PRACTICE
BLOOD GROUP EXAMINATION

A. Background

Blood is a tissue fluid that flows through blood vessels. Blood consists of red cells (white blood cells and red blood cells), platelets (platelets), and blood plasma. There are several systems of blood grouping in humans, for example the ABO and rhesus (Rh) systems. The basis of blood grouping is the presence of *agglutinogens* (antigens) in red blood cells and *agglutinins* (antibodies) in plasma (serum). Agglutinogens are substances that clump together and agglutinins are substances that clump together.

Dr. Landsteiner is the inventor of the ABO system. In the ABO system, the presence or absence of type A and B antigens in red blood cells determines a person's blood type. The system classifies human blood into four groups, namely, A, B, AB, and O. Based on the description above, the background of this practitioner is knowing the blood type test technique.

Blood is a liquid tissue consisting of two parts. The intercellular material is a liquid called plasma and in it are solid elements, namely blood cells. The total blood volume is approximately 5 liters. About 55 percent is fluid, while the remaining 45 percent is made up of blood cells. This figure is expressed in terms of the hematocrit value or the volume of compacted blood which ranges from 40 to 47.

In healthy times the volume of blood is constant and to some extent regulated by the osmotic pressure in the blood vessels and in the tissues. Arterial blood pressure is the force of blood against the walls of the vessels that contain it. This pressure varies at each stage of the cardiac cycle.

During ventricular systole, when the left ventricle forces blood into the aorta, the pressure rises to a peak, which is called the systolic pressure. During diastole the pressure drops. The lowest value reached is called the diastolic pressure. To better understand how we know blood pressure is done by conducting an experiment.

B. Purpose

The purpose of this practicum is to fulfill the tasks of Science in Nursing practicum, to know the blood type test technique, to know the technique to measure blood pressure, to measure human blood pressure, to determine blood type, and to be able to distinguish A, B, AB, and O blood groups.

C. Theory

The common classification system is known as A, B, O, but in 1990 and 1901, Dr. Landsteiner discovered antigens (agglutinogens) present in red blood cells and also discovered antibodies (agglutinins) found in blood plasma. On the basis of the types of antigens found.

The function of human blood grouping is very useful, namely for blood transfusions and assisting in criminal investigations. Blood transfusion is the giving of blood from someone called a donor. To people who need it, called the recipient. In the process of blood transfusion, efforts are made so that the agglutinogens in the donor's blood do not meet the anti-substances contained in the recipient's blood plasma. In general, blood transfusions can be performed in the following circumstances: accidents and severe bodily injury, burns, chronic illness, acute blood loss, when the body loses a lot of blood, for example during surgery.

Blood grouping is important before blood transfusion because mixing incompatible blood types causes agglutination and destruction of red blood cells.

To determine blood type the guidelines are as follows:

Genotype	Group	Agutinogen	Aglutinin
OO	O	-	anti-A and anti-B
OA / AA	A	A	anti-B
OB / BB	B	B	anti-A
AB	AB	A and B	-

If the blood of a person being tested is mixed with serum agglutinin A, the blood type is A or AB. If the blood does not clot, it is likely that the person has blood type B or O. If tested with serum agglutinins B, there is a clot, it is likely that the person has blood type B or AB. However, if there are no clots, then the person may have blood type A or O.

PRACTICE

BLOOD PRESSURE TEST

Pulse rate and blood pressure are factors that are used as indicators to assess a person's cardiovascular system. Apart from these two things, it is usually possible to measure cholesterol in the blood – by measuring the ratio of LDL or bad cholesterol to HDL or good cholesterol; and the Doppler test. This test is used to determine how well blood circulates throughout the cardiovascular system. Pulse rate (pulse rate) describes the frequency of contraction of a person's heart. Simple pulse check, usually done by palpation. Palpation is a way of examining by palpating, touching, or feeling structures with the fingertips; while the examination is called auscultation, if the examination is done by listening to natural sounds produced in the body.

In general, pulse measurements can be performed at nine points, namely the radial artery, brachial artery, common carotid artery, femoral artery, dorsalis pedis artery, popolite artery, temporal artery, apical artery, and posterior tibial artery.

Blood pressure is the force exerted by the blood on the unit area of the walls of blood vessels (arteries). This pressure must be adequate, i.e. high enough to produce a thrust against the blood and not so high that it can cause additional work for the heart. Generally, two blood pressure values are obtained in the measurement, namely systolic and diastolic pressure.

Systole and diastole are two periods that make up one cardiac cycle. Diastole is a state of relaxation, when the heart is filled with blood which is then followed by a period of contraction or systole. What is meant by systolic pressure is the peak pressure generated in the arteries when blood is pumped into these vessels during ventricular contraction, while diastolic pressure is the lowest pressure that occurs in the arteries when blood flows downstream during ventricular relaxation. The difference between the systolic and diastolic pressures is known as the *blood pressure amplitude* or *pulse pressure*.

A sphygmomanometer is an instrument used to measure arterial blood pressure. The device consists of an elastic cuff containing an inflatable rubber pouch. When the cuff is attached to the arm, inflation from the rubber bag compresses the tissue under the cuff. If the rubber bag swells to a pressure in excess of the peak value of the pulse wave, the artery continues to weaken and no pulse wave can be palpated in the peripheral artery. If the spontaneous internal pressure is gradually reduced, a point will be reached where there is a pulse wave slightly exceeding the pressure in the surrounding tissue and in the rubber bag. At

that level, the pulse becomes palpable and the pressure shown on the mercury manometer is a measure of the peak pulse or systolic pressure.

Blood flows through the artery under the cuff rapidly and accelerates the column of blood in the peripheral arterial branch, producing turbulence and a characteristic sound, which can be heard through a stethoscope. Some of the pressure in the cuff is reduced further. The difference between systolic pressure and cuff pressure widens and the arteries open over time. In general, the amount of corrugated blood under the cuff is equally increased, and heart sounds through the stethoscope tend to be louder. When the pressure in the cuff drops below the minimal pressure of the pulse wave, the artery remains open continuously and the emitted sound becomes muffled as the blood continues to flow and the degree of acceleration of the blood by the pulse wave is suddenly reduced. When the cuff pressure is low, sound is completely lost as laminar flow and blood flow return to normal.

The sound heard during auscultation of blood pressure examination is called the *Korotkoff* sound, which is a sound caused by turbulence of blood flow caused by partial occlusion of the brachial artery.

Various factors affect pulse and blood pressure, such as hormone activity, sympathetic nerve stimulation, gender, age, body temperature, including position and physical activity.

PRACTICUM WORKSHEET
BLOOD GROUP DETERMINATION AND BLOOD PRESSURE TESTING

A. Time and Place :

B. Tools and Material :

- glass object
- Awl
- Toothpick
- Cotton
- 70% alcohol
- Physiological saline solution
- Antiserum A and B
- Tensimeter (sphygmomanometer)

C. Ways of working

- Determine blood group

a. Wet a cotton swab with 70% alcohol, then wipe it on the middle finger.
b. Pierce the middle finger with a sterilized needle.
c. Drop 1 drop of blood onto the glass object in 3 places, as shown in the picture.
d. Add each to object glass number 1 with drops of physiological salt as a control. Object glass number 2 with 1 drop of antiserum A and object glass number 3 added with 1 drop of antiserum B.
e. Mix each drop with a different toothpick.
f. Observe what happens to each drop that is on the glass object. Write it down in your workbook and discuss it with your group mates! Determine the blood group you have used in the experiment.

2. To find the blood group, use the following conditions.

No.	Treatment	Treatment results
1	Dropped with antiserum A	If the blood clots, then you have blood type A
2	Dropped with antiserum B	If the blood clots, then you have blood type B
3	Dropped with antiserum A and B	If the blood clots, then you have blood type AB
4	Dropped with antiserum A and B	If the blood does not clot, then you have blood type O

➢ Measuring blood pressure

a. Attach the sphygmomanometer to the upper left arm, then press the device on the black side by pumping it several times.
b. Listen to the sound of the heartbeat produced, and record the pressure by looking at the numbers on the scale. The first heartbeat that is heard is the systolic pressure, while the diastolic pressure can be known from the disappearance of the heartbeat sound.
c. Record the results in your workbook.
d. Compare the results with the measurements of some of your friends in class! Are there any similarities? Try to explain what factors affect a person's blood pressure.

Question

1. How many people in your group are A, B, AB, or O?
2. Explain the process of determining human blood group.
3. What is the function of anti-A and anti-B serum in blood group tests?
4. How important is it for us to know our blood type?