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Review

EPIDEMIOLOGY UPDATE OF HELMINTHIASIS IN INDONESIA

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ABSTRACT

Helminthiasis are still a health problem in Indonesia. Although not deadly, helminth infections will slowly affect children's health and productivity through a decrease in nutritional status. The chronic clinical course and tend to be asymptomatic causes helminthiasis to be classified as a neglected tropical disease. Research on the epidemiology of helminthiasis has been carried out in several regions in Indonesia. However, there has not been a comprehensive review to see the epidemiology aspects of helminthiasis. This article will discuss in detail how helminth infections influence the host to increase the incidence of malnutrition and its impact on children's health. Although this is not an emergency and a condition, the risk factors will lead the child to a state of chronic helminthiasis and transmission to other children which will have a negative impact on public health.

Keywords: epidemiology, helminthiasis, worm infection

INTRODUCTION

The prevalence of helminthiasis in Indonesia is still quite high and spreads in various regions. Although rarely reported as a cause of death, helminthiasis can affect children's health and productivity through decreased nutritional status. The condition without complaints causes this disease to be considered common among other diseases. The losses caused by this infection are enormous. Worms affect the intake (intake), digestion (digestive), absorption (absorption), and metabolism of food. In the long-term helminthiasis can cause nutritional deficiencies in the form of protein and calories, as well as blood loss. In addition to inhibiting intelligence, work productivity, and physical development, worms will also reduce the body's resistance, making it easy to be infected with other diseases.[1]

The cases of helminthiasis are dominated by children of primary school age. Daily behavior that does not maintain hygiene, poor environmental sanitation, and the relatively easy mode of transmission of helminth infections are important factors that contribute greatly to the incidence of helminthiasis. Sorenson explained that the prevalence of helminthiasis in Latin America was dominated by ascariasis 18%, trichuriasis 19%, and hookworm 10%. The results of the 2013 Francis case study reported that 20,185 elementary school students in Uganda had a 6.3% prevalence of helminthiasis caused by Ascaris, 43.5% due to hookworms, and 5% due to Trichuris trichiura.[2]

In Indonesia, helminthiasis is still a public health problem with a fairly high prevalence, which is 45-65%. Even the prevalence of helminthiasis in some areas with poor sanitation can reach 80%. The most common worm species that infect children are Ascaris, hookworm, and Trichuris. Various research results show that worms attack school-age children more often because of their activities that often come into contact with the ground.[3]

Worm parasites that live and reproduce in the human intestine cause a very large negative impact on the incidence of other diseases, such as malnutrition, anemia, interfere with child growth and development, and affect other non-medical problems, such as decreased learning achievement until children do not go to grade.[4] This article aims to review the

description of epidemiology helminth infection in primary school children in Indonesia.

METHODS

This is a literature review using several databases such as PubMed and Google Scholar. The keywords used are epidemiology+helminthiasis+Indonesia. The criteria used are articles that are open access, for the last 10 years, and are not paid. The articles found are then reviewed according to the established criteria

RESULTS DAN DISCUSSION

Ascaris lumbricoides

A female worm can lay as many as 100,000 – 200,000 eggs a day, consisting of fertilized and unfertilized eggs. In a suitable environment, the fertilized egg will develop into an infective form in approximately 3 weeks. This species can be found almost all over the world, especially in tropical areas with hot temperatures a,nd poor environmental sanitation. All ages can be infected with this type of worm. Small children who often play with the soil will have a high chance of being contaminated by worm eggs, considering that these worm eggs ripen in the soil. Thus, it is necessary to pay attention to personal hygiene and environmental sanitation around the children's playground. Method include the design, population, sample, data sources, techniques/instruments of data collection and data analysis procedures. Methods should make readers be able to reproduce the experiment. Provide sufficient detail to allow the work to be reproduced.[5]

Trichuris trichiura

This parasite is found throughout the world, especially in hot and humid climates. Spread along with the worm *Ascaris lumbricoides*. The highest frequency is found in areas with high rainfall. High rainfall causes the soil to become moist so it is very suitable for maturation of worm eggs. In agricultural areas with vegetable crops, human waste is usually used for spraying plants, so care must be taken in washing vegetables before consumption.[6]

Hookworm

Adult worms live in the small intestine cavity with a large mouth attached to the intestinal wall mucosa. The female worm Necator americanus every day lays out 9000 turtle eggs, while Ancylostoma duodenale about 10,000 eggs. The spread of the parasite at this time was caused by population migration and spread to the tropics and sub-tropics. It is estimated that hookworms worldwide infect 700 million people, causing blood loss of 7 million liters a day, that is, the amount of blood of more than a million humans, as much as the blood of people living in Washington, Taipei or Bangkok.[7]

Strongiloides stercoralis

Strongyloides infection spreads along with hookworm infection, but the frequency is lower in areas with a temperate climate. The infection is mainly found in the tropics and sub-tropics, where heat, humidity and lack of sanitation benefit a free life cycle. In the United States this happens in the south, in the suburbs.[8]

Filariasis

This filariasis disease is cosmopolitan, which is widespread almost throughout the world, especially in the tropics. Recently, filariasis cases were mostly found in eastern Indonesia. At the end of 2004, many cases of filariasis occurred in the provinces of NTB and NTT. In April 2005, in Blora district, Central Java, fourteen patients with elephantiasis or filariasis were found. Following up on these findings, the Blora District Health Office conducted a filariasis survey of five hundred people and the results were 163 people (48%) tested positive for filarial worms. Seeing the wide distribution of filariasis problems, WHO established a global agreement in an effort to eradicate filariasis completely under the name of the program The Global Goal of Elimination of Lymphatic Filariasis as a Public Health Problem by The Year 2020. Filariasis is a chronic infectious disease caused by filarial worms. This disease shows symptoms of recurrent fever and inflammation of the lymph nodes. At an advanced stage there will be a blockage in the lymph node channel and can cause a rupture of the channel in the blockage area so that it will cause symptoms of elephantiasis.[9]

Fasciola hepatica

Worms from the class trematodes (leaf worms) generally require more than one host. The maturation of these individuals from one stage to the next also requires an intermediate host. Water media is needed in the process of developing this worm to its infective stage. Aquatic animals that are preferred as a place for maturation at the developmental stage are snails or water snails, while at the infective stage these worms are often attached to aquatic plants, making it easier to enter the bodies of large mammals that consume aquatic plants as food. There are many species of trematodes that can be studied as parasites that are transmitted through snails, but the cases that can and are

often found are the incidence of liver fluke infection (*Fasciola hepatica)* especially in livestock such as cattle, buffalo and goats although it is also very likely to infect human.[10]

Taenia saginata

The parasitic infection caused by the introduction of the bovine tapeworm Taenia saginata is called Taeniasis saginata. Taeniasis can attack animals and humans. Animals that become the definitive host for this tapeworm to breed, including in the mating process, are large cattle cattle. Some references state that cattle are the definitive host for this worm, it does not mean that other similar mammals cannot be the definitive host. The findings of these worms in other mammals are not as numerous as in cows considering that the most consumed large meat animal is cows. It is possible that buffaloes and goats as well as other mammals with physiological conditions that are similar to cows can also be the definitive hosts. Taeniasis saginata cases are mostly found in countries where people often consume beef/buffalo meat that is not followed by a perfect cooking method. If the cooking is undercooked, the worm larvae contained in the muscle (meat) have not been killed due to the cooking, so that when they enter the human body, the worm larvae will again find a suitable life atmosphere which will trigger the worms to become active again to grow and develop.[11]

Taenia solium

The disease caused by this worm infection is called Taeniasis solium. Just like the bovine tapeworm, this pork tapeworm in many references is indeed published as a tapeworm that has a definitive host for pigs, but in its development, it can also occur in monkeys, camels, dogs, sheep, cats, mice and humans. This should be the thought of every public health expert to anticipate the spread of undetected cases due to never paying attention to other similar animals that are very likely to be the new definitive hosts for this worm species. One thing that needs to be known is that any scientific writing on changes in the behavior of parasites is only based on the findings at the time of publication, while environmental changes in such a varied manner can affect the physiological and even molecular changes of an individual including parasites. The basic principle of the field of public health studies on disease prevention seems to require experts to always develop early awareness of any possible changes in disease patterns, especially in this case parasitic diseases. Taeniasis solium cases are often found in areas where people often consume pork that is not followed by a perfect cooking method. If the cooking is not mature enough, the worm larvae have not been killed, so that when they enter the human body, they will reproduce again. Areas with taboos or prohibitions on consuming pork are certainly not areas where these worm infections are found. The regions of Central and Eastern Indonesia where most of the people like to consume pork are the areas with the highest chance of infection. In addition, the people who live in the area around the pig farm and even the workers in it are a high-risk group that must always be monitored regularly for the possibility of cases of Taeniasis solium.[12]

Enterobius vermicularis

Enterobius vermicularis is a worm that can enter the mouth of the body through food, air, soil that will nest in the large intestine at night, usually female worms lay their eggs in the anus area. The presence of worms in the intestines will cause the sufferer to lose nutrients, causing a deficiency in the body's immune system which causes the disease to develop quickly. A female worm produces 11,000 eggs every day for 2-3 weeks, after which the female worm will die. Eggs of this asymmetric shape are colorless, have translucent walls and contain live larvae. The size of Enterobius vermicularis eggs is approximately 30 microns by 50-60 microns. This egg has a shell consisting of two outer layers in the form of albuminous translucent, chemical protection. E. vermicularis worm eggs are rarely found in feces, only 5% are positive in people infected with this disease.[13]

Hymenolepis nana

This worm is spread cosmopolitanly, but prefers hot climates rather than cold, including Indonesia. Infection occurs from hand to mouth, most often in children aged 15 years and under considering that at that age children often still like to ignore hand hygiene when they want to eat. Areas with a large population of rats are high risk areas. Rat droppings infected with this worm are a source of infection and spreader of worm eggs. Contamination of food and drink or food with rat feces needs serious attention. Infection in humans is always caused by ingested eggs from objects that come into contact with soil from the toilet or directly from the anus to the mouth.[14]

Hymenolepis diminuta

These worms are cosmopolitanly distributed, but prefer hot climates to cold climates, including Indonesia. A large population of rats will help spread the eggs of this worm, so we need to be vigilant. Infected rat droppings will contain a lot of worm eggs. The preference of rodents to choose a place to live in a hidden and hard-to-reach area with enough humidity

to trigger the survival of worm eggs with animal waste for a relatively long time. Dry manure can be a source of contaminants through wind or insects such as fleas and beetle flour that has similar life preferences. The use of high-legged furniture helps minimize hidden and damp areas, which is expected to reduce the population of rats.[15]

CONCLUSION

There are still many kinds of species which cause helminthiasis in Indonesia. There are *Ascaris lumbricoides, Trichuris trichiura, Necator americanus, Ancylostoma duodenale, Strongyloides stercoralis, Wuchereria bancrofti, Brugia malayi, Brugia timori, Fasciola hepatica, Taenia solium, Taenia saginata, Enterobius vermicularis, Heymenolepis nana,* and *Hymenolepis diminuta.* Eventhough helminthiasis is not emergency problem, but it may inhibit intelligence, work productivity, and physical development, worms will also reduce the body's resistance, making it easy to be infected with other diseases.

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