

Detection of *Toxoplasma gondii* Parasite on Blood Donor at PMI Kabupaten Magelang by Rapid Diagnostic Methods in 2022

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Abstract. *Toxoplasma gondii* is a parasite that can infect most warm-blooded animals, including humans. The infection is caused by *Toxoplasma gondii* called Toxoplasmosis. Toxoplasmosis transmission can occur because of human behaviour's such as keeping cats, eating raw vegetables and fruit with a less clean, not washing hands properly, and consuming food and drinks served without lids that could potentially be contaminated with oocysts, as well as soil-related work such as gardening and farming. *Toxoplasma gondii* is an infectious parasite that could be transmitted through blood transfusions. The aim of this research was to detect IgM and IgG antibodies of *Toxoplasma gondii* in blood donors by Rapid Diagnostic method at PMI Kabupaten Magelang. This research is a descriptive observational with a cross sectional design and used 25 respondents with blood categories A, B, O, and AB at PMI Kabupaten Magelang in 2022. According to the results of the Toxoplasmosis examination utilizing the Rapid Diagnostic Test technique on blood donors at PMI Kabupaten Magelang, as many as 25 respondents obtained non-reactive IgM and IgG antibodies against *Toxoplasma gondii*. It could be concluded that no respondents were found to have reactive IgM and IgG antibodies against *Toxoplasma gondii*.

1 Introduction

Toxoplasma gondii is one of protozoan parasite that can infect animals including humans. This parasitic infection is also called Toxoplasmosis [1]. Toxoplasmosis is a parasitic infection that can occur almost all over the world caused by various factors such as age, habits, nutrition, contact with cats and lack of consumption of cooked meat [2]. There seems to be no clinical symptoms of this disease, but it has caused a lot of harm to humans [3]. In Indonesia, the prevalence of toxoplasmosis is continue to increase along with changes in people's lifestyle patterns. The emergence of toxoplasmosis cases in humans is strongly influenced by life behavior including habits and diet in Indonesian society in general, which often consumes undercooked meat, this is one of the sources of *Toxoplasma gondii* infection

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[4]. In Indonesia, about 2-51% of the population has Toxoplasmosis infection which is divided into several regions. There are 58% in North Sulawesi, 10-12% in Jakarta, 9% in Surabaya, 62.5% in Central Java, 20% in Yogyakarta, 2% in Boyolali, 51% in Heavy Java, 9% in North Sumatra, 3% in West Kalimantan, 31% in South Kalimantan, 27% in Central Sulawesi, and 16% in Palu [5]. Transmission of toxoplasmosis can occur due to human behaviour such as the habit of keeping cats, eating raw vegetables and fruits that are less clean, the habit of not washing hands when eating, and consuming food and drinks served without lids that are potentially contaminated with oocysts as well as work related to soil such as gardening and farming [6,7,8]. Transmission of toxoplasmosis can also occur in laboratory workers who encounter blood containing *Toxoplasma gondii* parasites and can also be infected through accidental inoculation [9]. Toxoplasmosis can also be transmitted through blood transfusion. A person can become infected with Toxoplasma if they receive a blood transfusion containing Toxoplasma. Toxoplasmosis is often a scary thing for women because it is one of the causes of infertility in women, caused by the parasite *Toxoplasma gondii*. In fact, not only women, but men can also be infected with this parasite [10]. However, most cases of Toxoplasmosis are asymptomatic, so Toxoplasma in men is not given much attention. Based on the background, this study is to determine whether there are male donor blood samples detected reactive IgM and IgG *Toxoplasma gondii* antibodies at PMI Kabupaten Magelang and to determine the percentage of male donor blood samples detected reactive IgM and IgG *Toxoplasma gondii* antibodies at PMI Kabupaten Magelang.

2 Materials and Method

The type of this research is a descriptive observational study with a cross sectional design to detect antibodies of *Toxoplasma gondii* in the blood of 25 male donor, so this study was only conducted once and at one time. The blood samples used were the remaining blood samples from the EDTA tubes, after the screening test. The study was conducted at PMI Magelang Regency and was conducted on Wednesday, June 17, 2022. The tools used were centrifuge, tube rack, and timer. While the materials used were male donor blood samples, buffer solution, EDTA tubes, rapid test tapes and microtubes.

3 Results and Discussion

The examination results obtained did not detect the presence of specific antibodies against Toxoplasmosis in male donors at PMI Kabupaten Magelang, as shown in Table 1. The results of examination with Rapid Diagnostic Test for Toxoplasmosis antibodies showed non-reactive results.

Table 1. Results of Toxoplasmosis examination with Rapid test

Respondents	Result			
	Reactive	Percentage	Non-Reactive	Percentage
25 male respondents passed donor selection	0	0%	25	100%

The results of Toxoplasmosis examination using the Rapid Diagnostic Test method in the blood of male donors at PMI Kabupaten Magelang, 25 respondents were found to be non-reactive for IgM and IgG antibodies to *Toxoplasma gondii*. The sample was declared non-reactive because during the examination there was only one purple strip in the control area that appeared in the cassette test area. This indicates that there is no anti-TOX IgM and IgG in the specimen. The results of the examination with the Rapid test are declared non-reactive if red and purple lines are formed in the control area only, while invalid results are obtained

if there are no lines in the control and test areas, then the examination must be repeated [12]. However, in this study there were no invalid results so there was no need for re-examination.

The samples taken were blood samples of respondents who passed the donor selection who had agreed to informed consent and participated in the interview with different ages and different blood types. Data collection in this study used a questionnaire. Respondents were asked several questions in the questionnaire regarding risk factors for Toxoplasmosis in daily behavior, including having received blood transfusions, frequency of transfusions, keeping cats, hygiene factors and environmental factors. Based on the results of Toxoplasmosis examination using the Rapid test method related to health behaviors and habits carried out by 25 respondents. The following is Table 2. the results of interviews with male respondents at PMI Kabupaten Magelang.

Table 2. Interview Results with Questionnaires

Toxoplasmosis Factors	Yes	No
	%	%
Ever received a blood transfusion	0%	100%
Frequency of receiving blood transfusions	0%	100%
Keeping a cat	12%	88%
Consuming unwashed fruits and vegetables	0%	100%
Consuming raw meat	8%	92%
Consuming undercooked meat	32%	68%
Consuming unboiled water	0%	100%
Wash your hands before eating	100%	0%
Contact with soil or pets	60%	40%
Home neighborhood has stray cats	96%	4%

Based on Table 2. shows that out of 25 male donors at PMI Kabupaten Magelang, most of them consume undercooked meat (32%), often contact with soil or pets (60%), least consume raw meat (8%), and keep cats (12%). In addition, all respondents had never received a blood transfusion (100%), did not consume unwashed fruits and vegetables (100%), did not consume unboiled water (100%), wash their hands before eating (100%) and there were stray cats in the home environment (96%). Although the data on risk factors for toxoplasmosis showed that the respondents' home environment had stray cats (96%), respondents had contact with soil or pets (60%), respondents consumed undercooked meat (32%), consumed raw meat (8%) and respondents kept cats (12%). These factors can be prevented by improving hygiene and sanitation. In this study most respondents had improved hygiene and sanitation such as washing hands before eating (100%), respondents did not consume unfiltered water (100%), did not consume undercooked meat (68%), did not consume raw meat (92%), did not consume unwashed fruits and vegetables (100%), respondents did not keep cats (88%) and 25 respondents never received blood transfusions (100%). These factors can prevent the transmission of toxoplasmosis. The results of the toxoplasmosis examination using the Rapid test were related to the health behaviors and habits of the 25 respondents. Respondents whose blood samples tested non-reactive with IgM and IgG antibodies to *Toxoplasma gondii* had clean health behaviors and daily habits, such as not consuming unwashed fruits and vegetables, not consuming water that was not thoroughly cooked, and washing hands before eating. Prevention can be done by cooking meat thoroughly for mutton, beef, and pork. Storing meat in the freezer at a low temperature can also prevent Toxoplasmosis, although not as well as proper heating. Until now, the only prevention that can be done is to improve hygiene and sanitation. Therefore, the 25 male donors at PMI Kabupaten Magelang have been quite good in implementing hygiene and sanitation.

Toxoplasmosis that infected by *Toxoplasma gondii*, can be found everywhere in our environment. Many people can carry this parasite in their bodies but may not realize it

because it has no symptoms. Risk factors of Toxoplasmosis are caused by daily behaviors, namely keeping cats consuming uneaten fruits and vegetables, not washing hands, consuming raw meat, consuming undercooked meat, consuming unboiled water, not washing hands before eating, contact with soil or pets and home environments with stray cats. Receiving blood transfusions is also a risk factor for Toxoplasmosis. Research examining Toxoplasmosis in male donors at PMI Kabupaten Magelang uses the Rapid Diagnostic Test method by dripping serum or plasma samples from male donors into the Rapid Test tool by adding buffer from the Rapid Test tool. Detection of Toxoplasmosis in donor blood is one of the early detection efforts in protecting blood products, especially aimed at preventing transmission of Toxoplasmosis through blood transfusion. Toxoplasmosis infection in the community is generally asymptomatic so it is often not a serious concern. Toxoplasmosis has not been the focus of blood transfusion-transmitted infection screening tests to date.

4 Conclusion

Based on results of this research, there was no blood samples from male donors were detected reactive with *Toxoplasma gondii* antibodies at PMI Kabupaten Magelang. The results of toxoplasmosis examination conducted on 25 samples showed that 100% samples were not reactive with IgM and IgG *Toxoplasma gondii* antibodies at PMI Kabupaten Magelang. Prevention that can be done is by improving hygiene and sanitation. In this study, 25 male donors at PMI Kabupaten Magelang have been quite good in implementing hygiene and sanitation.

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