



HEALTH POLYTECHNIC OF PONTIANAK  
MINISTRY OF HEALTH OF INDONESIA



PONTIANAK  
INTERNATIONAL  
HEALTH  
CONFERENCE

Inter-professional Collaboration in Health Program:  
Promotion, Prevention, and Rehabilitation on  
Non-communicable Diseases



November, 23<sup>rd</sup> - 25<sup>th</sup> 2017  
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# PROCEEDING



Inter-professional Collaboration in Health Program:  
Promotion, Prevention, and Rehabilitation on  
Non-communicable Diseases



**POLTEKKES KEMENKES PONTIANAK**  
HEALTH POLYTECHNIC OF PONTIANAK  
MINISTRY OF HEALTH OF INDONESIA

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Promotive, Preventive, and Rehabilitative on  
Non-communicable Diseases**

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## THE MODIFICATION DIABETIC FOOT EXERCISE AND PHYSICAL ACTIVITY DECREASE THE BLOOD GLUCOSE LEVEL TYPE 2 DIABETES MELITUS

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### Abstract

The prevalence of diabetes mellitus at Public Health centre Bengkuring increased in the year 2013 was 316 people and increased in 2014 to 463 people. The purpose of this study was to determine the effect of modified diabetic foot exercise and physical activity on the decrease in blood glucose levels type 2 diabetes mellitus. This study is a true experiment research with randomize pre-test and post-test group design. In this study, the researchers conducted the intervention in two groups, namely one group of intervention and control group as a comparison. The efficacy of the treatment was assessed by comparing the mean values of the decreased blood glucose levels the intervention and control groups. The result of this research is  $p = 0,001 < 0,05$  with an average of decrease of the intervention group > control group (52,08 > 30,15). The modified diabetic foot exercise and physical activity effectively lowers blood glucose levels in people with type 2 of the diabetes mellitus.

Keywords: Modified diabetic foot exercise, physical activity, type 2 of the diabetes mellitus

### Introduction

Diabetes mellitus is a metabolic disease with characteristics of hyperglycemia that occurs due to abnormalities of insulin secretion, insulin unable to work or both. Diabetes mellitus is classified into type 1 as the diabetes mellitus, type 2 as the diabetes mellitus, and the gestational diabetes mellitus, and other types of diabetes mellitus (Adam et al, 2017; Kanatet al, 2015; Padayachee & Coombes, 2015).

Diabetes mellitus's patients have the potential to suffer from various complications, both the acute and chronic complications. The acute complications include coma hypoglycemia, ketoacidosis, non-ketotic hyperosmolar coma, whereas chronic complications include macrovascular complications, such as stroke and microvascular complications such as nephropathy, neuropathy, diabetic

retinopathy and foot complications (Soegondo, 2009; Greenat al, 2015). Complications of the foot is a frequent complication in people with diabetes mellitus where about 50% to 75% of the complications that occur will have an amputation. However, as many as 50% of cases of amputation are estimated to be avoided through preventive measures (Smeltzer, 2005; Tilburgat al, 2001).

According to some studies that have been done in the previously found that there is a decrease in the blood glucose levels after diabetes legs exercises (Rusli, 2015; Flora & Purwanto, 2014).

However, the diabetic foot exercises nastic performed in the previous research was with the movement of joints and feet with 1x10 repetition each time the movement and performed in 15-30 minutes. Meanwhile, according to Setiawan (1991) in the movement of foot



joints repetition of the movement that is done 2x8 every time the movement with attention to joint space. so that it can improve the elasticity of muscles, tendons and ligaments. Endurance sports (aerobics) such as walking, static heating and dynamic warming done regularly (2 times a week) for approximately 30 minutes and in accordance with CRIPE (continuous, rhythm, interval, progressive, endurance exercises) can increase the maximum pulse 75- 85% (Waspadji, 2011; Pandey et al., 2015).

Based on the above, it is deemed necessary to conduct a research on the modified diabetic foot exercises with endurance exercise conducted at Bengkuring Public health centre Samarinda. So, to know the effectiveness of its modification, the researchers will conduct research on "the influence of diabetic foot fat modification and physical activity to decrease the blood glucose levels when people with type 2 of diabetes mellitus.

The formulation of the problem in this research is whether there is any influence of diabetic foot modification foot and Physical Activity in front of the decreased blood glucose level when in people with type 2 of diabetes mellitus? The purpose of this study was to determine the decrease in blood glucose levels in people with type 2 diabetes mellitus after being given the intervention of modified diabetic foot exercises and Physical Activity, to know the difference between blood glucose levels when people with the type of diabetes mellitus who were given a modified diabetic foot exercise intervention and Physical Activity with the control group, to determine the effectiveness of the diabetic foot modification and Physical Activity diabetic foot exercises against the decrease

in blood glucose levels after being controlled by confounding variable that is age and oral medication.

### Research Methodology

This research is True Experiment research with pre-test and post-test group design randomise research. This research was conducted in the work area of Bengkuringpublic health centre Samarinda in May to June 2017. The population in this study was 463 people. The sample size used in this population is 26 people divided into 2 groups, the group 1 is the intervention group of modified diabetic foot exercise and the group 2 is the control group, the sample size is obtained from the calculation of unpaired numerical analytic formula.

The independent variable in this study is the diabetic foot exercised modification&physical activity, while the dependent variable was a decrease in blood glucose levels at the time. The instrument used in data collected in this study is the observation sheet. The data have been collected and analyzed by using a statistical test paired sample t-test and independent sample t-test with significant level  $p \leq 0,05$ ; then  $H_0$  is rejected and  $H_a$  accepted.

### Results

Table 1. The results of different test mean the decrease of blood glucose level when people with the type 2 of thediabetes mellitus.

Variable	Blood Glucose Level at the time	P	N
	Mean ±SD		
	Group 1		
Pre-Test	255,15±60,668	0,001	13
Post-Test	203,08±49,093		
Difference	52,08±25,44		
	Group 2		
Pre-Test	338,54±49,854	0,001	13



Post-Test	208,38±53,988
Difference	30,15±23,94

Sources: Primary Data Analysis, 2017

Table 1. shows the mean lowering of blood glucose level in people with type 2 of the diabetes mellitus after a modified diabetic foot modification exercises and Physical Activity for 1 month. From result of paired sample t-test in group 1 got value  $p = 0,001 < 0,05$  as well as in group 2 that is  $p = 0,001 < 0,05$  there is difference of blood glucose level before and after given the intervention of modification diabetic foot exercises and Physical Aktivty both in the group 1 and group 2.

Based on Table 1. the mean and standard deviation of decrease of the blood glucose level during type 2 of the diabetes mellitus in the intervention group was 52,08 standard deviation 25,444 and difERENCE was 52,08 standard deviation 25,44 to control group that is mean 30,15 standard deviation 23,947 difERENCE was 30,15 standard deviation 23,94. Based on these data, it can be concluded that the intervention of the diabetic foot exercises modification and Physical Activity lower more effectively the blood glucose levels when people with type 2 of the diabetes mellitus than respondents who are only given Physical Activity.

Table 2. Differences in decreased the blood glucose levels between the intervention and control groups

Variable	Blood Glucose Level at time	N	Levene test	P
	Mean ±SD			
Deviation	Group 1	13	0,562	0,03
	Group 2	13		
	52,08±25,444			
	30,05±23,947			

Sources: Primary Data Analysis, 2017

Table 2 shows the differences in the decrease in the blood glucose levels between the intervention group and the

control group. Based on the table obtained the results of levene test  $p = 0,562 > 0,05$  so it can be concluded that there is no variant difference or in other words both groups come from the homogeneous data.

Based on table 2, the result of independent sample t-test  $p = 0,03 < 0,05$  and the mean of decreasing of blood glucose level during intervention group was 52,08 with deviation standard 25,444 while in control group 30,05 with standard deviation 23,947. When viewed from the average decrease in both groups it can be concluded that there is a difference in the average decrease in blood glucose levels when the respondents were given a modified foot diabetic foot and Physical Aktivty with respondents who only provided Physical Activity.

### Discussion

Table 1. shows the mean lowering of blood glucose level in people with type 2 diabetes mellitus after a modified diabetic foot modification exercises and Physical Activity for 1 month. From result of paired sample t-test in group 1 got value  $p = 0,001 < 0,05$  as well as in group 2 that is  $p = 0,001 < 0,05$  meaning there is difference of blood glucose level before and after given intervention foot exercises and Physical Activity good in group 1 as well as in group 2.

Based on Table 1, the average decrease of blood glucose level in patients with type 2 diabetes mellitus in the intervention group was 52,08 with standard deviation 25,444 bigger than a control group that is 30,15 with standard deviation 23,947. Based on these data it can be concluded that the intervention of diabetic foot exercises modification and Physical Activity lower more effectively blood glucose levels when people with type 2 diabetes mellitus than respondents who are only given Physical Activity.



The decrease of blood glucose level when the respondent after the intervention of modified diabetic foot exercises in line with the research conducted Gusti Rizaniansyah Rusli and Septi Farianingsih who said that the diabetic foot exercise can lower blood glucose levels. In addition, the decrease in blood glucose levels caused by the intervention of modified diabetic foot exercises helped improve blood circulation and also strengthen the small muscles of the legs and accelerate blood circulation and prevent foot deformities (Medicine, 2010). In addition, foot exercises can also increase strength in the thigh muscles, calves and also overcome limitations in joint movement (Niken, 2011; Medicine, 2010; Bevc et al., 2012). In addition, the movement is carried out, resulting in the occurrence of metabolic processes in the process of using glucose as a material, so that in the process can reduce blood glucose levels (Thent, Das, & Henry, 2013; Regensteiner, 2014).

Other factors in question affect blood glucose levels during age, education level and food intake. When viewed from the characteristics of respondents most respondents group 1 has junior high education of 69.2% of 13 respondents and so in group 2 of 53.8% of 13 respondents this happens because education affects the perceptions and attitudes of a person. The level of education determines whether or not one can absorb and understand knowledge, generally the higher the education of a person the better the knowledge (Notoatmodjo, 2003). While in the age category in groups 1 and 2 almost all aged between 60-74 years of 84.6% and 92.3%. This is in line with the theory that increasing age (over 45 years) a person will experience physiological changes that drastically decrease rapidly, especially the ability of  $\beta$  cells in producing insulin to metabolize glucose (Rakhmadany, 2010;

Bonfrate, Procino, Wang, Svelto, & Portincasa, 2015; Bonfrate et al., 2015; Aune, Sen, Henriksen, & Didrik, 2016; Committee & Classification, 2010).

Table 2 shows the differences in the decrease in blood glucose levels between the intervention group and the control group. Based on the table obtained levene test results  $p = 0,562 > 0,05$  so it can be concluded that there is no difference variance or in other words both groups come from homogeneous data.

Based on table 2, the result of independent sample t-test  $p = 0,03 < 0,05$  and the mean of decreasing of blood glucose level during intervention group was 52,08 with deviation standard 25,444 while in control group 30,05 with standard deviation 23,947. When viewed from the average decrease in both groups it can be concluded that the diabetic foot of modified football legs and Physical Activity more effective in reducing the blood glucose daerah when people with diabetes mellitus type 2 compared with only given Physical Activity.

## Conclusion

1. There was a decrease in blood glucose levels type 2 diabetes mellitus after being given a modified diabetic foot exercisesnastic intervention and Physical Activity in the intervention group and the control group.
2. There was a difference in blood glucose level reduction during type 2 diabetes mellitus after being given modified diabetic foot exercises and Physical Activity in the intervention and control group that decreased blood glucose levels while in the intervention group was greater than the control group.
3. Exercise diabetic foot modification more effective in lowering blood glucose levels when people with





diabetes mellitus type 2 at Bengkuring Public health centre Samarinda. This can be seen from the analysis of paired sample t-test is  $P = 0.001$  ( $P < 0.05$ ).

### Suggestion

1. Modification Diabetic foot exercise is a preventive action as well as non-pharmacological management that proved effective in lowering blood glucose levels, so it is expected the government of Samarinda city health office can make this activity a mandatory program for all Public health centre in the city of Samarinda.
2. Modification Diabetic foot exercise is one alternative therapy that can be used in the intervention to people with type 2 diabetes mellitus in the work area Bengkuring Public health centre Samarinda.
3. To the public, especially patients with the type 2 of diabetes mellitus is advised to use modified diabetic foot as an alternative treatment of non-pharmacological blood glucose decrease, especially in patients with type 2 diabetes mellitus who have high blood glucose levels.
4. This research needs to be improved to some of variables which contribute to decrease the blood glucose rate and to be developed research methodology to control confounding variables.

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