, and T2DM mothers who did not participate in any physical activity. The sample size for this study was six mothers with T2DM, who were divided into two groups: those who engaged in physical activity (comprising three participants who performed three Prolanis exercises) and those who did not (comprising three participants who performed three Prolanis exercises). The sampling technique employed

was purposive sampling, whereby participants were selected based on specific criteria. These included mothers with Type 2 Diabetes Mellitus (T2DM) who regularly attend health visits at health centres and hospitals, housewives aged 40 years and above, and those without the assistance of household staff to support their daily activities. The data were collected via interviews, observation, and documentation. The research instrument was a structured interview. The analysis employed a narrative approach, comprising the following steps: data introduction, review of research objectives, indexing or coding of data, identification of research themes, data reduction, data display, conclusions and verification. In order to ensure the validity and credibility of the data, triangulation techniques were employed. The code of conduct for this research is 01.25738/KEPK/POLTEKKESKEMENKES MEDAN 2024

RESULTS

What was discussed in these two groups was their routine to check their health at the available health facilities, blood sugar levels before taking medicine and after routine taking medicine, compliance of the two groups in taking the medicine they got from the health facilities, symptoms they felt before taking medicine and after taking medicine, the reasons for following prolanis in the group that followed and the reasons for not following prolanis in the group that did not follow and the results of direct observation of physical conditions in both groups.

Group of participants who did physical activity; Prolanis exercises

Participant 1

"....Every month control because the medicine is once a month. And routinely take medicine.... between 100-200 so...first hit 500 more...easily drowsy, weak body.... at night often wake up and often pee.... it's a bit difficult to sleep again if you have woken up, tingling body like pain, often feel hungry quickly..... now it's a bit better than at the beginning ... drowsy not like before ... often pee at night is not as often as before, the body is no longer weak…. since joining senan this body is light in activity, can socialise meet with friends in the activity, share stories, laugh, happy when it is gathered, there is no sense of disease in this body if it is a group"

Participant 2

'"....regular treatment, at most if you are a day late if the date is off ..... never above 200 before taking medicine and prolanis exercise was 400.... if now the norm is normal.... must take the medicine if you want to be healthy, if you don't take medicine how will the sugar go down.... these eyes just want to be sleepy.... often also wakes up to pee at night, this body feels weak and helpless, if you are hungry you sweat cold if you are hungry.... often, feel hungry.... Different feels innate body, light to carry activities, ... before if you get up from sitting rather difficult..... if you are in that place happy this

feeling, laughing together.... there is just something funny to be our joke in that place ..."

Participant 3

"...Regular treatment once a month.....350, but now the highest is 200 sugar levels and even then if it happens to run out of medicine, it doesn't take medicine for a day because sometimes the date is red on the calendar, but sometimes it is also bought at the pharmacy routinely take medicine..... this body is getting thinner and thinner, weak, the whole body feels painful, the soles of the feet are painful, at night restless, it is often difficult to sleep at night, sleep is only 2 hours deep, legs feel numb..... Different atmosphere from home, it's fun to talk with fellow participants there..... happy and healthier body..... I have not participated twice, the activity is twice a week..... back numbness-freedom is felt anyway if you are used to participating it will be different if you don't participate in gymnastics"

Group of participants who did not do physical activity; Prolanis exercises

Participant 1

"..... take medicine regularly .... this is my medicine I just controlled a few days ago to the hospital..... before knowing diabetes complaints often this head hurts, throbbing, hands and toes like numbness, so it's hard to sleep because of complaints of pain in this body.... to the bathroom often at night urinating, in the morning often want to sleep, the body feels weak .... I can't participate in prolanis activities, take care of the grandchildren,, his mother, my daughter is pregnant, pity .... but if there is time and opportunity later, I want to try to join the activity.... seems fun….."

Participant 2

"... If you don't take medicine, it will get worse, if it's a matter of medicine I never forget to take ... to the Puskesmas once a month .... before taking the medicine, the sugar level used to be 300, now it's normal, the highest is 170 .... like a state of fasting for days, weakness, often feeling hungry, after the morning just want to sleep, tired, numbness .... I don't dare to go alone to that activity place, I don't have any friends to go with.....let's stay at home, there are also many household activities that can be done...."

Participant 3

"..... I routinely go to the hospital for treatment once a month.... drugs must be taken regularly, otherwise the sugar will rise.... in the past 500 I thought I died of darkness at that time, now it is stable, I record my sugar levels every month..... I have suspected why this body feels heavy to carry out activities such as high cholesterol, sometimes weakness, laziness to do activities because of weakness, body aches, often feeling hungry, not sleeping well at night because I often wake up even though I don't go to the bathroom, it's a bit difficult to sleep..... I had registered for this activity, on time it was a routine monthly check to check my sugar and take medicine and I also met with an officer who suggested I take part in the prolanis activity…..later when I have free time….."

The results of observations in the field researchers get a description of the activities and physical appearance of each participant. Participants who did physical activities; Prolanis gymnastics were assessed during gymnastic activities and while doing daily activities at home. Participants who did not participate in physical activity activities; Prolanis gymnastics were assessed in their respective homes and saw the activities they did daily.

The group of participants who do physical activities; Prolanis gymnastics received a description of their daily activities at home is good. Two participants in this group have daily activities by doing household chores every day and getting enough rest activities during the day. One person from this group of participants has additional activities by selling breakfast with the help of other people to help her sell and in her daily activities as a housewife. The facial features of this group did not look tired because they said they had enough rest during the day and night. Their faces were bright and happy and they told each other stories when they gathered in the field before the pronalised gymnastics activities began in each activity.

The group of participants who did not engage in physical activities, Prolanis gymnastics, exhibited diminished enthusiasm and fatigue. Based on observations, it appeared that when they engaged in one activity, they rapidly experienced fatigue, for instance, transitioning from a seated to an upright position. One participant in this group cares for her grandchildren in addition to performing routine household tasks. The other two participants in this group are homemakers.

DISCUSSION

From the results obtained that both groups both have complaints in general diabetes mellitus sufferers at the beginning before getting treatment from health facilities, both groups of participants also both have controlled sugar levels this is because both groups of participants routinely make visits to their health facilities, both groups of participants also both have compliance in T2DM treatment and also both do physical activity although they have different forms and quality of physical activity. The opinions of researchers who agree include Safitri *et al*., (2022) and Widagdyo *et al*., (2022), Physical activity is very important for people with diabetes mellitus because it is related to the speed of muscle blood sugar recovery. Hasniah *et al*., (2022) and Rismawan *et al*., (2023) that management and compliance with medication for diabetes mellitus patients is an important and indispensable role in achieving the success of diabetes mellitus therapy, so it indirectly plays a role in stabilising blood glucose levels in T2DM patients.

There is no debate about the effect of physical activity on blood glucose levels in people with T2DM. A lot of research has already suggested this. Many of these studies show that physical activity has a big impact on blood glucose levels. Physical activity is useful for controlling blood glucose levels and losing weight in people with diabetes mellitus. The major benefits of physical activity in diabetes mellitus include lowering blood glucose levels, preventing obesity, playing a role in overcoming complications, blood lipid disorders and increased blood pressure. Supriyatno *et a*l., (2022) in the results of his research said that 52.2% of physical activity in DMT2 patients had an effect on the blood sugar levels of these diabetes mellitus patients. Dewi *et al*., (2022) in the results of his research there is a significant relationship between physical activity and blood glucose levels at p = 0.000, meaning that there is a significant relationship between physical activity and blood glucose levels in people with DMT2. As well as research from Bassin & Srinath (2023) that physical activity can help control blood sugar levels in people with type 2 diabetes (DMT2).

There was a visible difference in the faces of the group of participants who did not attend the Prolanis exercises held regularly in the courtyard of the Aek Habil Health Centre in Sibolga City. They looked more withered and less enthusiastic. On the other hand, the group that participated in the Prolanis exercises looked healthier and happier. This is possible because of the influence of a group or peer group of fellow sufferers who become more enthusiastic when they get together and meet and share their respective stories so that they can increase their self-efficacy or confidence in managing the T2DM disease they suffer from. This is in line with research conducted by Pademme & Banna (2021), there is an effect of peer group support on the self-efficacy of people with T2DM, peer group support is an effective intervention to help people with T2DM in self-management. In line with research conducted by Maria *et al*., (2023), peer groups provide an opportunity for people with diabetes to interact with others who have similar experiences. They can share their stories, challenges and successes in managing their diabetes. In this supportive environment, patients feel listened to, understood and not alone. This emotional support can help reduce stress and improve overall quality of life.

Prolanis is one of the Indonesian government's programmes for the management of chronic diseases, particularly diabetes mellitus, which can undoubtedly be reduced and maintained through physical activity and regular check-ups at local health centres. But it cannot be denied that Prolanis also adds its own colour to the psychological treatment of fellow sufferers in its group activities. Gathering and sharing stories with others motivates and heals their psychology by creating 'happiness'. The Prolanis programme is effective when

implemented, monitored and evaluated on an ongoing basis. It would be beneficial if this programme (Prolanis) were modified to provide direct psychological effects. One potential avenue for achieving this would be by incorporating group recreation or other activities that can elicit feelings of joy and enthusiasm. Additionally, it would be advantageous to motivate Prolanis officers to possess the ability to modify the programme and to excel in persuasive communication with individuals who have not engaged with Prolanis activities. Providing incentives to Prolanis officers could serve as an effective motivator for programme improvement.

CONCLUSIONS

The two groups of participants exhibited comparable health complaints, with both groups of type 2 DM patients reporting similar symptoms. However, there was a notable distinction in the impact of physical activity on blood sugar levels, with the gymnastics group demonstrating no significant change, while the non-gymnastics group exhibited a slight decline. Furthermore, the quality of life in the two groups diverged, underscoring the necessity for tailored interventions to enhance the well-being of patients.In light of these findings, it is imperative to refine the programme for improving the quality of life of patients, incorporating more effective modifications to enhance its efficacy.

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