

The Effect of Allen Exercise Buerger on Blood Glucose Levels of Type 2 Diabetes Mellitus in Prolanis Members

Endah Nurul Kumarijati
Faculty of Public Health
Airlangga University, Indonesia

Abstract:- Diabetes Mellitus is a group of heterogeneous disorders characterized by elevated blood glucose levels or hyperglycemia. Hyperglycemia can be overcome by non-pharmacological therapy using the Buerger Allen Exercise. The purpose of this study was to determine the effect of Buerger Allen Exercise on blood glucose levels of type 2 Diabetes Mellitus patients in Prolanis members of Semanding Health Center, Tuban Regency.

The research method used was quasi experimental with a pre posttest with control design. The study sample was 22 people with type 2 Diabetes Mellitus who were selected by simple random sampling. Research instrument with Buerger Allen Exercise SOP and glucometer to measure blood glucose levels.

Data analysis with statistical tests using unpaired t-test obtained the results of Sig. (2-tailed) = 0,000 at $\alpha = 0.05$ which means H_1 is accepted so that it can be concluded that there is a significant effect of Buerger Allen Exercise on blood glucose levels of type 2 diabetes mellitus patients in Prolanis members of Semanding Health Center, Tuban Regency.

Keywords:- Buerger Allen Exercise, Blood Glucose Levels, Type 2 Diabetes Mellitus.

I. INTRODUCTION

Diabetes Mellitus (DM) is a group of heterogeneous disorders characterized by increases in blood glucose levels or hyperglycemia (M.E., 1883). Globalization changes quickly changed human civilization both in terms of information and technology or even an instant mindset and lifestyle. This phenomenon will affect the way of working and eating patterns of the people who are required to be fastpaced, so that many people choose a way to eat ready-to-eat foods, which if it lasts a long time it will affect public health and various diseases, one of which is Diabetes Mellitus (Federation, 2015)

International Diabetes Federation notes that there are 415 million people in the world who carry DM and predicted that in the coming 2040 it will increase to 642 million or 55% of the world's population (Federation, 2015). IDF also stated that the prevalence of DM in 2015 in Indonesia is around 10 million, so the results of the survey put Indonesia at the 7th rank out of the 10 countries with the

largest DM in the world. Basic Health Research Results (Amir, Wungouw and Pangemanan, 2015), in East Java found that the proportion of causes of death due to Diabetes Mellitus in the 45 until 54-year age group in urban areas ranked second, namely 14.7% and in rural areas, Diabetes Mellitus ranked 6th, with a prevalence of 5.8%. The Health Office of Tuban Regency in January to December of 2018 recorded as many as 80,611 visits of people with Non-Communicable Diseases from 1. 168. 277 or 6.9% of the total population in all districts of Tuban. Of the 33 Community Health Centers in Tuban District which ranked first with the highest DM prevalence, Semanding District Health Center was 3,884 (Tuban District Health Office, 2018). Semanding Health Center in January to December 2018 noted that as many as 845 type 2 DM patients had conducted an examination. The human body converts certain foods into glucose, which is the main energy supply for the body. Insulin from pancreatic beta cells needs to carry glucose into body cells where glucose is used for cell metabolism.

Diabetes Mellitus occurs when beta cells cannot produce insulin (type 1 DM) or produce insufficient amounts of insulin (type 2 DM), resulting in glucose not entering the cell, but remaining in the blood (Wahyuni, 2016). Glucose in the blood that is not immediately broken down into energy, over time will accumulate and cause problems in the body in the form of complications of hyperglycemia. 2 As a result of the complications of hyperglycemia that can be felt by people with type 2 diabetes, it is necessary to make efforts to reduce these complications. According to Orem's theory of self care, the act of caring for oneself is one way that can control disease and prevent complications in order to control and maintain health and well-being status (Mangiwa, Mario E. Katuk and Lando Sumarauw, 2017)

Efforts to minimize the complications of type 2 diabetes mellitus can be done through diet, exercise, monitoring, therapy, and health education (Sandra, 2017). Nursing intervention in the form of exercises that can minimize the complications of type 2 DM is the Buerger Allen Exercise which is one variation of active movement in the plantar area by applying gravity so that each stage must be carried out regularly (Amir, Wungouw and Pangemanan, 2015). Buerger Allen Exercise helps the needs of oxygen and nutrients into arteries and veins, strengthens and maximizes the work of small muscles, prevents the

occurrence of leg deformities and facilitates circulation so that it helps the process of healing diabetic wounds and increases the production of insulin which is used in glucose transport to cells , thus helping to reduce blood glucose levels in diabetic patients (Jannaim, Dharmajaya and Asrizal, 2018)

The general objective in this study was to determine the effect of Buerger Allen Exercises on blood glucose levels of type 2 Diabetes Mellitus patients in Prolanis members of Semanding Health Center, Tuban Regency. Whereas the specific objective is to identify blood glucose levels of type 2 Diabetes Mellitus patients in the treatment group before and after being given the Buerger Allen Exercise in Prolanis members of Semanding Health Center in Tuban Regency, identifying blood glucose levels of type 2 Diabetes Mellitus patients in the control group on the first day and day 15 on Prolanis member of Semanding Health Center, Tuban Regency.

The results of this study are expected to provide development and input or information especially in the field of Medical Surgical Nursing about the benefits of nonpharmacological alternative use in the form of Buerger Allen Exercise as one of the exercises that can be used as an alternative choice to reduce blood glucose levels in Diabetes Mellitus patients type 2.

II. DISCUSSION

1. The Blood Glucose Levels in the Treatment Groups in Prolanis Members of Health Centers Compared to Before Awarded Buerger Allen Exercise

No	Blood	Glucose	Level	Pretest
	Min	Max	Mean	SD
1.	151	349	226.7273	60.72

The results of table 1 can be concluded that the minimum value of blood glucose levels in the treatment group respondents before being given the Buerger Allen Exercise was 151 and the maximum value of blood glucose levels was 349 with an average value of 226. 7273.

The results of the research that have been done, blood glucose levels of patients with type 2 diabetes mellitus in Prolanis members during pre-test or before treatment were given, most of the treatment group respondents experienced hyperglycemia as many as 6 people, and as many as 5 people with normal blood glucose levels. In the treatment group after being given the Buerger Allen Exercise all respondents experienced a decrease in blood glucose levels. For the blood glucose level of the control group on the first day there were 7 people experiencing hyperglycemia and 4 people with normal blood glucose levels.

2. The Blood Glucose Levels in the Treatment Groups in Prolanis Members of Health Centers Compared to After Awarded Buerger Allen Exercise

No	Blood	Glucose	Level	Pretest
	Min	Max	Mean	SD
1.	104	234	167.2727	41.79

The results from table 2 can be seen that the minimum value of blood glucose levels in the treatment group respondents after being given the Buerger Allen Exercise was 104 and the maximum value of blood glucose levels was 243 with an average value of 167. 2727.

On the 15th day, the blood glucose levels of the control group mostly increased by 7 people and as many as 4 people experienced a decrease. This study found that there was a decrease in blood glucose levels which meant that patients with type 2 diabetes mellitus.

3. The Control Blood Glucose Levels in Prolanis Members of First Day

No	Blood	Glucose	Level	Pretest
	Min	Max	Mean	SD
1.	177	304	225.8182	46.86

The results of table 3 can be concluded that the minimum value of blood glucose levels in the first day control group respondents was 177 and the maximum value of blood glucose levels was 304 with an average value of 225.

4. The Blood Glucose Levels of Control Groups in Prolanis Members

No	Blood	Glucose	Level	Pretest
	Min	Max	Mean	SD
1.	181	361	266.3636	56.75

The results of table 4 can be concluded that the minimum value of blood glucose levels in the 15th day control group respondents was 181 and the maximum value of blood glucose levels was 361 with an average value of 266. 3636.

5. The Effect of Buerger Allen Exercise on Blood Glucose Level of Type 2 Diabetes Mellitus Patients in the Prolanis Member

Group	Value GDS	Min	Max	Mean	SD	p value
Treatment	Pre	151	349	226.7273	60.72	0.969
	Post	104	243	167.2727	41.79	0.000
Control	Pre	177	304	225.8182	46.86	0.969
	Post	181	361	266.3636	56.75	0.000

sig. (2-tailed) = 0.000 α = 0,05

The results of table 5 can be concluded that in the treatment group before being given the Buerger Allen Exercise the blood glucose level in the respondents showed a fairly high number of 349, while after being given Buerger Allen Exercise the blood glucose level decreased to 104. In the control group the blood glucose level of the day the first shows a high number of 304 and on day 15 the glucose level rises to a value of 361.

This is in accordance with the results of the research (Makiyah and Sari, 2018), regarding the value of Ankle Brachial Index and blood sugar levels when in type 2 Diabetes Mellitus patients after doing the Buerger Allen Exercise in the Puskesmas in Nganjuk Subdistrict, proving the influence of Buerger Allen Exercise in decreasing the value of Ankle Brachial Index and blood glucose levels in diabetics Type 2 Mellitus in the Puskesmas in the Nganjuk Subdistrict area.

Research conducted, about diabetes foot gymnastics reducing blood sugar levels of type 2 Diabetes Mellitus patients at the Balongpanggung Gresik Health Center also showed a decrease in blood glucose levels after diabetic foot exercises (Silaban *et al.*, 2019)

The similarity of the results of this study with previous research illustrates the effectiveness of the method of giving training in the form of Buerger Allen Exercise in reducing blood glucose levels. The statistical test in this study used the unpaired t-Test to determine the effect of the Buerger Allen Exercise on blood glucose levels of type 2 Diabetes Mellitus patients in Prolektis members of the Semanding Health Center in Tuban Regency, the results of sig. (2-tailed) = 0,000 which means that it is smaller than $\alpha = 0.05$ and means H_0 is rejected and H_1 is accepted. So that it can be concluded that there is an effect of Buerger Allen Exercise on blood glucose levels of type 2 Diabetes Mellitus patients in Prolanis members of Semanding Health Center, Tuban Regency.

III. CONCLUSIONS AND SUGGESTIONS

➤ CONCLUSIONS

The results of this study can be concluded that:

1. Blood glucose level of type 2 Diabetes Mellitus patients in the treatment group in Semanding Puskesmas members in Tuban Regency before the Buerger Allen 6 Exercise was conducted in the high category
2. Blood glucose levels of type 2 Diabetes Mellitus patients in the treatment group in Prolanis Semanding Health Center in Tuban Regency after the Buerger Allen Exercise conducted showed a significant decline
3. Blood glucose level in type 2 Diabetes Mellitus patients in the control group in the Semanding Puskesmas members in Tuban Regency on the first day in the high category

4. Blood glucose levels in patients with type 2 Diabetes Mellitus in the control group at the Prolanis Semanding Community Health Center in Tuban Regency on the 15th day showed a significant increase
5. There is an influence of Buerger Allen Exercise on blood glucose levels of type 2 Diabetes Mellitus patients in Prolanis Semanding Community Health Center, Tuban Regency

➤ SUGGESTION

The suggestions given are as follows:

1. Theoretical Advice

It is hoped that the results of this study can be used as information on science, especially medical surgical nursing and research methods related to diabetes mellitus and blood glucose levels.

2. Practical Advice

- The results of this study can be used for the development of learning about nonpharmacological interventions. For educational institutions to increase their reading resources both books, journals and other literature on nursing, especially those related to the use and benefits of Buerger Allen Exercise for the world of health.
- For patients with type 2 Diabetes Mellitus, Buerger Allen Exercise is expected to be an independent intervention and non-pharmacological therapy in controlling blood glucose levels.
- For the next researcher, in this study, some confounding variables were obtained, one of them being respondents who were obese and hypertensive, where it could affect the effectiveness of the training provided, so that researchers could find other more effective non-pharmacological interventions that could reduce blood glucose levels in type 2 Diabetes Mellitus patients with this problem.

REFERENCES

- [1]. Amir, S. M. J., Wungouw, H. and Pangemanan, D. (2015) 'Kadar Glukosa Darah Sewaktu Pada Pasien Diabetes Melitus Tipe 2 Di Puskesmas Bahu Kota Manado', *Jurnal e-Biomedik*, 3(1). doi: 10.35790/ebm.3.1.2015.6505.
- [2]. Federation, D. (2015) 'Annual Report', *International Diabetes Federation*.
- [3]. Jannaim, J., Dharmajaya, R. and Asrizal, A. (2018) 'Pengaruh Buerger Allen Exercise Terhadap Sirkulasi Ektremitas Bawah Pada Pasien Luka Kaki Diabetik', *Jurnal Keperawatan Indonesia*, 21(2), pp. 101–108. doi: 10.7454/jki.v21i2.652.
- [4]. M.E. (1883) "L'homme propose, mais dieu dispose.", *Notes and Queries*, s6-VIII(184), p. 7. doi: 10.1093/nq/s6-VIII.184.7-b.
- [5]. Mangiwa, I., Mario E. Katuk and Lando Sumarawu (2017) 'Pengaruh Senam Kaki Diabetes Terhadap Nilai Ankle Brachial Index Pada Pasien Diabetes Melitus', *eJournal Keperawatan*, 5.

- [6]. S., Makiyah, N. and Sari, N. K. (2018) 'Nilai Ankle Brachial Index Pada Penderita Diabetes Melitus Tipe 2 Sesudah Melakukan Buerger Allen Exercise Di Puskesmas Wilayah Kecamatan Nganjuk', *Jurnal Penelitian Keperawatan*, 4(1). doi: 10.32660/jurnal.v4i1.344.
- Sandra (2017) 'Buerger Allen Exercise dan Ankle Bractial Index (ABI) Pad Pasien Ulcus Kaki Diabetik di RSUD . Slamet Garut', *Indonesian journal of nursing sciences and practice*, pp. 94–110.
- [7]. Silaban, R. *et al.* (2019) 'Ankle Brachial Indeks (ABI), Kadar Glukosa Darah dan Nutrisi Pada Ulkus Diabetikum', *Jurnal Endurance*, 4(3), p. 449. doi: 10.22216/jen.v4i3.4560.
- [8]. Wahyuni, A. (2016) 'Senam Kaki Diabetik Efektif Meningkatkan Ankle Brachial Index Pasien Diabetes Melitus Tipe 2', *Jurnal Ipteks Terapan*, 9(2), pp. 155–164. doi: 10.22216/jit.2015.v9i2.231.