

Conference Paper

The Association Between Soil Transmitted Helminth Infections with Nutritional Status in Children (A Cross Sectional Study in Elementary School, Candi Village, Semarang District, Central Java Province, Indonesia)

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Abstract

Elementary school age children are vulnerable group in nutrition issue caused by Soil Transmitted Helminth (STH). The infections of STH can block the nutrient absorbment through body. The aim of this study was to analyze the relationship between STH infections (Soil Transmitted helminths) with the nutritional status among elementary school age children. This research was a observational analytic with cross sectional design. This study was conducted in elementary schools, located in Candi village, Bandungan District, Semarang Regency. Subjects were selected by random sampling technique, with 71 students as sample. Data was tested with validity and reliability test to determine the data quality. Data was analyzed by Chi-square test, with a 95% confidence level. The Prevalence of Soil Transmitted Helminth infection was 11.3% and the prevalence of underweight nutritional status was 40.8%. The statistical test showed that p value = 1.000 ($p > 0.05$). This study concluded that there is no statistical relationship between STH infection and nutritional status. Furthermore, to examine the main cause in nutritional status, students need feces observation.

Keywords: Association; Elementary School Age Children, Nutritional Status, Soil Transmitted Helminthes, Worm Infection

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1. INTRODUCTION

Soil Transmitted Helminths (STH) are parasitic worms of the nematodes species. The worms included in STH are: *Ascaris lumbricoides*, *Tricurius trichiura*, *Ancylostoma duodenale* or *Necator americanus*. Its transmission is through direct infection on the skin or through eggs that are contaminated by soil with poor environmental sanitation [19].

In 2010, estimations of global infection of STH are 27% on hookworm, *A. lumbricoides* 25%, and *Trichiuris trichiura* 48%. The highest prevalence is among Asian and African region [9]. Prevalence of STH infection on elementary school age children in Indonesia is 25% (WHO n.d). According to the data from Health Department of Central Java, the survey presented that highest worm infection case is in Semarang regency which is 25% [4]. Elementary school age children are vulnerable group in STH infection [16]. World Health Organization showed that number of children suffered with STH infection around this world is about 6.1300.000 (WHO 2012b). Recent study in Honduras explained that Factors affected the infection of STH in rural areas in Honduras were personal hygiene and environmental sanitation [7].

Epidemiological overview showed that infection intensity rate on most people is low. However, there are some with high infection intensity [10]. The consequence of manifestation of STH infection will affect nutritional status. Worms in the intestine take carbohydrate and protein before those nutrients move through the body. Besides absorbing nutrition in the intestine, the worms will damage the intestinal wall, so the function will be disturbed [2]. The condition contributes in the lack of nutrition intake which leads to retardation of growth, body fitness, intelligent performance, and anemia [13].

In 2010, according to WHO research, the global prevalence of malnutrition case on elementary age school children is 28% (171 million children), with the highest prevalence in East Africa [6]. Meanwhile, in Indonesia 59.7% protein intake is less than 80% based on Dietary Allowance (AKG) [24]. Meanwhile, prevalence of children nutritional status in Central Java is 10,2% skinny [11].

Malnutrition on children at school age is the primary problem of public health. More than 200 million school age children suffer by weight disorder and it is estimated that in 2020 about one billion children suffer physical and mental development disorders due to malnutrition [17]

2. METHODS

The type of the research is observational research using cross sectional approach. Sampling technique is random sampling. Population consists of 181 children grade 4 with 71 samples.

3. RESULTS

The research finding presented frequency distribution of personal hygiene behavior such as cutting nails, washing hands, playing on the ground, processing of municipal solid waste, floor management, and latrine management. Data collecting resulted in:

TABLE 1: Frequency Distribution of Personal Hygiene.

Personal Hygiene Behavior	Total (n)	Percentage (%)
Bad	32	45,1
Good	39	54,9
Total	71	100,0

From the table 1 above, result showed that more than half of the research subjects have good personal hygiene behavior.

TABLE 2: Frequency Distribution of Environmental Sanitation.

Environmental Sanitation	Total (n)	Percentage (%)
Unhealthy	66	93,0
Healthy	5	7,0
Total	71	100,0

Based on the table 2 above, 93.0% of the subjects are in unhealthy environmental sanitation condition.

TABLE 3: Frequency Distribution of Respondents Based On Worm Infestation Status.

Worm Infestation Status	Total (n)	Percentage (%)
Positive	8	11.3
- A. lumbricoides	5 (62.5%)	
- T. trichiura	2 (25.0%)	
- A. duodenale	1(12.5%)	
Negative	63	88.7
Total	71	100

From table 3 above, the data presented that the proportion of worm infestation on school age children in Desa Candi is 11.3%.

Based on table 4, results of height, weight, and age measurements calculated using *Z-scor* method are resulted in normal nutrition status 54.0%.

Based on table 5, percentage of good nutrition intake was higher (50,7%) than the bad one (49,3%). After data collection on worm infestation status and nutrition status, the writer examined their relations using Chi Square test. The examination

TABLE 4: Distribution of Nutrition Status.

Nutrition Status	Total (n)	Percentage (%)
Skinny	29	40.8
Normal	39	54.0
Fat	3	4.2
Total	71	100.0

TABLE 5: Frequency Distribution of Nutrition Intake.

Frequency of Nutrition Intake	Total (n)	Percentage (%)
Bad	35	49.3
Good	36	50.7
Total	71	100.0

was conducted twice because there are 2 categories of independent variables and 3 categories of dependent variables with nominal scale. The first cross table with nutrition status that consists of skinny and normal results in:

TABLE 6: Relationship between STH Infection and Nutrition Status of Skinny and Normal.

Worm Infestation Status	Nutrition Status				Total	
	Skinny		Normal			
	F	%	F	%	F	%
Worm Infestation	3	37,5	5	62,5	8	100,0
Non-Worm Infestation	26	41,3	37	58,7	63	100,0

The second crosstab with variables of nutrition status (skinny and fat) and worm infestation and non-worm infestation results in:

TABLE 7: Relationship between STH Infection and Nutrition Status Skinny and Fat.

Worm Infestation Status	Nutrition Status				Total	
	Skinny		Fat			
	F	%	F	%	F	%
Worm Infestation	3	37,5	5	62,5	8	100,0
Non-Worm Infestation	26	41,3	37	58,7	63	100,0

Based on table 6 and 7, the research subjects in Desa Candi Kecamatan Bandungan which are infected by worm infestation with nutrition status skinny are 37.5%. The result of statistical test is p value = 1.00 which means there is no relation between STH infection and nutrition status in Desa Candi Kecamatan Bandungan Kabupaten Semarang.

4. DISCUSSIONS

Prevalence of worm infestation on school age children at elementary schools located in Desa Candi was 11.3%. The value exceeds national target of worm infestation which is <10% [12]. The result of the study showed that the highest proportion of worms was *Ascaris lumbricoides*, which is known as type of worm that often infect human. Data from WHO showed that one million people had been infected by *Ascaris lumbricoides*, 795 millions were infected by *Trichuris trichiura* and 740 million were infected by *Hookworm* (WHO 2009c). Risk factors that cause the existence of *A. lumbricoides* are geographical condition and socio economy. Desa Candi has tropical climate with average rainfall intensity is 2.383 mm/year. The temperature range is between 18-32°C. Wind speed of the village is 0,37-0,71 knot with 38,5-98% humidity. Warm climate and moderate humidity support egg hatching and larva growth of *A. lumbricoides*. Candi is a rural area with primary means of livelihood as farmer. Socio economy, lack of sanitation and lack of cleanliness increase the chance of *A. lumbricoides* case [1, 18].

The condition of most of the subjects as seen in environmental sanitation aspect was still bad. STH is transmitted when the feces contained egg pollute the environment so it is easier to develop to the infective step and will likely enter the skin or through mouth. The highest prevalence is in the area with bad cleanliness, water facility, and lack of environmental sanitation [5]. According to the research conducted by Werrell and friend (2013), it is proven that the use and maintenance of personal sanitation facilities will affect STH infection. Environment sanitation and personal hygiene behavior is the key factor in determining exposure and it will affect transmission and infection rate [8].

The condition of personal hygiene in the village was mostly good. However, it didn't occur to all of the research subjects. Personal hygiene is prevention behavior on transmission of worm infestation. The behavior gives significant result to support protective effect [14].

Based on the result from relationship test, it presented that worm infestation infection was not the factor that affects children nutrition status in Desa Candi. The result was similar with the research on the relation between worm infection and nutrition status of elementary school children in Minahasa Indonesia where there was no significant association between worm infection and nutrition status [3]. The condition happens due to the frequency of eating of the elementary school children in Desa Candi is good. The increase of eating frequency can increase metabolism, decrease hunger, increase glucose and insulin, so it will affect nutrition status and prevent infection [25].

In this study, all of the infection intensity was low. Heavy infection burdens risk factor of malnutrition higher among the elementary school children [15].

5. CONCLUSIONS

The result of the research showed that prevalence good personal hygiene behavior was 54%, prevalence of unhealthy sanitation was 93.0%, prevalence of STH proportion was 11.3%, prevalence of Normal Nutrition Status was 54%, and Prevalence of Good Frequency of Food Intake 50.7%. Based on Chi Square test, there was no association between STH infection and nutrition status in Desa Candi Kecamatan Bandungan Kabupaten Semarang.

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