

# **The Effect Of Soil Contamination By Ascaris Lumbricoides Worm Eggs on The Incidence Of Intestinal Worms in RT 02 RW 05 In Herga Manah Village, East Cikarang, Bekasi West Jawa, Indonesia 2016**

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**Abstract**—According to WHO report 2012, 1(one) billion people suffer from worm diseases infected by *Ascaris lumbricoides*; 795 million by *T. trichiura*; and 740 million by hookworms (*Ancylostoma duodenale* and *Necator americanus*). The infection comes from contamination soil by ingestion of (*A. lumbricoides* and *T. trichiura*) eggs or by active penetration of the skin larvae in the soil.<sup>i</sup>In Indonesia, worm disease is the most public health problem after malnutrition, which is the highest prevalence and intensity are children of primary school age<sup>ii</sup>. In serious condition it is able to make malnutrition and reduce the physical and fitness. Desa Herga Manah, Eastern District of Cikarang, Bekasi-Indonesia, sanitary conditions are poor where there are still many households that do not use healthy family latrines. To prove the effect of soil contaminated by worm eggs in RT 02 RW 05, this research was conducted on June 2016 at Desa Herga Manah Cikarang, Bekasi West Jawa, Indonesia 2016. The method of this research was descriptive analytic study, which is intended to analyze the influence of soil contamination by worm eggs. Hypothesis (Ho) of this research was there was no influence of soil contaminated eggs of *Ascaris lumbricoides* on the incidence of wormy cases. The Results of the study were the proportion of patients with intestinal worms was 78%; the number of soil samples found worm eggs was 58%; and the effect of soil contaminated eggs of *Ascaris lumbricoides* against worm intestinal cases statistically significant effect, where as P-value of 0.036 or <0.05 OR 5.33.

**Keywords :** Worm Disease, Soil Pollution, Healthy Family, Latrines Construction

## **1. INTRODUCTION**

More than 2 billion people in the world are infected worms. High prevalence mostly found in developing countries. There are some kinds of worms which transmit the soil as agent such as *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms. The number of the infection are *A. lumbricoides* over 1 billion people; *T. trichiura* 795 million; and hookworms (*Ancylostoma duodenale* and *Necator americanus*) 740 million. The greatest numbers of infections happen in sub-Saharan Africa, the Americas and East Asia (including China). The Infection is caused by ingestion of eggs from *A. lumbricoides* and *T. trichiura* contaminated soil or penetration of the skin by larvae in the soil actively from hookworms.<sup>iii</sup>

Furthermore, Kathrin.Z (2012) states that more than a billion people in the world are infected with soil-transmitted helminths, parasitic worms that live in the human intestine (gut). Roundworm, whipworm and hookworm infections mainly occur in tropical and subtropical regions and mostly happen in developing countries. It happens where there is insufficient access to clean water, inadequate sanitation especially for disposal of human feces and urine, poor personal hygiene, infected individuals excrete helminth eggs in their feces, and contaminated soil of worm eggs.<sup>iv</sup>In addition, worm diseases cause chronic malnutrition, growth stunting and decreased physical fitness.

In Indonesia, worm disease is the most public health problem after malnutrition. The highest prevalence and intensity is found among elementary school age children. In North Sumatra, the prevalence rate ranged from 57 to 90% which includes the second level areas of Binjai, Tebing Tinggi, Simalungun, Pematang

Siantar, Tanjung Balai, Sibolga and Medan according to the results of a study in 1995.<sup>v</sup>

Based on observation in the field work of students every year, especially in *RT 02 RW 05* Herga Manah Village, East Cikarang, Bekasi West Jawa Indonesia, the condition of sanitation is still bad as the households do not use healthy family toilet. Thus, the area can be categorized as contaminated by abdominal worm eggs (*Ascaris lumbricoides*). To prove the effect of contamination of the soil by worm eggs on the case of worm diseases in *RT 02, RW 05* of Herga Manah Village, East Cikarang, Bekasi West Jawa-Indonesia, the research has been done. The aims of this research were to identify the proportion of worm sufferers based on faces examination; to analyze the number of positive contaminated soil samples, and to prove the effect of contaminated soil by worm eggs alongside worm disease cases in Desa Herga Manah village.

## **2. MATERIALS AND METHOD / RESEARCH METHOD**

The type of this research was descriptive analytical research, which is intended to analyze the effect of soil pollution by worm eggs of *Ascaris lumbricoides* due to use unhealthy latrines. Moreover, the influence of healthy life behavior (habit of defecation not in healthy toilet, do not wash hands after defecation and do not wash hands before eating) to the happening case of worm diseases.

### **A. Hypothesis:**

- 1) There is no effect of soil that is contaminated *Ascaris lumbricoides* worm eggs with the occurrence of worm diseases cases
- 2) There is no effect of soil that is not contaminated *Ascaris lumbricoides* worm eggs with the occurrence of worm diseases cases

This research was conducted on June to October 2016 in *RT 02, RW 05* of Herga Manah Village, East Cikarang Subdistrict, Bekasi Regency. The object of this research was the society and the soil either frontyard or backyard in *RT 02, RW 05* Herga Manah Village, East Cikarang District, Bekasi Regency. Total of the residents are 394 people (East Cikarang, Bekasi Regency in 2014 figures). The sample in this study were the residents and the soil as many as 50 houses located in *RT 02, RW 05* Herga Manah Village, East Cikarang District, Bekasi Regency, in 2016, while the population to be taken as feces sample were 100 people (every house taken two people).

### **B. Data collection:**

The technique of primary data collection was shown below.

- 1) Taken soil samples at residents who live in *RT 02 Rw 05* of Herga Manah Village, East Cikarang Subdistrict,
- 2) Taken faces samples at residents home of *RT 02 Rw 05* of Herga Manah Village, East Cikarang Subdistrict,
- 3) Recorded all of the samples including houses samples and the residents who were taken their faces samples using the available designed forms.
- 4) Sending samples of soil and faces to the laboratory of the Center for Environmental Health Engineering (BBTKL) Jakarta for laboratory examination.

### **C. Secondary data were required:**

- 1) Data about demographics
- 2) Data of worm diseases

3) Data coverage of family latrines.

#### D. Processing and analysis of data

Data processing was done by using the computer. Then, the data were grouped and tabulated into univariate and bivariate. The analysis was done analytically by test using SPSS program. This test was used to determine the regression model independent variables that partially significant effect on the dependent variable.

### 3. RESULTS AND DISCUSSION

#### a. Results:

##### 1) Proportion of Worms Diseases Patients

The proportion of worm sufferers based on faces examination in RT 02 RW 05 Herga-manah Village East Cikarang, can be seen in the table below :

Table 1. Proportion Of Worm Diseases Cases In Rt 02 Rw 05 Herga Manah Village, East Cikarang Bekasi 2016

Faces Examination Result	Amount	%
Wormy	39	78
Healthy	11	22
<b>Total</b>	<b>50</b>	<b>100</b>

Table 1 showed that from the results of laboratory tests, 39 respondents (78%) are suffering from worm diseases and the remaining 11 respondents (22%) did not suffer from worm diseases (healthy).

##### 2) Number of soil samples, positive found worm eggs

The number of positive soil samples found worm eggs in RT 02 RW 05 village Herga Manah, East Cikarang, Bekasi can be seen in the table as follows:

Table 2. Total Soil Samples, Positive Found Worm Eggs In Rt 02 Rw 05 Herga Manah Village, East Cikarang-Bekasi 2016

Soil Examination Result	Amount	%
Positive	29	58
Negative	21	42
<b>Total</b>	<b>50</b>	<b>100</b>

Table 2 showed that 29 (58%) soil samples positively contain worm eggs, and 21 (42%) soil samples negative contain worm eggs.

##### 3) Influence of soil contaminated with *Ascaris lumbricoides* worm eggs on cases of worm disease.

The effect of soil contaminated by *Ascaris lumbricoides* worm egg on the case of worms can be seen in table as follows:

Table 3. The Effects Of Soil Polluted With *Ascaris Lumbricoides* eggs On A Case Of Worms Diseases At Rt 02 Rw 05 Herga Manah Village, East Cikarang Bekasi, 2016

Result of Soil sample examination	Result of faces examination				Total		OR ( 95 % CI)	P Value
	Wormy		Healthy		Jml	%		
	Jml	%	Jml	%				
Positive (polluted)	26	89,7	3	10,3	29	58	5,33 (1,209 – 23,536)	0,036
Negative (not polluted)	13	61,9	8	38,1	21	42		
Total	39	78	11	22	50	100		

Table 5, shows that the result of positive soil samples test contained worm eggs (contaminated soil) were 26 respondents (89,7%); and 3 (10,3%) samples were negative or did not contain worm eggs (healthy). The negative soil samples of worm eggs (uncontaminated soil) were 13 respondents (61.9%) with positive faces samples containing worm eggs and 8 respondents (38.1%) were negative or not containing worm eggs (healthy). The effect of soil contaminated by *Ascaris lumbricoides* worm eggs on cases of worm diseases from statistical results showed that the P value of 0.036 with OR of 5.33

## **B. DISCUSSION**

### **1) Proportion of Worm Disease Patients**

After 50 respondents tested their faces, mostly 39 respondents (78%) found positive contaminated worm eggs which prevalence national 50 - 90% (Indonesia). This indicates that the person concerned were suffering from a worm disease. In this study, 39 faces samples found in the worm eggs were consisted 27 (69%) *Ascaris lumbricoides* worms and 16 (41%) hookworms. This problem is related with statement Umar Fahmi (2015) that in Indonesia worm disease is the most public health problem after malnutrition, which is the highest prevalence and intensity among children of primary school age. Many factors affect the incidence of intestinal worms beside socio-economic factors such as age, gender, occupation and education of parents.<sup>vi</sup>

According to the data, there are 39 people suffering worm disease: 20 people were male gender (51%) and 19 people were female gender (49%).

Besides, based on observations in the field, many children played in the yard and exposed to the soil which almost 58% of the soil has been contaminated by the worm eggs (according to the results of examination of soil samples). Then, after playing in the ground, they did not washing their hands. Therefore, it was predicted can lead to the occurrence of transmission of the incidence of worms in the children. This statement supported by Jill E. Weatherhead, MD (2013) that Intestinal helminth infections, or soil-transmitted helminth infections especially from hookworm, mostly happen in children and cause anemia or chronic malnutrition may result in growth stunting and decreased physical fitness and this can be permanent in chronic cases. The greatest numbers of children with intestinal worms found in India, Nigeria, Indonesia, and Bangladesh. In order to reduce the prevalence of intestinal helminth infections among children exceeds 50%, the children treated with a single annual dose of *albendazole* or *mebendazole*. Then, it needs supporting system to control the worm disease for children such as integration of water, sanitation, and hygiene programs.<sup>vii</sup>

### **2) Number of soil samples found Worm eggs**

According to the results of soil examination, it found 29 respondents (58%) who contained worm eggs or contaminated by human feces and 21 respondents (42%) found no worm eggs or not contaminated by human feces.

The presence of contamination by worm eggs indicate that the faces disposal system in the area was not required environmental health. Many of the people who dispose of faces (defecation) are out of place. The results of this study indicate that among the 50 families; there are 23 families (46%) did not have family toilet, 14 families (28%) with family latrines were eligible for health, and 13 (26%) they had family latrines but the condition did not required health requirements (unhealthy latrine).

The eggs were identified by powerful microscopes after they had been separated from the soil using sieves. In the right conditions, the dead eggs can be preserved for hundreds of years due to the robust nature of their cell walls. Roundworms infest the human digestive tract and use its body as a host to live and reproduce. As they steal their hosts' food, an infection could have resulted in malnutrition or death among people who had extremely poor diets.<sup>viii</sup> According to Susanne Damback (2015), 2.5 billion people do not have access to have healthy toilets, and that is one third of the human world population. A leaky latrine pits or open defecation makes people sick, which more than half of all diarrhea cases are caused by faecal pathogens that somehow ended up in drinking water. Diarrhea is a major killer: It is the second leading cause of death among children under five, and the leading cause of malnutrition this age group. Each year, diarrheal diseases kill about 760,000 children under five – and these deaths could be prevented with clean drinking water and adequate sanitary solutions.<sup>ix</sup> To reduce the amount of pollution of the soil by worm eggs, it is necessary to build a family toilet and provide counseling about Clean and Healthy Behavior.<sup>x</sup>

### **3) The effect of soil contaminated by *Ascaris lumbricoides* worm eggs on cases of worm diseases.**

The effect of soil contaminated by *Ascaris lumbricoides* worm eggs on the case of worms from the statistical result shows that the value of P-value is 0.036 or it means P value  $<0.05$  so that  $H_0$  is rejected and  $H_a$  is accepted so these mean, statistically there is influence between soil contamination with the occurrence of worms diseases, with OR of 5.33, meaning that the soil contaminated with worm eggs has a risk for worms diseases occurrence of 5.33 times greater than the soil that was not contaminated with worm eggs. The amount of soil contamination by intestinal worm eggs and unhealthy community behavior supports the risk of worm diseases. The more people who do not have healthy latrines the greater the risk for soil pollution and the risk of worm disease in the community. Therefore, it is necessary to build a healthy family latrine and provides counseling to the community to behave clean and healthy lifestyle. To overcome the worm disease needs to be treated against the sufferers<sup>10</sup>. For prevention of reducing worm disease, the children should wash their hands after using the toilet and before eating. Parents should seek medical treatment for infected children and change the bed linen and underwear daily for several days after treatment. Normal hot water washing of clothes and bed linen will kill threadworm eggs. At last but not least, clean toilet seats and pot ties and keep the children's fingernails short.<sup>xi</sup>

#### **4. CONCLUSION**

- 1) The proportion of worm sufferers was 39 (78%)
- 2) The number of soil samples found by worm eggs was 29 (58%)
- 3) The effect of soil contaminated by *Ascaris lumbricoides* worm eggs on worms diseases cases, statistically affected significantly with P-value 0.036 or  $<0.05$  with OR 5.33.

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