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THE REALTIONSHIP BETWEEN WORM INFECTION AND CLEAN AND HEALTHY LIVING BEHAVIOR (PHBS) IN STUDENTS OF MI NURUL FALAH JATIMULYA VILLAGE, SEPATAN TIMUR SUBDISTRICT, 2024

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Abstract: *Worms are one of the infectious diseases that are susceptible to occur in school-age children in Indonesia. The highest prevalence of worms occurs in underprivileged population groups and poor environmental sanitation. Children aged 6-12 years are more susceptible to worm infections due to their high curiosity to play intensely with the ground. At that age, children still depend on their parents to maintain personal hygiene. The consequences of worm infections that occur in toddlers or school-age children can cause malnutrition so that children's growth and development are disrupted due to reduced protein and carbohydrate energy and can cause anemia. Worm infections will be reduced and can even be eliminated if efforts are made to live a clean and healthy life such as washing hands with soap, managing food properly, a clean environment and nutritious food.* ***The specific objective*** *is to reduce the prevalence of worms in school-age children in poorly sanitation areas of Indonesia, as well as improve children's health and quality of life through evidence-based interventions.* ***Materials and Methods*** *: The research was conducted by the purposive sampling method, fecal samples were examined by the sedimentation method using a centrifuge and the behavior of PHBS was assessed using a questionnaire and then analyzed with the Chi-Square statistical test.* ***Results****: There was no significant association between hand washing behavior with soap, snack habits and rigid mat habits and the incidence of worms.*
Keyword*: Helminthiasis, PHBS, CTPS*

Pendahuluan

One of the neglected tropical infectious diseases *(NTDs),* helminthiasis remains a global health problem. Worldwide, more than 1.5 billion people, or 24% of the population, are infected with earthworms. The highest increase is in sub-Saharan Africa. Africa, America, China, and East Asia, but also in tropical and subtropical areas (Armaijn et al., 2023).

As a developing country, Indonesia still faces the problem of high prevalence of infectious diseases, especially those related to poor environmental sanitation conditions. One of the diseases with a high incidence is worm infection, which is one of the environmental-based diseases.

This is understandable considering that Indonesia is an agricultural country with low levels of socio-economic, knowledge, environmental sanitation and public hygiene which greatly supports the occurrence of infections and transmission of parasitic diseases including worms (Soedarto, 2011).

The prevalence of worms in Indonesia is generally still very high, especially in the underprivileged population with poor sanitation. The prevalence varies between 2.5% - 62%. One of the worm diseases is an intestinal worm infection transmitted through the soil (*Soil Transmitted Helminths*) which is still found in elementary school children who still often come into contact with the soil. There are four types of worms that are most important, namely roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*) and hookworms (*Ancylostoma duodenale* and *Necator americanus*) (Permenkes Nomor 15 Tahun 2017 Tentang Kecacingan, 2017).

Worm parasites are the most common cause of human infections, known as STH (Soil Transmitted Helminth) infections. types of intestinal nematodes that spread into the body through the soil and are a health problem that is spread throughout tropical regions similar to Indonesia (Tuuk et al.) Species that are included in the category of Helminthes that are transmitted to the

environment, for example *Giardia lamblia* , *Trichuris trichiura* , and hookworms, *Ancylostoma duodenale* , and *Necator americanus* (Safitri et al., 2019).

Worms are one of the infectious diseases that are susceptible to occur in school-age children in Indonesia. The prevalence of worms in Indonesia is highest in underprivileged groups and poor environmental sanitation. The prevalence of worms varies between 2.5% - 62%, with the highest incidence in school-age children (Angreany, 2019).

As many as 28% of Indonesian children were infected with worms in 2017, this is due to several factors, such as poor personal hygiene, consumption of food containing worm eggs or larvae, dirty environments, and low economic levels, in addition to children having more frequent contact with the soil due to play activities.

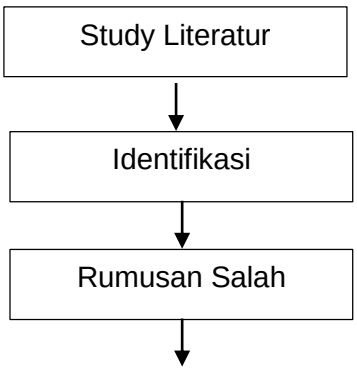
Children aged 6-12 years are more susceptible to worm infections due to their high curiosity to play intensely with the soil. At that age , children still depend on their parents to maintain personal hygiene, such as washing hands before eating and defecating, and making such habits. Age, gender, sex, clean and healthy living behavior, clean water sources, and physical environmental factors such as soil humidity, the presence of agricultural or plantation land, and social and economic factors are some of the risk factors that can cause someone to get a worm infection (Wulandari & Purhadi, 2020).

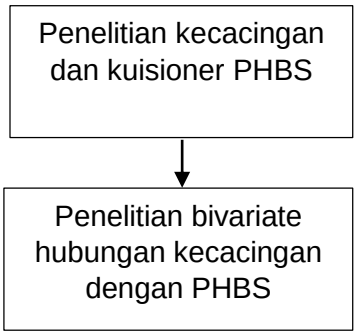
The effects of worm infections that occur in toddlers or school-age children can cause malnutrition so that the child's growth and development are disrupted due to reduced energy, protein and carbohydrates and can cause anemia (Z A, 2010).

The main basis for controlling worms is to break the chain of the worm's living environment which can be done at the level of worms in the human body, physical environment, socio-economic environment and culture (Sutanto I et al., 2008). Worm infections will be reduced and can even be eliminated if efforts are made to live a clean and healthy life such as the habit of washing hands with soap at five important times (after defecating, after cleaning children who defecate, before preparing food, before eating, after holding/touching animals), managing food properly, a clean environment and nutritious food (Permenkes Nomor 15 Tahun 2017 Tentang Kecacingan, 2017)

Method

This research activity is directed at children aged 6-12 years old at MI Nurul Falah, Jatimulya Village, Sepatan Timur District. The location of the research was carried out in the MI Nurul Falah Classroom, Jatimulya Village, Sepatan Timur District, Tangerang Regency. The method of implementing the research activity was carried out by distributing stulpots to students the day before taking feces samples, then on the day of the research the feces were collected together with the consent form, to determine the students' clean and healthy living behavior, a questionnaire was filled out , the research flow can be described as follows :





Bagan 1. Alur penelitian

This study uses an analytical research type, namely a method used to determine whether there is a relationship between worms and PHBS behavior and the incidence of worms in MI Nurul Falah Students, Jatimulya Village, Sepatan Timur District. This study uses a *cross-sectional design* , namely a study to determine the cause and effect factors taken by collecting data that is carried out once at the same time. The sampling technique was carried out by *purposive sampling* , namely the sampling of the study was carried out with a sample size of 37 students in the population. Sampling was carried out at MI Nurul Falah, Jatimulya Village, Sepatan Timur District. Meanwhile, sample examination was carried out at the Microbiology Laboratory of the Environmental Health Department, Poltekkes Kemenkes Jakarta II. This research was conducted on Friday, August 16, 2024 to Monday, August 19, 2024.

Tools and materials used in worm examination using the wet preparation method namely microscope, *deck glass, cover glass,* dropper pipette, gloves, mask, cotton, feces sample, feces container (stulpot), toothpick, 2% Eosin Solution, label, tissue, and 70% Alcohol, the results of the worm egg examination are presented in the form of a table which is then collected and processed using *computer software.* And to find out the students' clean and healthy living behavior, a questionnaire was filled out.

Results and Discussion

Table 1. 2Students , East Sepatan District

No	Worm Eggs	Amount	Presentation
1	Positif (+)	4	11,11
2	Negatif (-)	32	88,88
Amount		36	100

Based on table 1 of 37 students, there were 4 students (10.81%) positive for worm eggs, including 2 positive for *Enterobius vermicularis worm eggs* , 1 *Trichuris trichiura* , and 1 *Ascaris lumbricoides* and 33 students (89.18%) were negative which means no worm eggs were found in the feces sample. Worms transmitted through soil are transmitted through eggs excreted through the feces of infected people. Adult worms live in the intestines and produce thousands of eggs every day. In areas with inadequate sanitation, these eggs contaminate the soil Morbidity is related to the number of worms infested. People who experience mild infections (few worms) usually do not suffer from infection. More severe infections can cause a variety of symptoms including intestinal manifestations (diarrhea and abdominal pain), malnutrition, general malaise and weakness, and impaired growth and physical development (World Health Organization, 2023).

Table 2 Statistical Test of the Relationship between Worm Infection and Nail Cleanliness in Stundents of MI Nurul Falah Jatimulya, Sepatan Timur District

Warm Eggs	Nail								Total		OR (95% CI)	P Value
	Long and Dirty		Short and Dirty		Long and Clean		Short and Clean					
	n	%	n	%	n	%	n	%	n	%		
Positif	1	14.3	1	8.3	0	0	2	16.7	4	10.8		0.725
Negatif	6	85.7	11	91.7	6	100	10	83.3	33	89.2		
Amount	7	100	12	100	6	100	12	100	37	100		

Based on table 2, the results of the analysis of the relationship between worms and nail cleanliness showed that students who were positive for worm eggs, 1 (14.3%) students had long and dirty nails, 1 (8.3%) students had short and dirty nails, 2 (16.7%) students had short and clean nails. While students who were negative for worm eggs, 6 (85.7%) students had long and dirty nails, 11 (91.7%) had short and dirty nails, 6 (100) students had long and clean nails, 10 (83.3%) had short and clean nails. The results of the statistical test obtained that the P value = 0.725, it can be concluded that there is no relationship between worms and nail cleanliness.
Maintaining nail hygiene is an important aspect of maintaining self-care because germs can enter the body through nails. Therefore, cut nails 1x/mg or when they look long (use nail clippers and after cutting the tips of the nails are smoothed/filed (Elisanov, 2018). Although in this study there was no relationship between nail cleanliness and worm disease, nail cleanliness must still be maintained because every day hands come into contact with hundreds of objects. In reality, hands and feet are used for various other important activities such as walking, playing and eating. Long nails have the potential to cause a number of health problems because nails are the perfect place for germs, dirt and parasites to live.

Tabel 3 Statistical Test of the Relationship between Worm Infection and Wearing Sandals in Students of MI Nurul Falah Jatimulya, Sepatan Timur District

Worm Eggs	Wearing Sandals				Total		OR (95% CI)	P Value
	Yes		No					
	n	%	n	%	n	%		
Positive	1	16.7	3	9.7	4	10.8	0.536 (0.046-6.240)	0.524
Negative	5	83.3	28	90.3	33	89.2		
Amount	6	100	31	100	37	100		

Based on table 3, the results of the analysis of the relationship between worms and wearing sandals showed that students who were positive for worm eggs, 3 (9.7%) students did not wear sandals, 1 (16.7) students wore sandals. While students who were negative for worm eggs, 28 (90.3%) students did not wear sandals, 5 (83.3%) wore sandals. The results of the statistical test obtained that the P value = 0.524, so it can be concluded that there is no relationship between worms and wearing sandals.

From the analysis results, it was obtained that OR = 0.536, meaning that students who were negative for worm eggs had a risk of 0.536 for not wearing sandals. This is in line with Nurmarani's research (2017) which stated that there was no significant relationship between hand washing habits and the incidence of intestinal worm infections with a p-value of 0.678 (p>0.05) (Nurmarani, 2017). The habit of not wearing shoes outside the house, especially when stepping on the ground, can cause direct contact with worm eggs which can then result in the entry of worm eggs into the pores of the skin.

Tabel 4 Statistical Test of the Relationship between Worm Infection and Snacks in Students of MI Nurul Falah Jatimulya, Sepatan Timur District

Worm Eggs	Snacking				Total		OR (95% CI)	P Value
	Canteen		Outside School					
	n	%	n	%	n	%		
Positive	4	14.8	0	0	4	10.8	0.852(0.728-0.997)	0.557
Negative	23	85.2	10	100	33	89.2		
Amount	27	100	10	100	37	100		

Based on table 4, the results of the analysis of the relationship between worms and snacks showed that students who were positive for worm eggs, 4 (14.8%) students bought snacks in the canteen. While students who were negative for worm eggs, 23 (85.2%) students bought snacks in the canteen, 10 (100%) bought snacks outside school. The results of the statistical test obtained that the P value = 0.557, it can be concluded that there is no relationship between worms and where students buy snacks. This result is also supported by research conducted by Farah (2017) regarding the Relationship between Worm Infection and the habit of buying open snacks, based on the *Fisher Test* conducted showed a P value = 0.203. This shows that there is no relationship between worm infections and the habit of buying open snacks (Fathi, 2011) From the Analysis Results obtained that OR = 0.852, meaning that students who are negative for worm eggs have a risk of 0.852 for buying snacks outside school. This is in line with Nurmarani's research (2017) which states that there is no significant relationship between hand washing habits and the incidence of intestinal worm infections with a p-value = 0.207 (p>0.05) (Nurmarani, 2017). Snack foods, especially those that are not covered, are at risk of containing worm parasites, which can be caused by being infested by disease-transmitting vectors such as flies that carry worm eggs or worm larvae in their bodies.

Tabel 5 Statistical Test of the Relationship between Worm Infection and Hand Washing Before Eating in Students of MI Nurul Falah Jatimulya, Sepatan Timur District

Worm Eggs	Wash Hands Before Eating			Total	OR (95% CI)	P Value
	Container (basin)	Clean Water Flows	Clean Flowing			

					Water with Soap					
	n	%	n	%	n	%	n	%		
Positive	0	0	1	9.1	3	15	4	10.8		0.149
Negative	6	100	10	90.9	17	85	33	89.2		
Amount	6	100	11	100	20	100	37	100		

Based on table 5, the results of the analysis of the relationship between worms and washing hands before eating showed that students who were positive for worm eggs, 1 (9.1%) students washed their hands with clean running water, 3 (15%) students washed their hands with clean running water using soap. While students who were negative for worm eggs, 6 (100%) students washed their hands in a container (basin), 10 (90.9%) students washed their hands with clean running water, 17 (85%) students washed their hands with clean running water using soap. The results of the statistical test obtained that the P value = 0.149, so it can be concluded that there is no relationship between worms and washing hands before eating..

Tabel 6 Statistical Test of the Relationship between Worm Infection and Hand Washing After Eating in Students of MI Nurul Falah Jatimulya, Sepatan Timur District

Worm Eggs	Wash Hands After Eating						Total		OR (95% CI)	P Value
	Container (basin)		Clean Water Flows		Clean Flowing Water with Soap					
	n	%	n	%	n	%	n	%		
Positive	1	14.3	1	11.1	2	9.5	4	10.8		0.486
Negative	6	85.7	8	88.9	19	90.5	33	89.2		
Amount	7	100	9	100	21	100	37	100		

Based on table 6, the results of the analysis of the relationship between worms and washing hands after eating showed that students who were positive for worm eggs, 1 (14.3%) students washed their hands in a container (basin), 1 (11.1%) students washed their hands with clean running water, 2 (9.5%) students washed their hands with clean running water using soap. While students who were negative for worm eggs, 6 (85.7%) students washed their hands in a container (basin), 8 (88.9%) students washed their hands with clean running water, 19 (90.5%) students washed their hands with clean running water using soap. The results of the statistical test obtained that the P value = 0.486, so it can be concluded that there is no relationship between worms and washing hands after eating.

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Tabel 7 Statistical Test of the Relationship between Worm Infection and Hand Washing After Defecating in Students of MI Nurul Falah Jatimulya, Sepatan Timur District

Worm Eggs	Wash Hands After Defecating and Eating						Total		OR (95% CI)	P Value
	Container (basin)		Clean Water Flows		Clean Flowing Water with Soap					
	n	%	n	%	N	%	n	%		
Positive	1	20	1	14.3	2	8	4	10.8		0.516
Negative	4	80	6	85.7	23	92	33	89.2		
Amount	5	100	7	100	25	100	37	100		

Based on table 7, the results of the analysis of the relationship between worms and washing hands after defecating showed that students who were positive for worm eggs, 1 (20%) students washed their hands in a container (basin), 1 (14.3%) students washed their hands with clean running water, 2 (8%) students washed their hands with clean running water using soap. While students who were negative for worm eggs, 4 (80%) students washed their hands in a container (basin), 6 (85.7%) students washed their hands with clean running water, 23 (92%) students washed their hands with clean running water using soap. The results of the statistical test obtained that the P value = 0.694, so it can be concluded that there is no relationship between worms and washing hands after defecating (BAB).

This is in line with the research of Rizka Yunindha Anwar, et al (2013) which stated that there was no significant relationship between hand washing habits and the incidence of intestinal worm infections with a p-value = 0.235 (p>0.05) (Anwar, 2013). The absence of a relationship between the two variables in this study is thought to be caused by most students not practicing hand washing properly, as per the guidelines for hand washing as stated in the Regulation of the Minister of Health No. 3 of 2014 concerning Community-Based Total Sanitation (STBM). The regulation explains the 5 steps for proper hand washing which are carried out within 20 seconds, namely: wet your hands completely with running water, rub soap into the palms, backs of your hands and between your fingers, clean under your nails, rinse with running water and dry your hands by airing or shaking them (Permenkes No 3 Tahun 2014, n.d.). The impact that occurs in children if they are not accustomed to washing their hands will make it easier for germs to enter the body, this will result in children being susceptible to diseases such as diarrhea, worms, hand and mouth infections and ARI (Chuluq & Susmarini, 2013).

Conclusion

Based on the results of a study conducted on 36 students at MI Nurul Falah Jatimulya, Sepatan Timur District in 2024, it was concluded that 3 types of worms infected the students, 2 people tested positive for *Enterobius vermicularis worms,* 1 person tested positive for *Ascaris lumbricoides,* and 1 person tested positive for *Trichuris trichiura* . There is no significant relationship between hand washing behavior with soap, snacking habits and the habit of using stiff mats with the incidence of worms.

Thank-you note

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