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Screening Blood Glucose Levels at Adolescents in Rongtengah Village, Sampang District

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ABSTRACT

Background & Objective: Blood glucose is the level of glucose in the blood whose concentration is strictly regulated by the body. Increased blood glucose in adolescents is caused by changes in lifestyle and diet that tend to refer to an unhealthy lifestyle and diet due to frequent consumption of sugary drinks, instant food, or fast food. If this habit cannot be changed, it can lead to blood glucose disease. The purpose of this study was to determine blood glucose levels in adolescents aged 17-20 years in RW 06, Rongtengah, Sampang.

Method: The type of research used is descriptive. The population in this study were adolescents aged 17-20 years in Rongtengah Village, Sampang. The research sample was adolescents aged 17-20 years in RT 01 to RT 05, RW 06, a total of 42 people from Rongtengah Village, Sampang. This study used a purposive sampling technique that met the criteria of 17-20 years of age—the technique of checking blood glucose levels using the POCT method with units of mg/dL. Data analysis in this study will be tabulated in tabular form.

Result: The results of the study obtained as many as 5 high yield samples, the results of normal blood glucose levels as many as 37 samples.

Conclusion: The conclusion of this study shows that adolescents still have the potential to have high blood glucose levels.

Keywords: Adolescent; Blood Glucose; Diabetes mellitus.

Introduction

Blood glucose is the level of glucose in the blood whose concentration is tightly regulated by the body. Glucose flowing in the blood is the main source of energy for body cells. An increase in blood glucose levels after eating or drinking will stimulate the pancreas to produce insulin which prevents further

increases in blood glucose levels and causes blood glucose levels to decrease slowly. The process of glucose performance in the body will certainly be disrupted if the body experiences an increase in glucose that exceeds normal limits. The older you get, the greater the risk of increasing blood glucose and this can be caused by diabetes mellitus (Demur, 2018).

In Madura Sampang, many cases occur in the elderly, one of which is high blood glucose levels. In adolescents aged 17-20 years, this does not guarantee that they will not experience high blood glucose levels. At the age of 17-20 years, there are many changes in lifestyle and eating patterns which tend to be unhealthy because of the habit of frequently consuming instant and ready-to-eat sweet foods and drinks which can cause obesity and various diseases and can result in suffering from blood glucose in adolescents.

Triggers for increased blood glucose levels (hyperglycemia) in the body are pancreatic dysfunction, insulin resistance, and impaired blood glucose tolerance. A decrease in blood glucose levels is caused by the use of insulin or oral glycemic drugs, hyperinsulinemia, liver dysfunction, chronic kidney dysfunction, the influence of pharmacological agents, surgery for neoplasms, and congenital metabolic disorders (Lestari ZS, 2021).

Based on WHO data in 2020, the first cause of death in the world is non-communicable diseases, which is estimated to continue to increase throughout the world, reaching 70% of deaths caused by non-communicable diseases such as diabetes mellitus. Apart from that, the WHO also stated that there was an increase in Diabetes Mellitus sufferers by 70% in the adolescent population, and it was recorded that 422 million people suffer from Diabetes Mellitus in the world (Qifti, 2020). WHO predicts an increase in the number of people with Diabetes Mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. The number of people with Diabetes Mellitus will increase by 2-3 times in 2035. Results reported by Riskesdas (2018) by the Ministry show that the prevalence of Diabetes Mellitus in Indonesia increased in 2013 by 1.5% to 2.0% in 2018 (Yelfi Anwar, 2022).

Based on the results of the 2018 Basic Health Research, the prevalence of Diabetes Mellitus in adolescents aged over 15 years has increased, namely, in 2013 it was 6.9%, while in 2018 it increased by 8.5%. Diabetes Mellitus sufferers among adolescents are quite significant in Indonesia, and this should receive attention from the Government. Supporting examinations for diabetes mellitus in adolescents is an important thing that needs to be done to avoid errors or delays in diagnosis and treatment that can lead to death (Riskesdas, 2018).

One of the regions with the highest number of Diabetes Mellitus sufferers is East Java Province. The prevalence of Diabetes Mellitus sufferers is 2.1% which is in the top 10 in fifth place in the prevalence of Diabetes Mellitus sufferers in Indonesia (Nanda, 2020). The Diabetes Mellitus rate in East Java according to Riskesdas in 2013 was 2.1% and increased to 2.6% in 2018 (Riskesdas, 2020). The prevalence of Diabetes Mellitus in East Java among adolescents who consume fast food is 64.2%, consume instant drinks 31%, and hereditary factors are 13.30% (PERKENI, 2016).

Factors that influence blood glucose levels are age, food intake, physical activity, and medication. Firstly, age is a factor that has a very strong influence on the prevalence of Diabetes Mellitus and impaired glucose tolerance, especially in adolescents. In adolescence, the body components that experience changes are pancreatic beta cells that produce insulin, target tissue cells that produce glucose, the nervous system, and

other hormones that influence blood glucose levels (Dhanny, 2022).

The second factor is food intake which plays an important role in increasing blood sugar levels. Foods consisting of carbohydrates, protein, and fat can increase blood glucose levels. Carbohydrates are absorbed by the body through the intestines, then turned into glucose and circulated in the bloodstream. One to two hours after eating, blood glucose will reach its highest level (Christine Evelyn Sitorus, 2020).

The third factor is that physical activity reduces increases in blood glucose levels and plays a role in managing blood glucose control, especially after eating. Physical activity will also increase the metabolic work of muscle tissue and improve cardiovascular health in general. Increasing physical activity and exercise is important in achieving and maintaining weight loss, in addition to improving insulin resistance, it also reduces insulin levels. The fourth factor, drug use, is one of the factors that can influence blood glucose levels by inhibiting insulin secretion or action and also through interactions with antidiabetic agents (Wantania, 2020).

According to Basic Health Research (Riskesdas), blood glucose levels among adolescents in the Madura region are higher in urban areas than in rural areas (Riskesdas, 2018). Based on a survey conducted by researchers on March 12, 2023, adolescents in the urban area of Madura aged 17-20 years who consumed a sweet, ready-to-eat, instant diet and lacked sports activities involving 42 respondents, data was obtained from adolescents aged 17-20 years have a habit of consuming sweet, instant and ready-to-eat foods and drinks compared to healthy foods.

Objective

The research aims to determine blood glucose levels in adolescents aged 17-20 years in RW 06, Rongtengah Village, Sampang District.

Method

The type of research is descriptive research with analytical observational research. The population and sample for this study were adolescents aged 17-20 years in RT 01 to RT 05, RW 06, a total of 42 people in Rongtengah Subdistrict, Sampang District.

The sampling technique used is the purposive sampling technique. The time for this research was carried out in March 2023. The variable in this study was blood glucose levels in adolescents in RT 01 to RT 05, RW 06, Rongtengah Village, Sampang District. Operational Definition The blood glucose level variable is the amount of instantaneous blood glucose used to measure blood glucose levels which are examined using the POCT method in mg/dL units. Adolescents are adolescents aged 17-20 years who live in RT 01 to RT 05, RW 06, Rongtengah Village, Sampang District. The data taken is primary data obtained based on the results of checking blood glucose levels in adolescents. Data collection was carried out by analyzing samples using a glucometer.

The examination tools and materials used in this research were 70% alcohol swab, cotton, autoclick, lancet, glucometer (Easy Touch), and glucose stick (Easy Touch).

Stages of Proficiency Test or Comparative Test

A comparative test of blood glucose examination using a photometer clinic device and a glucometer device with 3 blood samples at the Jrengik Community Health Center Laboratory in Sampang Regency.

Photometer clinical equipment, namely preparing tools and materials. Then prepare 3 reaction tubes, namely blank, standard, and sample. After that, pipette the reagent using a micropipette on a 1000 ul blank, then pipet

1000 ul reagent and 10 ul standard, then pipet 1000 ul reagent and 10 ul serum. Mix and incubate for 5 minutes at 37°C. Then insert it into the photometer by sucking it starting from the blank, standard, and sample. Wait for the results.

In the glucometer, put enough blood on the blood glucose test strip attached to the glucometer and wait for the results.

Sampling Preparation Procedure for Taking Blood from One of the Capillary Areas at the Fingertips

Prepare tools and materials such as a 70% alcohol swab, cotton, autoclick, lancet (small needle), glucometer (Easy Touch), and glucose sticks (Easy Touch). After that, wash your hands thoroughly and wear medical gloves. Then prepare the glucometer and insert the testing strip into the tool. Insert the sterile needle into the lancet pen piercing tool. After that, choose the tip of the thumb that you want to pierce. Then clean the tip of your thumb with alcohol cotton and leave it for a while. After that, massage the patient's finger so that the blood collects at the tip of the finger, then prick the finger with a lancet pen. Then the first drop of blood is removed using dry cotton wool, then the second drop of blood is added to the test strip. Then press the pricked finger with alcohol cotton so that the bleeding can stop.

Reference values:

70 – 130 mg/dL

Results

The results of research on blood glucose levels that were carried out using samples on adolescents aged 17-20 years in RT 01 to RT 05, RW 06, Rongtengah Village, Sampang District in May 2023 with a total of 42 respondents and glucose levels were checked Blood results obtained as follows:

TABLE 1. Results of Blood Glucose Level Examination in Adolescents May 2023

Variable	N	%
Age		
Mean: 18.9		
Gender		
Man	19	45
Woman	23	55
Blood glucose results		
Mean ± SD: 112.57 ± 18.01		
Normal	37	88
High	5	12

Table 1, shows that the data obtained on blood glucose levels in adolescents was 42 respondents, there were results of 5 people having high blood glucose levels with a percentage of 12% and the results of normal blood glucose levels were 37 people with a percentage of 88%. From the results of this examination, the average value of blood glucose levels in adolescents aged 17-20 years was 112.57 mg/dL.

TABLE 2. Results of Blood Glucose Levels Based on Gender

Gender L/P	Normal	High	Amount	Percentage
P	16	3	19	45
L	21	2	23	55
Total	37	5	42	100

Table 2, shows that the results of blood glucose levels based on gender are for women, namely 16 people who are normal and high, there are 3 people with a percentage of 45%, while for men, there are 21 people who are normal and high, there are 2 people with a percentage of 55%.

Discussion

Factors that influence blood glucose levels in adolescents are age, genetics, diet, lifestyle,

and physical activity. The first risk factor for blood glucose is age, one of the factors that has a very close influence on the prevalence of blood glucose levels in adolescents. As adolescents age, the body components that experience changes are pancreatic beta cells that produce insulin, target tissue cells that produce blood glucose, the nervous system, and other hormones that influence blood glucose levels (Dhanny, 2022).

The second factor, genetics, is a disease that is passed down from parents to their children genetically. If parents suffer from blood glucose levels, their children will suffer from blood glucose levels. However, this does not mean that children of both parents suffering from blood glucose will suffer from blood glucose too, but they can maintain and avoid other risk factors. The third factor, diet, plays an important role in increasing blood glucose levels. Foods consisting of carbohydrates, protein, and fat can increase blood glucose levels. Unhealthy eating patterns and a tendency to overdo it cause obesity. Obesity is a factor of lack of physical activity (Fitriani Nasution, 2021).

The fourth factor, physical activity, is to reduce the increase in blood glucose levels, especially after eating. Physical activity will also increase the metabolic work of muscle tissue. Physical exercise is important in achieving and maintaining weight loss, in addition to improving insulin resistance, it also reduces insulin levels. Lack of physical activity causes a lack of energy burning by the body so that excess energy in the body will be stored in the form of fat in the body. Excessive storage will cause obesity (Wantania, 2020).

In this study, 5 respondents had abnormally high blood glucose levels, this was due to unhealthy teenage lifestyles, such as consuming instant, ready-to-eat sweet foods and drinks rather than consuming healthy foods. It is caused by various factors such as diet, lifestyle, and lack of physical activity so excess energy in the body will be stored in the form of body fat. However, the majority of blood glucose levels were normal, as many as 37 respondents, because adolescents still do a lot of physical activity and exercise which is sufficient to burn fat and lose weight.

Based on age, blood glucose levels are most common at the age of 20, because as you get older, body components will change, such as consuming sugary drinks too often, poor lifestyle and eating patterns resulting in excess carbohydrates, disruption of the insulin hormone, and too many calories. inside the body.

Based on gender on blood glucose levels, women experience high blood glucose levels. This is based on the results of questionnaires from respondents in their teens. Many women suffer from blood glucose levels compared to men because many women's lifestyles are less healthy, such as consuming instant, ready-to-eat sweet foods and drinks, lack of physical activity, and unhealthy lifestyles that increase fat in the body easily accumulate due to disruption. insulin hormone. Women should be able to maintain a healthy lifestyle to avoid high blood glucose and avoid risk factors such as unhealthy eating patterns and lack of physical activity.

From the results of this study, it can be stated that in adolescence, blood glucose levels increase due to several causes such as genetics, physical activity such as lack of exercise, unhealthy lifestyles, and the habit of frequently consuming sweet, instant, and ready-to-eat drinks which cause increased glucose blood in adolescence.

Conclusion

Based on the results of the research that has been carried out, it was concluded that from 42 samples of adolescents, high blood

glucose levels were obtained with a percentage of 12% and normal blood glucose levels with a percentage of 88%.

Conflict of Interest

There is no conflict of interest in this study.

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