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RESEARCH ARTICLE

The Relationship of Intestinal Parasitic Infections to Environmental Sanitation

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Abstract: Intestinal parasitic infection is a problem that is still widely encountered in health-related communities with a fairly high morbidity rate of 411 per 1,000 population in Indonesia and 12.5% in the city of Medan. The cause is due to protozoan infection and to helminthiasis. Transmission of parasitic infections has risk factors that greatly influence, namely personal hygiene, residence, access to health education, family education, shoe wearing habits, hand washing practices, toilet availability, availability of clean water and defecation practices. This study was conducted to determine the relationship between intestinal parasitic infections and environmental sanitation at Helvetia Health Center, Labuan Health Center, Martubung Health Center. Analytical conservation (Chi-Square) with cross-sectional design. At least 100 people met the inclusion criteria. Data from surveys are results obtained over time from survey respondents' responses and information from survey participants' stool samples examined under a microscope using lugol and diethyl ether. From a total of 100 samples, it was found that 8 (8%) people suffered from intestinal parasitic infections with *Trichuris trichiura* 1 (1%), *Hookworm* 3 (3%), and *Blastocystis* 4 (4%). There were 100 (100%) samples that had good sanitation. No significant association was found between intestinal parasitic infection and environmental sanitation in the study sample (p = 0.08). There is no relationship between intestinal parasitic infections and environmental sanitation.

Keywords: environmental sanitation, intestinal parasites.

INTRODUCTION

Environmental sanitation is an effort to create and foster a good and healthy condition in the health sector, especially health in the community. Environmental sanitation has its own way to nourish the human environment, especially in the physical environment, namely soil, air, and water. Environmental sanitation can be used to show the state of health of an ecosystem that shows an increased rate of sewage removal, and the provision of clean water. (IWASH, 2018). The occurrence of a relationship between intestinal parasitic

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infections and environmental sanitation that can cause disease in the population around the work area of Helvetia Health Center, Labuhan Health Center and Martubung Health Center. [1]

Intestinal Parasitic Infection is a health problem experienced by the community caused by protozoan infection and worms. Based on WHO data, more than 1.5 billion people or 24% of the world's population suffer from intestinal parasitic infections. This infection is spread in tropical and subtropical countries with the highest number of protozoan infections in sub-Saharan countries – Africa, America, China, and East Asia with a morbidity rate of 50 million people showing symptoms of infection and 100,000 thousand people dying. In Indonesia, this infection is also still widely found and has not been completely resolved. [1]

Morbidity due to infection to intestinal worms is quite high at 411 per 1000 population arising in Indonesia and in Papua around 21.9%. [1.2] Intestinal parasitic infections are also found in North Sumatra, especially in the city of Medan by 12.5%. [3] Based on research data conducted by Simorangkir (2015) on grade 3 and 4 elementary school children in Harjosari 1 Village, Medan Amplas District found data on the prevalence of *Soil Transmitted Helmintes* (STH) infections that were quite high, reaching 40% in the form of single infections and mixed infections, with *Ascaris lumbricoides* being the cause of the most infections. Meanwhile, data on the prevalence of worms in elementary school students in Sikapas Village, Mandailing Natal Regency in 2016, found that 60 students were positive for STH infection (70.1%) from a total of 87 research samples. [4]

The role of parasitic infections is thought to be influenced by several factors. Some factors that greatly influence the transmission system of intestinal infectious diseases are clean water facilities used as water sources that do not meet sanitary requirements, waste disposal in the form of unhealthy toilets, waste disposal, and improper waste management. Another risk factor is a dirty and unhealthy lifestyle. [5.19]

Symptoms of people with parasitic infections can include abdominal pain, diarrhea, skin problems, intestinal worms, dysentery, typhoid, and even cholera. Transmission of parasitic infections through contaminated air, contaminated hands, or directly through contaminated food or drink. [6,19,20] Based on previous research, it is known that 72.0% of residents in the working area of the Tasikmadu Health Center in Karanganyar Province do not have latrines that are measured 3,229 times higher than the recommended level. Risk is present. 61.7% of the population does not have waste handling facilities, and young children living in slums with inadequate waste management facilities face a risk 2,547 times greater than the average population. 71.4% of the population does not have access to clean air, while young children born and raised in developing countries have this access. Homes with persistent air leaks that do not qualify have a 3,232 times higher risk. [7]Therefore, this study aims to determine the relationship between

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environmental sanitation and the recent outbreak of parasitic infections in Helvetia Health Center, Labuan Health Center, Martubung Health Center, and Haji Adam Malik Medan Central General Hospital.

METHODS

This study is an analytical observational study with a *cross sectional* approach. This research was conducted at Helvetia Health Center, Helvetia Village, Medan Helvetia District; Medan Labuan Health Center; Martubung Health Center; and at RSUP. H. Adam Malik. The time of this study began in August – October 2021. This research was conducted by obtaining approval of the code of ethics of the Faculty of Medicine, University of North Sumatra with code of ethics approval number **26/UN5.2.1.1.23/SDM/IKT/2021.**

Sample selection based on *purposive sampling* with inclusion criteria: All age groups who come to the Puskesmas and are willing to participate in the research by signing on the consent sheet. Sample acquisition based on *case base detection* , namely the population who come for treatment to puskesmas and health workers. If the patient has been taking antibiotics for 1 week and the wrong specimen collection and collection technique was excluded in the study. The minimum sample size based on the formula obtained at least 100 samples that must be studied. Samples that have met the inclusion criteria. D conduct examination offecal specimens with lugol staining where the assessment of fecal examination in the form of color, consistency, presence of mucus, pus or blood. Stool that has been stained by lugol will be examined by a microscope to assess the presence of cysts or protozoa.

Data processing and data analysis were performed univariate and bivariate analysis using computer statistical software (Chi-Square test). Univariate analysis to determine the picture of the distribution of the sample frequency of the study with the distribution of intestinal parasites. Bivariate analysis was conducted to assess the correlation / relationship of knowledge level, personal hygiene status, and environmental sanitation in the distribution of intestinal parasites. From the multivariable analysis, variables that had a *p-value* of less than 0.05 were expressed as factors that were significantly associated with intestinal parasitic infections.

RESULTS

Of the 100 patients with intestinal parasitic infections who have met the inclusion criteria, 48 people (48%) are men and 52 people (52%) are women, which can be seen in table 1. Judging from the degree of education where the most is found, namely high school education amounting to 84 people (84%). Based on the work in this study, the most characteristics obtained by 48 people (48%) are most workers / employees and 2 people (2%) are at least drivers. Based on body mass index (BMI) 99 people (99%) are samples with body mass index status Obesity I. With less body weight only 1 person (1%).

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Table 1. General Characteristics of Research Samples

Variable	Research sample	
	Number of People (n)	Percentage (%)
Gender		
Man	48	48
Woman	52	52
Education		
Did not finish elementary school	2	2
Primary school	0	0
Junior High School	9	9
High School	84	84
College	5	5
Work		
Housewives	17	17
Self employed	9	9
Driver	2	2
Farmer	7	7
Labor/Employee	48	48
Miscellaneous	17	17
Body Mass Index		
Underweight	1	1
Normal weight	0	0
More weight	0	0
Weight is riskier	0	0
Obese I	99	99
Obese II	0	0

From the most common parasitic infection studies, 100 fecal specimens were found as many as 8 (8%) were positively infected with intestinal parasites and (92%) were negative or no intestinal parasites were found.

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blastosyitis eggs as much as 4 (4%), *hookworm* parasites as many as 3 (3%), and *trichuris trichura* 1 (1%).

Table 2. Intestinal Parasite Infections Found

Types of intestinal parasitic infections	Number of People (N)	Percentage (%)
Not infected	92	92
Infected	8	8
Single infection	8	8
Trichuris trichura	1	1
Hookworm	3	3
Blastosystis	4	4
Double infection	0	0

In this study, it can be seen that the majority have a moderate level of knowledge as many as 59 people (59.0%), and the percentage of less and good knowledge level is almost equal to the difference of 1 sample. Personal hygiene status and environmental sanitation are good with a percentage of 100%.

Table 3. Distribution of Knowledge Levels, Personal Hygiene and Environmental Sanitation

Variable	Number of People (n)	Percentage (%)
Knowledge Level		
Less	20	20,0
Keep	59	59,0
Good	21	21,0
Personal Hygiene		
Less	0	0,0
Good	100	100
Environmental Sanitation		
Less	0	0,0
Good	100	100

From Table 4 below it can be seen that there is a relationship between knowledge and intestinal parasitic infections, this is evident from the results of Fisher's exact test, where p<; 0.05 (p=0.011).

Table 4. Level of Knowledge with Intestinal Parasitic Infections

Knowledge Level	Examination of helminth eggs		Total	P value
	Found	Not Found		

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	Sum (n)	Percentage (%)	Sum (n)	Percentage (%)		
Less	5	25,0	15	75,0	20	0,011
Keep	3	5,1	56	94,9	59	
Good	0	0,0	21	100	21	

Based on the relationship between personal hygiene and intestinal parasites, it was found that no parasites were found in good personal hygiene status by 92 (92%) and only 8 people (8.0%) were found worm eggs in feces with good hygiene status as well.

Table 5. Personal Hygiene Level with Intestinal Parasitic Infections

Higiene Personal	Examination of helminth eggs				Total	P value
	Found		Not Found			
	Number of People (n)	Percentage (%)	Number of People (n)	Percentage(%)		
Good	8	8,0	92	92,0	100	0,08
Less	0	0,0	0	0,0	0	

From table 6 below, it can be concluded that 92% of research samples that have good sanitation are not found parasites in parasitological examinations. However, a p: 0.08 value showed no significant relationship between sanitary status and the occurrence of intestinal parasitic infections.

Table 6. Environmental Sanitation with Intestinal Parasitic Infections

Environmental Sanitation	Examination of helminth eggs				Total	P value
	Found		Tidak Ditemukan			
	Number of People (n)	Percentage (%)	Number of People (n)	Percentage (%)		
Good	8	8,0	92	92,0	100	0,08
Less	0	0,0	0	0,0	0	

DISCUSSION

An infection known as intestinal parasites is one of the most commonly reported, in both developed and developing countries. In this study, the most gender, namely 48 people (48%) were men and 52 people (52%) were women. The results showed that more cases involved this female gender compared to men. In the current study, about 84% of students were high school students, but it was concluded that none of the students were enrolled in elementary school programs. In contrast to the report stating that the prevalence of

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infant maltreatment throughout Indonesia during years 1 to 12 is at a high level, ranging from 30% to 90%. There are currently 13 million children in the United States attending school and 37 million elementary school children in the United States infected with intestinal worms or *soil-transmitted helminths* (STH). [8,15,17]

Of the 100 fecal specimens, 8 (8%) were positively infected with intestinal parasites and (92%) were negative or found no intestinal parasites. Below shows that the types of parasites found are *blastosyitis* eggs as much as 4 (4%), *hookworm* parasites as many as 3 (3%), and *trichuris trichura* 1 (1%). In the study of Lia TH &; Sitti, RU, in 2017 the results showed that 88 people (88%) were not infected with parasites while 12 people (12%). *Trichuris trichiura* (8%), *Cryptosporidium sp*. (1%), hookworm (1%), double infection between Trichuris trichiura and *Enterobius vermicularis* (1%), and *Trichuris trichiura* caused by *Cryptosporidium sp*. are the most commonly reported parasitic infections. This result is in accordance with the results of the analysis that has been carried out, which shows that the proportion of samples that are free of parasitic infection is much higher compared to infected samples. [9,14,16]

From this study, the majority had a moderate level of knowledge as many as 59 people (59.0%), and the percentage of less and good knowledge level was almost equal to the difference of 1 sample. Personal hygiene status and environmental sanitation results are good with a percentage of 100%. Based on knowledge and intestinal parasitic infection there was a significant relationship with p value = 0.011 in this examination. It can be seen that no parasites were found in good personal hygiene status by 92 (92%) and only 8 people (8.0%) found worm eggs in feces with good hygiene status as well. [10.12]

However, Yulianto's (2007) research has just confirmed a significant relationship between personal hygiene and, for example, hand washing and nail trimming with the incidence of worms in the case of a student at SDN Rowosari 01, Tembalang District, Semarang City. Only 8% of people with good personal hygiene were found to have worm eggs [10]. The study found no evidence of parasites. [11.13]

This study showed that 92% of research samples with good hygiene found no parasites during parasitological examination. But a *P-value* of 0.08 showed no significant association between health and the presence of intestinal parasitic infections.

In addition to harmful factors, environmental factors such as the amount of stale air, the amount of fresh air, and the distribution of latrines are also examined to see how they relate to recurrent parasitic infections. The results of this study are in line with research conducted by Lia TH &; Sitti, RU in 2017 which found that air quality from the sea, rain reservoirs, and wells was not associated with intestinal parasitic infections. (p = 0.151, 95% CI 2.042-2.366). People generally already have healthy latrines with septic tanks available at home, although there are still some people who have latrines at home but defecate in rivers or in gardens, this wrong habit factor makes it difficult to assess the

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relationship between the availability of healthy latrines and the incidence of intestinal parasitic infections. [11,18,19]

CONCLUSION

In this study, it was concluded that there was no relationship between intestinal parasitic infection and environmental sanitation with a p value = 0.08.

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