Effect of Cycling 20 Minutes of Blood Sugar Levels in Male Students of Senior High School 9 Tangerang 2015

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Abstract. Blood sugar levels is very important as an indicator of measurement associated with diabetes. The prevalence of diabetes that occurs during adolescence in Indonesia has increased, so it is important to maintain health condition to controlling blood sugar levels in the body since adolescence. Aerobic physical activity such as cycling can regulate and control blood sugar levels because it makes glucose as the body's main energy source. This study aims to determine the effect of cycling for 20 minutes on blood sugar levels in male students of senior high school 9 Tangerang. This study design was quasi-experimental one group pre-test and post-test. The sample were 21 respondents selected by purposive sampling. Intervention was given by cycling for 20 minutes at speed approximately 25km/h. 2 hours before intervention was given, all respondents have breakfast together with the same menu. Measurement of blood sugar levels done before and after intervention. The results showed that cycling for 20 minutes affect changes in blood sugar levels significantly (p=0.000). The average reduction in blood sugar levels after the intervention is 25.0 mg / dl. Cycling for 20 minutes if done regularly can help keep blood sugar levels in the normal rate.

1. Introduction

Diabetes is referred to as the silent killer and there is a call as mother of disease because it can attack other organs, like the heart, kidneys, nerves, blood vessels, eyes, and cause death. According to WHO, diabetes is responsible for six deaths that occurred within 1 minute, and 20 deaths. In Indonesia, according to Riset Kesehatan Dasar (Riskesdas) the prevalence of DM in 2013 (2.1%) increase compared to 2007 (1.1%). Increased prevalence of diabetes also occurs in adolescence so it is important to know the health condition of the body as a teenager as checks blood sugar levels in the body.

Many of the school children especially the middle level on claim to have never checking blood sugar levels and also very minimal knowledge about the prevention of diabetes at an early age because diabetes can happen to anyone. Plus dense academic activities to make students complained and claimed saturated. They have assumed the burden of thinking become unbalanced with physical activity they do. A series of intensive academic activity makes them difficult to set the time of their sport in the midst of the routine, when they know exercise is good for maintaining fitness and health. Extracurricular activities that are not really interest to the students. The students prefer to focus on their academic demand at school because of the many exercises and homework given by the teacher at the school makes the students and the students are reluctant to add to their activities in the organization extracurricular

An intensive activity makes them difficult to set the time of their sport in the midst of the routine, when they know exercise is good for maintaining fitness and health. Cycling is a physical activity (exercise) that require energy in practice. To produce energy, our bodies need food. If the lack of physical activity such as exercise, the extra energy in the body will be stored as glycogen and fat so that the potential of causing obesity to be at risk for various diseases. Having regard to the facts and issues described earlier, it is necessary to experimental studies to determine the effect of cycling on blood sugar levels in male students - male high school 9 Tangerang.

2. Discussion

2.1. Blood Glucose

Blood is a fluid that flows in the vascular system found in humans and animals [1]. Blood is a vehicle or medium for transportation of nutrients throughout the body. Function in the blood transports oxygen, nutrients and waste products of metabolism from the heart throughout the body and back again to the heart [2].

All types of carbohydrates are consumed by humans both types of complex carbohydrates (rice, potatoes, bread, and cassava dBs) and also the simple carbohydrates (glucose, sucrose, and fructose) will be converted into glucose in the body. Glucose thus formed can then be stored as energy reserves as glycogen in the liver and muscles and can be stored in the blood or it can also be brought into the cells of the body that need [3]. See Table 1.

Table 1. Blood glucose levels in some circumstances and time.

Time / Situation	Blood Glucose level (mg/dl)
Wake up	70-100
Before lunch	70-110
2 hour after eat	110-140

Source: Neil F. Gordon. Diabetes: Exercise Your Complete Guide. Canada, Human Kinetics Publishers. 1993), h.35.

When glucose is not immediately needed for energy, the extra glucose that goes continuously into the cells will be stored as glycogen or converted into fat [4]. Especially glucose stored as glycogen until the cells have as much ability to store glycogen [1].When the glycogen storage cells (mainly liver and muscle cells) approaching saturation glycogen, additional glucose is converted into fat in the liver cells and fat cells and stored as fat in fat cells [5].

At the time of exercise, muscle calorie purposes initially filled with glycogenolysis in muscles and increased glucose uptake. Plasma glucose initially rise due to increased liver glycogenolysis but could go down because of heavy exercise and long [6].

2.2. Diabetes Mellitus

Diabetes mellitus is a disease due to a disturbance (hyperglycemia) and found glucose in the urine (glycosuria). This occurs carbohydrate metabolism characterized by high blood glucose levels because of the disruption of insulin production [7]. Can also be caused by the disruption of activity / sensitivity to insulin (insulin resistance). Diabetes is defined as a fasting blood sugar level is higher than 125 milligrams per deciliter (mg / dl) after going through repeated measurements [5].

For someone who is at risk of diabetes, lifestyle changes include weight loss, physical activity (at least 150 minutes per week) and the restriction of fat intake recommended by the American Diabetes Association to decrease the incidence of diabetes [8].

Here is the effect of increased physical activity in diabetics [9]:

- Physical activity directly improve muscle sensitivity to insulin, so the glucose more easily deposited in the muscle rather than be left to rise in the bloodstream.
- Physical activity can help lose weight, and particularly more useful for maintaining weight gained due to changes in the composition of the food.
- Program the prevention and treatment of diabetes is most successfully incorporate increased physical activity of moderate intensity in everyday life.

According Chaveau and Kaufman, exercise in diabetes can lead to increased use of glucose by the muscles active, thus directly exercise can cause a decrease in blood glucose [10].

2.3. Cycling

Cycling is synonymous with physical activity or exercise that can be done by all people. Physical activity includes activities that involve body movement. Therefore, cycling can stimulate the heart rate in accordance with the target we want. Cycling is synonymous with physical activity or exercise that can be done by all people. Physical activity includes activities that involve body movement. Therefore, cycling can stimulate the heart rate in accordance with the target we want. Cycling is a great way to practice for 20 to 30 minutes a day, 3 to 5 days each week in order to obtain good health and fitness [10].

The human body was designed to move. Research shows that regular exercise for 30 minutes a day provides many benefits, although 30 minutes is divided into two or three different sessions. If you are aged over 40 years, are overweight or have never exercised regularly in a long period of time, it is important for you to consult with your doctor first before starting any exercise program cycling. Cycling can burn calories quickly. If you live within 8km from office is by riding a bicycle, at least you've been exercising for 20 minutes. If you live close to the office, you can pedal a bicycle twice a week and burn about 3,000 extra calories in the body, about half a kilogram in a month [10].

3. Method

This study aims to determine how much employment effects of cycling for 20 minutes against the blood sugar levels in male students of class XI Senior High School 9 Tangerang, the study was conducted in Senior High School 9 Tangerang, Jl. H. Jali 9 Village Kunciran Pinang Jaya sub district, Tangerang City on January 31, 2015.This research using the "experiment" to study design using the One Group "Pre-Test And Post-Test Design" (pretest-posttest group design). In this study, which will be the population is 106 male students of class XI Senior High School 9 Tangerang.

This study design was quasi-experimental one group pre-test and post-test. In this study, the population is 106 male students of class XI Senior High School 9 Tangerang. The sample were 21 respondents selected by purposive sampling with the criteria : Willing to do research, births in 1997-1998, physical and mental health (medical certificate), Having weigh between 49-51 kg, blood sugar levels two hours after eating between 110-140 mg / dl.

Data collected by taking blood, in this study the data was taken by measuring the sugar levels in the blood. Blood sugar is taken before and after the intervention. Its intervention was cycled for 20 minutes with average speed - approximately 25 km / h and a distance of approximately 8 km. Data analysis used unvariat and bivariate data processed by the data processing computer software.

4. Result

Table 2. Blood sugar level before and after intervention

Number of Respondents	Blood Sugar Levels Before Intervention	Blood Sugar Levels After Intervention	p value	Mean of Different (MD)
1	116.0	87.0		
2	132.0	103.0		
3	122.0	102.0		
4	112.0	87.0		
5	117.0	92.0		
6	114.0	94.0		
7	129.0	109.0		
8	118.0	90.0		
9	112.0	97.0		
10	130.0	106.0		
11	121.0	109.0	0,000	25,0
12	120.0	104.0		
13	132.0	111.0		
14	138.0	105.0		
15	132.0	102.0		
16	127.0	95.0		
17	121.0	106.0		
18	119.0	83.0		
19	129.0	92.0		
20	123.0	97.0		
21	130.0	98.0		

The results on table 2 showed that cycling for 20 minutes affect changes in blood sugar levels significantly (p=0.000). The average reduction in blood sugar levels after the intervention is 25.0 mg / dl. Cycling for 20 minutes if done regularly can help keep blood sugar levels in the normal rate.

References

[1] Ganong W F 2002 *Buku ajar fisiologi kedokteran*. Edisi 20 515-518
[2] Giri W 2012 *Fisiologi dan Olahraga* Graha Ilmu Surakarta
[3] Irawan M A 2007 *Metabolisme energi tubuh dan olahraga* Sport Science Brief [serial online]
[4] Guyton Arthur C and Hall Jhon E 2006 *Buku Ajar Fisiologi Kedokteran*
[5] Soegondo S, Soewondo P and Subekti I 2009 *Penatalaksanaan diabetes melitus terpadu*. FKUI. Jakarta.
[6] Rendi A P 2013 *Hidup Manis dengan Diabetes* Jakarta: Media Pressindo
[7] David M N and Linda M D 2005 *Menaklukkan Diabetes* Jakarta: PT.Bhuana Ilmu Populer
[8] Ibnu khalis 2011 *Bikemania* Jakarta: Flashbooks
[9] Pan X R, Li G W, Hu Y H, Wang J X, Yang W Y, An Z X and Jiang X G 1997 Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance *The Da Qing*

IGT and Diabetes Study. *Diabetes care* ***20***(4) 537-544

[10] Gary Glover B S W 2012 *Working with Mandatory and Negotiable Aspects of Personal Codes: Implications of the Narratives of Rural Men for Social Work Practice* (Doctoral dissertation, Carleton University Ottawa).