



Overview of Worm Infections and Hemoglobin Levels in Children Living in TPA (Final Waste Disposal Site) Tamangapa Makassar, Indonesia

Ka'bah^{1*}, Risma Yuliana¹

¹Diploma of Medical Laboratory Technology Study Program, Faculty of Health Technology, Universitas Megarezky, Makassar, Indonesia

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*Corresponding author:

Ka'bah

E-mail address:

kabah.paharu@gmail.com

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ABSTRACT

Introduction: Children who live around TPA Tamangapa often play and do activities around the TPA. This can increase their risk of being exposed to worm eggs or larvae in the garbage. Lack of public knowledge and awareness about the dangers of worm infections. Hemoglobin (Hb) levels are an indicator of a child's nutritional status. This study aims to present an overview of worm infections and hemoglobin levels in children living in TPA (final waste disposal site) Tamangapa Makassar, Indonesia. **Methods:** This study is a descriptive observational research. This study uses primary data from observations of research subjects. A total of 10 research subjects participated in this study. **Results:** The results of microscopic examination of fecal samples showed that 6 were positive for worm infections and 4 were negative for worm infections. The positive results were found to be intestinal nematodes, namely *Ascaris lumbricoides* and *Tricuris trichiura*. Examination of hemoglobin levels in blood samples with the results obtained were normal in all samples. **Conclusion:** The majority of subjects experienced worm infections with the worm species found being *A. lumbricoides* and *T. trichiura*. All samples showed blood hemoglobin levels within normal limits.

1. Introduction

The prevalence of worm infections in elementary school children in Indonesia varies, ranging from 15.5% to 48.32%. This figure shows that worm infections are still a serious public health problem in Indonesia. Worm infections can be caused by various types of worms, such as roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and hookworms (*Necator americanus* and *Ancylostoma duodenale*). These worms can enter the human body through the mouth, usually when eating food or drink contaminated with worm eggs or larvae. Worm infections can cause various symptoms, such as nausea, vomiting, diarrhea, abdominal pain, and

weight loss. In severe cases, worm infections can cause anemia, malnutrition, and impaired growth and development.¹⁻⁴

TPA Tamangapa is one of the largest landfills in Makassar. Waste disposed of in this landfill comes from various sources, including households, industry, and markets. The garbage that accumulates in landfills can become a breeding ground for various types of worms, including roundworms, whipworms, and hookworms. Children who live around TPA Tamangapa often play and do activities around the TPA. This can increase their risk of being exposed to worm eggs or larvae in the garbage. Lack of public knowledge and awareness about the dangers of worm

infections. There are still many people, including parents, who do not understand the dangers of worm infections. This can hamper efforts to prevent worm infections.⁵⁻⁸

Hemoglobin (Hb) levels are an indicator of a child's nutritional status. Hb is a protein that contains iron and functions to carry oxygen throughout the body. Low Hb levels can cause anemia, which can hinder a child's growth and development.^{9,10} This study aims to present an overview of worm infections and hemoglobin levels in children living in TPA (final waste disposal site) Tamangapa Makassar, Indonesia.

2. Methods

This study is a descriptive observational research. This study uses primary data from observations of research subjects. A total of 10 research subjects participated in this study, and the research subjects met the inclusion criteria. The inclusion criteria in this study were children aged 5-10 years in the TPA Tamangapa area, Makassar, Indonesia, who were willing to participate in this study, which was marked by signing informed consent. The sampling process was carried out by consecutive sampling in the period 16 August – 5 September 2022. This study has received approval from the medical and health research ethics committee of Universitas Megarezky, Makassar.

This study observed the presence of worm eggs and the hemoglobin levels of research subjects. Worm egg

examination is carried out using the Kato Katz method. On a clean glass object, free of dust/grease, using an applicator, insert the stool sample into the hole in the cardboard pattern until it is full, then lift the cardboard so that the stool sample remains on the glass object as much as it fills the hole in the cardboard. Cover the bench with the prepared plastic sheet. Gently press the cellophane with a rubber holder/small bottle until the stool underneath is evenly distributed under the plastic. Drain the excess solution by slowly placing the slide on filter paper/cloth while pressing gently to absorb the remaining liquid, then come back. Let stand for 15 minutes at room temperature. The preparations are ready to be examined under a microscope with an objective magnification of 10x. Count the number of worm eggs in the preparation. The examination of hemoglobin levels is carried out using a hematology analyzer. Data analysis was carried out univariately in the form of data frequency distribution.

3. Results and Discussion

The characteristics of Table 1, regarding the characteristics of the research subjects, illustrate the average age distribution of children at the TPA Tamangapa, Makassar. Where 8-year-olds are 3 people with a percentage of 30%, 9-year-olds are 2 people with a percentage of 20%, and 10-year-olds are 5 people with a percentage of 50%.

Table 1. Subject characteristics based on age.

No.	Age	Number of samples	Percentage (%)
1.	8 years	3	30%
2.	9 years	2	20%
3.	10 Years	5	50%
		Total	100%

Table 2 shows the results of the microscopic examination method Kato Katz, which used 10 stool samples from children at the TPA Tamangapa, Makassar. The results obtained were that 6 positive

samples were found STH (soil-transmitted helminth) type *Ascaris lumbricoides* and *Trichuris trichiura*, and 4 samples were negative.

Table 2. Results of microscopic examination method Kato Katz by using feces samples.

No.	Respondent code	Age	Gender	Results	Type of STH obtained
1.	JT	9 years	Female	Positive	<i>Ascaris lumbricoides</i>
2.	AN	10 years	Female	Positive	<i>Ascaris lumbricoides</i>
3.	SC	10 years	Female	Positive	<i>Trichuris trichiura</i>
4.	EB	10 years	Male	Positive	<i>Ascaris lumbricoides</i>
5.	FT	10 years	Male	Positive	<i>Ascaris lumbricoides</i>
6.	FH	10 years	Male	Positive	<i>Ascaris lumbricoides</i>

Table 3 shows the results of the hemoglobin examination using a hematology analyzer. Where using 6 blood samples of children at the TPA Tamangapa Makassar and the results obtained in sample 1 (JT) were 12.8 g / dl, sample 2 (AN) obtained

results of 13.1 g / dl, sample 3 (SC) obtained results of 12.7 g / dl, sample 4 (EM) obtained results of 12.9 g / dl, sample 5 (FT) obtained results of 13.2 g / dl, and sample 6 (FH) obtained results of 11.7 g / dl.

Table 3. Hemoglobin test results using a hematology analyzer.

No.	Respondent code	Age	Gender	Results	Information
1.	JT	9 years	Female	12.8 g/dl	Normal
2.	AN	10 years	Female	13.1 g/dl	Normal
3.	SC	10 years	Female	12.7 g/dl	Normal
4.	EM	10 years	Male	12.9 g/dl	Normal
5.	FT	10 years	Male	13.2 g/dl	Normal
6.	FH	10 years	Male	11.7 g/dl	Normal

The results of this study are different from other studies in that the hemoglobin level found in children infected with worms was 9.4 g/dl, as in other studies, the results obtained in children infected with worms were an average hemoglobin level of 9.7 g/dl.¹¹⁻¹⁴ This is not in accordance with research, which shows that children infected with worms have no relationship to hemoglobin levels because the overall results were normal according to the normal value, namely 11 g/dl - 15 g/dl. One of the causes of normal results could be because children infected with worms are still in the early stages of infection; in the small intestine, the larvae turn into adult worms until they lay eggs, which takes approximately 2-3 months.¹⁵⁻²⁰

4. Conclusion

The results of microscopic examination of fecal samples showed that 6 were positive for worm infections and 4 were negative for worm infections. The positive results were found to be intestinal nematodes, namely *Ascaris lumbricoides* and *Tricuris trichiura*.

Examination of hemoglobin levels in blood samples with the results obtained were normal in all samples.

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