

RESEARCH ARTICLE

# Association of Knowledge, Behavior, and Environmental Sanitation with Helminthiasis among Children Aged 7–9 Years in Namo Sialang Village, 2024

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## ABSTRACT

**Background:** Intestinal worms are diseases caused by infections from worms that reside in the soil. Children's understanding of personal hygiene is crucial, as good knowledge about intestinal worms can promote preventive actions. The high prevalence of worm infections is influenced by factors affecting the life cycle of these worms, such as poor environmental sanitation, inadequate personal hygiene, and the socioeconomic conditions of the community.

**Objective:** This study aims to identify the relationship between knowledge of intestinal worms, behavior, and environmental hygiene among children aged 7-9 years in Namo Sialang Village in 2024.

**Method:** This research is a correlational study with a cross-sectional design.

**Result:** The study involving 49 samples revealed a significant relationship between knowledge and the prevalence of worm infections ( $p = 0.003$ ), as well as between behavior and worm infection occurrence ( $p = 0.002$ ). Environmental sanitation also showed a significant correlation with worm infections ( $p = 0.010$ ).

**Conclusion:** This conclusion indicates a significant relationship between knowledge, behavior, and environmental sanitation with the occurrence of intestinal worms. In terms of distribution, the level of knowledge influences the prevalence of worm infections.

**Keywords:** Intestinal worms, knowledge level, behavior, environmental sanitati

## **INTRODUCTION**

Worm infection is a disease caused by worms entering the human body, usually through the soil. A person is considered infected with worms if worm eggs are found in a stool sample analyzed in a laboratory. Worms transmitted through soil are called soil-transmitted helminths (STH) and reproduce in the intestines. Some common types of worms that infect humans include roundworms, hookworms, and whipworms.<sup>1</sup>

Worm infections are the most common diseases worldwide, according to the World Health Organization (WHO), and are transmitted through soil. Approximately 1.5 billion people, or about 24% of the global population, are infected. The highest prevalence rates are found in sub-Saharan Africa, China, South America, and Asia, where more than 260 million preschool-aged children and 654 million school-aged children are affected. In Indonesia, the prevalence of helminthiasis remains very high, particularly among low-income communities with inadequate sanitation. Infection rates range from 2.5% to 62% in Indonesia, making it an ongoing public health challenge.<sup>2</sup> In North Sumatra Province, the prevalence of soil-transmitted helminthiasis reaches 22.50%, according to a survey conducted by the North Sumatra Provincial Health Office. The highest prevalence rates are found among toddlers and elementary school children.<sup>3</sup>

Indonesia is a developing country that still faces various health issues, including soil-

transmitted helminth infections. Helminthiasis is a common infectious disease in tropical regions. Indonesia's tropical climate, with warm temperatures and high humidity, fosters the occurrence of helminth infections. Children infected with worms may have difficulty concentrating while studying and experience growth and developmental delays, which impact their ability to keep up with school lessons.<sup>4</sup>

In children, soil-transmitted helminth infections are common because they frequently come into contact with soil at that age. Children with mild worm infections usually show no symptoms, but more severe infections can cause various problems, such as intestinal disorders, malaise, and cognitive and physical developmental delays, including anemia. Worm infections are highly detrimental to the health of growing children. One of the most common consequences of worm infections is anemia.<sup>5</sup>

Education is closely linked to knowledge. Higher education can enhance an individual's ability to absorb information, leading to a broader understanding and awareness of this disease. Children's knowledge also influences personal hygiene; thus, a good understanding of parasitic infections will encourage them to adopt effective attitudes and behaviors for prevention.<sup>6</sup>

The high prevalence of parasitic infections is caused by various conditions that affect the life cycle of parasites, such as an unclean environment, poor personal hygiene, and poor socioeconomic conditions. Sanitation is an effort to control physical factors in the

environment that impact human health, particularly those that affect and endanger physical development and health.<sup>7</sup>

### RESEARCH MATERIALS AND METHODS

This study is a cross-sectional correlational study aimed at exploring the relationship between levels of knowledge, behavior, and environmental sanitation as independent variables, and intestinal parasitic infections in children as the dependent variable.

The study population included all children aged 7–9 years in Namo Sialang Village, totaling 96 children, based on inclusion and exclusion criteria.

The sample size was determined using the Slovin formula based on a total population of 96 children, resulting in a total of 49 children. The sampling method used was random sampling.

The instrument used in this study was a questionnaire consisting of 10 questions. A total of 49 valid responses were collected, which will be analyzed using the SPSS (Statistical Product and Service Solutions) data analysis software, through univariate and bivariate analyses.

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### RESEARCH RESULTS

Table 4.1 frequency Distribution by Gender

Gender	Distribution	Frequency (%)
Male	25	51.0
Female	24	49.0
<b>Total</b>	<b>49</b>	<b>100</b>

Based on Table 4.1, there are 25 men (51.0%) and 24 women (49.0%).

Table 4.2 Frequency Distribution by Age

Age	Distribution	Frequency (%)
7	15	30.6
8	19	38.8
9	15	30.6
<b>Total</b>	<b>49</b>	<b>100.0</b>

Based on Table 4.2, the age distribution shows that there are 15 children aged 7 years (30.6%), 19 children aged 8 years (38.8%), and 15 children aged 9 years (30.6%).

Table 4.3 Frequency Distribution Based on Knowledge Level

Level of Knowledge	Distribution	Frequency (%)
Good	11	22.4
Poor	38	77.6
<b>Total</b>	<b>49</b>	<b>100</b>

Based on Table 4.3, there are 11 people with a good level of knowledge (22.4%) and 38 people with a poor level of knowledge (77.6%).

Table 4.4 Frequency Distribution Based on Behavior

Behavior	Distribution	Frequency (%)
Good	13	26.5
Poor	36	73.5
<b>Total</b>	<b>49</b>	<b>100</b>

Based on Table 4.4, there were 13 people with good behavior (26.5%) and 36 people with poor behavior (73.5%).

Table 4.5 Frequency Distribution Based on Environmental Sanitation

Environmental Sanitation	Distribution	Frequency (%)
Meets Requirements	15	30.6
Not Eligible	34	69.4
<b>Total</b>	<b>49</b>	<b>100</b>

Based on Table 4.5, there were 15 people with adequate environmental sanitation (30.6%) and 34 people with inadequate environmental sanitation (69.4%).

Table 4.6 Frequency Distribution Based on Parasitic Infection Incidence

Incidence of Worm Infection	Distribution	Frequency (%)
Ever Had Worm Infection	33	67.3
Never Had Worms	16	32.7
<b>Total</b>	<b>49</b>	<b>100</b>

Ever Had Worm Infection	33	67.3
Never Had Worms	16	32.7
<b>Total</b>	<b>49</b>	<b>100</b>

Based on Table 4.6, 33 respondents have had intestinal worms (67.3%) and 16 respondents have never had intestinal worms (32.7%).

Table 4.7 Relationship Between Knowledge Level and Parasitic Infection

Level of Knowledge	Incidence of Worm Infection		2-sided Sig
	Ever Had Worms	Never Had Worms	
Good	3	8	<b>0.003</b>
Poor	30	8	
<b>Total</b>	<b>33</b>	<b>16</b>	

Based on Fisher's Exact test, a p-value of 0.003 ( $p < 0.05$ ) was obtained, indicating a significant relationship between the two variables. Thus, it can be concluded that there is a relationship between knowledge level and the incidence of parasitic infections.

Table 4.8 Relationship Between Behavior and Intestinal Parasites

	Incidence of Intestinal Parasites	Sig- 2-
Good	3	8
Poor	30	8
<b>Total</b>	<b>33</b>	<b>16</b>

Behavior	Ever Had Worms	Never Had Worms	sided
Good	4	9	<b>0.002</b>
Poor	29	7	
<b>Total</b>	<b>33</b>	<b>16</b>	

Based on Fisher’s Exact test, a p-value of 0.002 ( $p < 0.05$ ) was obtained, indicating a significant relationship between the two variables. Thus, it can be concluded that there is a relationship between behavior and the incidence of intestinal parasitic infections.

Table 4.9 Relationship Between Environmental Sanitation and Parasitic Infections

Environmental Sanitation	Incidence of Intestinal Parasites		Sig-2-sided
	Ever Had Worm Infection	Never Had Worm Infection	
Meets Requirements	6	9	<b>0.010</b>
Not Eligible	27	7	
<b>Total</b>	<b>33</b>	<b>16</b>	

Based on Fisher’s Exact test, a p-value of 0.010 ( $p < 0.05$ ) was obtained, indicating a significant relationship between the two variables. Thus, it can be concluded that there is a relationship between environmental sanitation and the incidence of intestinal parasitic infections.

## DISCUSSION

Knowledge is the result of a cognitive process that occurs when a person — including elementary school-aged children — observes a specific object. The more information obtained, the broader the knowledge possessed. Knowledge is not only acquired through formal education but also through non-formal education. A low level of knowledge can influence a person’s daily actions. Therefore, having good knowledge is crucial in shaping behavior, and adequate knowledge can help reduce the risk of parasitic infections.<sup>8</sup>

Personal hygiene behaviors, such as washing hands with soap, wearing footwear, and practicing good sanitation, have a significant association with the incidence of intestinal parasitic infections. Several studies in Indonesia consistently demonstrate this correlation. For example, a study in Jember Regency, East Java, found that handwashing behavior and the use of clean toilets were significantly associated with low rates of parasitic infections among elementary school children.<sup>9</sup> Another study showed that health education programs that improve hygiene behaviors can effectively reduce the prevalence of parasitic infections in children.<sup>10</sup>

Environmental sanitation can be defined as efforts to improve and maintain environmental conditions essential for human well-being. This includes the

provision of clean and safe water, the efficient management of waste from humans, animals, and industry, and the protection of food from biological and chemical contamination. Additionally, having clean air and safe housing is also crucial. Environmental sanitation conditions are closely linked to helminth infections in elementary school children, as inadequate sanitation can serve as a source of helminth transmission into the human body.<sup>7</sup>

## CONCLUSION

Based on the results obtained from the study on the Relationship Between Knowledge Level, Behavior, and Environmental Sanitation Regarding Worm Infection in Children Aged 7–9 Years in Namo Sialang Village in 2024, the following conclusions can be drawn:

1. The majority of respondents with poor knowledge levels numbered 38 people (77.6%). Based on Fisher's Exact test, there is a relationship between knowledge levels and the incidence of parasitic infections with a p-value of 0.003 ( $p < 0.05$ ).
2. The frequency distribution showed that the majority of respondents with poor behavior numbered 36 people (73.5%). Based on Fisher's Exact test, there was a significant association between

behavior and the incidence of intestinal parasitic infections with a p-value of 0.002 ( $p < 0.05$ ).

3. The majority of respondents with substandard environmental sanitation were 34 people (69.4%). Based on Fisher's Exact test, there was an association between environmental sanitation and the incidence of helminthiasis with a p-value of 0.010 ( $p < 0.05$ ).

## RECOMMENDATIONS

1. For Future Researchers

Future researchers are encouraged to conduct studies in different locations and to include additional variables related to parasitic infections. Additionally, supportive examinations should be performed to confirm the diagnosis of the specific type of parasitic infection.

2. For the Community

It is hoped that this study will serve as a means of educating the public about the factors that cause parasitic worm infections.

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