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RELATIONSHIP OF PERSONAL HYGIENE AND SANITARY HYGIENE CONDITIONS WITH SOIL TRANSMITTED HELMINTS (STH) WORM INFECTIONS IN ELEMENTARY SCHOOL CHILDREN

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ABSTRACT

Helminths can attack all age groups and genders. Helminths can cause a decrease in health conditions, intelligence, productivity, and the quality of human resources, resulting in economic losses due to loss of carbohydrates, protein, blood, and can reduce body resistance so that it is easy to get other diseases. This research uses quantitative research type. The population in this study were elementary school children in SDN Dukuh Kupang V Surabaya *with the number of 50 children. This study uses a sampling technique in the form of total sampling. The data collected in this study include primary data and secondary data where the primary data is in the form of STH worm infection data obtained from the direct method of examination of respondents' feces. Secondary data in the form of hygiene and sanitation obtained through questionnaires. The data that has been obtained is then analyzed and looked for correlation using the product moment test. Based on the results of the study and after a series of analyzes and discussion of the results of the examination of the 50 samples examined, 32% (16 people) had positive results while the rest were negative, it was concluded that there was a significant relationship between environmental sanitation and personal hygiene (hand washing habits, nail hygiene, and use of footwear) with Soil Transmitted Helminths (STH) infection in primary school children. So it is expected to always wash hands with water and soap so that it is more effective in removing dirt and dust mechanically from the skin surface and significantly reduces the number of disease-causing microorganisms such as viruses, bacteria, and other parasites on both hands on the skin surface, nails, and fingers.*

INTRODUCTION

Helminths are one of the environmental-based diseases that are a problem for public health. In Indonesia, intestinal worms do not get enough attention by some people. One type of worm disease is caused by infection with worms from the Soil Transmitted Helminyhs (STH) group (Ottay, 2013). STH is a worm that belongs to the class Nematoda. These worms transmit to humans and animals through soil media. In Indonesia, there are three types of STH that infect humans, that are ringworm (Ascarislumbricoides), whipworm (Trichuristri chiura) and hookworm (Necatoramericanus and Ancylostomaduodenale) (Anggraini et al., 2020).

STH can infect humans due to contamination of food, both food that is not cooked before consumption, not washing hands before eating, and contamination caused by inhalation with dust. Helminths can attack all age groups and genders. Helminths can cause a decrease in health conditions, intelligence, productivity, and the quality of human resources, resulting in economic losses due to loss of carbohydrates, protein, blood, and can reduce body resistance so that it is easy to get other diseases (Manalu and Saragih, 2020). More than 1.5 billion people, or 24% of the world's population, are infected by worms transmitted through the ground over the world. The infection is widespread in the tropics and subtropics, with the greatest number occurring in sub-Saharan Africa, the Americas, China, and East Asia. More than 267 million preschool-aged children and more than 568 million school-aged children live in areas where this parasite is transmitted intensively, and requires treatment and preventive interventions (World Health Day, 2013). Indonesia is an endemic country for STH with the third largest number of children aged 1-14 years in the world after India and Nigeria, which is around 7 (Renuka, 2018). This is due to the lack of awareness of good self-hygiene in elementary school children so that it becomes a high risk factor for infection with Soil Transmitted Helminths (STH).

According to KEMENKES (2017), generally, the prevalence of worms in Indonesia is still very high, especially in the poor population with poor sanitation. The prevalence of intestinal worms varies between 2.5%-6.5% (Kementrian Kesehatan Republik Indonesia, 2018). In Indonesia, the prevalence of helminth infections is still very high, between 60%-90% depending on the location and environmental sanitation conditions. The prevalence and intensity of infection is usually highest in children between the ages of 3 and 8 years (Kalimantan and Bisara, 2016). It is estimated that the prevalence of Ascaris lumbricoides is reported to be 75%, T. trichiura 62%, and hookworms 30% where the province of West Nusa Tenggara has a relatively high prevalence (Farida et al., 2019). In South Sumatra, the prevalence of STH is still quite high, as evidenced by a study conducted in elementary schools in Gandus District, Palembang City, South Sumatra which showed the prevalence of STH infection in students of SDN 169 Gandus Sub-district, Gandus District, Palembang City was 6.8% with a male ratio of 6.8%. male and female 1.3% : 5.5%. Age group 7-8 years most infected (4.1%) (Handayani, Santosab and Siswanto, 2015). The number of helminth infections that occur is due to poor sanitary conditions and also lack of personal hygiene.

Hygienic sanitation is divided into two, that are environmental sanitation which includes sanitation of water sources, disposal of human waste, and food sanitation that supports worm infections due to poor eating behavior, for example not washing hands before eating. According to research by (Mahmudah, 2017) The prevalence of helminth infections is 40.21% in elementary school children due to the type of floor, availability of clean water, ownership of trash cans, and waste water disposal facilities in SD Barengan, Teras Subdistrict, Boyolali Regency. Other research by Triyana (2019) which states that the poor sanitation of elementary school students can be seen from their daily activities that do not use footwear.

In addition to environmental sanitation, food sanitation also causes a high risk factor for worm infection in children. Kusumawardani et al (2019) stated that the prevalence of STH worm infection in elementary school children in Gianyar Bali was 16% with the highest prevalence in the type of worm Trichiuris trichiura (13%) because it was affected by the habit of not washing hands with soap, dirty fingernails and not having a latrine. Elementary school children often neglect to wash their hands before eating. This is what causes STH to infect children very easily. Research by Sihura Et al (2022) showing poor hand hygiene behavior in school-age children generally lack awareness of washing hands with soap in their daily lives, especially when in the school environment. Therefore, it is very important to carry out environmental sanitation checks and also get used to personal hygiene in elementary school age children. Research by Zubaidi et.al, (2017) Relationship of Personal Hygiene (Washing Hands

Using Soap) with Deworming Disease in Class I-VI Children MI Nahdlatul Wathan (NW) Bimbi Rensing Raya Village, Sakra Barat District, East Lombok Regency, There is a correlation between personal hygiene and the incidence of STH worm infection. Different with research by Martila et.al, (2017) The relationship between personal hygiene and the incidence of helminthiasis in Abe Pantai Jayapura elementary school students, there is no correlation between personal hygiene and the incidence of STH worm infection. Therefore, this study aims to: 1) test whether there is an effect of Personal Hygiene and Sanitary Hygiene Conditions on the occurrence of Soil Transmitted Helmints (STH) Worm Infections in Elementary School Children, and 2) examine whether there is a direct or indirect relationship between Personal Hygiene and Conditions Sanitation Hygiene with Soil Transmitted Helmints (STH) Worm Infection in Elementary School Children.

LITERATURE REVIEW

Soil Transmitted Helmints (STH) Infection Worms

Soil Transmitted Helminths (STH) infection is an infection caused by intestinal nematodes which in its transmission requires soil media. Worms included in the STH are Ascaris lumbricoides (roundworm), Trichuris trichiura (whip worm), hookworm (Necator americanus and Ancylostoma duodenale), Strongyloides stercoralis, and several species of Trichostrongylus are the cause of helminthiasis or Helminthiasis (Supali et.al, 2013). STH infection causes more disability than death. STH infections are spread in various tropical and subtropical countries, Indonesia is one of them. Climate is the main determinant of the spread of STH infection, humidity and hot temperatures are very important for larval development in the soil. Temperature, soil type, soil particle properties and soil tillage are aspects of the climate to be able to influence the growth and development of the worm life cycle.

In Indonesia, Ascaris lumbricoides worms are known as roundworms. Adult worms predilection are in the lumen of the human small intestine but can also manifest to other organs. Whipworms are the name for Trichuris trichiura worms. Adult worms have a predilection for the large intestine, especially the cecum, while Ancylostoma duodenale and Necator americanus are known as hookworms. Adult worms have a predilection for the small intestinal mucosa, especially the duodenal and jejunal mucosa of humans. In addition there are also types of worms known as thread worms, namely Strongyloides stercoralis. Adult worms have a predilection for the mucosa of the small intestine, especially the duodenum and human jejunum.

The most appropriate way to overcome with STH infection is to break the life cycle of worms by improving personal health knowledge, improving sanitation and using anthelmintic drugs.

Hygiene Sanitation

Sanitation is a disease prevention effort that focuses on environmental health activities (Rejeki, 2015:2). Sanitation can be defined as an effort to prevent disease by eliminating or regulating environmental factors related to the chain of disease transmission. In Depkes RI (2013) Hygiene is a preventive health effort that focuses its activities on individual health efforts. Hygiene also includes self-care efforts, including proper posture. According to Surono et.al, (2016:89) sanitation in the food industry means cleaning all surfaces including floors, tables and tools, as well as workers who come into contact with food products through treatments that are effective in destroying harmful microbes. Food sanitation is aimed at freeing food and beverages from all hazards that can interfere with health, starting from the food before it is produced, during the processing, transportation, storage, to presentation/distribution so that the food and drink is ready for consumption.

Minister of Health Regulation (Permenkes No 329/Menkes/Per/VI/1976) states that food produced and circulated in the territory of Indonesia must meet the safety, health, quality standards or requirements set by the minister for each type of food. The application of hygienic sanitation is intended to control the risk factors for contamination of food, both from food ingredients, people, places and equipment so that they are safe for consumption (Permenkes No 1096/Menkes/Per/VI/2011 tentang Higiene Sanitasi Jasaboga). According to Surono dkk (2016:23-24), Food safety itself must be based on a general framework (Plan) called the Hazard Analysis and Critical Control Point (HACCP) Framework.

Table 1. HACCP Principle

Principle	***Explanation***
Principle 1	*Conduct a hazard analysis.* *Seek complete information about the hazards that may occur, when and where.*
Principle 2	*Determine critical control points or Critical Control Points (CCPs).* *Details the actions that can be taken to prevent the identified hazards from occurring*

Principle 3	*Set critical limits.* *What is the limit that is considered harmless*
Principle 4	*Establish a system to monitor CCP control.*
Principle 5	*Define corrective action to be taken (if certain CCP is not in control).* *Actions to be taken in the event of an error (nonconformity) in the process*
Principle 6	*Establish verification procedures to ensure that the HACCP system is working effectively.*
Principle 7	*Establish documentation of all procedures and records in accordance with the principles of the HACCP system and its application.* *What documents and records are needed to prove that the whole process is under control*

Personal Hygiene

Personal hygiene comes from the Greek language, derived from the word 'personal' which means individual and 'hygiene' which means healthy. Personal hygiene is an action to maintain the cleanliness and health of a person for both physical and psychological well-being. Types of personal hygiene, that are cleanliness of skin, feet, hands and nails, hair care, oral and dental care, eye, ear and nose care. The purpose of personal hygiene care is to improve someone health status, maintain someone personal hygiene, improve personal hygiene, prevent disease, increase one's self-confidence and create beauty.

Basically the scope of personal hygiene business can be grouped into three parts, that are: 1) Body hygiene, such as efforts to maintain hand and nail hygiene, foot hygiene care, hair, teeth, mouth, eyes and others, 2) Clothing and equipment hygiene, such as avoiding prolonged use and/or dirty clothes, as well as underwear, towels and toothbrushes, and 3) Food and beverage hygiene, that are from the sorting of food ingredients to their presentation, the habit of not eating snacks, washing fresh vegetables clean piece by piece. using running water etc. According to the Ministry of Health R.I (2001) Efforts to prevent intestinal worms include: maintaining body hygiene, good environmental hygiene, good and clean food and drink, wearing footwear, defecating in the latrine (latrine), maintaining good personal hygiene such as cutting nails and washing hands before eating.

According to Sucipto (2015:110) Broadly speaking, personal hygiene includes personal hygiene, maintaining health by arranging work and rest times as well as recreation/sports, preventing behaviors that can cause food contamination, and good relations between humans, especially in the food business sector, in order to avoid any unfair way of competition. Maintaining personal hygiene and health is important to avoid the dangers of food contamination because human body parts are actually a source of pollution. Maintaining personal hygiene and health can be done by doing things like bathing twice a day, brushing your teeth at least twice, changing clothes every day, washing your hair, trimming your nails, and not wearing excess make-up.

RESEARCH METHOD

This research uses quantitative research type. The research design used in this research is cross sectional where a research design is used to study the dynamics of the correlation between variables by approaching, observing or collecting data at the same time. The method used in this study is explanatory research, which is to find out how much influence Personal Hygiene and Sanitary Hygiene Conditions have on Soil Transmitted Helmints (STH) Worm Infections in Elementary School Children.

The population in this study were elementary school children in SDN Dukuh Kupang V Surabaya with the number of 50 children. This study uses a sampling technique in the form of total sampling. This research was conducted on March to April 2022. Total sampling is the determination of the sample that involves all members of the population. In research involving sample criteria, inclusion and exclusion criteria can be included. Inclusion criteria: students who are willing to be respondents, students fill out a questionnaire, get permission from parents. Exclusion criteria: taking deworming medicine in the last 2 months, not collecting questionnaires or stool pots past the predetermined limit (7 days).

The sample in this study were elementary school children in SDN Dukuh Kupang V Surabaya. The data collected in this study include primary data and secondary data where the primary data is in the form of STH worm infection data obtained from the direct method of examination of respondents' feces. Secondary data in the form of hygiene and sanitation obtained through questionnaires. The data that has been obtained is then analyzed and looked for correlation using the product moment test. The tools used in his research were a microscope, object glass, deck glass, dropper, sticks and pots of feces. The material used is 2% eosin (IndoReagent) and feces. The inspection procedure uses the direct method, namely: Providing a glass object that has been cleaned with alcohol cotton; Drip a glass object with

2% eosin reagent as much as 1 drop; Take a small amount of feces and mix until homogeneous using a stick; Cover the glass object with dekglass and examine it under a microscope (Axiom Germany) with a magnification of 10-40x.

Table 2. Frequency of Respondents Personal Hygiene and Environmental Sanitation

		Bad		**Good**		**Total**
	Indicator	*N*	*%*	*N*	*%*	
DWI	*Source of water*	*34*	*68*	*16*	*32*	*50*
	Storage Vessels	*32*	*64*	*18*	*36*	*50*
	Drinking Method	*35*	*70*	*15*	*30*	*50*
	Boiling Water	*31*	*62*	*19*	*38*	*50*
	Water storage practices (covered/uncovered)	*28*	*56*	*22*	*44*	*50*
PHI	*Before food with water*	*30*	*60*	*20*	*40*	*50*
	Before food with water and Soap	*38*	*76*	*12*	*24*	*50*
	After visiting toilet with soap	*35*	*70*	*15*	*30*	*50*
	Wearing footwear	*27*	*54*	*23*	*46*	*50*

From table 2, it can be seen that the majority of students pay less attention to the Source of water, as many as 34 people (68%) and the minority pay attention to the Source of water quite well, as many as 16 people (32%). The majority of students paid less attention to Storage Vessels as many as 32 people (64%) and the minority paid attention to Storage Vessels quite well, as many as 18 people (36%). The majority of students did not pay attention to the Drinking Method, as many as 35 people (70%) and the minority paid attention to the Drinking Method quite well, as many as 15 people (30%). The majority of students paid less attention to Boiling Water as many as 31 people (62%) and the minority paid attention to Boiling Water quite well, as many as 19 people (38%). The majority of students did not pay attention to water storage practices (covered/uncovered) as many as 28 people (56%) and the minority paid attention to water storage practices (covered/uncovered) quite well, namely as many as 22 people (44%).

From table 2, it can be seen that the majority of students did not wash their hands before food with water as many as 30 people (60%) and the minority washed their hands before food with water quite well, as many as 20 people (40%). The majority of students did not wash their hands before food with water and soap, as many as 38 people (76%) and the minority washed their hands before food with water and soap quite well, as many as 12 people (24%). The majority of students did not wash their hands after visiting toilet with soap as many as 35 people (70%) and the minority washed their hands after visiting toilet with soap quite well as many as 15 people (30%). The majority of students did not wash their hands wearing footwear, as many as 27 people (54%) and the minority washed their hands wearing footwear quite well, as many as 23 people (46%).

Table 3. distribution of infection with Soil Transmitted Helmints (STH)

No	***Warm infection***	***Frequency***	***%***
1	*Negative*	*34*	*68*
2	*Positive*	*16*	*32*
Total		*50*	*100*

Based on the results of the examination of the 50 samples examined, 32% (16 people) had positive results while the rest were negative

Table 4. Species of Soil Transmitted Helmints (STH)

Types of Worms	***Frequency***	***%***
Ascaris Lumbriocis	*9*	*56*
Trichus Trichiura	*4*	*25*
Hookworm	*3*	*19*
Total	*16*	*100*

In table 4, the results of the examination of STH worm species were found in 16 positive students, namely ascaris lumbriocis as many as 9 people (56%), trichus trichiura as many as 4 people (25%), and hookworms as many as 3 people (19%}.

Table 5. Tabulation

Hygiene student	***Warm infection***				***Total***		***P Value***
	Positive		*Negative*				
	N	*%*	*N*	*%*	*n*	*%*	
Good	*9*	*56*	*34*	*68*	*43*	*86*	*0.002*
Bad	*7*	*14*	*0*	*0*	*7*	*14*	
	16	*70,25*	*34*	*68*	*50*	*100*	

Judging from the hygiene aspects of students who have been categorized into 2 categories. A total of 9 (56%) students who were positive for worm eggs were students who had good hygiene behavior, while the other 7 students (14%) came from students with poor hygiene aspects.

The results of statistical tests with Fisher's Exact test obtained p value = 0.002 (p <0.05) which means that there is a relationship between personal hygiene and Sanitation Hygiene Conditions of students with STH egg contamination.

RESULT AND DISCUSSION

Worm infections mostly attack students because their activities are more related to soil. In general, it does not cause serious and non-lethal disease so it is often ignored, but in the long term it can reduce health status (Nurhalina and Desyana, 2018). Worms as parasitic animals not only take nutrients in the intestines, but damage the intestinal walls so that they interfere with the absorption of these substances. Humans infected with worms usually experience symptoms of lethargy, weight loss, lack of enthusiasm and accompanied by coughing.

Research by (Kamariah, Manyullei and Bujawati, 2014) in Medan each shows, 25% and 15.09% of students' fingernails were positively contaminated with worm eggs and all came from the Ascaris lumbricoides species. on the fingernails of students in an elementary school in Bandar Lampung is 88.2%.

The incidence of worm infection can be affected by unhygienic habits. According to Onggowaluyo (2002) that transmission of worms infection is through dirty hands and fingernails. The results of various studies show that the average fingernail growth in one week is 0.5-1.5 mm (Han and goleman, daniel; boyatzis, Richard; Mckee, 2019). Long nails can certainly be a place for various dirt and worm eggs to attach which can then enter the body when consuming food without washing hands first. Washing hands after defecating with soap is also very important, because according to Sofiana (2011) feces plays a very important role as the main route in the transmission of infectious and non-communicable diseases such as worms infection (Sofiana, Sumarni and Ipa, 2011).

Suriani (2014) stated that hand washing behavior is very important where hands contaminated with STH can transmit worm infections. Washing hands with water and soap can more effectively remove dirt and dust mechanically from the skin surface and significantly reduce the number of disease-causing microorganisms such as viruses, bacteria, and other parasites on both hands on the skin surface, nails, and fingers (Wahyuni, 2018).

Research by Ching (2010) in Hamlet II, Sidomulyo Village, Binjai District, Langkat Regency, North Sumatra, showed that the percentage of soil contamination by STH eggs in residents' yards was 70% of the 40 samples. A similar study was also carried out by Sumanto (2010), that school children who live in houses where worm eggs are found in the soil have a 10.4 times greater risk of being infected with worms than children who live in houses with yards that are not contaminated by worms. ova. Therefore, children who often play outdoors and come into contact with the ground will be at risk of STH egg contamination on their nails and hands. This is in line with the results of Wintoko's research (2014), which shows that there is a significant relationship between playing with the ground and the identification of worm eggs on the fingernails of students in Bandar Lampung (p = 0.001).

Most students also have good hygiene, but there are still students who have worm eggs on their nails and hands. The reason may be the hand washing technique that is still not right. Washing hands with soap with the right technique is the best way to prevent worms.

Proper hand washing behavior, namely by washing hands in running water and using soap, can remove various kinds of dirt on the hands so that the hands become clean.

CONCLUSION

Based on the results of the study and after a series of analyzes and discussion of the results of the examination of the 50 samples examined, 32% (16 people) had positive results while the rest were

negative, it was concluded that there was a significant relationship between environmental sanitation and personal hygiene (hand washing habits, nail hygiene, and use of footwear) with Soil Transmitted Helminths (STH) infection in primary school children. So it is expected to always wash hands with water and soap so that it is more effective in removing dirt and dust mechanically from the skin surface and significantly reduces the number of disease-causing microorganisms such as viruses, bacteria, and other parasites on both hands on the skin surface, nails, and fingers.

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