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Screening of Infectious Diseases and Hb Levels at Blood Donor Unit Indonesian Red Cross in Jayapura City Papua

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Abstract

Voluntary blood donors are people who voluntarily donate their blood to other people and not to certain patients. Before blood is given to the recipient, a blood filter test or screening test is carried out. A screening test is a process of screening or separating blood that can be transfused and not infected with an infectious disease. Research has been conducted with the title Infectious Disease Screening Results and Hemoglobin (Hb) Levels in Voluntary Donors at the Indonesian Red Cross Blood Transfusion Unit, Jayapura City. This research was conducted for 1 month, from 13 May to 15 June 2019. The population used in this study were all voluntary donors who came to donate blood. The number of samples in this study was 45 samples. Methods for examining infectious diseases, in this case testing for HIV, HBsAg, and hemoglobin levels used were the ELISA method and Bj: 1.053 copper sulfate. 2 people (4.4%) were positive and 43 people (95.6%) negative, HBsAg test found 7 people (15.6%) positive and 38 people (84.4%) negative and Hemoglobin obtained results as many as 45 people (100%) normal.

Keywords: Infectious diseases ; HIV ; HBsAg ; hemoglobin levels ; voluntary donors

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1 Introduction

Voluntary blood donors are people who voluntarily donate their blood and not for certain patients. Based on the results of a survey at *Blood Donor Unit Indonesian Red Cross* Jayapura City in 2018, 2,025 people voluntarily donated blood [1]. Before the blood is given to the recipient, a blood screening test/screening test is performed. A screening test is the process of screening/separating blood that can be transfused and not infected with infectious diseases. One of the initial screening tests carried out is hemoglobin examination.

According to the Minister of Health (2014), the examination of infectious disease infections includes testing for HIV and Hepatitis B, Hepatitis C, Syphilis [2].

Based on WHO (2016), there were 36.7 million people infected with HIV and in Indonesia in 2017 there were 242,699 people [3]. According to the Directorate General of PP and PL (1987) in December 2016, it was reported that the cumulative number of HIV infections was 232,323 people and in the province of Papua it ranked 3rd in Indonesia with 24,725 people. Based on the results of a survey at the *Blood Donor Unit Indonesian Red Cross* in Jayapura City (2018), there were 238 HIV reactive tests or positive results for HIV infection [1], while according to WHO (2016), Indonesia occupies the second position in ASEAN [3]. The Ministry of Health in 2014, reported that as many as 18 million people were infected with hepatitis B. The province of Papua was infected with hepatitis B by 0.8%. Based on the results of a survey at the *Blood Donor Unit Indonesian Red Cross* in Jayapura City (2018), there were 856 people with reactive or positive results with hepatitis B infection. *Blood Donor Unit Indonesian Red Cross* Jayapura City (2018), hemoglobin examination on prospective voluntary donors was 4,542 people . Infection with HIV and Hepatitis B mostly occurs in the adult age group, namely the age of 25-49 years and 20-24 years, (Ministry of Health of the Republic of Indonesia, 2017).

The high mortality rate due to lack of blood is still a health problem in Indonesia. One of the evidence is reflected in the maternal mortality rate, which is mostly due to bleeding, which is still a big problem in the world of health, especially in Indonesia.

The purpose of this study was to obtain the results of the examination of infectious diseases, in this case, namely Human Immunodeficiency Virus (HIV), Hepatitis B Surface Antigen (HBsAg), and Hemoglobin (Hb) Levels in Voluntary Donors at the Indonesian Red Cross Blood Transfusion Unit, Jayapura City.

2 Method

This type of research is descriptive with a laboratory test approach to determine the results of HIV, HBsAg, and Hb levels on voluntary donors at UTD PMI Jayapura City. This research lasted for one month, starting from May to June 2019 with the research location at *Blood Donor Unit Indonesian Red Cross* in Jayapura City.

The sample in this study was taken using the Accidental Sampling sampling technique, for one month the study amounted to 45 people. The sample must-have criteria, namely being a voluntary donor and willing to be a respondent.

Furthermore, the tools used in this study included a red vacuum tube (without anticoagulant), test tube rack, tension, clamps, scissors, scales, micropipette, beaker glass, hands sealer, centrifuge, and ELISA Uranus AE 75. The materials used in this study include 70% alcohol cotton, dry cotton, plaster, blood bag, clamps, blood lancet, yellow tip, blue tip, microhematocrit, betadine, HIV reagent, and HBsAg (Acon) and Cupri Sulfate solution BJ: 1,053.

The donor is then examined for vital organs, including examination of the heart, lungs, and others. The examination is done by auscultation if necessary and followed by palpation examination (if the history reveals abnormalities in these vital organs). Next, the bodyweight is weighed, blood pressure checks, hemoglobin level checks, and blood type checks are carried out, and enter the results of the examination on the donor blank and the medical check-up file.

Donor blood samples are taken and tested for HIV and HBsAg using the ELISA (Enzyme-Linked Immunosorbent Assay) method. easy to test. For hemoglobin examination, the Copper Sulfate (CuSO4) Bj 1.053 method was used.

The interpretation of the results of the HIV examination according to the SOP for the *Blood Donor Unit Indonesian Red Cross* in Jayapura City (2016) is as follows [4]:

Reactive : If it has a negative control value ≥0.186.
Non reactive : If it has a negative control value ≤0.186.

The interpretation of the results of the HBsAg examination, according to the SOP for the *Blood Donor Unit Indonesian Red Cross* Jayapura City (2016) is as follows:

Reactive : If it has a negative control value ≥0.074.
Non reactive : If it has a negative control value ≤0.074

The interpretation of hemoglobin examination, according to the SOP for UTD PMI Jayapura City (2016), is as follows:

Men
Height : >16 g/dL
Normal : 13-16 g/dL
Low : <13 g/dL
Woman
Height : >14 g/dL
Normal : 12-14 g/dL
Low : <12 g/dL

3 Result and Discussion

The results of this study are shown in Table 1 and Table 2.

Table 1. Results of HIV tests and HBsAg Examination on Voluntary Donors at UTD PMI Jayapura City

No	Parameters	Number of Donor Serum Samples	Result	
			Reactive	Non Reactive
1.	HIV	45	2 (4.4%)	43 (95.6%)
2	HbsAg	45	7 (15,6%)	38 (84,4%)

Table 1 shows the results of HIV examinations with serum samples from voluntary donors as many as 45 people, 2 people were positive (4.4%) and 43 people were negative (95.6%), and the results of HBsAg examination with serum samples from voluntary donors of 45 people, 7 people found positive (15.6%) and 38 people negative (84.4%).

Table 2. Results of Hemoglobin Examination on Voluntary Donors at UTD PMI Jayapura City

No	Parameters	Number of Donor Serum Samples	Result		
			Normal	High	Low
1.	Hemoglobin	45	45 (100%)	-	-
	Total	45	45 (100%)	-	-

Table 2 shows the results of Hemoglobin examination with 45 volunteers' blood samples, 45 people (100%) have normal results.

In table 1 the results of HIV examinations on voluntary donors that have been carried out on 45 donor serum samples at the *Blood Donor Unit Indonesian Red Cross* Jayapura City in 2019, show the results that there are 2 people (4.4%) positive for HIV infection and 43 people (95.6%) obtained a negative result. HIV examination on voluntary donors resulted in 2 positive results, this was because the donor's serum samples found antibodies to the HIV. The low results of HIV testing on voluntary donors are due to the strict level of donor selection and blocking measures and the high level of awareness of donors about the risk of transmission and can maintain sexual behavior by not having sex with someone who has been positive for HIV and does not change partners. According to Wulandari et al. (2015), DDS (Voluntary Blood Donor) has a low risk compared to DDP (Substitute Blood Donor), DDS with positive HIV results (7.9%), and DDP with HIV positive as much as 14.8%. This is because DDS donates blood regularly every 2.5-3 months. Every donor who donates blood will be screened regularly and under control [5].

According to Saimima (2018), the decrease in risk factors is due to prevention programs such as reducing the adverse effects of injecting drug users, this decrease is most likely due to the effectiveness of the HIV/AIDS control program. The program is the Strategic Use of ARV (SUFA) which in its implementation the SUFA program emphasizes TOP (Find, Treat and Maintain). To support socialization efforts at all regional levels, and Advocacy Team and KIE were formed. Advocacy is to provide support for the implementation of activities for women's empowerment, welfare, and child protection in the prevention of HIV/AIDS. KIE functions to mobilize and mobilize the community to carry out IEC activities which include Mass IEC which is used with large numbers of targets and is supported by the mass media, group IEC is carried out in one group such as recitations, group meetings. Interpersonal IEC (Face-to-Face) is more individual in nature, carried out by home visits or personal communication, counseling, and so on.

According to Devita et al. (2012), at *Blood Donor Unit Indonesian Red Cross* Semarang City, the number of donors for the period January 2008 – December 2012 was 259,765 donors with a positive HIV IMLTD screening result of 673 (11.5%) donors. This is because UTD PMI Semarang City does not have a permanent donor and for the provision of bloodstock UTD, PMI Semarang City cooperates with universities

(PT), organizations by holding blood donor activities. UTD PMI also held mobile activities using the Mobil Unit (MU) [6].

In table 2 the results of the HBsAg examination on voluntary donors that have been carried out on 45 samples of donor serum at *Blood Donor Unit Indonesian Red Cross* Jayapura City in 2019, show the results that there are 7 people (15.6%) positive for HBsAg infection and 38 people (84.4%) negative results were obtained. HBsAg examination on voluntary donors showed 7 positive results, this is because the donor serum samples found hepatitis B virus antibodies. According to Radji (2015), the Hepatitis B virus is found in body fluids, including blood, saliva, feces, urine, sperm, and vaginal fluids [7].

The results of this study are supported by research by Nadia, et al (2014), which found that 3.61% of donors at *Blood Donor Unit Indonesian Red Cross* Padang City had positive results. According to Oktavia et al. (2012), the number of donors at UTDC PMI Padang was 26,306 donors with the total number of hepatitis B positive or reactive was 974 (3.7%) donors [8]. Previously, a study was conducted by Hartati at UTDC PMI Padang in 2001 where the prevalence of HBsAg was 4.24%. Research conducted by Elvanetty in 2002 found the prevalence of positive HBsAg in donor blood was 4.19%. The decrease in the number of HBsAg sufferers may be due to the impact of the implementation of the immunization program against hepatitis B that has been carried out by the government and the examination of HBsAg on serum donors who donate blood. This result is low, likely, most of the Padang city donors have already done hepatitis B vaccine/immunization.

According to Hadi (2017), hepatitis B is a disease that is commonly found in the world and is considered a public health problem that must be resolved. In addition to its high prevalence, the hepatitis B virus can cause post-acute problems, and even liver cirrhosis and primary hepatocellular carcinoma can occur. 10% of hepatitis B virus infections will become chronic and 20% of patients with chronic hepatitis within 25 years of infection will experience liver cirrhosis and hepatocellular carcinoma (hepatoma). The likelihood of becoming chronic is higher if the infection occurs at a young age where the immune response has not yet developed completely [9].

According to Devita et al. (2012), at *Blood Donor Unit Indonesian Red Cross* Semarang City, the results of the number of donors for the period January 2008 – December 2012 with a positive IMLTD HBsAg screening result were 3198 (54.9%) donors. This is because *Blood Donor Unit Indonesian Red Cross* Semarang City does not have a permanent donor and for the provision of bloodstock *Blood Donor Unit Indonesian Red Cross* Semarang City cooperates well with universities (PT), organizations by holding blood donor activities. UTD PMI also held mobile activities using the Mobil Unit (MU) [6].

In table 2 the results of the hemoglobin examination on voluntary donors that have been carried out on 45 voluntary donor blood samples at the *Blood Donor Unit Indonesian Red Cross* Jayapura City in 2019, show the results that 45 people (100%) obtained normal Hb levels. In this study, normal Hb levels were found in voluntary donors, this is due to the possibility that each prospective donor has a high awareness of maintaining adequate rest patterns and consuming foods that contain sufficient levels of iron vitamins for the formation of protein molecules in red blood cells. According to Zainuddin (2015), Hemoglobin (Hb) is a protein molecule (protein containing iron) in red blood cells that functions as a carrier of oxygen (O2) from the lungs to all body tissues. Hemoglobin also carries carbon dioxide (CO2) back to the lungs to be exhaled out of the body [10].

According to Tanamal et al. (2015), in various countries, various donor selection criteria have been established that function to protect both donors and recipients, including a minimum hemoglobin (Hb) level of 13 g/dL for men and 12 g/dL for women. The American Association of Blood Bank (AABB) sets a minimum Hb level for men of 13.5 g/dL and women of 12.5 g/dL. Meanwhile in Indonesia, according to the Guidelines for Blood Transfusion Services from the Indonesian Red Cross Center Blood Donor Unit (UDD PMI), the Hb level for men and women is at least 12.5 g/dL. The volume of donated blood is generally around 350-450 so about 175-225 mg of iron will be lost. If the donor is not iron deficient, erythrocyte and hemoglobin levels will

generally return to normal within 3-4 weeks. Iron is one of the essential components in the body, mainly used in forming hemoglobin. If the iron that enters the body through the daily diet is less than that which is excreted, the body's iron reserves will be mobilized and used, so that one-day iron deficiency will arise. In humans, iron deficiency occurs in three stages, the mildest stage is the latent stage (iron depletion), the latent stage (iron-deficient erythropoiesis), and iron deficiency anemia (iron deficiency anemia) [11].

According to Kartika et al (2015), entitled "Iron in Regular and Irregular Donors", the results showed that there was no difference in iron profile levels for regular and irregular blood donors, this is because regular blood donors can still get the opportunity to compensate for the iron that occurs as a result of blood donation by forming new erythrocytes and increasing the absorption of iron which can be obtained with sufficient protein levels. Consumption of insufficient protein levels can affect iron metabolism because it can decrease the absorption process so that ferritin levels decrease and are balanced with an increase in TIBC (Total Iron Binding Capacity) levels [12].

4 Conclusion

With the discovery of HIV and HBsAg reactive voluntary donor blood samples, early screening or screening should be carried out so that the quality of blood obtained by UTD is even better before being distributed to those in need.

5 Conflicts of Interest

The authors declare no conflict of interests.

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