

The Effect of Physical Exercise (Bleep Test Test) on Blood Sugar Levels on Students in the Class of 2020 at the Sekolah Tinggi Ilmu Ekonomi Lmii Medan

Dhea Rebeca Lumbanraja, Chairul Radjab Nasution, Erwin Handoko

Faculty of Medicine, Prima Indonesia University, North Sumatra, Indonesia

ABSTRACT

Everyone always wants a healthy body. To see a healthy physical condition, it is certainly necessary to check the blood sugar levels in the body in order to maintain a balance with physical exercise so that there is no accumulation of sugar levels in the blood. Therefore, this study aims to determine the effect of physical exercise on blood sugar levels in children. 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan. This research is a descriptive study of 20 students from the class of 2020 at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan. Parameters measured in this study include: blood sugar levels before and after physical exercise. From the results of the study, it was found that the average blood sugar level before doing physical exercise was 90.2 mg/dL and the average blood sugar level after doing physical exercise was 84.45 mg/dL. It can be concluded that there is an effect of physical exercise on blood sugar levels in 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan.

KEYWORDS: *Physical Exercise And Blood Sugar Levels*

How to cite this paper: Dhea Rebeca Lumbanraja | Chairul Radjab Nasution | Erwin Handoko "The Effect of Physical Exercise (Bleep Test Test) on Blood Sugar Levels on Students in the Class of 2020 at the Sekolah Tinggi Ilmu Ekonomi Lmii Medan" Published in International

Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-6, October 2021, pp.1608-1614,

URL: www.ijtsrd.com/papers/ijtsrd47667.pdf



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1. Background.

Everyone always wants a healthy body. One of the actions that humans can take to keep the body healthy is to maintain physical health and body fitness. Physical health and physical fitness are very important human needs because they can create health for the body and avoid all diseases.

Humans who have good physical health and physical fitness will always maintain their physical condition so that they always survive perfectly. One way to maintain a healthy physical condition is by doing regular exercise.

According to WHO (2018), there is an increased risk of death by 20% -30% in people who lack physical activity compared to people who actively do physical activity for at least 150 minutes per week with moderate intensity on a regular basis.

In Indonesia, the prevalence of experiencing Non-Communicable Diseases (NCD) is increasing from

year to year. Riskesdas in 2018 showed that there was an increase in the prevalence of non-communicable NCDs from 2013-2018. Based on blood sugar examination, diabetes mellitus rose from 6.9% to 8.5%. The increase in the prevalence of non-communicable diseases is related to lifestyle, including lack of physical activity. The proportion of less activity also increased from 26.1% to 33.5%.

To see a healthy physical condition, of course, it is necessary to check the blood sugar levels in the body in order to maintain its balance with physical exercise so that there is no accumulation of sugar levels in the blood. Examination or checking blood sugar levels should be done before and after physical exercise so that we can see changes in blood sugar that occur between before and after physical exercise.

To measure blood sugar levels, it can be done with the Bleep Test field test by running continuously

between 2 lines 20 meters apart by listening to the beeps that have been heard.

2. Problem Formulation.

Based on the background that has been explained, the formulation of the problem obtained is: "Is there any effect of the Bleep Test on blood glucose levels in 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII ?".

3. Research Objectives.

3.1. General Purpose.

To find out the effect of the Bleep Test on blood glucose levels in 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII.

3.2. Special Purpose.

- A. Knowing the picture of blood sugar when in the class of 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII.
- B. Knowing and analyzing the process of physical exercise (bleep test) for 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII.
- C. Knowing the effect of physical exercise (bleep test) on blood sugar levels during class 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII.

4. Research Benefits.

4.1. Practical Benefits.

- A. This research is expected to provide information to other researchers about the effect of the Bleep Test on blood sugar levels conducted on students of the class of 2020 at the Sekolah Tinggi Ilmu Ekonomi LMII.
- B. This research is expected to be a recommendation for other researchers to conduct the same research in a different environment

4.2. Theoretical Benefits.

A. For The Community.

As information material for the public to be able to do this simple Bleep Test independently

B. For Researchers.

As information material for researchers to add insight into the Bleep Test conducted on students of the class of 2020 at the Sekolah Tinggi Ilmu Ekonomi LMII.

C. For The Health Sector.

As information material for the health sector for the development of a very simple health science, namely the Bleep Test.

5. Theoretical Basis.

5.1. Blood Glucose.

Blood glucose or blood sugar is one of the most important carbohydrates used as a source of energy.

Blood sugar level is a term that refers to the level of glucose in the blood. (Murray, 2017).

Glucose comes from outside the human body because it comes from food and drinks consumed by humans every day so that it becomes a substance in human blood.

Every human eating carbohydrates will be able to change the condition of human blood sugar which is the fuel in the human body and must be maintained in the blood glucose balance in the human body where human blood glucose will increase after eating. (Smith, 2016).

In a normal human body, a sugar level of 70-100 milligrams is needed for every 100 ml of blood and if you consume too many sweets, the sugar level will rise in the human body so that it can cause diabetes because it is caused by a buildup of human blood sugar.

5.2. Physical Training.

Physical exercise can be interpreted as physical activity where body movements are carried out by muscles in a planned, structured, and repetitive manner that causes an increase in energy use with the aim of improving body fitness (Fadhila, 2019).

One form of physical activity is the Bleep Test. Another term for Bleep Test is Multistage 20m which means Test Running continuously between 2 lines which are 20 meters apart by hearing a recorded beep sound. The Bleep test is the most valid, inexpensive and very easy to perform. Any person or group of people can do the Bleep Test.

Bleep Test will be a measurement of body fitness through regular sports activities. If a person has physical fitness, that person will avoid various diseases, including: heart disease, blood vessels, lung disease, etc.

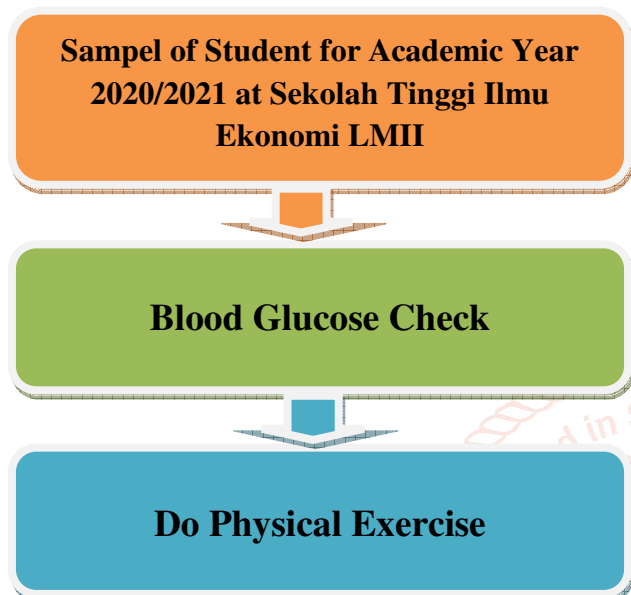
5.3. Effect Of Physical Exercise On Blood Sugar Levels.

During physical exercise, energy requirements will increase and this is met by the breakdown of glycogen and the breakdown of triglycerides, free fatty acids from adipose tissue and the release of glucose from the liver. Glucose levels are maintained normally to meet the energy needs of the brain during physical exercise through hormonal mechanisms. Decreased insulin hormone and increased glucagon hormone are needed to increase hepatic glucose production during physical exercise and in prolonged physical exercise there will be an increase in glucagon and catecholamine hormones. Physical exercise in addition to improving insulin sensitivity, can also maintain body fitness and lower blood

glucose levels. Several studies have proven that physical exercise can enter glucose into cells without the need for insulin, besides that physical exercise can reduce weight for people with diabetes and obesity and prevent the rate of progression of impaired glucose tolerance.

6. Conceptual Framework.

With the background and theoretical support, the framework of thinking in this research can be described as follows:



From the conceptual framework above, it can be concluded that the independent variable is physical exercise and the dependent variable is blood glucose.

7. Operational Definition

- Blood glucose measured in this study is blood glucose taken from the periphery using an Aesitoc meter.
- The physical exercise carried out in this study was the Bleep Test.

8. Research Design.

Research design is a design or description that will be used to achieve what will be formulated. This research is a descriptive research, thus the research design model that is used can be seen in the following figure:

9. Location And Time Of Research

9.1. Location.

In this study, the place or location of the research is the Sekolah Tinggi Ilmu Ekonomi LMII, Medan

9.2. Time.

This research will be conducted in April - June 2021.

10. Population And Sample.

10.1. Population.

In the study, the population used were students of the class of 2020 at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan.

10.2. Sample.

The sample that will be taken in this study are students of the class of 2020 at the Sekolah Tinggi Ilmu Ekonomi LMII who meet the inclusion and exclusion criteria. The sampling technique is the total sampling method.

A. Inclusion Criteria

- Class of 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII.
- Willing to be a research subject.
- Willing to fill out and sign the informed consent form.

B. Exclusion Criteria.

- Subjects who are not willing to fill out and sign the informed consent form.
- Students of the Sekolah Tinggi Ilmu Ekonomi LMII who are not included in the Class of 2020.

11. Method Of Collecting Data

Data analysis technique is a way of processing data from data obtained from the field (Maryati and Suryati, 2002: 111). The data obtained in this study is blood glucose levels.

Measurement of glucose level data using the Aesitoc Meter

- Purpose: To measure blood glucose levels
- Tools: Aesitoc (pocket), strip, lancet, and alcohol wipes.

C. Implementation:

- First, we take the blood using a lancet on one fingertip.
- Then the end of the strip that has been inserted into the aesitoc (pocket) is touched to the blood that comes out at the fingertip earlier.
- Then the value will appear automatically on the aesitoc (pocket) tool.
- And the value that appears is the glucose level
- After taking the value of glucose levels, then clean the blood on the fingertips using alcohol wipes.

12. Variable Operationalization

12.1. Independent Variables.

A. Conceptual Definition.

According to Sugiyono, 2007, the independent variable is the variable that causes or is affected by the dependent variable.

B. Operational Definition.

The variable in this study is Physical Exercise (X).

12.2. Dependent Variable.

A. Conceptual Definition.

According to (Sugiyono, 2007:33) is a variable whose value is influenced by the independent variable.

B. Operational Variables

The dependent variable in this study is Blood Sugar Levels (Y).

13. Data Analysis Plan.

For data analysis, paired sample t-test will be used where this hypothesis is tested to determine whether the average difference is significant or not from the sample group.

14. Research Ethics

In conducting the research, the researcher applied for permission to the Sekolah Tinggi Ilmu Ekonomi LMII to conduct research which used a population of 2020 students. To get approval by emphasizing research problems with informed consent (approval after explanation). Before conducting the research, the students who were the sample were informed about the purpose, objectives, benefits and impacts of the action, and explained that their participation in this research was voluntary. In this study, patients used data taken from blood sugar results before and after doing physical exercise (Bleep Test).

15. Results and Discussion.

15.1. Results.

Based on research that has been conducted at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan on 20 students, it was found that the results of lowering blood sugar in each student. The results of the distribution of group characteristics in the form of gender, age and blood sugar levels are as follows:

1. Distribution of Subjects by Gender.

Table 1 Distribution by Gender

	Frekuensi (n)	Persentase (%)
Female	8	40
Boys	12	60
Total	20	100

Based on table 1, it can be seen that from 20 students at the Sekolah Tinggi Ilmu Ekonomi LMII Medan, there were more sexes, namely 12 men (60%) while 8 women (40%).

Table 2 Distribution Results by Gender and Blood Sugar Levels

	Blood Sugar Before	Blood Sugar After
1	90	79
2	97	87
3	88	77
4	99	96
5	98	95
6	90	86
7	99	95
8	87	84
9	83	75
10	96	86

11	86	78
12	97	94
13	89	86
14	76	74
15	89	79
16	84	73
17	85	82
18	89	86
19	84	82
20	98	95

Based on the data in table 2, the results of the difference in blood sugar before and after between men and women at the Sekolah Tinggi Ilmu Ekonomi LMII Medan.

2. Distribution of Subjects Based On Age.

Table 3 Distribution by Age

	Frekuensi (n)	Persentase (%)
≤ 20 tahun	10	50
> 20 tahun	10	50
Total	20	100

Based on table 2, it can be seen that from 20 students at the Sekolah Tinggi Ilmu Ekonomi LMII Medan, the results obtained were 10 students (50%) and > 20 years (50%) where the lowest age was 18 years and The highest age is 25 years.

3. Characteristics of Blood Sugar Samples Before And After Physical Exercise.

Table 3 Blood Sugar Characteristics Before and After Physical Exercise

	Before	After
N	20	20
Minimum	76	73
Maximum	99	96
Mean	90,2	84,45
St. Deviasi	6,48	7,51

Based on table 3 shows the characteristics of blood sugar before and after physical exercise (Bleep Test). From the results it can be seen that there is a decrease in the average value of blood sugar levels before and after with an average value before amounting to 90.2 mg/dL and an average value after amounting to 84.45 mg/dL. The minimum blood sugar values before and after physical exercise are 76 mg/dL and 73 mg/dL. While the maximum value of blood sugar before and after physical exercise is 99 mg/dL and 96 mg/dL.

4. Test Results Data Differences In Blood Sugar Before And After.

Table 4 Distribution of Respondents By Work Position

Mean Blood Sugar Before	Mean Blood Sugar After	Nilai P
90,2	84,45	0,001

Based on table 4 shows changes in blood sugar levels before and after physical exercise (Bleep Test) where the results obtained p value = 0.001 < 0.05 so that it can be stated according to the paired sample t-test test with a value of = 0.05. It can be concluded that there is a significant change between blood sugar before and after physical exercise (Bleep Test).

15.2. Discussion

In a study that was conducted on 20 students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan, it was found that there was a decrease in blood sugar levels between before and after physical exercise (Bleep Test) in each sample.

15.2.1. Overview of Blood Sugar Before Physical Exercise in Class of 2020 Students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan

Based on the results of the study, the average blood sugar level before physical exercise was 90.2 mg/dL with the lowest blood sugar level being 76 mg/dL and the highest blood sugar level being 99 mg/dL. The data shows that blood sugar levels before doing physical exercise in class 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan are in the normal category according to (PERKENI, 2019:p:1), which is 70-99 mg/dL. The results of this study are different from previous research conducted by A. Parawansa, (2018) regarding the Effect of Physical Activity on Blood Sugar Levels in Students of SMA Negeri 1 Bulukumba where the average blood sugar level before doing physical exercise was 109.25 with a value of 109.25 levels. the lowest blood sugar level was 94 mg/dL and the highest blood sugar level was 119 mg/dL. In addition, there are also previous studies conducted by (Lesmana & Broto, 2019) on Blood Glucose Profiles Before, After Submaximal Physical Exercise and After the Recovery Phase for FIK UNP Students where the average results of blood sugar levels before physical exercise were 112, 2 mg/dL with the lowest blood sugar value of 90 mg/dL and the highest blood sugar value of 178 mg/dL.

Blood sugar is one of the forms resulting from the carbohydrate metabolism process which is used as the main energy source and insulin plays a role in controlling it (Auliya et al., 2016). Controlled blood sugar levels can prevent complications. One of the complications that can occur if blood sugar is not controlled or high is obesity and diabetes.

There are several factors that can cause high blood sugar levels, including obesity, genetics, age, stress, lack of physical activity, consumption of food and beverages (Rahmasari, 2019). Routinely checking blood sugar is one of the efforts to prevent

complications and can also see the success rate of blood sugar control efforts that have been carried out, namely by diet, exercise or taking medication (Deny, 2020).

Blood sugar levels in class 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII in Medan are within normal limits and it can be concluded that students can control blood sugar well.

15.2.2. Overview of Blood Sugar After Doing Physical Exercise for Class of 2020 Students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan.

Based on the results of the study, it was found that the average blood sugar level after doing physical exercise was 84.45 mg/dL with the lowest blood sugar level being 73 mg/dL and the highest blood sugar level being 96 mg/dL. The description of blood sugar from 20 students at the Sekolah Tinggi Ilmu Ekonomi LMII in Medan who were respondents had blood sugar levels in the normal category according to (PERKENI, 2019:p:1), namely 70-99 mg/dL.

In contrast to previous research conducted by (Nurfitriani, 2018) on the description of blood sugar levels in people with diabetes mellitus who regularly do physical exercise, the results obtained were 90.7% or 39 respondents in the prediabetes category (100-199 mg/dL) and 9.3 % or 4 respondents in the normal category (70-99 mg/dL) and the sugar levels used in this study were blood sugar levels.

The average blood sugar level in the class of 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII in Medan has decreased significantly because the respondents have been doing physical exercise. This is because glucose or glycogen is used as the main energy source in doing physical exercise through the stages of glycolysis, Krebs cycle, oxidative decarboxylation and electron transfer (Blood et al., 2019). Physical exercise can increase the need for oxygen and energy consumption by about 20 times so that glucose can be used in large quantities without the need for large amounts of insulin.

15.2.3. The Effect of Physical Exercise on Blood Sugar Levels in Class of 2020 Students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan.

Based on the results of the study, it was found that changes in blood sugar levels between before and after doing physical exercise with the average value of blood sugar levels before doing physical exercise 90.2 mg/dL and the average value of blood sugar levels after doing physical exercise 84.45 mg /dL. It can be concluded that physical exercise can affect blood sugar levels.

This research is in line with previous research conducted by (Darah et al., 2019) on the Effect of Physical Activity on Blood Sugar Levels in Adolescents at SMKN 1 Palangkaraya where it was found that all respondents experienced a decrease in blood sugar levels after running with an average blood sugar before doing physical exercise was 95.33 mg/dL and the average blood sugar level after doing physical exercise was 86.46 mg/dL.

There are also other previous studies that have been conducted by (野田 et al., 2018) regarding the Effect of Physical Activity on Blood Sugar Levels in Students of SMK Negeri 1 Bulu Kumba where the results of a decrease in blood sugar levels before and after doing physical exercise (bleep test) on students of SMK Negeri 9 Bulukumba. It can be concluded that physical exercise can affect blood sugar levels.

In contrast to the research conducted by (Edward Alezandro Lbn. Raja.; Ikhtiari, Refi.; Raif, 2019) on the Effect of Bleep Test on Increasing Blood Sugar Level where the results of increasing blood sugar levels between before and after physical exercise were 67% , 36.2% which have little effect and some have no effect at all.

According to (Burgomaster et al., 2006) stated that physical exercise in the short term can affect the body's metabolism, namely carbohydrates which can increase blood sugar levels.

The decrease in blood glucose after physical exercise occurs because of an increase in insulin sensitivity and a low amount of glucose production or breakdown. Insulin inhibits hepatic phosphorylase, which is the main enzyme that causes the breakdown of glycogen in the liver into glucose. During physical exercise, energy requirements will increase and this is met by the breakdown of glycogen and the breakdown of triglycerides, free fatty acids from adipose tissue and the release of glucose from the liver.

16. Conclusions And Suggestions.

16.1. Conclusion.

The conclusion obtained from the results of this study is that the average blood sugar level before doing physical exercise is 90.2 mg/dL and the average blood sugar level after doing physical exercise is 84.45 mg/dL and it can be concluded that there is an effect of physical exercise on blood sugar levels in 2020 students at the Sekolah Tinggi Ilmu Ekonomi LMII, Medan.

16.2. Suggestion

Based on the results of the study, discussion and conclusions, the authors suggest for further researchers to use different variables such as physical

exercise. Many types of physical exercise that can be used such as running, walking, or gymnastics and many more.

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