



## Family Characteristics Affecting the Incidence of Worm Parasites Infection in Rural Areas of Central Java, Indonesia

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### Abstract

**Background:** Parasitic infectious diseases are still prevalent in society, especially in tropical and subtropical regions, including in Indonesia. These infections are mostly caused the group of worms transmitted through the soil. The parasitic infections are known as worm disease.

**Objective:** This study aimed to analyze the influence of family characteristics on the incidence of intestinal worms in children under five in one rural area of Central Java, Indonesia.

**Method:** This research applies cross-section design. The location of this research was conducted in District Sumbang Banyumas, Central Java Province. 237 study sample size are toddlers (aged 12 months to <60 months). The data analysis employs univariate and bivariate analysis. Each variable was tested with the statistical test Chi-Square.

**Result:** The results of this study show the family habits who do not defecate in latrines ( $p = 0.02$ ), and the mother feeding the using a spoon ( $p = 0.01$ ) as the causes of the worm infection.

**Conclusion:** Family characteristics related to the worm eggs infection in infants is family's habit of not to defecate in the restroom and how mothers feed their babies. Suggestions for the community that every family should be able to access the toilet so that the dirt does not contaminate the soil and increases the risk of transmission of worm eggs and always wash hands with soap.

**Keywords:** family characteristics, infection parasite.

### Introduction

Helminthiasis prevalent in rural areas and urban slums can infect all ages both in infants, children or adults. But the most common worm infection in children aged under five because at that age children most often contact with the ground, regularly playing in an open environment, and often indiscriminate convenient foods contaminated with feces.

Mild helminthiasis tends to have mild symptoms or no symptoms while the infection is tedious and time often show complaints and clinical signs and cause complications (Ideham et al., 2007). In severe diseases and chronic conditions, can occur continuously diarrhea, malnutrition, and anemia which may ultimately result in reduced endurance, intelligence, and starvation. This has an impact on the quality of human resources (Sumanto, 2008).

The worms transmitted through the ground happened quite high in Indonesia are *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm (Sutanto et al, 2008).

The level of worm infection is influenced by several factors, including environmental pollution, the state of sanitation, and human behavior plays an essential role in the spread of the worm infection. Fecal contamination of soil is a suitable transmission medium for soil-transmitted Helminths (STH). The fertilized eggs will develop rapidly in favorable circumstances and become infective eggs within a few weeks. Worm infection in humans occurs due to contaminated hands of infective worm eggs, then into the mouth with food or larvae penetrate the skin (hookworm infection).

## Results

The main findings are presented in the following tables.

**Table 1** Frequency Distribution of Family Characteristic

No	Variables	Category	Numbers	%
1	Father's education	Below Elementary	158	66.7
		Junior High above	79	33.3
		Total	237	100
2	Mother's education	Below Elementary	177	74.7
		Junior High above	60	25.3
		Total	237	100
3	Father's occupation	Farmer, cattle breeder, labor	141	59.5
		Self-employed, private, civil servants	96	40.5
		Total	237	100
4	Mother's occupation	Working	51	21.5
		Housewives	186	78.5
		Total	237	100
5	Family's income	< Rp 250.000.-	152	64.1
		> Rp 250.000.-	85	35.9
		Total	237	100
6	Homeownership	Sharing with relatives	87	36.7
		Own self	150	63.3
		Total	237	100
7	Washing hand	Occasionally with soap	128	54
		Always with soap	109	46
		Total	237	100
8	Defecation	Not in latrine	146	61.6
		Always in latrine	91	38.4
		Total	237	100
9	Feeding toddlers	Without spoon	208	87.8
		With spoon	29	12.2
		Total	237	100
10	Mother's physical appearance	Dirty	185	78.1
		Clean	52	21.9
		Total	237	100

From the analysis result, it is found that 66.7% of father's education is in the elementary school category below and 33.3% are junior high school and above. The result of the analysis of mother

## Methods

The study design was observational with a cross sectional study to determine the characteristics of the family that makes the incidence of infection in infants worm eggs. Location of the study was conducted in the Sumbang District randomly on one of five districts whose family latrine and water quality in Banyumas regency. The population in this study were all children (aged 12 months up to <60 months) by taking the total sampling of 237. Data collected are tabulated and analyzed using univariate and bivariate analysis to examine the relationship between the dependent and independent variable with the statistical test of Chi-square.

education is 74,7% with elementary school education and 25,3% with elementary education and above. Father's work has a 59.5% distribution working as farmers, ranchers, laborers and 40.5%

others are self-employed, private, / civil servants. Mother working is 21.5%, and 78.5% is being a housewife. 64.1% of 237 respondents have family income <Rp 250.000, - every month, while 35, 9% family have income> Rp 250.000, -

The category for home ownership is self-owned and family/rent. 63.3% of homes are self-owned, while those who follow family/rent as much as 36.7%. The distribution of the results of the analysis of hand washing scores with soap was found that those who stated always use soap when hand washing was 46% and respondents stated sometimes / rarely washed hands with soap by

54%. The result of distribution analysis to the family habit of defecation is 61, 6% defecation still not in the toilet, and 38,4% family defecate in the toilet. How to feed a toddler is 87.8% of mothers sometimes do not use spoons. Mothers who feed their toddlers always use spoons are 12.2%

The results of the analysis of the physical condition of mothers who have dirty nails, runny nose, skin diseases and not wearing footwear are 78.1% while mothers whose clean physical condition reached 21.9%.

**Table 2** Cross Tabulation of Family Characteristics and Infection of Worm Eggs

No.	Variables	Category	Infection of worm's egg in toddler				Total	
			Positive		Negative		No.	%
			No.	%	No.	%		
1	Father's education	Below Elementary	91	57.59	67	42.41	158	100
		Junior High above	51	64.56	28	35.44	79	100
		<b>P = 0.303</b>	<b>OR = 0.75 ; CI (95%) = 0.43-1.3</b>					
2	Mother's education	Below Elementary	100	56.5	77	43.5	177	100
		Junior High above	42	70	18	30	60	100
		<b>P = 0.065</b>	<b>OR = 0.57 ; CI (95%) = 0.29-1.04</b>					
3	Father's occupation	Farmer, cattle breeder, labor	78	55.32	63	44.68	141	100
		Self-employed, private, civil servants	64	66.67	32	33.33	96	100
		<b>P = 0.08</b>	<b>OR = 0.62 ; CI (95%) = 0.36-1.06</b>					
4	Mother's occupation	Working	29	56.86	22	43.14	51	100
		Housewives	113	60.75	73	39.25	186	100
		<b>P = 0.616</b>	<b>OR = 0.85 ; CI (95%) = 0.45-1.99</b>					
5	Family's income	< 250.000	93	61.18	59	38.82	152	100
		> 250.000	49	57.65	36	42.35	85	100
		<b>P = 0.594</b>	<b>OR = 1.16 ; CI (95%) = 0.67-1.99</b>					
6	Homeownership	Sharing with relatives	54	62.07	33	37.93	87	100
		Own self	88	58.67	62	41.33	150	100
		<b>P = 0.606</b>	<b>OR = 0.72 ; CI (95%) = 0.42-1.21</b>					
7	Washing hand	Occasionally with soap	72	56.25	56	43.75	128	100
		Always with soap	70	64.74	39	35.78	109	100
		<b>P = 0.212</b>	<b>OR = 2.081 ; CI (95%) = 1.163-3.723</b>					
8	Defecation	Not in latrine	96	65.75	50	34.45	91	100
		Always in latrine	46	50.55	45	49.45	91	100
		<b>P = 0.02</b>	<b>OR = 2.081 ; CI (95%) = 1.1-3.206</b>					
9	Feeding toddlers	Without spoon	131	62.98	18	40.08	208	100
		With spoon	11	37.93	18	40.08	29	100
		<b>P = 0.01</b>	<b>OR = 2.784 ; CI (95%) = 1.25-6.202</b>					
10	Mother's physical appearance	Dirty	109	58.92	76	41.08	29	100
		Clean	33	63.46	19	36.54	52	100
		<b>P = 0.55</b>	<b>OR = 0.83 ; CI (95%) = 0.44-1.56</b>					

Fathers whose primary school education has the proportion of infant toddlers positively infected are 57.59%, while the father who is educated in junior high has the proportion of infants positively infected with worm eggs is 64.56%. The result of statistical test obtains p-value = 0,303 showing no significant influence between father's education with worm egg infection.

Mothers whose primary school education has a definite proportion of infants infected by worms are 56.7%, while mothers who are educated junior high and above, the percentage of infants positively infected with worm eggs is 70%. The result of statistical test obtains p value = 0,065 showing no significant influence between mother education with worm egg infection.

Fathers who work as farmers, breeders, and workers have a definite proportion of infants infected by worms is 55.32% while the father who works as an entrepreneur, private, civil servants proportion of infants positively infected with worms worm is 66.67%. The result of statistical test analysis got p-value = 0,08 indicating there is no influence of father's job with the incidence of worm egg infection in the toddler. Working mothers have a definite proportion of infants infected with worm eggs are 56.86 while mothers who do not work, the percentage of infants positively infected with worm eggs is 60.75%. The results of statistical test analysis obtain p-value = 0.616 showing no effect of the mother who works with the incidence of worm egg infection in the toddler.

Families whose income less than Rp 250,000 has a definite proportion of infants infected by worms as much as 61.18%, while families whose income is more than Rp 250,000 proportion of infants positively infected with worm eggs is 57.65%. The result of the statistical test gets p-value = 0,594 showing there is no significant influence of infection of worm egg with family income.

Families living with families have the proportion of infants positively infected with worm eggs are 62.07% while families who have their own homes have the balance of infants infected with e worms is 58.67%. The result of statistical test obtains p-value = 0.606 showing there is no influence of house ownership to the happening of infection of worm egg in the toddler.

Mothers who wash hands occasionally with soap have a definite infant proportion infected with worm eggs of 56.25% while mothers who always wash hands with soap has a precise infant proportion infected with worm eggs of 64.22%. The result of statistical test obtains p-value = 0.212 shows there is no effect of infection of worm egg on the toddler with hand washing.

Families who do not defecate in latrines have a proportion of infants infected by worms as much as 56.25% while families who always defecate in the toilet, infection of worm eggs in toddlers is

50.55%. The results of statistical tests obtain  $p = 0.02$  indicating that there is a difference in the proportion of positive infant events infected with worm eggs between families who have never been defecated in latrines and families who always defecate in the toilet. From the test results, it is also found the value of  $OR = 1.878$ , which means that families who do not defecate in the bathroom have a chance of 1.878 times (rounded 2) to be infected by the worm eggs than families who always defecate in the toilet.

The mother feeding her toddler not to use a spoon has the proportion of infants positively infected with worm eggs of 62.98% while the mother who feeds her toddler with a spoon get the proportion of infants positive infected by worm eggs by 37.93%. In the statistical test results obtains  $p = 0.01$  which indicates there is a difference in the percentage of infants positively infected with worm eggs between mothers not using a spoon with mothers who always use a spoon. Test results obtain  $OR = 2.784$ , which means that the mother who does not use a spoon when feeding has a chance 2,784 times (rounded to 3) to be infected in comparison with mothers who feed babies using the spoon.

Mothers whose physical condition is not clean have a proportion of infants positively infected by worms as much as 58.92%, while the decent mother, the portion of infant undoubtedly contaminated with worm eggs is 53,46%. The result of the statistical test gets p-value = 0.55 shows there is no difference in the proportion of infant affected by worm egg between mother having the clean physical condition and not.

### Discussion

From family characteristics variables were related to the infection of worm eggs in young children, there are two variables that proved to be statistically significant at the family who do not defecate in latrines and how mothers feed their babies. Variable families who do not defecate in toilets associated with the incidence of infection in infants worm eggs is very supportive for the

worm, because the burden of soil contamination by worm eggs will be even more significant, thus increasing the risk of infection in infants worm eggs. Furthermore, maternal feeding habits in toddlers that do not use a spoon and rinsed hand will speed up the process of transmission of worm eggs in infants.

The preceding may be boosted by the presence of latrines which are lacking, knowledge of worm diseases and habits of hand washing. For that, efforts are needed on each family member to educate about the disease and how to prevent worm and repair the sanitation facilities either on a group or family.

Several previous studies that support, for example, Suhartono, (1996) showed hand washing, use of cutlery, defecation and knowledge can be associated with a worm infection. Kurniawati, Subakir, & Setyawati, (2016) shows the relationship of personal hygiene, hand washing with soap and latrine usage habits influenced the incidence of intestinal worms. Another study showed nearly similar conditions that the existence of latrines, hand washing with soap, the type of flooring, the availability of clean water and food habits mental influenced the incidence of intestinal worms (Yulianto, 2007).

For variable family income, homeownership, physical cleanliness of mother though did not show a significant association statistically to the incidence of infection of worm eggs in toddlers are found in the group who are at higher risk compared to those who are not at risk. Income families can support the establishment/ improvement of sanitation facilities home and home ownership. Home ownership can be expected also helps the possibility of home environmental conditions for a less sense of responsibility for maintaining the home, especially to those who rent.

For mother, hand washing habits with soap showed no significant relationship with worm eggs infection in infants that contrary to previous research. Nevertheless, it remains necessary the instigation of hand washing with soap as an effort

to prevent the disease of worm eggs. This is in line with research (Kartini, 2016), that hand washing is significantly related to the incidence of worm on Elementary School Students. Next to education, employment and washing hands showed no significant relationship statistically with worm infection, although studies conducted by Suhartono (1996) indicates that the knowledge of parents and elementary school students related to worm infection in students. Further research by Sadjiman, Tony (1998) showed that the father and mother's education, and working mother are pertaining to worm infection. Finally the knowledge of parents to infection worm eggs for elementary school children influence morbidity due to worm infestation (Amelasari, 2007).

### Conclusion

The results that affect the incidence of infection of worm eggs in young children in Sumbang a rural district in Central Java is described as follows:

- 1) Family conditions who do not defecate in latrine affect the incidence of infection of worm eggs in infants (intestinal worms)
- 2) Mothers' way of feeding toddler affects the prevalence of disease of worm eggs in infants.
- 3) Counseling needs to be done on every member of the family about the disease and how to prevent worm and repair/provision of sanitation facilities either on a group or family.

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