# Decreasing Blood Sugar Levels Through Modification of Diabetes Exercise and Peer Group Support

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## Abstract

**Background:** The efforts to handle patients with type 2 diabetes mellitus need to consider both the physical and psychological aspects. A physical activity that can be done is diabetes exercise. To do this exercise regularly.

Purpose: This study aims to analyze the effect of modified diabetes exercise and peer group support in decreasing blood sugar levels in patients with type 2 diabetes mellitus.

Method: This study used a quasi-experimental design with a pre-test and post-test with 38 respondents, which consisted of 19 respondents for the intervention group and 19 respondents for the control group. They were selected by purposive sampling. Data was collected using aglucometer, observation sheets with a Standard Operating Procedure (SOP).

**Results:** The results of the paired t test showed decreasing blood sugar levels after modified diabetes exercise and peer group support in the intervention group with p value as much as 0.001 <0.05. Meanwhile, in the control group there was no decrease in blood sugar levels, with results of the paired t test with p value of 0.453> 0.05.

**Conclusion:** To control blood sugar levels through modified diabetes exercise and peer group support.

***Keywords:*** *Diabetes Mellitus, Diabetes Exercise, Peer Group Support, Blood Sugar Levels.*

## Introduction

Diabetes mellitus is the inability of the body to metabolize carbohydrates, fats and proteins which leads to hyperglycemia (high blood glucose levels) which is a progressive chronic disease[1]. According to WHO data the number of diabetes mellitus cases in 2015 was 415 million. In 2040, it is estimated that the number will be 642 million. The prevalence of Diabetes Mellitus based on a doctor's diagnosis in residents aged ≥ 15 years old in South Sulawesi, Indonesia in 2013 was 1.6% and increased to 1.7% in 2018 which showed a 0.1% increase based on a doctor's diagnosis[2]. Based on this, blood sugar level problems need to be addressed.

Diabetes mellituscan be managed non-pharmacologically through meals' planning and physical activities. There are 4 main pillars in the management of diabetes mellitus, namely meal planning, physical exercise, hypoglycemic efficacy drugs and counseling [3]. A physical activity that diabetics can do is diabetes exercise.

Diabetes exercise is a way to reduce blood glucose levels in people with diabetes mellitus, because during physical exercise such as diabetes exercise increases blood flow, making more insulin receptors available. This increase is caused by more capillary nets opening, and receptors becoming active that will decrease blood glucose levels in patients with type 2 diabetes mellitus[4]. Sharoh & Salmiyati (2019) stated that diabetes exercise influenced blood sugar levels in patients with type 2 diabetes mellitus. 10 out of 12 participants in their

intervention group experienced lower blood sugar levels compared to 2 participants who experienced increased blood sugar level after diabetes exercise[5].

People with diabetes mellitus are affected by various psychological factors such as motivation, habits, goals and awareness when they undergo either pharmacological and/or non-pharmacological treatments. One way to make patients more enthusiastic to receive either treatment is getting social support from partners, families, as well as health workers and communities with diabetes mellitus.

Patients with diabetes mellitus can get support and assistance from various sources, one of them is peer group[6]. Peer group support provides an opportunity for people with the same painful experience to share knowledge and experience with others that cannot be obtained from health workers or family[7]. Doing activities together can increase motivation and foster interests and attitudes in managing diabetes, one activity being through physical exercise/diabetes exercise. Patients with type 2 diabetes mellitus may feel compelled to exercise because they are connected to social groups that are ready to listen to their complaints and share strategies to solve problems related to the illness[8].

Aty (2014) researched the aerobic capacity of respondents that exercised less than 3 times/week for less than 30 minutes before peer group support. With peer group support the aerobic capacity of the majority of respondents increased. The respondents exercised between 4-6 times/week for 45-60 minutes[9]. This study tries to analyze the effect of modifying diabetes exercise and peer group support on decreasing blood sugar levels in patients with type 2 diabetes mellitus.

## Method

This research used a quasi-experimental design with a pre-test and post-test with 38 respondents, with consisted of 19 respondents for the intervention group and 19 respondents for the control group which were selected using purposive sampling. The data was collected using a glucometer and observation.

The researchers used observation sheets for both the intervention group and the control group. The researchers measured blood sugar levels using a glucometer. The intervention group participated in physical exercise/ diabetes exercise followed by peer group support for approximately 2 hours for 3 consecutive days. Their blood sugar levels were measured post-intervention (15 minutes after intervention).

The data was analyzed to determine the effect of modifying diabetes exercise with peer group support on decreasing blood sugar levels usingpaired t test with p <0.05.

## Results

**Table 1. Characteristics of Frequency Distribution DM Type 2**

| Variables | (n) | (%) |
|---|---|---|
| Age | | |
| ≤ 50 | 13 | 34.2 |
| 51 – 53 | 5 | 13.2 |
| 54 – 56 | 12 | 31.6 |
| >57 | 8 | 21.1 |
| **Gender** | | |
| Male | 7 | 18.4 |
| Female | 31 | 81.6 |
| **Education** | | |
| Low Education | 30 | 78.9 |
| Middle Education | 6 | 15.8 |
| High Education | 2 | 5.3 |
| **The Use of Oral Hypoglycemic Medicine** | | |
| Consuming | 13 | 34.2 |
| Not Consuming | 25 | 65.8 |
| **Obedience to Taking Medicine** | | |
| Low Obedience | 7 | 53.8 |
| High Obedience | 3 | 23.1 |
| Middle Obedience | 3 | 23.1 |

Table 1 shows the characteristics of the respondents. 34.2% were less than 50 years old, 81.6% were women and in term of education, 78.9% had poor education. 65.8% did not consume oral hypoglycemic medicine, and for the ones who consumed medication, 53.8%had low obedience in term of taking medication.

**Table 2. Effect of Modifying Diabetes Exercise and Peer Group Support on Decreasing Blood Sugar Levels**

| Variable of Blood Sugar Levels | Pre Intervention | | Post Intervention | | pvalue |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Group of diabetes exercise modification and peer group support | 284.4 | 99.8 | 239.8 | 94.7 | 0;001 |
| Group of control | 231.2 | 62.2 | 238.4 | 60.7 | 0.453 |

There were differences in blood sugar levels before and after intervention by modifying diabetes exercises and peer group support the paired t test results with p value (0.001).

## Discussion

The decrease in blood sugar levels after intervention via diabetes exercise and peer group support was caused by the respondents' motivations to take part in the exerciseswith peer group support. Bandura'ssocial learning theory (2004) explained these results; the theory stated that if someone wants to act there must be motivation and encouragement from the environment. Here the motivation came from peers with the same disease[10].

The difficulty of motivating respondents to participate in diabetes exercise was overcome by peer group support. Peer group activities affect both the group and individuals in the group. Thisis in accordance with Sarason (1994) who stated that the strategies to improve obedience include the support of health professionals, social support, health behaviors, and provision of information[11].

Peer group members can share, exchange ideas, listen to suggestions or experiences from others and discuss various point of views. This helps them to understand each other's feelings, especially those who are struggling with the same problems, with similar emotions, and the same thoughts regarding the disease. Peer groups help the participants to increase their self-esteem and respect for each other. Peer groups encourage members to be more open to express their problems, it is a more practical and comfortable place to give and receive emotional support and can be an effective place to exchange information[8].

The results of this research are supported by other research[12]. The research stated that patients who had peer group support achieved a more significant decrease in blood sugar levels due to increase knowledge related to insulin use and increased self-management abilities. Kusnanto (2009) stated that there was a significant difference between the treatment group and the control group that showed the influence of peer group support to increase exercise obedience in people with diabetes mellitus[8].Yin et al.(2015) stated that diabetes mellitus patientswith peer group support were better in term of self-management and also more regularly checked their blood sugar levels over a period of 4 years[13].

Peer groups make clients feel that they have a group that is ready to listen to complaints, and remind them to exercise regularly[8]. Feeling well and regular exerciseshelp to increase blood flow to the muscles by opening the capillaries of small blood vessels to the muscles. Physical activity can control blood sugar levels since glucose will be converted into energy. Physical activity increases the production of insulin, which decreases blood sugar levels. People who lack exercise have difficulty to burnt food that remains in the body as fat and sugar. If insulin is insufficient to convert glucose into energy, this may cause type 2 diabetes mellitus[14].

This result is in line with Yulianto's (2015) research that showed decrease in blood sugar levels in the intervention group[15]. Hastuti W, Sonhaji, Abdillah Y(2017) stated that diabetes exercise had an effect on blood sugar levels in patients with type 2 diabetes mellitus [16].Nugraha et al. (2016) showed that there were differences in blood sugar levels before and after diabetes exercise [17].

## Conclusion

Blood sugar levels can be controlled by paying attention to physical and psychological aspects. The intervention group that implemented modification of diabetes exercise and peer group support showed decreasing blood sugar levels compared to the control group. There was a significant difference between blood sugar levels in the intervention group and the control group.

**Recommendation:** Modification of diabetes exercise and peer group support can be used as a non-pharmacological therapy in an effort to reduce blood sugar levels in patients with type 2 diabetes mellitus.

**Relevance of the Research:** This study highlighted the problem faced by diabetes mellitus patients of lack of motivation to exercise. Hence the modification of diabetes exercise and peer group support can increase their motivation to join diabetes mellitus handling programs.

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**Conflict of Interest:** Nil.

**Source of Findings:** Self.

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