OVERVIEW OF CURRENT BLOOD GLUCOSE LEVELS IN COFFEE DRINKERS IN BAKTI VILLAGE PULUBALA DISTRICT GORONTALO REGENCY

Dea Ananda Ernawan[1)],Marlia[2)], Adriyanto Dai[3)]
[1,3)] Bina Mandiri University Gorontalo
[2)] Faisal islamic hospital macassar
E-mail: dea652485@gmail.com, marliajohan95@gmail.com, adriyantodai@gmail.com

ABSTRACT

Hyperglycemia or increased blood sugar levels are diseases characterized by medical conditions with increased blood sugar above normal. One factor that affects blood glucose levels is drinking coffee. This study aimed to determine the description of random blood glucose levels in coffee drinkers and whether they increase or decrease. The method used in this study is a quantitative approach with a descriptive research type. The sampling technique in this study uses a *purposive sampling* technique, assuming the number of samples is 30 and using univariate test data techniques. The result of the study shows that in coffee drinkers with a sample size of 30, it was found that 22 (80%) coffee drinkers had normal blood glucose levels, and 8 (20%) coffee drinkers had high blood glucose levels.

Keywords: Coffee Drinkers, Random Blood Glucose, Hyperglycemia.

INTRODUCTION

The biggest consumers of coffee in Indonesia are adults and young people. generally people around the world consume coffee to add freshness and avoid drowsiness so that they can work and think with a fresh and healthy body. many studies on how coffee consumption and other diseases can affect high blood sugar levels. a 2019 study from South Korea Tested that coffee consumption is positively associated with the risk of elevated blood sugar. According to this study, people who consume coffee are less likely to develop diabetes mellitus.

There are various types of coffee that are commonly consumed in Indonesia such as arabica is the most famous type of coffee in Indonesia is this coffee and has become a global phenomenon. Arabica coffee is grown in the dry highlands at an altitude of 1,300-1,800 meters above sea level. 1000 to 1750 meters above sea level is where this coffee can be found, and has been grown and produced in 29 Indian states today there is a distinctive and strong aroma to this coffee 46].

While robusta is people's choice of coffee but tend to plant robusta coffee as their preferred type of coffee because it is easier to grow than arabica coffee. this coffee thrives at an altitude of 1000 meters above sea level. [46].

Excessive coffee consumption has a negative impact on drinkers. The effects of coffee consumption cause anxiety, trembling, restlessness, increased heart rate, increased blood pressure, and vomiting. strong coffee

Submit:June 23th,2025 Accepted: June 23th , 2025 Published: 23 Junethe ,2025
Journal of Health,Technology and Science (JHTS)—E-ISSN:2746-167X

can cause vomiting (in large quantities, sustained), bruising, hypotension, arrhythmias, hypertension, myoclonus (muscle spasms), seizures, hyperglycemia, metabolic acidosis, and respiratory alkalosis [11].

The effect of caffeine varies from person to person, and caffeine in coffee can increase, normalize, or decrease blood sugar levels in people with DM. In people with diabetes, consuming as much as 200 mg of coffee or 1 to 2 cups of coffee can cause blood sugar levels to change, so coffee drinkers should be limited to 3 cups per person [25].

The properties of coffee as an antioxidant make coffee beneficial to the human body and improve health. Compared to caffeine, coffee contains more antioxidants than tea or chocolate 45].

The caffeine in coffee can have detrimental effects on your body, such as causing you to experience rapid breathing, shaking, and hypertension. Tooth decay, bad breath, stress and high blood pressure in the morning, insomnia, stroke, digestive problems, addiction, and premature aging are all possible results of consuming too much caffeine. Caffeine is one of the main causes of headaches. Drinking more than two cups of coffee a day increases the risk of bone disease or osteoporosis in women50].

Glucose is glycogen, which is obtained from carbohydrates in food, stored as blood sugar in the liver and muscles. blood sugar is an important carbohydrate as fuel for energy [10]. Hyperglycemia or elevated blood sugar levels is a disease that is identified by increased blood sugar levels. Hyperglycemia is one of the typical symptoms of diabetes [40].

The incidence of diabetes or elevated blood sugar levels is based on worldwide prevalence. The International Diabetes federation (IDF) calculates that DM affects 463 million people worldwide, about 9% of the world's population. In 2021, the IDF's latest figures show that Indonesia's approximately 19.4 million people affected by DM, compared to the number in 2019, amounted to 81.8%. Indonesia ranked fifth among countries such as China, Pakistan and the United States. The number of people with diabetes in Indonesia is the highest among ten countries in Southeast Asia.

According to the World Health Organization (WHO) in 2021, people with diabetes are expected to increase and the number of deaths will double from 2021 to 2030. currently, there are 140.9 million people in China, 74.2 million people in India, 33 million people in Pakistan, 32.2 million people in the United States, 19.5 million people in Indonesia, 15.7 million people in Brazil, 141,000 people in Mexico, and 13.1 million people in Bangladesh.

According to the Ministry of Health (2019), the prevalence of diabetes in Indonesia is Jakarta 3.4%, Yogyakarta, Kalimantan 3%, Manado 3%, and Surabaya 2%, Bangka Belitung Islands 2.5%, Aceh and Gorontalo 2.4%, Palu and Banten 2.2%, Semarang 2%, Medan 2%, Riau and West Papua 1, 9%, Province and Makassar 1.8%, Riau Islands, Bali, West Java 1.7%, padang, , West Nusa Tenggara, pontianak 1.6%, North Maluku 1.5%, Jambi, Lampung 1.4%, kendari, Bengkulu, Palembang and Mamuju

1.3%, Maluku and Papua 1.1%, and East Nusa Tenggara 0.9%. The number of people with diabetes in Gorontalo was found to be 1.74% of the total population. the district with the highest number of sick people in Gorontalo was 2.7%, followed by Gorontalo Regency at 1.8%, and the lowest was Boaremo Regency with a sick population of 0.7%.

The liver and muscles utilize glucose as their energy source, which comes from the digestion of carbohydrates (Rahmatunisa et al., 2021). The amount of sugar in the blood is called glucose. Blood sugar levels or blood glucose concentration are the result of a process in the body. the synthesis of other carbohydrates in the body can be identified by glucose, which includes glycogen, ribose, deoxyribonucleic acid, galactose and glycolipids, glycoproteins, and proteoglycans 14].

The amount of sugar in the blood plasma determines healthy blood sugar levels. Food sensitivity, stress and mood, weight gain, age and exercise are among the factors that can affect blood sugar levels. Normal blood sugar levels can be achieved without food intake for 8 hours (fasting) with levels of 70-126 mg/dl, before eating 70 to 130 mg per day, after eating < 180 mg/dL liters, and before bedtime with levels of 100-140 mg / 300 dl. sustainable blood sugar levels This can be determined by measuring fasting blood glucose levels, blood glucose levels during, or blood glucose levels 2 hours postprandial.checking blood sugar levels is necessary, blood sugar can be controlled by enzymatic, chemical, and metabolic means (Fahmi, 2020)[14].

Glucose levels in the human body can be influenced by many aspects such as insulin and glucagon which positively affect the transporter system in liver and muscle cells. then what needs to be considered is external factors, such as food consumed. Blood glucose levels also depend on human characteristics, gender and other factors such as insufficient exercise, high blood pressure, nutritional status (BMI and waist circumference) (Dwi Cahya, 2023)[11].

This is based on the fact that blood sugar levels are affected by a decrease in insulin sensitivity with age, and the risk of type 2 diabetes increases with age. in fact, after the age of 40, the human body undergoes a rapid decline that affects the pancreas and other organs 28].

Other factors include genetic history, physical activity and body weight. People with diabetes can also be affected by their health condition if they have children or a family history of diabetes. This occurs through a combination of genes that increase the risk of diabetes. Individuals who have diabetes in their family members may be 2 to 6 times more likely to develop the disease than those who do not have a diabetic sibling or child 34].

Exercise causes muscle contraction and movement. Muscles convert glucose into energy by breaking it down. Blood sugar levels can be controlled through exercise. This is because exercise uses glucose in the muscles without requiring insulin to use it, resulting in normal blood sugar levels. This will make blood sugar levels return to normal, but conversely a lack of physical

activity will increase blood sugar levels above normal 5].

Weight has been shown to have no effect on blood sugar levels. Being overweight does not mean our blood sugar levels will rise. Blood sugar levels work on the adrenaline and corticosteroid hormones secreted by the adrenal glands. Adrenaline increases glycemic demand and corticosteroids reduce it. BMI can be used as a risk measure of the risk of developing metabolic syndrome. Being overweight is associated with an increased risk of diabetes, but being underweight also increases the risk. This difference may occur because blood sugar levels in different people are affected by other factors. Pancreatic beta cell hypertrophy is caused by increased glucose production to cover cellular energy, which is usually observed in overweight adults with body weight >25 kg/m2 [34].

Increase in blood sugar levels, and low blood sugar levels. The increase in blood sugar is due to decreased insulin secretion or impaired insulin by pancreatic beta cells. glucose levels are influenced by several factors including consuming unhealthy foods, especially the amount of carbohydrates, body mass index, and exercise. on the other hand, if you experience hypoglycemia or abnormal glucose concentrations in plasma that are less than 70 mg/dl. hypoglycemia is classified into mild, moderate, or severe hypoglycemia based on signs and symptoms and the need for external support. mild hypoglycemia causes symptoms of cold sweat and trembling [11].

Elevated blood sugar levels, and low blood sugar levels. The rise in blood sugar is due to a decrease in insulin secretion or impairment of insulin by pancreatic beta cells. glucose levels are influenced by several factors including consuming an unhealthy diet, especially the amount of carbohydrates, body mass index, and exercise. on the other hand, if you experience hypoglycemia or an abnormal glucose concentration in plasma that is less than 70 mg/dl 11].

Hypoglycemia is classified into mild, moderate, or severe hypoglycemia based on signs and symptoms and the need for external support. mild hypoglycemia causes symptoms of cold sweats and trembling. Severe hypoglycemia often goes undetected and can cause symptoms such as physical fatigue, confusion, and behavioral changes. immediate treatment is needed to prevent damage to the most important human organs, especially the brain. blood sugar levels <55 mg/dL have a significant impact on the brain, because glucose is needed by the brain and is unable to store it as a metabolism. if the brain experiences a lack of oxygen and glucose, ischemia will occur 4-6 minutes, which means it has a severe brain impact that lasts more than 10 minutes (Dwi Cahya, 2023)[11].

Hyperglycemia is a common problem in critically ill patients. The presence of hyperglycemia is associated with increased morbidity and mortality regardless of the reason for hospital admission (e.g., acute myocardial infarction, postoperative cardiovascular conditions, stroke, sepsis). Hyperglycemia and diabetes are associated

with severe damage and prolonged healing, such as organs that are difficult to work, especially the nerves and heart (Elman B, 2022)[45].

Hyperglycemia is a condition where insulin secretion decreases leading to increased insulin sensitivity. This reduces insulin production in the body, creating a cycle that causes blood sugar to rise. High and uncontrolled blood sugar levels can lead to hyperosmolarity, which stimulates the body's osmotic diuresis process allowing the flow of intracellular water and electrolytes into the extracellular fluid. this movement of water reduces the amount and intensity of cell fluid, leading to dehydration (Lutfi., 2019)[30].

The examination method used in the study was POCT. The POCT method is the most commonly used health screening method (Kehar, 2018). Test with the POCT (Point-Of-Care-Testing) method and screen in advance for health problems that occur in the community and determine the test results as soon as possible so that it can help

determine further treatment [7].

Source : [26]

Glucose level check is divided into intermittent blood glucose level, fasting blood glucose level, and 2 hours after meal glucose check. Blood sugar levels can be checked at any time without having to fast or eat.The experiment should be done twice, first before dinner and then in the afternoon for self-use. For long-term DM treatment (glucose control for about 3 months), dark blood glucose measurements are taken. Problems due to rapid changes in blood sugar levels may affect this test. The normal range for blood sugar levels is <200 mg/dl.

Fasting blood glucose test a patient should not eat additional calories for 8 hours or more undergoing a fasting blood glucose test to determine their fasting blood sugar level. It is recommended to fast the night before the test if you drink unsweetened water. A patient's fasting blood sugar level can be controlled at 80-130 mg/dL 4].

This 2-hour postprandial glucose screening is done 2 hours after consuming carbohydrates more than 75 grams of sugar. In people with diabetes, with 20 grams, blood sugar levels are considered under control 2 hours after consumption 4].

A person's current blood glucose level can reduce the risk of developing diabetes or cardiovascular disease, known as euglycemia [45].

The World Health Organization classifies IGT (impaired glucose tolerance) as a disease in which I am more likely to develop diabetes, even when blood sugar is restored. People with blood sugar levels in the IGT range have a higher risk of developing heart disease, which is common in people with diabetes. the cause of IGT disease according to experts is improper hormone production and muscle tissue disorders in insulin production 48].

Based on the results of a pre-survey conducted in the field, researchers found an increase in blood sugar levels while drinking coffee in Bakti Village. This is the

researcher's goal to find out the picture of blood sugar levels in coffee drinkers whether it rises or falls.

RESEARCH METHOD

The research method used was descriptive with a cross sectional research design. The research was conducted in July. The sample used was capillary blood from some of the people of Bakti Village with a total sample size of 30 respondents. This study used purposive samling method and univariate data analysis.

Data Collection Methods According to Sugiyono 2017, a questionnaire is a method of collecting data by asking respondents a series of questions or written statements to answer. Data processing is secondary and primary data, secondary data is obtained by researchers through mediation and used to obtain research information. Secondary data is evidence, or historical records collected in reports or articles and is intended to obtain blood glucose data on coffee drinkers.

Data processing is secondary and primary data, secondary data is obtained by researchers through mediation and used to obtain research information. Secondary data is evidence, or historical records collected in reports or articles and is intended to obtain blood glucose data on coffee drinkers.

Based on the sample size statistics, a group of 30 coffee drinkers in Bakti village, Pulubala sub-district, Gorontalo district was selected.

Data collection according to Sugiyono 2017, a questionnaire is a method of collecting data by asking respondents a series of questions or written statements to answer.

Tools and materials used in the study such as PPE masks, handscoon, a set of POCT tools, test strips, luncet, and alcohol swab.

RESEARCH RESULTS

Based on the results of the study, it is known that the results of the examination of temporal blood sugar:

Table 1. Shows the distribution of gender:

No	Type Gender	Total	Percentage (%)
1.	Laki-Laki	19	63.3%
2.	Perempuan	11	36.7%
	Jumlah	30	100%

Based on the results in table 1, out of 30 respondents, blood sugar test results based on gender showed 11 people (36.7%) were female and 19 people (63.3%) were male.

Table 2. shows the age distribution:

No	Age	Total	Percentage (%)
1.	20-30 Tahun	3	3%
2.	31-40 Tahun	4	4%
3.	41-50 Tahun	8	8%
4.	51-60 Tahun	10	10%
5.	>60 Tahun	5	5%
	Jumlah	30	100%

Based on the results of table 2 of 30 respondents showed, the results of blood sugar checks based on age showed 3 people aged more than 20-30 years, 4 people aged more than 31-40 years, 8 people aged over 41-50 years, 10 people aged over 41-50 years, 5 people> 60 years.

Table 3. Shows the distribution of the results of the blood glucose test:

No	GDS levels	Total	Percentage (%)
1.	Normal	22	80%
2.	Tinggi	8	20%
	Jumlah	30	100%

Based on table 3, the results of the blood sugar examination of coffee drinkers in Bakti village as many as 30 respondents showed, 22 people (80%) were in the normal range and high results were 8 people (20%).

DISCUSSION

Based on the results of the gender survey of 30 coffee drinking respondents, it can be seen that most coffee drinkers are men, 19 people (63.3%) and 11 people (36.7%) are women. This is in accordance with research [2] which states that men consume more coffee than women.

Based on the results of a coffee consumption survey obtained from 30 coffee-drinking respondents, it is known that 8 people who consume more than 3 cups of coffee (<400 mg) per day have higher blood sugar levels. This means that respondents of more than 1-2 cups of coffee per day, their blood sugar levels increased. This is in line with [35] that to be safe, you should limit coffee consumption per day, no more than 2-3 (400 mg) cups per day. Many studies show that drinking caffeinated coffee can reduce the risk of high blood sugar, but if you consume too much coffee, the effect of caffeine on insulin can cause blood sugar levels to rise.

A total of 22 respondents were found to have blood sugar levels that were within the normal range. As a result, the study concluded [19] that those who consumed more than one cup of coffee had higher blood sugar levels compared to those who consumed only one cup per day. During that time, 8 respondents (10%) had blood sugar of more than 114 mg/dl and consumed more than 3 cups of coffee.

According to [29] Drinking more than 3 cups of coffee increases coffee consumption 2-4 times compared to non-coffee drinkers. Increased coffee drinking with increased caffeine consumption, and the addition of extracted coffee, sugar, or instant coffee leads to increased sugar consumption.

Blood sugar testing is a common practice as it can identify abnormal blood sugar levels in the body without delay. The purpose of this test is to avoid problems arising from sudden fluctuations in blood sugar levels. In this study, The Point of Care Test (POCT) method was used, which is a simple laboratory test method. This procedure is only for capillary blood samples, not for plasma and serum samples. To measure blood glucose with the POCT method, a POCT device, test strips, lancets, and alcohol swabs are required.

electrochemical detection of enzymes is used in this POCT on membrane strips.

POCT is designed to simplify and speed up the process of laboratory examination of patients, so that doctors can make clinical decisions quickly. two commonly used methods are amperometry and reflectometry. One thing to note before testing is to look at the test strip The POCT code and chip must match, otherwise the POCT cannot be used. Test results will not be published because the chip has an expiration date.

The study showed that blood sugar levels were mostly within the normal range. This is because coffee drinkers are still active in Bakti Village, Pulubala Subdistrict and do simple, easy and strenuous activities. Lack of physical activity can have an impact on blood sugar levels, according to research [9]. exercise can control blood sugar levels because exercise requires energy that is converted from sugar. Various diseases, including high blood sugar levels, are associated with unreliable exercise and lack of physical activity.

This decrease in blood sugar occurs in people who are physically active. physical activity means that the body gets more energy from the muscles, so more sugar can be converted into energy. can lower blood sugar levels in your body.

The effects of physical activity are related to an increase in the rate of glucose uptake (the amount of glucose muscles take from the blood). during exercise, muscles use the glucose in them. when blood sugar levels drop, your muscles pull sugar from the blood to fill the void. this can lower blood sugar levels and improve blood sugar control. Muscles use the sugar in the blood as fuel. the more you eat the lower the blood sugar levels.

CONCLUSIONS

Based on the research that has been conducted in Bakti Village, it can be concluded as follows: Gender obtained from 30 respondent drinkers as many as 19 men (63.3%) consume coffee, compared to the average consumption level of women. The number obtained from 30 coffee drinking respondents found that the majority of coffee drinkers were in the age group> 40 and> 50 years as many as 18 respondents (56.7%). Normal blood sugar levels were 22 (%), while 8 respondents (%) had higher blood sugar levels due to drinking more than 3 cups of coffee per day and light activities.

REFERENCES

[1] Almita Mila Susanti. , Siti Cholifah ,Rina Puspita sari. (2020). PENGARUH PEMBERIAN JUS TOMAT TERHADAP KADAR GULA DARAH SEWAKTU PADA PASIEN HIPERGLIKEMIA. *Nusantara Hasana Journal* Volume 1 No. 3 (August 2021).

[2] American Diabetes Association. (2021). 2 . *Classi fi cation and Diagnosis of Diabetes : Standards of Medical Care in Diabetes* d 2021. 44(January), 15–33.

[3] Amrullah, J. F., (2020) Hubungan Aktivitas Fisik Dengan Kadar Gula Darah Sewaktu Pada Lansia Penderita Diabetes Melitus Di Wilayah Kerja Upt Puskesmas Babaka SariKota Bandung.

[4] DEWI, Desi Ratna, et al. ANALISIS KAFEIN MINUMAN BERENERGI BERMERK MENGGUNAKAN METODE

SPOT-TEST DAN IODOMETRI. *JURNAL KREASI RAKYAT*, 2024, 2.1: 24-35.

[5] Dwi Cahya H., Heru L., & Putri Widelia Welkriana (2023). ambaran Kadar Glukosa Darah Sebelum Dan Sesudah Mengkonsumsi Kopi Pada Penderita Diabetes Melitus Tipe 2 Di Wilayah Puskesmas Sawah Lebar Kota Bengkulu. Jurnal Fatmawati Laboratory & Medical Science. Vol 3 No 1 Juni 2023.

[6] Fahmi, N. F., Nailufar, F. & Putri, N., (2020) Pengaruh Waktu Penundaan Terhadap Kadar Glukosa Darah Sewaktu Dengan Metode Poct Pada Mahasiswa. *JURNALNURSING UPDATE-VOL.11.NO.2*.

[7] Hafidz Assegaf, Susianto Tseng, Mamlukah (2021). Korelasi Antara Konsumsi Kopi Dengan Tekanan Dan Gula Darah, Imt, Hb, Lama Tidur Dan Screen Time Barista Di Kabupaten Majalengka Tahun 2021. *Journal Of Public Health Innovation* VOL. 01 NO. 02 JUNI 2021

[8] KEMENKES. (2022). Mengenal Penyakit Hiperglikemia.

[9] Komariah, d. & Rahayu, S., (2020) 'Oral Dengan Gula Darah Puasa Pada Pasien Diabetes Melitus Tipe 2 Di Puskesmas Baturraden'. *jurnal Kesehatan Husada,* p. 41–50.

[10] NURUL, KALIDAZIA (2019). *HUBUNGAN GAYA HIDUP DAN PERSEPSI RISIKO DENGAN PERILAKU KONSUMSI KOPI INSTAN PADA MAHASISWA FAKULTAS PERTANIAN UNIVERSITAS ANDALAS*

[11] ROSARES, Vivi Eprillia; BOY, Elman. Pemeriksaan Kadar Gula Darah untuk Screening Hiperglikemia dan Hipoglikemia. *Jurnal Implementa Husada*, 2022, 3.2: 65-71.

[12] Sabila, Firda Nasywaa, et al. "Analisis Keputusan Mahasiswa Dalam Menentukan Kopi Berdasarkan Kandungannya." *Konstanta: Jurnal Matematika dan Ilmu Pengetahuan Alam* 2.1 (2024): 123-134.

[13] Safitri, R. (2020). Analisis Kadar Kafein Pada Kopi Bubuk Murni Dan Kopi Bubuk Campuran Menggunakan Spektrofotometri Uv-Vis.

[14] Setiawan, D., (2019) 'Efektivitas Jus Buah Naga dan Jus Bengkuang Terhadap Penurunan Gula Darah pada Penderita Diabetes Melitus di Kelurahan Takeran Kecamatan Takeran Kabupaten Magetan'.

[15] TITI, A. (2023). *HUBUNGAN KONSUMSI KOPI DAN MEROKOK DENGAN TEKANAN DARAH PADA PASIEN HIPERTENSI DI PUSKESMAS CILACAP UTARA 1* (Doctoral dissertation, Universitas Al-Irsyad Cilacap)

[16] Lutfi Septy Munawaroh, Diah Titik, S. S. E. (2019). Gambaran Kadar Glukosa Darah Peminum Kopi Dan Bukan Peminum Kopi Pada Penderita Diabetes Melitus Tipe 2. Analisis Kesehatan Sains, 8(2).

[17] Darul, dkk (2021). Pengaruh Aktifitas Fisik Terhadap Kadar Glukosa Darah Pada Mahasiswa Prodi Gizi FIK UNM. Jurnal Seminar Nasional Hasil Penelitian 2021 "Penguatan Riset, Inovasi, Dan Kreativitas Peneliti di Era Pandemi Covid-19".

[18] Kahar, H. (2018). Keuntungan Dan Kerugian Penjaminan Mutu Berdasarkan Uji Memastikan Kecermatan (Poct). *Indonesian Journal of Clinical Pathology and Medical Laboratory*, 13(1), 38.