TEST THE CONTENT OF GLOBULIN, BIURET AND HEMOGLOBIN IN BLOOD IN ADOLESCENT WOMEN

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ABSTRACT

Blood is a liquid found in humans and all high-level animals that serves to transmit substances and oxygen needed by the body's tissues, transport chemicals from metabolism, and also as a defense of the body against viruses or bacteria. This study aims to find out the content of globulin and biuret in the blood of adolescent women and identify hemoglobin levels contained in this.

Method used in this study is qualitative research that is descriptive, with sampling techniques that use *purposive* sampling method.

The results showed that in this globulin test aims to see the presence of globulin or protein deposits in serum and the results obtained are deposits in serum samples. Then the biuret test aims to see the discoloration, and the result Occurs discoloration of the serum (white) and for this hemoglobin test aims to see if the sample blood is normal or not and the result is normal sample blood.

Keywords: globulin, biuret, hemoglobin

INTRODUCTION

Blood is the fluid of body tissues. Its main function is to transport the oxygen needed by cells throughout the body. Blood also supplies the body's tissues with nutrients, transports metabolic waste substances, and contains a variety of immune system constituents aimed at defending the body from various diseases. Hormones from the endocrine system are also circulated through the blood. Blood is a liquid tissue consisting of two parts. Intercellular material is a liquid called plasma and in it there are solid elements, namely blood cells. The overall blood volume is approximately 5 liters. About 55 percent is fluid, while the remaining 45 percent consists of blood cells. This number is expressed in hematocrit values or compressed blood volume ranging from 40 to 47.

Blood is also a defense of the body against viruses or bacteria. The medical term for blood begins with the Greek word hemo- or hemato- meaning blood. Human blood is red, between bright red when rich oxygen to deep red if oxygen deprivation. Red color in the blood is caused by hemoglobin, a respiratory protein containing iron in the form of heme, which is the place where oxygen molecules are bound.

Humans have a closed circulatory system which means blood flows in the blood vessels and is circulated by the heart. Blood is pumped by the heart into the lungs to release residual metabolism in the form of carbon dioxide and absorb oxygen through the pulmonary arteries, then carried back to the heart through the pulmonary veins. After that blood is delivered throughout the body by the aortic vascular tract. Blood circulates oxygen throughout the body through a fine channel of blood called capillary vessels. The blood then returns to the

heart through the superior vein cava and inferior vena cava. Blood also transports metabolic waste materials, medicines and foreign chemicals to the liver to be decomposed and to the kidneys u.

Albumin is the main protein that has a simple structure with a small amount in the cell, while globulin is a simple protein with large amounts in plasma and cells [8].

Albumin and globulin are synthesized in the liver, but most globulins are formed by the immune system. Albumin serves to keep blood from leaking out of blood vessels, helps carry drugs or other substances through the blood, and is important for tissue growth and healing, while globulin serves to transport metals, such as iron in the blood and help fight infections. Globulin consists of different types of proteins, namely alpha, beta, and gamma types [8].

Blood is a liquid found in humans and all high-level animals that serves to transmit substances and oxygen needed by the body's tissues, transporting metabolic chemicals, and also as a defense of the body against viruses or bacteria. The medical term for blood begins with the Greek word hemo- or hemato, meaning blood [7].

Some of the functions of blood in the body are, breathing, oxygen transport from the lungs-tissues and carbon dioxide from the tissues of the lungs. Nutrition, transport of substances that are dibsorbsi through the intestinal wall to be disposed of, if the blood that has been given antikoaguan rotated with a loader, then the blood cells will settle [2].

Blood has a weak alkaline pH of about 7.36 in the body, blood serves as a means of transportation of substances, especially oxygen, regulates the reactions of kima in the body, heat regulation and protection against infection. Blood [11]. Of all the blood in the body, more than half is blood plasma. Blood plasma is a liquid part of the blood that does not clot misyalnya dalah in the vascular system (blood clots) of the body, or in vitro blood that was previously given anticoagulants. Between one-third to half the volume of blood is erythrocytes, which are suspended in protein-rich blood plasma. Erythrocytes are formed from a protector cell called retickulasit. The largest component of blood plasma is water. Blood plasma is yellowish clear liquid. Blood plasma in the body serves to transport food juices from the small intestine wall of the body's tissues. In addition, blood plasma also transports acidic substances (oxygen) and acidic substances (carbon dioxide). In the blood plasma contained substances useful for tubu immunity to disease. It is an antibody [11].

Protein is the most abundant solid substance in plasma, which is between 6%-8% of plasma. Proteins found in plasma include fibrinogen, albumin and globulin. Fibrinogen is a protein that can turn into fibrin and cause blood clots when we are injured. Fibrinogen has globulin-like properties. Proteins present in the plasma part are diversity in interesting properties and functions. The most abundant protein in blood plasma is serum albumin, its very important function is to maintain blood osmosis pressure against tissue osmosis pressure. Globulin is the second serum protein in the abundance of this protein to work as an antibody that forms a defense system against foreign proteins from other antigens [2].

Blood contains several types of cells that are carried in a yellow liquid called blood plasma. Blood plasma is composed of 90% water containing food juices, proteins, hormones, and fecal deposits in addition to blood cells. There are three types of blood cells, namely red blood cells (erythrocytes), white blood cells (leukocytes), and blood chips (platelets).

Red blood cells and white blood cells are also called corpuscles[9].

Red blood cells, erythrocytes are the most numerous types of blood cells that carry oxygen to the body's tissues through blood in vertebrate animals. The inside of the erythrocyte consists of hemoglobin, a biomolecule that can bind to oxygen. Hemoglobin will take oxygen from the lungs lungs and gills, and oxygen will be released as erythrocytes pass through the capillary vessels. The red color of red blood cells itself comes from the color of hemoglobin whose element is iron. In humans, red blood cells are created in the spinal cord, then form biconkaf pieces. In red blood cells there is no nucleus. Red blood cells themselves are active for 120 days before finally being destroyed[3].

Erythrocytes generally consist of hemoglobin, a complex metalloprotein containing heme groups, in which group of heme, iron atoms will be temporarily connected with oxygen molecules (O2) in the lungs and gills, and then these oxygen molecules will be released throughout the body. Oxygen can easily diffuse through red blood cell membranes. Hemoglobin in erythrocytes also carries some waste products such as CO2 from tissues throughout the body. Almost all of these CO2 molecules are carried in the form of bicarbonate in blood plasma. Myoglobin, a compound associated with hemoglobin, acts as an oxygen carrier in muscle tissue [3].

The color of erythrocytes comes from the heme group found in hemoglobin. While the blood plasma liquid itself is brownish yellow, but erythrocytes will change color depending on the condition of hemoglobin. When bound to oxygen, erythrocytes will be bright red and when oxygen is released the color of erirocytes will be darker, and will cause bluish color in blood vessels and skin. The occimetry pressure method benefits from this discoloration by measuring oxygen saturation in arterial blood using colorimetry techniques [3].

Each red blood cell contains 200 million molecules of hemoglobin. Hemoglobin (Hb) is a protein containing iron hemin compounds. Erythrocytes have a biconkaf shape, such as a disc with a center line of 7.5 uM and is not bisected. The color of erythrocytes is yellowish and can be red because in the cytoplasm there is a red pigment in the form of hemoglobin. The life span of erythrocytes is only about 120 days or 4 months, then overhauled in the liver and spleen. Some hemoglobin is converted into bilirubin and biliverdin, which are blue pigments that give bile color. Iron decomposing hemoglobin is sent to the liver and spleen, further used to form new erythrocytes. Approximately every day there are 200,000 erythrocytes formed and overhauled. This amount is less than 1 % of the total erythrocyte count [10].

White blood cells (leukocytes) have a very important task, which is to kill the germs that enter the body. In addition, it also protects the body against infection. White blood cells are formed in the bone marrow in the spleen glands. These cells have nuclei, but do not have a fixed, colorless cell shape. White blood cells in every cubic millimeter of blood approximately amount to 8,000. The place of formation of white blood cells is in the red marrow of flat bones, spleen, and lymph nodes. All white blood cells have a lifestime of between six and eight days.

White blood cells can be distinguished into several kinds, namely lymphocytes, monocytes, neutrophils, eosinophils and basophils. Umunya, larger than red blood cells, anmeboid shape (irregular), and bernti round or concave cells. The most common type of white blood cell is neutrophils, about 60%. Neutrophils serve to attack and kill disease-causing bacteria that enter the body, by enveloping it and releasing a

substance that kills disease-causing bacteria that enter the body, by enveloping it and in white blood cells about 20%-30%.

Lymphocytes function to form antibodies, which are a type of protein that serves to combat disease germs. The amount of monocytes in the white blood is about 5%-10%. As with neutrophils, monocytes function to attack and turn off the battery. The number of eosinophils in white blood is about 5%. Eosinophils act to attack bacteria, remove damaged cell remains, and regulate the release of chemicals when attacking bacteria. Basophils in white blood amount to about 1%. Basophils serve to prevent clots in blood vessels.

White blood cells have phagocyte properties, which can kill disease germs by "eating" the germs. To destroy disease germs, white blood cells can penetrate the walls of blood vessels. That ability is called diapedesis. An uncontrolled increase in the number of white blood cells can result in white blood cells eating red or abnormal blood cells. This occurs in people with blood cancer (leuchemical).

Platelets or platelets are the smallest and lightest components of blood. Due to their small size they usually travel near the walls of the blood vessels that carry them. The walls of blood vessels consisting of special cells called endothelium prevent platelet attachment to the walls of blood vessels. However, in case of injury, when the endothelial cell layer is damaged and blood begins to flow out of the blood vessels (bleeding), the platelets immediately react by sticking to the damaged blood vessels and fibers form and a clotting layer occurs so that the bleeding stops [5].

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Platelets contain substances that play an important role in the blood clotting process. At the time of the wound, the pieces of blood secrete these substances. Finally, the pieces of blood form fibrin threads. These fibrin threads will close the wound and clot the blood. Therefore, blood stops flowing from the wound. When there is an open surface in the injured blood vessel, the pieces of blood immediately stick and cover the open surface [5].

Attached pieces of blood, other factors, and injured tissue trigger the activation of thrombin, an enzyme, from prothrombin in blood plasma. The formed thrombin will catalyze the change of fibrinogen into fibrin threads. Fibrin molecules stick to each other, forming fibrous tissues. This fibrin protein tissue, stops the blood flow and makes the blood solid, like gelatin when it is cold. This tissue traps red blood cells and increases the density of the frozen blood. The pieces of blood stick to the fibrous part and remove the sticky threads and make them stick to each other. Within half an hour, the pieces of blood shriveled, pulled the hole to dock, and forced the existing liquid to come out. The action results in a dense and strong freeze that makes the wound close. In this way, wound healing begins [5].

Blood is divided into several groups based on the type of antigen present in the cell. Human blood group based on the absence of aglutinogen, i.e. blood group A, B, AB, and O [4].

Blood group A, if erythrocytes contain aglutinogen A and aglutinin β in the blood plasma. Blood group B, if erythrocytes contain aglutinogen B and aglutinin α in the blood plasma. Blood group AB, if erythrocytes contain aglutinogenS A and B, and in blood plasma does not contain aglutinin. Blood group O, if erythrocytes do not contain aglutinogen A and B, and blood plasma has aglutinin α and β.

Antigens are molecules that cause the formation of antibodies (agglutination). While aglutinogen is a specific protein in plasma membranes in red blood cells [5].

RESEARCH METHOD

In this study used a type of research that is descriptive. In this study using qualitative laboratory examination with the method of testing the content of globulin, biuret and hemoglobin in the blood. Qualitative research was conducted to determine whether or not the content of globulin, biuret and hemoglobin in the blood of adolescent women.

In this study sampling techniques used purposive sampling method. Purposive sampling method is a method of deliberate sampling for a specific purpose based on research purposes. The population of this study was adolescent women [1].

Description of Materials

Materials used in blood practicum are as follows:

1. Sodium chloride, also known as kitchen salt, or halite, is a chemical compound with the nacl molecular formula. This compound is the salt that most affects the salinity of the ocean and extracellular fluid in many multicellular organisms. As the main component of kitchen salt, sodium chloride is often used as a seasoning and food preservative. Sodium chloride has a molar mass of 58.5 g/mol. A solid, white crystal-shaped nacl with a structure, each Na+ ion is surrounded by six Cl- ions in octahedral geometry.
2. Ammonium Sulfate [(NH4)2SO4] is an inorganic salt that has several uses, such as fertilizer add-on soil nutrients or as food additives. Ammonium sulfate contains 21% nitrogen and 24% sulfur elements. Ammonium sulfate will experience decomposition when heated to a temperature of 250 °C, and first form ammonium bisuulfat. If heated at a higher temperature, ammonium sulfate will decompose into ammonia. nitrogen, sulfur dioxide, and water.
3. Globulin reagents, globulins are proteins that can be insoluble in water, but soluble in saline solutions. Globulin is the main protein found in blood plasma, which serves as a carrier of steroid hormones and lipids, and fibrinogen; necessary for blood clotting. There are several types of globulin with various functions and can be divided into four fractions namely; alpha-1 globulin, alpha-2 globulin, beta globulin, and gamma globulin. The four fractions can be obtained separately through the protein electrophoresis process. Gamma globulin makes up the lion's share of all globulin proteins. Globulin levels may increase due to chronic infections, liver disease, carcinoid syndrome, etc., but may also decrease due to nephrosis, acute hemolytic anemia, liver dysfunction etc. Globulin reagents, globulins are proteins that can be insoluble in water, but soluble in saline solutions. Globulin is the main protein found in blood plasma, which serves as a carrier of steroid hormones and lipids, and fibrinogen; necessary for blood clotting. There are several types of globulin with various functions and can be divided into four fractions namely; alpha-1 globulin, alpha-2 globulin, beta globulin, and gamma

globulin. The four fractions can be obtained separately through the protein electrophoresis process. Gamma globulin makes up the lion's share of all globulin proteins. Globulin levels may increase due to chronic infections, liver disease, carcinoid syndrome, etc., but may also decrease due to nephrosis, acute hemolytic anemia, liver dysfunction etc.

4. Biuret Reagents, Biurets are reagents used to test protein content in samples. Biuret test is used to show the presence of peptide bonding in a substance tested. The presence of peptide bonds identifies the presence of proteins, since amino acids are related to other amino acids through the bonding of peptides forming proteins.
5. Blood, is a liquid found at all high levels that serves to transmit substances and oxygen needed by the body's tissues, transporting chemicals from metabolism, and also as a defense of the body against viruses or bacteria.
6. Aquadest, is the water distillation/distillation is the same as pure water or H2O, because H2O contains almost no minerals.
7. Alcohol cotton is a cotton packed in a unit aluminum foil containing Ethyl alcohol 70%. Fixed alcohol content so that effectiveness is not reduced. Used when in need of sterilization antiseptic alcohol, such as injection, blood collection, donor danah, blood sempel retrieval and so on.
8. Dry cotton, is a staple fiber of nang grown in the form of bales or protective capsules surrounding the seeds of the cotton plant matan génus Gossypium. Dry cotton, is a staple fiber of nang grown in the form of bales or protective capsules surrounding the seeds of the cotton plant matan génus *Gossypium*.
9. Alcohol 70%, an antiseptic liquid that serves as a skin disinfectant to kill fungi and bacteria on the skin. Liquid products with an alcohol content of up to 70 percent are commonly used as supporting ingredients for disinfectants, antifreestuffs, and solvents. Alcohol 70%, an antiseptic liquid that serves as a skin disinfectant to kill fungi and bacteria on the skin. Liquid products with an alcohol content of up to 70 percent are commonly used as supporting ingredients for disinfectants, antifreestuffs, and solvents.
10. Tissues, which are soft, easy-to-absorb, and easy to dispose of paper, are mainly used for the face. Tissues are usually sold in box-shaped wraps, and are designed to facilitate snot from the nose. Tissues also have many other uses, for example used as cleaning wipes.

Tools and Materials

The tools used in this practicum are filter paper, test tube, centrifuge tube, centrifuge, beaker, glass funnel, test tube rack, tube clamp, drip pipette, measuring glass, 3 ml syringe, sahli haemometer set, and stirrer rod.

The ingredients used in this practicum are NaCl 1%, (NH4)2SO4, biuret reagents, blood, globulin reagents, aquades, cotton alcohol, dry cotton, alcohol 70%, and tissues.

Working Procedure

Dans ce practicum effectuer des tests de protéines de 2 façons, à savoir la fabrication de sérum, et l'essai de globuline.

1. Serum making
   - Take a blood sample ± 3 ml Let stand or disentrifuge for 5 to 10 minutes at a speed of 3000 rpm
   - Then separate the serum and the formed sediment
   - Place the serum in the test tube.
2. Test de globuline

- Take 1 ml of serum and put in a test tube.Tambahkan 2 ml (NH_4) SO_4 22%
- Then let stand for 30 minutes
- Filter the formed deposits (save globulin filtrate obtained will be used in albumin test)
- Filtered deposits dipped in NaCl 1 % in beakers volume 20 ml
- Then do a biuret test

3. Biuret test
   - Precipitate obtained added with CuSO4 solution 1% as much as 2 ml and NaOH 1% as much as 2 ml
4. Hemoglobin test
   - Preparing tools and materials
   - Take 3 cc of blood and pour it in the centrifus tube
   - Mixing HCl 0.1 % into the centrifus tube by draining 2 drops of HCl
   - Memipet blood up to 20 microliters
   - Add aquades little by little until the color looks the same in a standard solution

RESEARCH RESULTS

After conducting several experiments obtained the following results:

Table 1. Protein test observation results

№.	Test Name	Results	Ket
1.	Serum making	After the blood sample is centrifuged, separate blood sample with serum	There is a serum in the blood sample that is blue
2.	Globulin test	Precipitate occurs in serum samples	Changes to the sample
3.	Biuret Test	Discoloration of serum (white)	Changes occurred in the sample

Source: Primary data, 2019

Table 2. Results of hemoglobin test observations

№	Test name	Results	Description
1	Hemoglobin test (HB)	After the blood sample in the centrifus there is a discoloration that is yellowish color	The color produced is the same as the color of the standard solution which means that the basis of the person is normal.

Source: Primary data, 2019

DISCUSSION

On blood practicum conducted 4 experiments, namely serum making, globulin test, and biuret test to test the presence of protein, and hemoglobin test (HB)

Serum making

Serum making in protein test by taking blood samples ± 3 ml and then let stand or in setripuge for 10 minutes, this is done to separate the serum with other blood ingredients.

After separating the serum and the sediment formed, the serum is placed in the test tube for further tests, where there are deposits where white indicates that in the blood there is serum.

Globulin test

In this globulin test, aims to see the presence of globulin or protein deposits in

serum. by using 1 ml of serum added with 2ml solution (NH4)2SO4 22% which serves to precipitate serum, then let stand for 30 minutes after the presence of sediment filter deposits formed using filter paper, filtered deposits dipped in NaCl 1% in chemical glasses, NaCl solution serves to obtain gel deposits.

Biuret test

In this test the filtered solution is

added CuSo4 solution 1% as much as 2 ml and NaOH 1% as much as 2 ml where cuso4 solution and NaOH solution is used to see the discoloration, and the results that can occur discoloration in the serum in the test is white (negative) contains protein.

Hemoglobin test

In this hemoglobin test take a blood sample as much as 3cc and pour into the centrifus tube and mix HCl 0.1 % as much as 2 drops, then pick up blood to 20 microliters and add aquades little by little while paying attention to the discoloration, and the result obtained is a discoloration that is yellowish color.

This indicates that a person's blood is at normal values, because the normal value of blood when the resulting color is the same as the color of the standard solution is yellowish.

CONCLUSION

Based on the results of research conducted blood is a liquid contained in humans and all high-level animals that serve to transmit substances and oxygen needed by the body's tissues, transport chemicals from metabolism, and also as a defense of the body against viruses or bacteria.

In the blood practicum conducted protein testing with 4 experiments namely serum making, globulin test, and biuret test, and hemoglobin test (HB). And the four experiments were successfully conducted, and in the first experiment that is the manufacture of serum there are deposits in which white this indicates that in the blood there is a serum.

Then the globulin test resulted in a precipitate in the serum sample, which means the experiment was successful. Then the biuret test aims to see the discoloration, and the result Occurs discoloration in serum (white) and for this hemoglobin test that aims to see if the sample blood is normal or not and the result is.

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