

# Analysis of the Incidence of Helminthiases in Children in the Village of Sungai Kunyit Hulu

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## ABSTRACT

Helminthiases worms are common in many tropical and subtropical regions, with more than 1.5 billion individuals worldwide contracting the disease. Sanitation, education, socioeconomic status, as well as daily behavior are factors that are often associated with the prevalence of helminthiases. The prevalence of worms in Indonesia ranges from 2.5% to 65%. Many primary school students who come from disadvantaged socioeconomic backgrounds live in environments that do not support hygiene. Not only that, the parenting style applied by parents also plays an important role in the level of worms. The purpose of this study was to analyze the incidence of worms in elementary school children in Sungai Kunyit Hulu Village through factors of knowledge and parenting patterns of parents or families on clean living habits in the family. This research uses a descriptive-analytical approach with survey methods. Data were collected through the distribution of questionnaires to parents or families of children as well as through examination of children's feces. The results showed that the incidence of worms in children in Sungai Kunyit Hulu Village reached 57.8%. Other factors associated include low family economic status (53.3%), primary level of parental education (64.4%), lack of complete immunization of children (73.3%), children under 5 years of age (46.7%), male sex (48.9%), and poor clean and healthy living behavior (73.3%). The factor that most influences the incidence of helminth infections in children remains related to clean and healthy living practices. Therefore, raising awareness of the

importance of hygiene and health is an important step for every individual.

**Keywords:** children, helminthiases, incident

## INTRODUCTION

Helminthiases refers to infections of the intestinal tract triggered by whipworms (*Trichuris trichuria*), hookworms (*Necator americanus* and *Ancylostoma duodenale*), and roundworms (*Ascaris lumbricoides*). The disease commonly occurs in tropical and subtropical regions and involves more than 1.5 billion individuals worldwide. The highest incidence rates were recorded in several regions including Latin America, China, sub-Saharan Africa, and Southeast Asia, including Indonesia (World Health Organization, 2020).

The Ministry of Health of the Republic of Indonesia has conducted studies in several provinces in Indonesia, and the results indicate that the overall prevalence of helminth infections ranges from 40-60%. However, when the prevalence is calculated specifically in school-age children, the figure rises to reach the range of 30-90% (Prasetyo H & Rosyidah HN, 2018). The elementary school level (SD) or age 6-12 years is an age range that often experiences worms with high interaction intensity with the soil (Ministry of Health RI, 2017).

The high prevalence of helminth infections is because Indonesia is a tropical country, an environment that supports the

development of endemic diseases, especially helminthiasis, and Indonesia has many risk factors for helminthiasis, such as low quality of life, behavior to protect the environment, lack of knowledge, low socioeconomic level and knowledge (Elfred., Arwati H, 2016). Helminthic is often associated with hygiene, socioeconomic, educational, and daily behavioral factors. In developing countries, up to 12% of all cases in schoolchildren aged 5 to 14 years are infected with worms, and at that age they are the school-age group and most vulnerable to transmission. In Indonesia, the prevalence of helminthic infections ranges from 2.5% to 65%. This figure increases considering that in school-age children, the prevalence of worm infections reaches 80% (Permenkes, 2017).

### **LITERATURE REVIEW**

Prevention of intestinal worms can be done by washing hands with soap before eating, before eating fruit washed with clean water, using soap when washing hands and after going to the toilet, using the toilet when urinating, keeping nails clean and short, and drinking clean water. An interesting problem for researchers is children in Sungai Kunyit Hulu Village, Sungai Kunyit District, Mempawah Regency, West Kalimantan, where after observation in October 2022, it was found that many elementary school students who have a habit before going to school do not wash their hands, eat and eat often. Play on the ground without using shoes. This then became the basis for researchers to conduct research on clean living habits and the prevalence of helminthic diseases in children. Most primary school students with low socioeconomic backgrounds live in unhealthy living environments. Hygiene problems, especially hand hygiene, are often ignored, this then causes diarrhea, worms and other diseases in many elementary school students in Indonesia.

One of the causes is a lack of knowledge about the importance of maintaining hand hygiene. To maintain hygiene, things that

need to be considered are before eating to wash hands and cut nails regularly. Nevertheless, the practice of hand washing is still not pervasive in the culture of the community. Therefore, it is better to introduce the habit of washing hands early, considering that children are the generation that plays a role in changing the environment. This initiative is intended to examine the prevalence of helminthiasis among elementary school students in Sungai Kunyit Hulu Village, by looking at how the knowledge possessed by parents or families and the education provided in shaping daily living habits in the family.

### **MATERIALS & METHODS**

This research is a descriptive analytical study that utilizes survey methods to identify whether there are cases of worm infection in elementary school students in Sungai Kunyit Hulu Village. The sampling method applied is accidental sampling. Accidental sampling is a sampling method based on practicality, where individuals who coincidentally meet the researcher will be the sample used. The variable that became the focus of this study was the prevalence of helminthic infections in children of elementary school (SD) age, with an age range of 6-12 years. Measurement of this variable is carried out through the process of collecting data using questionnaires filled out by parents or family members related to these children. Researchers also conduct direct interviews with parents or family to obtain more in-depth information. After the questionnaire filling stage is complete, the next step is to conduct a direct examination of the fecal samples of elementary school children. The method used is 2% eosin staining and the results are observed through a microscope.

## RESULT

**Table 1. Distribution of frequency of helminthiases incident and causative factors of child helminthiases incident in Sungai Kunyit Hulu Village.**

Variables	Number (N)	Percentage (%)
<b>Helminthiases / Worms</b>		
Positive	26	57.8
Negative	19	42.2
<b>Family Economic Status</b>		
Low	24	53.3
Intermediate	21	46.7
<b>Parent Education</b>		
Base	29	64.4
Intermediate	16	35.6
<b>Acquired Immunizations</b>		
Complete	12	26.7
Incomplete	33	73.3
<b>Children Age</b>		
< 5 years	21	46.7
> 5 years	24	53.3
<b>Children Gender</b>		
Man	22	48.9
Woman	23	51.1
<b>Clean and Healthy Living Behavior</b>		
Good	12	26.7
Bad	33	73.3

## DISCUSSION

### The Incidence of Helminthiases in Children in Sungai Kunyit Hulu Village

In this study, microscopic examination of feces was carried out directly on 45 samples of children from the Upper Kunyit River Village area. The results showed that more than half of the child samples in Sungai Kunyit Hulu Village tested positive for worm infection after examining fecal specimens, namely 26 samples (57.8%) with types of *Ascaris lumbricoides*, *Taenia sp*, *Diphyllobothriumlatum*, and *Hymenolepisdiminuta*. The percentage of positive worms in Upper Turmeric Village can be seen in the following diagram. Children whose specimens were negative for worms, namely 19 samples (42.2%). The proportion of positive worms in children in Sungai Kunyit Hulu Village was obtained at 81% of children infected with worms of the type *Ascaris lumbricoides*, 11% positive *Taenia sp*, 4% positive *Diphyllobothrium latum* and 4% positive *Hymenolepis diminuta*.

The results of this study when viewed from the background of the habits of the people of Sungai Kunyit Hulu Village, most of whom have not implemented clean living behavior. The results of this study according

to Permenkes R1 Number 15 concerning deworming are included in the high criteria because the worm rate is above 50% (Ministry of Health RI, 2017).

In accordance with the guidelines of the Ministry of Health of the Republic of Indonesia in 2017, mass preventive medicine (POPM) for worm infections is carried out in children under five, pre-school children, and school-age children every six months. The government's deworming program has not been able to reduce the prevalence of worms in Sungai Kunyit Hulu Village. There are many factors that influence the high number, including lack of public awareness of the importance of maintaining cleanliness and lack of compliance with consuming deworming drugs given.

### Family Economic Status

Based on the results of interviews conducted with mothers of children in Sungai Kunyit Hulu Village about the family's economic status, it showed that more than half of the respondents had low economic status, namely 24 respondents (53.3%) and those with medium economy as many as 21 respondents (46.7%). The results showed that the social and economic status of

children's families in Sungai Kunyit Hulu Village was on average low.

Helminthiases are often associated with family socioeconomic status. Good socioeconomic status determines people's welfare. Socioeconomic factors that include welfare in the form of fulfillment of nutrition, materials, education, and health reflect the socioeconomic condition of a family. The risk of helminthic disease will increase due to low socioeconomic status. The low-income level of most people will make their sense of concern for nutrition and family health reduced.

Low income in a family can be an indicator of the family's economic level. Low economic conditions can also affect the quality of sanitation applied and maintained in the family, as well as the practice of clean and healthy living behavior. In addition, factors such as education level and level of knowledge can also be related to low economic levels in a family. (Suriani, E., Irawati, N., & Lestari, Y., 2019).

Dukpa *et al.* (2020) suggests that the father's status as the head of a low-income family requires the family to live in a non-ideal environment, which can contribute to an increased risk of transmission of helminth infections. Meanwhile, according to research by Ningrum *et al.* (2021) Parents' work has the potential to influence children's behavior in carrying out clean and healthy living practices. If parents are busy with work, monitoring children's behavior, especially the habit of washing hands with soap at home and school, tends to be less effective. However, Rohani *et al.* (2017) also said that deworming was not correlated with parental occupation. This can be due to other factors, one of which is hygiene.

### **Parent Education**

The results of this study indicate that the average education of parents in Sungai Kunyit Hulu Village only reaches a low level. This level of education of parents has an impact on clean and healthy living practices in the family. Low education tends to contribute to an individual's lack of

awareness regarding the importance of maintaining the cleanliness and health of the surrounding environment. Therefore, it is recommended that individuals have adequate knowledge and education so that awareness of the importance of maintaining cleanliness and environmental health can be increased. In addition, the application of clean and healthy living practices will also be better with better understanding through education. The importance of education is related to the process of shaping individual behavior and attitudes, and the level of education has an impact on how information is received and responded to. (Wati & Ridlo, 2020).

The prevalence of helminth infections tends to be lower in children who have parents with higher levels of education. In addition, higher levels of education also have the potential to increase an individual's chances of getting a better job with a higher income. Therefore, having a higher education can reduce the risk of worm infections in children and families compared to parents who have low education. Individuals with higher education will have knowledge regarding the measures necessary to maintain the cleanliness and health of the environment, family, and themselves.

### **Acquired immunizations.**

Based on the results of the study, children in Sungai Kunyit Hulu Village on average do not get complete immunization from birth to school age. More than half of the children were not fully immunized, with 33 children (73.3%) out of 45. This is also one of the triggers for the high incidence of worms in children. Based on research by Agustina, Rahman, & Hermiyanty (2018) states that incomplete immunization can weaken children's immunity so that they will be more susceptible to infection. Infections in toddlers can be at risk of becoming stunted. One of these infectious diseases is helminthic (Agustia, Rahman, & Hermiyanty, 2018).

Disease infection can worsen nutritional status, reduce appetite, interfere with

absorption in the digestive tract, so that nutritional needs are not met. Complete immunization plays a role in increasing the child's body resistance to a disease, one of which is helminthiasis. Children who have worm infections have the potential for decreased health, nutritional status, intelligence, and productivity levels. Especially in children's nutritional intake will be hampered which will lead to other complications such as stunting. Helminth infections are on the list of ten common diseases in children. The impact of this disease can result in a decrease in the health, nutritional status, intelligence, and productivity of affected children, potentially causing significant economic losses (Kristanty, et. al. 2022).

### **Children Age**

The age of children in this study was classified into 2 groups, namely < 5 years and > 5 years. Based on the results of the study, the average respondent was a child aged > 5 years or elementary school age. Compared to adults or pregnant women, children are more susceptible to helminthiasis. The immune response in children is lower than in adults. The main factors provoking the vulnerability of children to infection with worms are the lack of adequate hygiene and sanitation, as well as the environment that facilitates the breeding of worms.

Childhood is a time when children can often play freely without worrying too much about potential diseases, such as the habit of playing with soil which can be a contributing factor to worm infections. This is because a few types of worms fall into the category of *Soil Transmitted Helminths*, where these worms require soil to reach the infective stage and serve as a source of transmission for humans (Lalangpuling, 2020).

According to WHO, the highest prevalence of helminthic infections in children under 5 years old occurs in locations with inadequate sanitation and clean water. Indonesia is estimated to be 2/3 of children

in Indonesia aged 1 to 14 years, so in 2009 WHO recommended Indonesia as a country to get anthelmintic prevention for STH (*Soil Transmitted Helminths*). Surveys in Indonesia show that in children under 5 years the prevalence of *A. lumbricoides* and *T. trichiura* worms is higher and no hookworm infection is found. However, the prevalence of hookworms increases with age. This happens because environmental conditions that have the habit of eating without washing hands defecate in the environment around the house, rarely cut nails, play barefoot on the ground. It can be concluded that children under the age of 5 years are children who have a risk of being infected with worms (Weatherhead & Hotez, 2015).

### **Children Gender**

Based on the results of the study, there are more girls than boys. Research conducted by Fakhrizal *et al.* (2019) states that cases of helminthic infections are more often found in boys, because they have a higher intensity of outdoor activities than girls. In addition, the risk of transmission of helminths is also higher in boys because their maturation process into adolescence is generally slower than that of girls. In this phase, girls tend to care more about hygiene and appearance aspects compared to boys.

However, according to research by Bestari *et al* (2017) Sex with worms has no meaningful relationship. The risk of contracting helminth infections in men and women is almost the same. Findings from previous studies indicated that there was no association between the incidence of worm infections and the sex of the children (Derek, Kalesaran, & Ratulangi, 2017).

### **Clean and Healthy Living Behavior (PHBS)**

The incidence of worms cannot be separated from the clean and healthy living behavior of everyone. Based on the results of the study, the average family in Sungai Kunyit Hulu Village has not properly implemented clean and healthy living behaviors. Clean

and healthy living habits can include habits before eating washing hands, cutting nails 1 time / week, wearing footwear outside the home, throwing garbage in its place, defecating and urinating in healthy latrines, washing food ingredients before cooking, and cooking water before drinking.

Helminthiasis are still a common problem among the Indonesian population. This can be due to the presence of the *Soil-Transmitted Helminth* group of worms, which are types of intestinal nematode worms that utilize soil as an environment to transform parasites from non-infective forms to infective forms in their life cycle or in the process of transmission. Children who do not maintain nail hygiene are very easy to contract worms, because of the possibility of worm eggs tucked into the nails, then when the child eats, worm eggs enter the child's body. Parents need to pay attention to nail hygiene in children, especially in children aged < 5 years, because at that age most children cannot cut their own nails. Meanwhile, for children aged > 5 years or school age, the school needs to emphasize the policy to cut nails every 1 time / week or 1 time / 2 weeks so that it becomes a good habit for children (Suriani, E., Irawati, N., & Lestari, Y., 2019).

Clean and healthy living behavior is closely related to parenting to children. Therefore, parents' knowledge of hygiene and health determines the daily habits of the family. Helminthic infections can also be transmitted from adults to children. For example, when parents feed children to eat by not washing their hands first and long nails can transmit worm infections into the child's body. Dirty hands are a great time to wash your hands and wash them using running water and soap. The family water source also determines the clean and healthy living behavior of each family member. Water plays an important role; almost every day humans live in need of water.

The condition of the floor of the house is also a factor in the occurrence of worms in children. If family members move barefoot and then enter the house, dirty floors can be

a medium of transmission of helminthic infections. Efforts to prevent and overcome the incidence of worms in children can be maximized by maintaining the cleanliness of the floor and the environment around the house. A healthy home floor has conditions, namely the floor is made of tile or cement material. However, this condition is not suitable to be applied to rural areas because the price is quite expensive. In the countryside usually has a floor of the house from compacted soil. However, the most important requirement of a house floor is that in the dry season it is not dusty and in the rainy season it is not wet (Novianty, Pasaribu, & Pasaribu, 2018).

The results of the study in Nairobi, Kenya noted that worm infection rates in children living in places with dirt or sand floors tended to be higher than children living in homes with tiled floors (Worrel, et.al., 2016). The habits of family members deficient are also a factor in the incidence of helminthiasis. One-way families dispose of human feces by facilities such as latrines, also known as latrines or toilets. The existence or absence of latrines in the house has a significant impact on the cleanliness of the surrounding environment. One important step in preventing or reducing fecal contamination of the environment is to dispose of it in an appropriate place to create good sanitation. In the context of the village, the latrine must meet several criteria. First, latrines must be able to minimize pollution to the surrounding water surface. Furthermore, latrines should also be designed in such a way that they do not produce unpleasant odors. The facility should also be difficult for insects to reach. In addition, the design should be simple, economical, easy to use, and easy to maintain. In the end, latrines must be accepted by their users so that they voluntarily use them (Maryunani, 2013).

## CONCLUSION

The prevalence of worm infection in children in Sungai Kuyit Hulu Village is still at a high level. There are several

causative factors that have been investigated and the results show unsatisfactory or unfavorable results, including low family economic status 53.3%, education level of parents of children who receive basic education 64.4%, children who do not get complete immunization 73.3%, children under 5 years old 46.7%, male children 48.9%, and poor clean and healthy behavior 73.3%.

For future research, it is expected to be able to conduct research related to other factors that are broader and have a relationship with the incidence of worm infections. The incidence of worms in each region varies. The most decisive thing about the incidence of worms in children is strongly influenced by clean and healthy living behavior. So, every individual needs to increase awareness of hygiene and health.

#### **Declaration by Authors**

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