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Personal Hygiene and Soil Transmitted Helminth (STH) Infection in Rice Farmers in East Bulotadaa Village, Gorontalo City

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ABSTRACT

Soil Transmitted Helminth (STH) infections are still a public health problem, especially in occupational groups that have direct contact with the soil such as rice farmers. A humid and muddy rice field environment and a lack of personal hygiene can increase the risk of worms. The purpose of the study was to determine personal hygiene and STH infection in rice farmers in East Bulotadaa Village, Gorontalo City.

Types of quantitative research with a descriptive survey approach. The research sample of 38 rice farmers was selected using the purposive sampling technique. Personal hygiene data and health complaints were obtained through interviews, the identification of worm eggs was carried out through laboratory examination using the flotation method on farmer nail samples.

The results of the personal hygiene research on farmers did not meet the requirements as many as 34 respondents (89.5%). Poor hand washing habits were 27 respondents (71.1%), poor nail cutting habits were 35 respondents (92.1%), and poor use of gloves and footwear were 30 respondents (78.9%). Laboratory examination, 14 respondents (36.8%) were positive for STH worm eggs and 24 respondents (63.2%) were negative. The eggs of the worms found include Ascaris lumbricoides, Trichuris trichiura, and Hookworm. A total of 18 respondents (47.4%) experienced health complaints such as itching of the skin, diarrhea, weakness and easily broken nails.

In conclusion, most rice farmers have poor personal hygiene and STH infection is still found on the farmers' nails. It is recommended to improve personal hygiene by getting used to washing hands with soap, cutting nails, and using personal protective equipment to prevent worms.

INTRODUCTION

Soil Transmitted Helminth (STH) is a group of intestinal nematode worms that infect humans through the fecal-oral route with transmission that occurs through contaminated soil, food or drink, or direct contact with soil (Erikayani *et al.,* 2025). According to Febiani *et al.,* (2024) STH consists of several species of intestinal nematodes, namely *Ascaris lumbricoides*, *Trichuris trichiura*, *Hookworm* consists of two species (*Necator americanus* and *Ancylostoma duodenale*), and *Strongyloides stercoralis*. InSTH feces are still one of the public health problems in various developing countries because they are closely related to poor environmental sanitation, low clean and healthy living behaviors, and high exposure to contaminated soil. If left untreated, STH infection can cause impaired nutritional status, anemia, and decreased work productivity.

World Health Organization (WHO) states that soil-borne worm infections of STH reach more than 1.5 billion infected people or 24% of the world's population (WHO, 2023). In Indonesia, STH infection reaches 8,635 cases in 2022, with Papua and East Nusa Tenggara as the highest-affected areas. By 2025, the national rate of worms will average around 3.3% in children, but in some areas the prevalence could reach more than 10% (Ministry of Health of the Republic of Indonesia, 2025). The high infection rate shows that STH is still a public health problem, especially in groups with high exposure to soil, one of which is farmers.

Farmers are a group of workers who have a high risk of STH infection because Farmer activities that involve direct contact with the soil. Agricultural activities such as planting, hoeing, fertilizing, and harvesting require farmers to be in frequent direct contact with the soil. This condition makes farmers a vulnerable group to

worm infections (Idayani et al., 2021). This condition is further aggravated by predisposing factors in the form of behavior *Hygiene* and inadequate use of personal protective equipment, thereby increasing the vulnerability of farmers to soil-borne worm infections (Gurmassa et al., 2024).

Maintaining personal hygiene and health is an important thing that needs to be applied in daily life as an effort to maintain a healthy degree of health (Prasetya & Jusuf, 2022). Individual hygiene is an individual activity in maintaining and maintaining personal hygiene in improving physical and psychological health. Individual hygiene includes skin, hair, teeth, eyes, ears, hands, feet, and nails or in the sense of the human body as a whole (Maksum & Sahari, 2023). Application *personal hygiene* which is good for preventing the entry of pathogenic microorganisms into the body and reducing the risk of various diseases. One of the impacts of the lack of implementation *personal hygiene* is an increased risk of infectious diseases.

Previous research conducted by (Pasha, 2021) shows the existence of a relationship between *Personal Hygiene* with STH infection. The research was also conducted by (Assagaff, 2023) about the Identification of STH Eggs in Farmers' Nail Dirt in Talaga Kodok Hamlet, Leihitu District, Central Maluku Regency, stated that Work activities without implementation *Personal Hygiene* The habit of not washing hands and feet with soap, ungroomed nails, and not using personal protective equipment, is closely related to the existence of STH worm eggs. However, similar research has never been carried out on rice farmers in East Bulotadaa Village, so that the condition of the *personal hygiene* and the incidence of STH infection in the region is not yet known. Therefore, this study aims to describe *Personal Hygiene* and Infections *Soil Transmitted Helminth* (STH) Rice Farmers in East Bulotadaa Village, Gorontalo City.

RESEARCH METHODS

The research site was carried out in the rice fields of East Bulotadaa Village, Sipatana District, Gorontalo City. This research is a quantitative research with a descriptive survey approach. The research sample amounted to 38 rice farmers who were selected using *the purposive sampling technique*. Personal *hygiene* data and health complaints were obtained through interviews using questionnaires, while the identification of *Soil Transmitted Helminth* (STH) infections was carried out through examination of hand nail samples using the flotation method at the Laboratory of the Department of Public Health, Gorontalo State University. The data were analyzed univariate and presented in the form of frequency and percentage distributions.

RESULTS

Respondent Characteristics

Distribution of Respondents by Age

Based on the results of the research that has been conducted, the distribution of respondents based on age is obtained as follows:

Table 1 Distribution of Respondents by Age

Farmer Age Group (year)		Quantity	
		n	%
Early Adulthood	26-35	6	15,8
Late Adult	36-45	7	18,4
Early Elderly	46-55	9	23,7
Late Elderly	56-65	7	18,4
Manula	>65	8	21,1
Total		38	100
Youngest Age		30	
Oldest Age		63	
Average Age		45	

Source: *Primary Data, 2026*

Based on Table 1, the most farmer age group is the age group of 46-55 years (Early Elderly), which is 9 respondents (23.7%). Meanwhile, the least age group was the age group of 26-35 years (Early Adult), which was 6 respondents (15.8%).

Distribution of Respondents by Gender

Based on the results of the research that has been conducted, the distribution of respondents based on gender is obtained as follows:

Table 2 Distribution of Respondents by Gender

Gender of Farmers	Quantity	
	n	%
Male	38	100
Women	0	0
Total	38	100

Source : *Primary Data, 2026*

Based on table 2 of the distribution of respondents by gender, all respondents were male, namely 38 respondents (100.0%).

Distribution of Respondents by Education

Based on the results of the research that has been conducted, the distribution of respondents based on Education is obtained as follows:

Table 3 Distribution of Respondents by Education

Education	Quantity	
	n	%
SD	22	57,9
SMP	12	31,6
SMA	4	10,5
Total	38	100

Source : *Primary Data, 2026*

Based on table 3 of the distribution of respondents based on the last education, the most had the last elementary education, which was 22 respondents (57.9%), while the least had the last high school education, which was 4 respondents (10.5%).

Distribution of respondents based on length of work as a farmer

Based on the results of the research that has been conducted, the distribution of respondents based on Length of Employment is obtained as follows:

Table 4 Distribution of respondents based on length of work as a farmer

Long Time Working (year)	Quantity	
	n	%
11-14	13	34,2
15-18	9	23,7
19-22	9	23,7
23-26	4	10,5
27-30	2	5,3
31-34	1	2,6
Total	38	100
Shortest Working Time	11	
Longest Working Time	32	
Average Length of Work	18	

Source : *Primary Data, 2026*

Based on Table 4 of the distribution of respondents based on length of work, it is known that the respondents have the most working period of 11–14 years, namely 13 respondents (34.2%), while the respondents have the least working period of 31–34 years, namely as many as 1 respondent (2.6%)**.**

Personal Hygiene **(Habit of washing hands, habit of cutting nails, habit of using socks and footwear) Rice Field Farmer**

Distribution of Respondents Based on Handwashing Habits

Based on the results of the research that has been conducted, the distribution of respondents based on Hand Washing Habits is obtained as follows:

Table 5 Distribution of Respondent Results Based on Handwashing Habits

Hand Washing Habits	Quantity	
	n	%
Good	11	28,9
Less	27	71,1
Total	38	100

Source : *Primary Data, 2026*

Based on table 5 above, it can be seen that of the 38 respondents had a minimum of 27 respondents (71.1%) and the fewest were respondents with good handwashing habits as many as 11 respondents (28.9%).

Distribution of Respondents Based on Nail Cutting Habits

Based on the results of the research that has been conducted, the distribution of respondents based on the Habit of Cutting Their Fingernails is obtained as follows:

Table 6 Distribution of Respondents' Results Based on Nail Clipping Habits

Nail Trimming Habits	Quantity	
	n	%
Good	3	7,9
Less	35	92,1
Total	38	100

Source : *Primary Data, 2026*

Based on table 6 above, it can be seen that of the 38 respondents had a bad habit of cutting their nails, as many as 35 respondents (92.1%) while respondents with good nail cutting habits were 3 respondents (7.9%).

Distribution of Respondents Based on Habit of Using Socks and Footwear

Based on the results of the research that has been conducted, the distribution of respondents based on the Habit of Using Socks and Footwear is as follows:

Table 7 Distribution of Respondent Results Based on the Use of Socks and Footwear

Habits of Using Socks and Footwear	Quantity	
	n	%
Good	8	21,1
Less	30	78,9
Total	38	100

Source : *Primary Data, 2026*

Based on table 7 above, it can be seen that of the 38 respondents had a bad habit of using gloves and footwear, namely 30 respondents (78.9%) while respondents with good footwear were 8 respondents (21.1%).

Distribution of Respondents Based on *Personal Hygiene*

Based on the results of the research that has been conducted, the distribution of respondents based on *the distribution of Personal Hygiene* is obtained as follows:

Table 8 Distribution of Respondents by *Personal Hygiene*

Personal Hygiene	Quantity	
	n	%
Meet	4	10,5
Not Compliant	34	89,5
Total	38	100

Source : *Primary Data, 2026*

Based on table 8 above, it can be seen that of the 38 respondents who had the most unqualified *Personal Hygiene*, namely 34 respondents (89.5%) while respondents with *qualified Personal Hygiene* were 4 respondents (10.5%).

Soil *Transmitted Helminth* (STH) Infection in Rice Farmers

Distribution of Respondents Based on STH Infection in Rice Farmers

Based on the results of the research that has been conducted, the distribution of respondents based on STH Infection in Rice Farmers is as follows:

Table 9 Distribution of Respondents Based on STH Infection in Rice Farmers

STH Infection	Quantity	
	n	%
Positive	14	36,8
Negatives	24	63,2
Total	38	100

Source : *Primary Data, 2026*

Based on table 9 above, it can be seen that of the 38 respondents who were not infected with STH, the most were 24 respondents (63.2%) while the respondents infected with STH were 14 respondents (36.8%). Based on the results of the examination, *Ascaris lumbricoides eggs* were found in 8 respondents, *Trichuris trichiura* eggs in 4 respondents, hookworm eggs in 1 respondent, and mixed infections in the form of *Ascaris lumbricoides* eggs and *Trichuris trichiura* in 1 respondent.

Health Complaints Felt by Rice Farmers

Distribution of Respondents Based on Health Complaints in Farmers

Based on the results of the research that has been carried out, the distribution of respondents based on Health Complaints is obtained as follows:

Table 10 Distribution of Respondent Results Based on Health Complaints

Health Complaints	Quantity	
	n	%
No Complaints	20	52,6
There are complaints	18	47,4
Total	38	100

Source : Primary Data, 2026

Based on table 10 above, it can be seen that of the 38 respondents, the most did not have health complaints, namely 20 respondents (52.6%) while respondents who had health complaints were 18 respondents (47.4%). Based on the data of respondents' health complaints, there was 1 respondent who experienced itching on the skin only, 1 respondent had diarrhea only, and 1 respondent only experienced abdominal pain. In addition, there were 4 respondents who experienced itching on the skin and diarrhea, 2 respondents experienced diarrhea and abdominal pain, 2 respondents experienced itching on the skin and nails that are easily brittle, and 1 respondent experienced diarrhea and brittle nails. Furthermore, there were 1 respondent who experienced itching on the skin and abdominal pain, 2 respondents experienced itching on the skin, abdominal pain, and brittle nails, 1 respondent experienced itching on the skin, diarrhea, and abdominal pain, 1 respondent experienced itching on the skin, diarrhea, and the body felt weak, and 1 respondent experienced itching on the skin, diarrhea, and brittle nails.

DISCUSSION

***Personal Hygiene* (habit of washing hands, habit of cutting nails, habit of using gloves and footwear) in rice field farmers**

Based on the results of the study, as many as 34 respondents (89.5%) had *ineligible personal hygiene* . These findings show that there are still farmers who have not implemented proper personal hygiene, such as poor hand washing habits, unkempt nails, and not using personal protective equipment such as footwear and gloves when working in the rice fields.

The activities of farmers who are in direct contact with soil and rice field mud every day cause *Personal Hygiene* is an important factor in the prevention of STH infection. Soil contaminated with worm eggs can be a source of transmission if farmers do not maintain the cleanliness of hands, nails, or feet after work. In this context, poor sanitation can worsen health conditions because it has a direct impact on the increased risk of infection and disease (Suardi et al., 2025).

The high proportion of *Personal Hygiene* who do not meet the requirements is influenced by the characteristics of the respondents, who are all male, namely 38 respondents (100%). Based on the results of direct observation, men have lower attention to personal hygiene than women, so they pay less attention to the habit of washing hands, nail hygiene, and the use of footwear and socks. The results of this study are in line with research (Baidowi et al., 2019 which states that male farmers have a higher risk of experiencing health problems related to

personal hygiene because they pay less attention to *personal hygiene* practices than female workers.

This condition is also influenced by the level of education, the most respondents are the last level of education in elementary school (SD), which is 22 respondents (57.9%). This finding is in accordance with the results of direct observation, most have an elementary education level. The level of education plays a role in shaping a person's knowledge and awareness of the importance of clean and healthy living behaviors. Low levels of education can lead to limited understanding of how to maintain proper personal hygiene, These results are in line with research (Zunaidah, 2023) which explains that education is one of the factors that affect health knowledge. Individuals with low levels of education tend to have a more limited understanding of clean and healthy living behaviors, including proper handwashing habits.

Poor personal hygiene can also be influenced by the length of time respondents work as rice farmers. All respondents have worked for more than 10 years as farmers. Agricultural activities that are carried out regularly cause farmers to have a high frequency of contact with soil and rice field mud. If not balanced with the habit of maintaining good personal hygiene, this condition can increase the risk of exposure to *Soil Transmitted Helminths* (STH) worm eggs. The results of this study are supported by Saftarina et al. (2020) who stated that the more often and for longer a person comes into contact with contaminated soil, the greater the chance of being exposed to STH worm eggs.

Hand Washing Habits

Based on the results of the study, as many as 27 respondents (71.1%) had poor hand washing habits, namely. This condition shows that most rice farmers still do not apply the habit of washing their hands using soap after working in the rice fields or before eating. From the results of direct observation and interviews, the habit of washing hands that is still lacking in rice field farmers is caused by work activities carried out every day in the rice field area. Respondents considered washing their hands without soap to be enough to clean their hands after work. Even though hands that are in direct contact with soil and mud can be a medium for attaching feces and worm eggs.

Washinghandsis one of the practices of personal hygiene (*personal hygiene*) which is very important to prevent various diseases (Nakoe et al., 2025). According to Prasetya & Jusuf, (2022) The application of this practice through Hand Washing with Soap (CTPS) is one of the simple, easy, cheap, and effective efforts in preventing various diseases because it can reduce the transfer of germs from hands to the body. For rice farmers, the application of CTPS after work and before eating is important considering the high frequency of contact with soil and mud during agricultural activities.

The results of this study are in line with the research conducted by (Prabandari et al., 2023) which states that poor hand washing habits can increase the risk of STH infection due to the entry of worm eggs through contaminated hands.

Habit of Cutting Nails in Rice Farmers

Based on the results of the study, as many as 35 respondents (92.1%) had poor nail clipping habits. This condition can be seen from the fact that there are still farmers with long and unclean nails when taking nail samples. From the results of observation and direct interviews, it was found that farmers with long, dirty and poorly maintained nails were found when sampling was carried out. This condition is caused by work activities that are often in direct contact with soil and rice field mud. In addition, the respondents have worked as farmers for a long time so that exposure to the soil occurs continuously while working in the rice fields.

Nail care is one of the important aspects of nail care. *personal hygiene*. According to Maksum & Sahari, (2023) Nail care is carried out by maintaining cleanliness and cutting the fingernails and toes regularly to keep them short and clean. Long and dirty nails can be a place for worm eggs and other microorganisms that come from the soil to attach. Dirt that sticks to the nails can be difficult to clean if the respondent does not regularly cut the nails. If contaminated hands are used to eat without washing hands first, the worm eggs can enter the body through contaminated food (Idayani & Putri, 2023).

The results of this study are in line with the research conducted by (Ryzka Puput Yunisyar et al., 2024) which states that poor nail hygiene can increase the risk of STH infection. The study found the presence of worm eggs on the nails of respondents who rarely cut their nails regularly.

The Habit of Using Gloves and Footwear in Rice Field Farmers

Based on the results of the study, as many as 30 respondents (78.9%) had poor habits of using socks and footwear. This condition shows that rice farmers still do not use personal protective equipment regularly when working in rice fields. From the results of observations and interviews conducted with farmers, the use of gloves and footwear is considered uncomfortable and can hinder work activities in muddy rice fields. This condition causes farmers to make more frequent direct contact with soil and mud while working in the rice fields. Unprotected hands and feet make it easier for eggs and worm larvae to stick to the respondent's skin while working. In addition, the low use of personal protective equipment is influenced by farmers' work habits that have been carried out for generations so that the use of personal protective equipment has not been the main concern when working in the rice fields.

The use of gloves and footwear is one form of application *personal hygiene* which functions to protect hands and feet from direct contact with soil or mud while working in the rice fields. The use of personal protective equipment is expected to reduce exposure to disease-causing agents in the work environment. Lack of use of personal protective equipment can increase the risk of exposure to eggs and larvae of STH worms found in contaminated soil. Worm larvae can enter through the skin of the legs, while worm eggs can enter the body through dirty hands (Renyaan, 2020).

The results of this study are in line with the research conducted by (Hafidz et al., 2023) which states that farmers who do not use personal protective equipment have a higher risk of developing worm infections than farmers who use personal protective equipment while working. The study showed that the use of footwear and gloves can help reduce exposure to worm eggs from contaminated soil.

STH Infection in Rice Farmers

Based on the results of the study, 14 respondents (36.8%) were positive for STH infection, while 24 respondents (63.2%) did not find worm eggs on their nails. Most eggs *Ascaris lumbricoides* is the type that is found, followed by *Trichuris trichiura*, *hookworm*, as well as mixed infections *Ascaris lumbricoides* and *Trichuris trichiura*. This is because the egg *Ascaris lumbricoides* has thick walls so it is more resistant to environmental conditions and able to last longer in moist soil (Ishak, 2019).

Long and unclean nails can be a place for dirt, worm eggs, and other microorganisms to accumulate. If farmers do not wash their hands with soap after work or before eating and do not regularly cut and clean their nails, then worm eggs attached to hands and nails can enter the body through contaminated food or hands (Saftarina et al., 2023).

The results of this study are in line with the research (Erikayani et al., 2025) mentioned that workers who are often in direct contact with soil have a higher risk of developing worm infections if *Personal Hygiene* not well implemented. The use of personal protective equipment such as gloves and the habit of washing hands using soap are important factors in the prevention of STH infection.

Complaints of Rice Field Farmers' Health

Based on the results of the study, it was known that as many as 18 respondents (47.4%) experienced health complaints, while 20 respondents (52.6%) did not experience health complaints. Reported complaints include itching of the skin, diarrhea, abdominal pain, brittle nails, and the body feels weak. Based on the results of observations and interviews, the complaints are allegedly related to the activities of farmers who often come into direct contact with the soil and mud of rice fields and the low implementation *of personal hygiene* and the use of personal protective equipment. These conditions can increase the risk of exposure to eggs and larvae *of Soil Transmitted Helminths* (STH) (Prabandari et al., 2023).

However, the results of the study showed that not all health complaints experienced by respondents were related to STH infection. This can be seen from the number of respondents who experienced more health complaints than respondents who were positive for STH infection. These findings are supported by research by Auliya et al. (2023) which states that *Soil Transmitted Helminths* infection in farmers is not always accompanied by obvious clinical symptoms, especially in mild infections.

In this study, there were 4 respondents who reported health complaints even though the results of the nail examination did not show the presence of STH worm eggs. Based on the results of the interview, two respondents had a history of stomach ulcers and often ate late while working in the rice fields, so it was suspected to be the cause of stomach pain complaints. Meanwhile, two other respondents complained that their bodies felt weak due to heavy work activities because in addition to working as rice farmers, they also had other jobs to increase their income. These findings suggest that health complaints in farmers are not necessarily caused by STH infections, but can also be affected by health conditions and occupational factors.

CONCLUSION

Based on the results of the study, *the Personal Hygiene* of rice field farmers did not meet the requirements, namely 34 respondents (89.5%), which included poor hand washing habits as many as 27 respondents (71.1%), poor nail cutting habits as many as 35 respondents (92.1%), and poor habits of using gloves and footwear as many as 30 respondents (78.9%). The results of laboratory examinations using the flotation method showed that 14 respondents (36.8%) were positive for *Soil Transmitted Helminths* (STH), with the types of worm eggs found including *Ascaris lumbricoides*, *Trichuris trichiura*, *hookworm*. In addition, as many as 18 respondents (47.4%) experienced health complaints in the form of itching on the skin, diarrhea, abdominal pain, brittle nails, and body feeling weak.

ADVICE

For researchers, they can then conduct research with a larger number of samples and examine other factors such as deworming consumption habits, ownership and use of healthy latrines, bowel habits, clean water sources and the level of knowledge about the prevention of worms related to *Soil Transmitted Helminth* (STH) infection in rice farmers.

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