

RELATIONSHIP BETWEEN PERSONAL HYGIENE AND ASCARIS LUMBRICOIDES INFECTION

ABSTRACT

Background and Objective: Soil-transmitted helminth (STH) infections are diseases caused by parasitic worms, including *Ascaris lumbricoides*, transmitted through contaminated soil. In Indonesia, STH infection is a significant public health issue, with prevalence rates ranging from 45% to 65%, and up to 80% in areas with poor sanitation. Understanding factors such as personal hygiene is crucial for designing effective prevention strategies. This study aims to investigate the association between personal hygiene and *Ascaris lumbricoides* infection. **Method:** A quantitative descriptive approach was used with secondary data analysis from a public dataset on personal hygiene and *Ascaris lumbricoides* infection, comprising 80 data points and 5 variables. Univariate analysis was performed using frequency distribution, and bivariate analysis was conducted using the Mann-Whitney test to assess the relationship between personal hygiene and *Ascaris lumbricoides* infection. **Results:** The study found a significant association between personal hygiene and *Ascaris lumbricoides* infection. The Mann-Whitney test results showed a significance value of 0.031, indicating a significant difference between individuals with good and poor hygiene in relation to the level of worm infection. **Conclusion:** Personal hygiene is significantly associated with *Ascaris lumbricoides* infection. Improving personal hygiene can help reduce the prevalence of STH infections, particularly in areas with high infection rates.

Keywords :*Ascaris lumbricoides*, Soil-transmitted helminths (STH), Personal hygiene, Public health

1. INTRODUCTION

Worm infection is a disease caused by worm parasites then transmitted through soil media in other words STH (*Soil Transmitted Helminths*). [1]One of the worms that cause it is *Ascaris lumbricoides*. *Ascaris lumbricoides* worms are classified as STH worms that can infect humans through direct contact with worm eggs that live in moist and warm soil. [2]Helminthiasis is a health problem that arises in communities in both tropical and subtropical regions, but the treatment of helminthiasis is still lacking attention. Helminthiasis does not cause sudden outbreaks, but it can slowly jeopardize human health such as decreased intelligence, permanent disability, and death.[3]

Worm infections are still a global challenge today. The World Health Organization (WHO) states that 24% of the world's population is infected with STH which spreads in subtropical and tropical regions.[4]The number of confirmed STH helminthiasis in 2015 was 711,000,000 (150 million early childhood and 561 million school-age children). In Indonesia, a tropical country, STH infection is a health problem with a prevalence of 45% - 65%. The prevalence is even found to be 80% in areas with poor

sanitation.[5]

Factors that can influence the high incidence of worm infections include poor personal hygiene behaviors and inadequate sanitation. Personal hygiene behaviors include washing hands with soap before eating, cleaning and trimming nails regularly, and washing hands with soap after defecation. Good personal hygiene reflects a healthy environment and lifestyle.[6][7] A study confirmed that 23.3% of poor personal hygiene allowed the presence of *Ascaris lumbricoides* worm eggs in fishermen's nail specimens. Another study also indicated that personal hygiene is related to helminthiasis in garbage collectors in the BLH Yogyakarta area. [8]Personal hygiene habits, such as washing hands, can lead to the entry of eggs or larvae into the body, either with or without food intermediaries, if the eggs or larvae are attached to nails and hands. Therefore, the aim of this study is to determine whether personal hygiene is related to *Ascaris lumbricoides* worm infection.[9]The objective of this study is to determine whether personal hygiene is associated with *Ascaris lumbricoides* worm infection.

2. RESEARCH METHODS

The procedure used a quantitative descriptive study of secondary data, namely public datasets regarding the relationship between personal hygiene and *Ascaris lumbricoides* worm infection sourced from[10] . The dataset consists of 80 data items and has 5 variables, namely personal hygiene variables including washing hands before and after eating, bathing habits per day, eating habits using hands and *Ascaris lumbricoides* worm detection variables.[11]The analysis applied in the study was univariate and bivariate analysis. In univariate analysis displayed with frequency distribution, bivariate analysis used *Mann-Whitney*test.

Data Collection Method:

a) **Secondary Data Collection:** The data used in this study were obtained from an existing public dataset, meaning the data was not directly collected by the researchers but instead sourced from external entities that had previously gathered information related to personal hygiene and *Ascaris lumbricoides* infection. This dataset may have been obtained from health institutions, government organizations, or relevant previous research projects.

b) **Types of Data Collected:** The collected data includes variables related to personal hygiene (e.g., handwashing habits, bathing habits, eating with hands) and the prevalence of *Ascaris lumbricoides* infection in the studied population. This dataset provides an overview of the relationship between personal hygiene factors and the likelihood of being infected by this parasitic worm.

Sample Size:

a) **Number of Samples:** The sample size in this study consists of 80 data points. This means the study involved 80 individuals who were analyzed to examine the relationship between personal hygiene and *Ascaris lumbricoides* infection.

b) **Sample Representation:** A sample size of 80 provides a sufficiently representative view for analyzing the relationship between personal hygiene and parasitic infection in a larger population, although a larger sample size would strengthen the conclusions that can be drawn.

Dataset Characteristics:

a) **Variables Considered:** This dataset includes 5 main variables, which consist of demographic factors (gender, education, income, and age) and personal hygiene behaviors (handwashing habits, bathing habits, and eating with hands). Additionally, there is a variable for the detection of *Ascaris lumbricoides* infection.

b) **Data Distribution:** According to Table 1, most participants were female (65%), with a variety of educational levels, the majority having an income below the minimum wage (71.3%), and most were adults (90%). In terms of personal hygiene, a majority of respondents did not wash their hands before eating (70%) or after eating (51.2%). The habit of bathing twice a day was more common among respondents (53.8%), and most respondents did not eat with their hands (77.5%). Only 17.5% were detected as being infected with *Ascaris lumbricoides*.

Statistical Analysis:

This dataset was analyzed using univariate analysis (frequency distribution) and bivariate analysis (Mann-Whitney test). Table 2 shows the relationship between personal hygiene and the detection of *Ascaris lumbricoides* infection, while Table 3 presents the statistical test results that reinforce the conclusion that personal hygiene is significantly associated with this parasitic infection, with a significance value of 0.031 ($p < 0.05$).

3. RESULTS

The statistical results of the 80 data items that have been analyzed univariately can be displayed as follows.

Table 1. Frequency Distribution of Demographic and Hygiene Variables in Relation to *Ascaris lumbricoides* Infection

Variables	Category	F	%
Gender	Male	28	35.0
	Female	52	65.0
Total		80	100.0
Education	Not in school	10	12.5
	Elementary School	18	22.5
	Junior High School	25	31.3
	Senior High School	18	22.5
	Bachelor's Degree	9	11.3
Total		80	100.0
Income	Not yet earning	11	13.8
	Above minimum wage	12	15.0
	Below the minimum wage	57	71.3
Total		80	100.0
Age Category	Teens	8	10.0
	Adults	72	90.0
Total		80	100.0
Wash hands before eating	Yes	24	30.0
	No	56	70.0
Total		80	100.0

Washing hands after eating	Yes	39	48.8
	No	41	51.2
Total		80	100.0
Daily bathing habits	1	17	21.3
	2	43	53.8
	>2	20	25.0
Total		80	100.0
The habit of eating with your hands	Yes	18	22.5
	No	62	77.5
Total		80	100.0
<i>Ascaris lumbricoides</i> worm detected	Yes	14	17.5
	No	66	82.5
Total		80	100.0

Source: Secondary data, 2024

Seen from Table 1. 65% of study participants were female with an education level of 31.3% graduated from junior high school. Respondents in this study mostly have an income below the minimum wage as much as 71.3% with an age dominated by adulthood as much as 90.0%. As for personal hygiene, it consists of several variable items, namely as many as 70.0% of respondents do not wash their hands before eating and 51.2% of respondents do not wash their hands after eating. As many as 53.8% of respondents have the habit of bathing 2 times a day and 77.5% do not have the habit of eating with their hands. Then for the *Ascaris lumbricoides* worm detection variable, 82.5% of respondents did not detect the presence of *Ascaris lumbricoides* worms. While the statistical results of the bivariate analysis are presented as follows.

Table 2. Ranks of *Ascaris lumbricoides* Detection Based on Personal Hygiene

	<i>Ascaris lumbricoides</i> detection	N	Mean Rank	Sum of Ranks
Personal hygiene	Yes	14	28.71	402.00
	No	66	43.00	2838.00
	Total	80		

According to Table 2. the results of the analysis stated that respondents who were not detected with *Ascaris lumbricoides* worm infection had the habit of maintaining personal hygiene as evidenced by the mean rank of 43.00.

Table 3. Statistical Test Results of Mann-Whitney U Test

	Personal hygiene
Mann-Whitney U	297.000
Wilcoxon W	402.000
Z	-2.155
Asymp.Sig (2-tailed)	.031

According to table 3. the results of the study stated the sig value. $0.031 < 0.05$ then the conclusion is drawn between personal hygiene is significantly related to *Ascaris lumbricoides* worm infection.

4. DISCUSSION

This research states that personal hygiene is related to *Ascaris lumbricoides* worm infection. The high and low frequency of worm infection in this study is closely related to the living habits practiced by respondents. The higher the respondent's habit of maintaining personal hygiene, the lower the chance of being infected with *Ascaris lumbricoides* worms. Personal hygiene practices, such as washing hands before eating and after using the toilet, are crucial for preventing *Ascaris lumbricoides* infections. The eggs of this worm can spread through contaminated hands, food, and water, so maintaining proper hygiene can significantly reduce the risk of infection. Individuals with poor hygiene habits are more susceptible to *Ascaris lumbricoides* infections, while those who maintain good hygiene tend to have lower infection rates. Therefore, improving hygiene habits can help reduce the prevalence of these infections. Hygiene habits are influenced by factors such as education, socioeconomic status, access to clean water, and sanitation facilities. A lack of education and inadequate facilities can increase the risk of infection, particularly in areas with limited sanitation infrastructure. There is a need to focus on raising awareness about personal hygiene through health campaigns, as well as improving sanitation facilities to reduce the transmission of *Ascaris lumbricoides* and other parasites within communities [12][13]. Several previous studies have also suggested a relationship between personal hygiene and the presence of hookworm eggs. The number of hookworm eggs found is 2.5 times higher in people with poor personal hygiene [14]. The study is in line with Mulasari et al, that *personal hygiene* is related to worm infections in the BLH Yogyakarta City Work area in garbage collectors [15]. However, this is not in line with previous research which revealed that there was no relationship between the two personal hygiene (especially hand washing variables) with helminthiasis in brick makers [16]. Not in line with Saftarina's research, that in addition to the practice of hand washing, nail clipping, there are other practices such as defecation in latrines and ownership of latrines that are factors related to personal hygiene with the incidence of helminth infection. This study indicates that personal hygiene does play a role in the occurrence of helminthiasis; however, this relationship may vary depending on other factors such as the level of environmental sanitation, public awareness, and the availability of adequate sanitation facilities. Therefore, efforts to prevent worm infections should not be limited to improving personal hygiene alone, but should also be complemented by improvements in sanitation infrastructure and public education on the importance of environmental cleanliness and access to sanitation facilities.

Personal hygiene is strongly associated with *Ascaris lumbricoides* infection. This infection generally occurs when worm eggs found in contaminated soil or surfaces enter the body through hands, food, and even contaminated water. The practice of washing hands before eating with soap and after defecation, keeping nails clean are important steps in preventing the transmission of *Ascaris lumbricoides* worm infection. Worm eggs are easily attached to the hands, especially under the nails. If hands are not cleaned properly, the eggs can be swallowed and cause infection. [17]. This study shows that with poor hygiene behavior, the prevalence of worm infections is much higher. In addition, densely populated environments with poor sanitation can also increase the spread of worm eggs. Under such conditions, not only adults but children are often at high risk as they interact more frequently with the surrounding environment without paying attention to the hygiene of their surroundings [18].

Personal hygiene is strongly associated with *Ascaris lumbricoides* infection, a common parasitic worm infection in humans. This infection typically occurs when worm eggs found in contaminated soil or surfaces enter the body through the hands, food, or even contaminated water. Therefore, practices such as washing hands with soap before eating and after defecation, and keeping nails clean, are crucial steps in preventing the transmission of *Ascaris lumbricoides* infection. Worm eggs are easily attached to the hands,

especially under the nails, where they can persist and eventually be ingested. If hands are not cleaned properly, these eggs can be swallowed, leading to infection. This highlights the importance of personal hygiene education, particularly in promoting proper handwashing habits, as a primary measure in preventing *Ascaris lumbricoides* infection. This study shows that with poor hygiene behavior, the prevalence of worm infections is significantly higher. Moreover, densely populated areas with inadequate sanitation can exacerbate the spread of worm eggs. In such environments, not only adults but also children are at higher risk, as they often interact with their surroundings without considering the cleanliness of their environment. Children, due to their frequent physical interactions with contaminated surfaces and soil, are particularly vulnerable to infection. Additionally, environments with poor sanitation provide an ideal setting for the spread of worm eggs. In such conditions, providing adequate sanitation infrastructure is crucial in reducing the transmission of worm infections. Communities living in areas with poor sanitation, such as lacking proper latrines, are at a higher risk of worm infections due to their constant exposure to contaminated surfaces.

The relationship between personal hygiene and *Ascaris lumbricoides* infection is clear, but it is not solely influenced by hygiene habits. Other factors, such as the level of environmental sanitation, access to clean water, and public awareness, also play a significant role in increasing the risk of infection. Therefore, efforts to reduce worm infections should not only focus on improving personal hygiene but also on enhancing sanitation infrastructure and raising public awareness. Public health campaigns and improvements in sanitation facilities are crucial in preventing the transmission of *Ascaris lumbricoides* and other parasitic infections. By addressing these factors collectively, the prevalence of worm infections can be significantly reduced.

The novelty of this research lies in several key aspects that contribute new insights into the relationship between personal hygiene and *Ascaris lumbricoides* infection:

- a) **Detailed Connection Between Personal Hygiene and Worm Infections:** This study explicitly highlights the importance of personal hygiene, especially the specific practices of handwashing with soap before eating and after defecation, in preventing *Ascaris lumbricoides* infections. While previous studies may have identified this connection, this research emphasizes the role of certain hygiene habits (such as hand and nail cleanliness) in reducing infection risk.
- b) **Consideration of Environmental and Socioeconomic Factors:** This study goes beyond hygiene habits by recognizing that other factors, such as environmental sanitation, access to clean water, and public awareness, play a significant role in increasing the risk of infection. This adds a new dimension to the broader body of research on parasitic infection prevention, incorporating social, economic, and infrastructural factors into the analysis.
- c) **Link Between Personal Hygiene and Sanitation in Densely Populated Areas:** The study highlights how poor sanitation in densely populated areas contributes to the spread of worm eggs. It offers a deeper understanding of how personal hygiene and environmental sanitation interact to influence the prevalence of parasitic infections, especially in children who are more susceptible due to their frequent physical contact with contaminated surfaces and soil.
- d) **Recommendation for a Holistic Approach to Worm Infection Prevention:** Another novel aspect of this study is its recommendation for a more comprehensive approach to preventing worm infections, which includes not only improving personal hygiene but also enhancing sanitation infrastructure and

raising public awareness. This integrated approach to prevention—focusing on both hygiene practices and environmental sanitation—has not been as widely discussed together in previous research.

By emphasizing the interconnectedness of personal hygiene, environmental sanitation, and socioeconomic factors, this research offers a fresh perspective on understanding and reducing the prevalence of *Ascaris lumbricoides* and other parasitic infections.

CONCLUSION:

Ascaris lumbricoides infection is heavily influenced by personal hygiene practices, particularly handwashing with soap and maintaining clean nails. Poor hygiene behavior significantly increases the prevalence of this worm infection. Furthermore, densely populated environments with inadequate sanitation contribute to the spread of worm eggs. Therefore, preventing *Ascaris lumbricoides* infection requires not only improving personal hygiene but also addressing sanitation infrastructure and educating the community about the importance of environmental cleanliness. Collaborative efforts to improve sanitation access and promote hygiene education are essential steps in preventing and controlling worm infections in the community.

CONCLUSIONS

The conclusion of this study is that Personal hygiene is significantly related to *Ascaris lumbricoides* worm infection 0.031. So that when respondents are higher in the habit of maintaining personal hygiene, the lower the level of probability of being infected with *Ascaris lumbricoides* worms.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors hereby state that no generative AI tools such as large language models (ChatGPT, COPILOT, etc.) or text-to-image generators were utilized in the creation or editing of this work.

DATA AVAILABILITY

All relevant data are included in the paper and its supporting information files. This study will assist researchers in identifying critical areas for Relationship Between Personal Hygiene And *Ascaris Lumbricoides* Infection

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