

Personal Hygiene Practices To Reduce The Risk Of Soil-Transmitted Helminth Infection In Farmers

Kholifatur Rosyidah¹, Aulia Maulidia¹, Adzraa Sadira Ranu Indrasasi¹, Enggal Hadi Kurniawan^{1*}, Alfid Tri Afandi¹, Kholid Rosyidi Muhammad Nur¹, Dicky Endrian Kurniawan¹

¹Faculty of Nursing, Universitas Jember, Indonesia

** Corresponding Author: enggalhadi.psik@unej.ac.id*

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Abstract

Backgrounds: Soil-transmitted Helminths infections have become a frequent phenomenon among farmers due to their lack of hygiene, making it easy for nematode worms to enter the body. Soil-transmitted helminths can affect nutritional status, resulting in anemia, loss of appetite, and damage to the intestines. To overcome this phenomenon, adequate personal hygiene in farmers is needed. Purpose: The purpose of this study is to analyze how personal hygiene can affect the incidence of Soil-Transmitted Helminths infection. Methods: The method used is a literature review using 10 kinds of literature from 3 sources, namely Google Scholar, PubMed, and Science Direct with a publication range from 2020-2024. Result: The results showed that some articles showed an association between personal hygiene and the incidence of soil-transmitted helminths. Good personal hygiene can prevent the entry of nematode worms into the digestive tract of the body. Besides that, some articles also showed no association between personal hygiene and soil-transmitted helminth infection. Conclusion: Adequate personal hygiene such as always using gloves and complete personal protective equipment while working, always washing hands before eating, and maintaining environmental hygiene is needed by farmers to avoid the incidence of soil-transmitted helminth infection.

Keywords: personal hygiene, soil-transmitted helminth, farmer

Introduction

Farmer is a profession that focuses on managing land to grow and maintain plants as a source of food or energy, with the hope of earning income from these activities.¹ In the farming process, management activities will begin with the selection of plant seeds, cultivating, harvesting, packaging, distributing, and marketing plant products. Farming is one of the jobs that requires a person to be in direct contact with the soil which will have an impact on increasing the risk of hazards that can threaten the safety of farmers.² Farmers have a high risk of experiencing diseases that are caused by viral, bacterial, or parasite infections such as infection by eggs of intestinal worms.³

According to the World Health Organization, soil-transmitted helminth infections are the most common infection with an estimated 1.5 billion people or about 24% of the world's population, with the highest prevalence in Africa, China, South America, and Asia.⁴ In Indonesia, the incidence of soil-transmitted helminth infection has a diverse percentage in each region. In East Java Province, the incidence percentage showed a rate of 7.95%, Central Java of 33.8%, Bali of 13.5%, and North Sumatra of 60.4%.⁵

Soil-transmitted helminths (STH) are a group of nematode worms that require soil media for the development of eggs to become their infective form. Soil-transmitted helminth infections are generally caused by *Ancylostoma duodenale*, *Necator americanus*, *Ascaris lumbricoides*, and *Trichuris trichiura*. STH worm eggs and larvae can infect humans through oral ingestion or skin penetration. The eggs and larvae will then grow into adult worms in the human body which will eventually produce eggs and be excreted along with the patient's feces. Soil-transmitted helminths infections that occur in a person, including farmers, are closely related to a person's hygiene status.⁵

Personal hygiene is an action to maintain personal hygiene and health to obtain physical well-being and prevent the onset of disease. Poor personal hygiene in farmers such as the habit of eating raw food, rarely washing hands and cutting nails, not using gloves, footwear, and complete personal protective equipment when working in rice fields are the main transmission routes for worm eggs to infect farmers. In addition, the habit of not defecating in latrines and poor environmental sanitation are also supporting factors for soil-transmitted helminth infection in farmers.³ Based on the description above, the author is interested in analyzing how the influence of personal hygiene

owned by farmers or farmers' families on the incidence of soil-transmitted helminth infection.

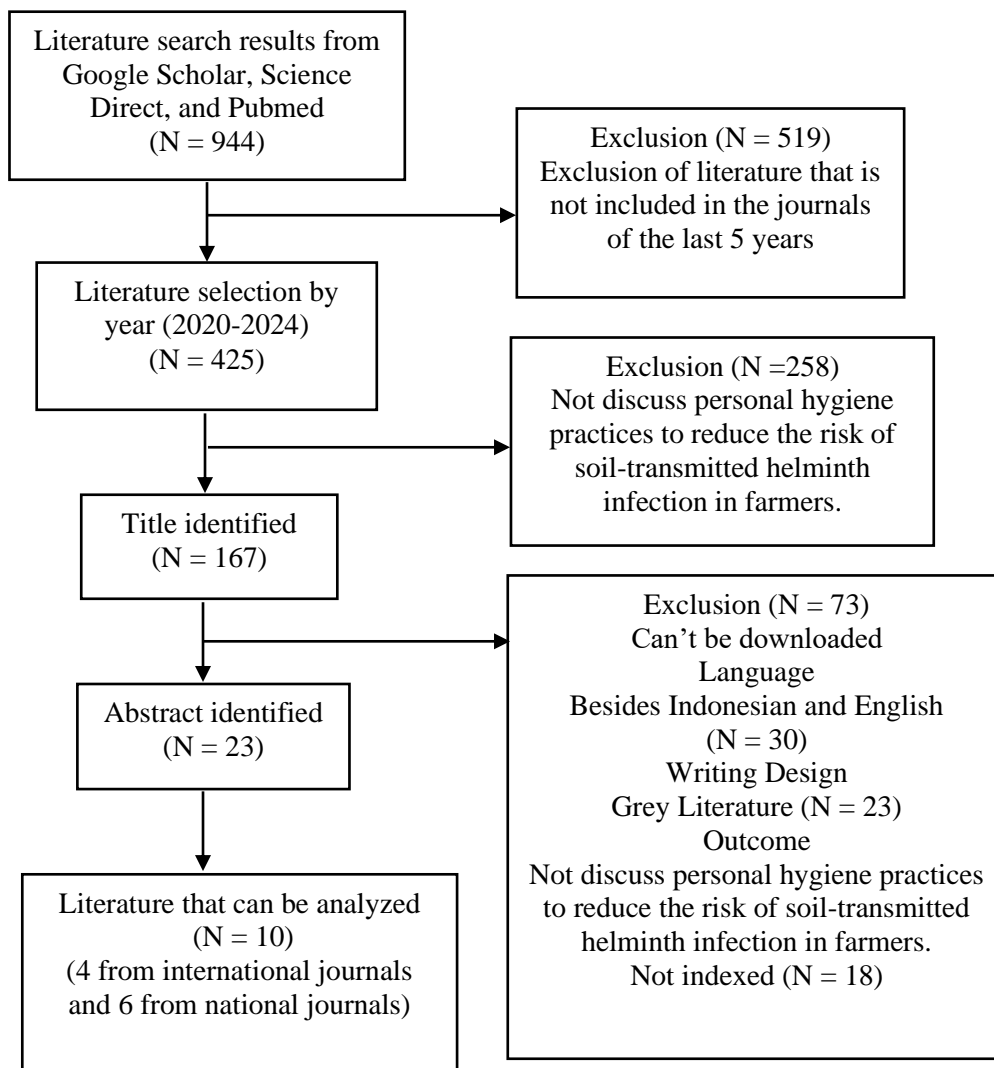
Method

This study used the literature review method. The literature review was chosen because it generated evidence from previous studies on the issue of personal hygiene practices to reduce the risk of soil-transmitted helminth infections in farmers. The article search process used 3 databases available on national and international article sites, such as Google Scholar, Science Direct, and Pubmed. The search was conducted using several keywords in English and Indonesian. The literature search in English used the keywords "Personal Hygiene" AND "Soil-Transmitted Helminth" AND "Farmers". Meanwhile, the literature search in Indonesian used the keywords "Personal Hygiene" DAN "Soil-Transmitted Helminth" DAN "Petani".

Based on the selection criteria, this literature review was conducted using inclusion and exclusion criteria. The formula for determining inclusion uses PICOS (Population, Intervention, Comparison, Outcomes, Study design). Based on the PICOS technique, the inclusion criteria were 1) The study population is farmers or family farmers, 2) Intervention of personal hygiene practices to reduce the risk of soil-transmitted helminths infection in farmers, 3) Comparison between farmers who implement personal hygiene practices and farmers who do not implement personal hygiene practices, 4) The results of the effect of personal hygiene practices to reduce the risk of soil-borne helminthiasis infection in farmers, 5) Quantitative research design, 6) The year of publication of the articles discussed is at least the last 5 years between 2020-2024, 7) Using Indonesian and English. Meanwhile, the exclusion criteria included topics that were not related to the discussion of the research problem, the publication year of the articles discussed was less than the range of 2020-2024, and articles using languages other than English and Indonesian were not included in the inclusion criteria.

The article search process began with the identification of predetermined keywords. At the identification step, 944 articles matched the keywords. The next step is to filter by selecting the year of publication that matches the research criteria, namely 2020-2024 and 425 articles fit the research criteria. After that, the articles were filtered

based on the titles of articles that met the inclusion and exclusion criteria of the study. 167 articles met the inclusion and exclusion criteria. The next step was to screen the articles based on the abstract and 23 articles fit the research criteria. Then, from the 23 selected articles, another screening was carried out on language, research design, research results, and several other predetermined criteria. At last 10 articles were determined that matched the research criteria and could proceed to the analysis step.



Page 1. Flow Diagram of Literature Analysis Based on PRISMA

Results

From the results of the study search, it was found that the majority of articles used a cross-sectional research design, with several methods such as analytic

observational study, descriptive research, sedimentation method, observational study, cluster randomized controlled trial, and a DeWorm3 trial. Based on the results of the review, most articles use samples in the form of nails and also feces from farmers or family farmers who will then be analyzed to determine the presence of nematode worms (Soil Transmitted Helminths). Reviewing the results of the review, some articles concluded that there is a significant influence between a person's hygiene and the incidence of soil-transmitted helminths in farmers. However, some articles also mentioned that there is no significant relationship between personal hygiene and the incidence of Soil-Transmitted Helminths in farmers. The difference in conclusions may be due to the different characteristics and habits of the sampled farmers. Some farmers may have been able to maintain personal hygiene and implement clean living such as diligently using gloves and complete personal protective equipment when working in the fields, diligently cutting nails and washing hands before eating, and creating a clean environment. However, some farmers are still unable to implement these habits, making them more vulnerable to Soil-Transmitted Helminths infection. Therefore, further research is needed to prove whether there is a relationship between personal hygiene and the incidence of soil-transmitted helminth infection.

Table 1. Result of Literature Review

ID No.	Author and Journal Identity	Journal Title	Objective	Population and Sample	Method	Summary of Result
A1	Author: Makata et al. Journal Identity: BMC Medicine / 19(1): 1-13 (2021).	Hand Hygiene Intervention to Optimise Soil-Transmitted Helminths Infection Control Among Primary School Children: The Mikono Safi Cluster Randomised Controlled Trial in Northwestern Tanzania. ⁶	To determine the effectiveness of the Mikono Safi handwashing intervention on sustaining the prevalence of STH infections.	Stool samples from 3.081 school children living in farming areas with the majority of parents working as farmers.	This study used a cluster randomized controlled trial with a cross-sectional study.	The results showed that there was no effect of handwashing using water and soap intervention on soil-transmitted helminth infection. Only 1% of participants had evidence of hookworm infection, with no difference between trial arms. This may be due to infection occurring in the home or other transmission routes, or the fact that the children were already able to wash hands using soap and clean water.
A2	Author: Rahmawati et	Hubungan Higienitas	To determine the association	The number of samples used was	The research method used in	The research findings indicate that plantation

	al. Journal Identity: Journal of Agromedicine and Medical Sciences / 6(1): 7-13 (2020).	Perorangan terhadap Kejadian Soil- Transmitted Helminthiasis pada Pekerja Perkebunan Widodaren di Kabupaten Jember. ³	between personal hygiene and the incidence of soil- transmitted helminths among workers at Widodaren Plantation.	68 people (plantation workers) from Widodaren Plantation.	this journal is a cross-sectional research design.	workers with positive soil- transmitted helminthiasis tend to have poor behaviors towards handwashing, nail cutting, eating habits, defecation habits, toilet ownership, and the use of personal protective equipment. Personal hygiene plays a crucial role in causing the high incidence of worm- related diseases.
A3	Author: Avokpaho et al. Journal Identity: LoS Neglected Tropical Diseases / 15(8): 1-27 (2021).	Factors Associated with Soil-Transmitted Helminths Infection in Benin: Findings from the DeWorm3 study. ⁷	To assess and analyze the factors associated with Soil- Transmitted Helminths infection in Come.	Stool samples from 6.139 individuals (PSAC or aged from 1-4 years, SAC or aged from 5-14 years, and participants aged 15 years old and above) that mostly work as farmers. Stool samples were tested by Kato- Katz.	This study used a cross-sectional design with the DeWorm3 trial.	There is a significant relationship between Soil- Transmitted Helminth infections with some factors such as age, water, sanitation and hygiene, and also environmental. Adults, lack of clean water, poor personal hygiene such as not wearing shoes while working, infrequent hand washing, and open defecation were found to be strongly associated with STH infection.
A4	Author: Nath et al. Journal Identity: IJID Regions / 5: 1-7 (2022).	An Update of Intestinal Helminths Infections Among Urban Slum Communities in Bangladesh. ⁸	To assess the prevalence of intestinal helminth infections and associated risk factors among people living in urban slums in Bangladesh.	Stool samples from 360 individuals divided into 2 groups (school- aged and adults) that mostly work as farmers and come from farming families.	This research used a cross- sectional study.	Overall, from 360 samples it was found that 31.7% of participants had soil- transmitted helminths, with 13.3% having mixed infections. Several factors that contribute to intestinal parasitic infections are lack of hygiene, frequent contact with soil, the type of latrine used, lack of use of spray disinfectant in and around households, presence of free-roaming animals, and open defecation.
A5	Author: Idayani et al. Journal Identity: Bali Medika Jurnal / 8(3): 233-238 (2021).	Hubungan Antara Personal Hygiene dengan Infeksi Telur Cacing Usus (Soil Transmitted Helminths) pada Petani Sayur di	To analyze the correlation between personal hygiene and the incidence of soil- transmitted helminths in	100 grams of fecal samples from 30 vegetable farmers in Gianyar Regency who work in the rice fields.	This study used correlative descriptive research with a cross-sectional study design.	The results showed that there is no relationship between personal hygiene and the incidence of Soil- Transmitted Helminths with a p-value > 0.05, which was proven by the 25 farmers who showed poor personal hygiene and

		Kabupaten Gianyar. ⁹	vegetable farmers in Gianyar District.			the remaining 5 showed good personal hygiene, 6 of them tested positive for an infection and 24 people others were not infected.
A6	Author: Mebiana et al. Journal Identity: The Journal of Medical Laboratory / 9(2): 78-85 (2021).	Deteksi Keberadaan Telur Soil Transmitted Helminth (STH) pada Kuku Petani. ¹⁰	To determine the relationship between personal hygiene and the presence of soil-transmitted helminths in farmers' fingernails.	Nail samples that were taken from 17 male farmers in Kaligondang District, Purbalingga Regency.	This study used an analytic observational with a cross-sectional design.	The results showed that there is no relationship between personal hygiene and the presence of STH in farmers' fingernails. Out of the 17 respondents, 11 of them had poor personal hygiene, and the remaining 6 had good personal hygiene. Based on this, only 5 out of 11 farmers with poor personal hygiene and 4 out of 6 farmers with good hygiene tested positive for STH infection.
A7	Author: Aritonang et al. Journal Identity: Jurnal Sains dan Teknologi Laboratorium Medik / 5(2): 34-29 (2020).	Analisis Telur Cacing Soil Transmitted Helminth (STH) pada Petani Sayur di Kartama Pekanbaru. ¹¹	This study was conducted to determine the presence or absence of Soil Transmitted Helminth (STH) eggs, on vegetable farmers in Kartama Pekanbaru.	27 fingernail and stool samples of vegetable farmers in Kartama Pekanbaru.	This study used the sedimentation method with a cross-sectional design.	The results of the analysis obtained from 27 samples examined at vegetable farmers in Kartama Pekanbaru are negative which proves that no Soil Transmitted Helminth eggs were found. This is because vegetable farmers always wash their hands with running water and soap, diligently cut their nails, and eat using a spoon.
A8	Author: Ohorella et al. Journal Identity: The International Journal of Health, Education and Social (IJHES) / 3(8): 44-55 (2020).	The Effect of Personal Hygiene, Environmental Sanitation and Characteristics of Children with Worms Infection in Elementary Schools in Tulehu Village, Salahutu District, Central Maluku City. ¹²	To analyze the effect of personal environmental sanitation characteristics and child hygiene on helminthiasis infection in elementary school children who are mostly children from farming families in Tulehu Village, Salahutu	202 students in 5 elementary schools, the majority of children from farmer families in Tulehu Village, Central Maluku District.	This study uses an analytical study with a cross-sectional design.	The results showed that the proportion of worms in 5 elementary schools in Tulehu village (72.77%) was evidenced by several variables associated with the incidence of worms, namely environmental sanitation (home and school environment), personal hygiene (nail hygiene, use of footwear and hand washing habits), child characteristics (knowledge, attitudes and parental income) with each ρ value = 0.0001 while the unrelated variable was gender with a ρ value = 0.2940.

District,
Central
Maluku.

A9	Author: Wikandari et al. Journal Identity: Indonesian Journal of Medical Laboratory Science and Technology / 3(2): 135-145 (2021).	Factors Related to Soil-Transmitted Helminth Infection in Vegetable Farmers. ¹³	To analyze factors associated with STH infection in vegetable farmers, especially in personal hygiene factors when working at the garden in the Semarang Regency.	55 vegetable farmers were aged 17-55 years with a minimum 1-year working period.	Observational study with cross-sectional. With the chi-square analysis.	There is a relationship between the habit of washing hands using clean water and soap by farmers before eating with the incidence of worms with significant results, namely $p = 0.000$. All the respondents had used toilet facilities while working with clean water and used footwear while working. Therefore there were only 3 cases in the study site.
A10	Author: Kurscheid et al. Journal Identity: PLoS Neglected Tropical Diseases/14(12): 1-17. (2020).	Epidemiology of Soil-Transmitted Helminth Infections in Semarang, Central Java, Indonesia. ¹⁴	To analyze the association of STH infection with knowledge of risk factors and personal hygiene in Semarang and the prevalence of STH infection.	16 villages and randomly selected with a maximum cohort of 550 people per village.	A cross-sectional study with Pearson's chi-squared, the Welch Two Sample t-test, and Spearman's Rho for the statistical analyses.	There was no significant association of STH infection with using a soap ($p = 0.27$). A total of 57% ($n = 3578$) of respondents used soap when washing hands at meals, before praying, and when preparing food. There was also no association of STH infection with the practice of cleaning up after defecation ($p = 0.14$).

Discussion

Soil Transmitted Helminth (STH) infection is one type of earthworm infection that often occurs in farmers. In addition to infecting the farmer, usually, the farmer's family will also be affected by the STH infection. Some types of worms included in the STH category are *Ancylostoma duodenale* (earthworm), *Ascaris lumbricoides* (roundworm), *Necator americanus*, and *Trichuris trichiura* (whipworm). The occurrence of STH infections in these farmers usually occurs due to a lack of hygiene. In a study by Rahmawati et al (2020), it was found that 26 workers experienced STH infections. STH infections occur due to a lack of hygiene behavior in farmers such as cutting nails, washing hands, eating habits, defecation habits, and the use of Personal Protective Equipment (PPE). The lack of hygiene in farmers' nails is because they do not use

gloves when working and the lack of knowledge of personal hygiene and about this STH.³ This is in line with research by Nath et al (2022) that study participants had soil-borne helminth infections. In addition to one's hygiene factor, frequent contact with individuals with soil will also affect STH infection. The presence of animals that are free to roam around the house and open defecation behavior are also risk factors for individuals infected with STH.⁸

Research by Wikandari et al (2021) shows that there is a relationship between the habit of washing hands before eating using clean water and soap with the incidence of STH infection.¹³ Similarly, research by Avokpaho et al (2021) shows that there is a relationship between STH infection and sanitation and hygiene factors. A farmer who rarely washes his hands after work and does not wear footwear while working is more at risk of STH infection. Because this is related to personal hygiene.⁷ The use of footwear as an intervention is also in line with research by Ohorella et al (2020) that personal hygiene behaviors such as the use of footwear, nail hygiene, and hand washing habits in farming families have a relationship with the incidence of STH infection. This is where the higher the level of personal hygiene of a person, the risk of being infected with STH will be lower. The habit of washing hands before eating is also a determining factor in whether the farmer can be infected with STH.¹² This is supported by research by Aritonang et al (2020) that found a low level of STH infection cases among vegetable plantation farmers in Kartama Pekanbaru. Most vegetable farmers in the Kartama area have a fairly good level of hand hygiene behavior. Therefore, good hand-washing habits will reduce the cases of STH infection.¹¹

In contrast to research conducted by Idayani et al (2021), personal hygiene does not correlate with the incidence of STH infection.⁹ This is in line with research by Kurscheid et al (2020) that there is no significant relationship between STH infection and the use of soap when washing hands. This is because almost 57% of respondents have implemented good hand-washing behavior marked by the low prevalence of STH cases in the area.¹⁴ Similarly, research conducted by Makata et al (2021) found that there was no effect of hand washing intervention using water and soap on the incidence of STH infection. The absence of this effect is because children can wash their hands using soap and clean water regularly. So the number of STH cases is relatively low in the area. In addition to the factor of routine hand washing, whether or not the farmer's

nails are clean is also a risk factor for STH infection.⁶ However, research by Mebiana et al (2021) found that there was no relationship between personal hygiene and the presence of STH eggs in farmers' nails. This is because the level of nail hygiene of farmers in the area is categorized at a high level. Maintaining personal hygiene by farmers including washing hands, using footwear when working, nail hygiene, and good defecation habits can make these farmers not at risk of STH infection. Therefore, apply personal hygiene from now on.¹⁰

To overcome the phenomena of farmers' lack of behavior in maintaining cleanliness, education about personal hygiene is needed for farmers. Research by Lee et al. (2023) states that a person with a high knowledge of hygiene will have a positive impact on the lower prevalence of soil-transmitted helminth infection. In communities with poor knowledge, habits that do not pay attention to hygiene, inadequate sanitation, and poor environmental conditions such as lack of access to clean water can be a major obstacle to the eradication program of soil-transmitted helminth infection in the community.¹⁵ Therefore, a strong approach and education are needed regarding the importance of maintaining personal and environmental hygiene to prevent soil-transmitted helminth infection in farmers.

Conclusion

Personal hygiene practices can reduce the incidence of Soil-Transmitted Helminth infections in farmers. While some studies may not consistently show a direct association, the overall consensus emphasizes the importance of maintaining personal hygiene, including hand washing and proper food handling, to prevent helminth-related diseases. Improving personal hygiene practices is critical in reducing the prevalence of these infections among at-risk populations such as farmers and schoolchildren.

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Conflict of Interest

None.

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Example:

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