

Infection Prevalence *Soil Transmitted Helminth* (STH) at Metal Muslim Al-Hidayah Islamic Boarding School Students, Pasuruan

Bagus Dwi Nugraha¹, Sri Wijayanti Sulistiawati² , Widati Fatmaningrum³

¹Medical Program, Faculty of Medicine, Universitas Airlangga,

²Department of Parasitology, Faculty of Medicine, Universitas Airlangga,

³Department of Public Health Science-Preventive Medicine, Faculty of Medicine, Universitas Airlangga

ABSTRACT

*Soil-Transmitted Helminth (STH) infection is a national and international health problem. STH infection can inhibit the process of absorption of food so that the body lacks nutrients. Children are the most commonly encountered because of the lack of awareness of maintaining personal hygiene, especially in Islamic boarding schools where children are outside the supervision of parents. This research is a cross-sectional study with an observational descriptive type. The location of this research is Metal Muslim Al-Hidayah Islamic Boarding School, Pasuruan. The study used stool samples from the students which were then examined using the Kato-Katz method. From the results of the study, it was found that the number of students infected with STH was 28 students (68.3%), the infection was known to be of this type of *Trichuris trichiura*. 18 students (43.9%) had mild infections and 10 students (24.4%) had moderate infections. the most infected students were male with 19 students (46.3%), while according to age the most were at the age of 9 years with 12 students 29.27%. this incident could be due to the activities of students playing outdoors plus a lack of awareness to maintain personal hygiene such as washing hands with soap.*

How to cite:

Nugraha, B.D., Sulistiawati, S. W., Fatmaningrum, W.,. 2023. Infection Prevalence Soil Transmitted Helminth (STH) at Metal Muslim Al-Hidayah Islamic Boarding School Student, Pasuruan, Indonesia. Journal of Community Medicine and Public Health Research, 4(1): 49-54.



Open access under Creative Commons Attribution-ShareAlike 4.0 International License (CC-BY-SA)

ARTICLE HISTORY

Received: December, 29, 2022

Revision: January, 02, 2023

Accepted: February, 12, 2023

Online: June, 12, 2023

doi:10.20473/jcmphr.v4i1.42032

KEYWORDS

Soil-Transmitted helminth

Trichuris trichiura

Islamic boarding school

Corresponding author

Sri Wijayanti Sulistiawati

✉ sri-w-s@fk.unair.ac.id

Department of Parasitology,
Faculty of Medicine,
Universitas Airlangga,
Surabaya, Indonesia

INTRODUCTION

Infection *Soil Transmitted Helminth* (STH) is a national and international health problem. It is known that more than 1.5 billion people or 24% of the total world population are infected with STH. This infection is more common in tropical and subtropical areas. Indonesia is in second place for the country with the highest

number of people infected with STH in Asia^{1,2}. The prevalence of STH infection in Indonesia is still high with a range that varies between 2.5% -62%³.

STH is a term that refers to a type of nematode that is transmitted through soil media, some of which are *Trichuris trichiura*, *Ascaris lumbricoides*, *Hookworm*, and *Strongyloides stercoralis*. STH infection is known to cause sufferers

to lose nutrients that should be absorbed by the body such as carbohydrates, and proteins, and can even lose blood resulting in anemia which affects cognitive function and also the nutritional status of children. STH mostly affects people who don't maintain personal and environmental hygiene so they are easily infected³.

Islamic boarding schools are one of the religious learning institutions in Indonesia. Al Hidayat Muslim boarding School or Metal Islamic boarding school (Memorizing Al Quran) is located in Rejoso, Pasuruan Regency, East Java. The dormitory system is implemented in Islamic boarding schools with the activities of eating, studying, playing, reciting the Koran to sleeping carried out by the students together. This can increase the risk of transmitting helminthic infections to students⁴. because there were no routine checks carried out, the researcher was interested in conducting a study to see the prevalence of STH infection at the Metal Muslim Al-Hidayah Islamic boarding school, Pasuruan so that further efforts could be made, namely immediate treatment to treat infected students.

MATERIALS AND METHODS

This research is a type of descriptive observational study with a study design *cross-sectional*. The location of this research is the Metal Muslim Al-Hidayah Islamic Boarding School with a population of all students, then sampling was carried out using the technique *Total Sampling*. This study lasted for 6 months from September 2021 to March 2022. Stool samples were collected and then brought to the laboratory for microscopic examination using the Kato-Katz method to see the intensity of infection caused by STH.

RESULTS

From the examination conducted, a sample of 41 students was obtained with the following results:

Table 1. Characteristics of students based on gender and age

Category	Frequency	
	n=41	%
Sex		
Male	23	56.1
Female	18	43.9
Age		
6	2	4.88
9	13	31.71
10	6	14.63
11	8	19.51
12	6	14.63
13	4	9.76
15	1	2.44
16	1	2.44

Table 2. Characteristics of Type and Intensity of STH Infections

Category	Frequency	
	n=41	%
Infeksi STH		
Positive	28	68.3
Negative	13	31.7
Type and Intensity		
<i>Ascaris lumbricoides</i>		
Light	-	-
Currently	-	-
Heavy	-	-
<i>Trichuris trichiura</i>		
Light	18	43.9
Currently	10	24.4
Heavy	-	-
<i>Hookworm</i>		
Light	-	-
Currently	-	-
Heavy	-	-
<i>Strongyloides stercoralis</i>		
Light	-	-
Currently	-	-
Heavy	-	-

Based on the figure and table above, it is known that the male students totaled 23 students and 18 female students, based on age the most were at the age of 9 years with a total of 13 students (31.71%). based on the students who were infected with STH as many as 28 students (68.3%) came from the type *Trichuris trichiura*. Based on the intensity, 43.9% were mild infections and 24.4% were moderate infections.

Table 3. Distribution of sex and age based on STH infection

Category	Positive		Negative		Total	
	n	%	n	%	n	%
Sex						
Male	19	46.3	4	9.7	23	56
Female	9	22	9	22	18	44
Age						
6	-	-	2	4.88	2	4.88
9	12	29.2	1	2.44	13	31.7
10	3	7.32	3	7.32	6	14.6
11	4	9.76	4	9.76	8	19.5
12	4	9.76	2	4.88	6	14.6
13	3	7.32	1	2.44	4	9.76
15	1	2.44	-	-	1	2.44
16	1	2.44	-	-	1	2.44

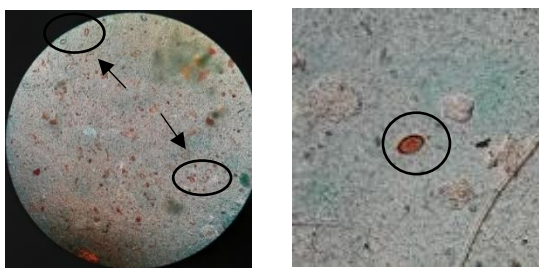


Figure 1. On microscopic laboratory with Kato-Katz has found *Trichuris trichiura*

Based on the table, it is known that the students who are most infected with STH are male at 46.3%. Meanwhile, judging from the age, the most infected with STH were 9 years old with 12 students

(29.27%). Results of Observations and interviews of researchers with the Pondok Pesantren.

The results of the researchers' observations found that the Islamic boarding school environment was still dominated by field land. From the daily life of the students, it can be seen that some students do not wear footwear when doing activities outside the room, do not wash their hands after doing activities outside.

DISCUSSION

Based on the results of the study, the prevalence of students infected with STH is relatively high when referring to national (40%) and international (24%) figures (Ministry of Health, WHO, 2020). The most infected with STH were male students with a total of 19 children (46.3%). Meanwhile, the most infected students were aged 9 years with 12 students (29.27%). This is related to the habit of male students playing on the ground more often than female students. In addition, some students who do activities do not use footwear plus the lack of habit of washing hands with soap after playing further increases the risk of transmitting STH infection. STH infection usually mostly affects children aged 5-10 years due to children's playing habits and lack of understanding of maintaining personal hygiene so that they are more susceptible to STH infection⁵.

STH infection transmission can be suppressed by applying *personal hygiene* good practices such as washing hands with soap at 5 times (after defecating, after cleaning children from defecation, before preparing food, before eating, and after touching animals)¹⁰. Based on the results of interviews with the caretakers of the boarding school, it is known that there are

still students who do not wash their hands with soap after eating, do activities without wearing footwear, and do not maintain personal hygiene. This has proven to be influential through research conducted by Sulistyawati S W et al. 2022 who conducted research at the Metal Muslim Islamic boarding school which stated that the habit of washing hands with soap before eating was only 47% with good habits, washing the rectum after defecating 72% had good habits, washing hands after defecating 47% had good habits and wearing footwear when leaving the house only 64% do good habits. It is known that children who play on the ground have the possibility of being infected with STH by 7.53 times. Hand washing is the simplest solution that children can get used to because it is proven to reduce the possibility of STH infection by up to 0.16 times¹².

The prevalence of STH infection comes from the type *Trichuris trichiura* which needs a warm environment and moist soil to survive. Eggs will mature in 3-6 weeks at an optimum temperature of 30°C and can survive in the soil for several years. This research was conducted in the period June 2021 when the average temperature in Pasuruan district is 30°C until at this temperature the egg *Trichuris trichiura* can reproduce well⁶. No type found *Hookworm* because this worm infects humans through direct skin penetration when a person is active outside with infected soil *Hookworm*⁷. Besides that, *Hookworm* and *Strongyloides stercoralis* require moist soil such as loose sand mixed with humus or leaf-covered mud to survive⁸.

Based on the intensity of infection of *Trichuris trichiura*, it was known that 18 (43.9%) of them were mild infections, 10 (24.4%) moderate infections, and no severe infections. Clinical manifestations for mild

infections are usually asymptomatic or symptomatic but not so specific as to be difficult to recognize. Meanwhile, severe infections are usually marked by the presence of colitis and signs of chronic iron deficiency anemia in adults, in children, it can be characterized by diarrhea and have shorter stature for children of their age with or without complaints such as colitis or other serious illnesses⁹. This study has limited data due to limited time available and some data cannot be collected quantitatively so the results obtained are limited by using existing data.

CONCLUSION

Prevalence of infection *Soil Transmitted Helminth* in Islamic boarding school students Metal Muslim Al-Hidayah by 86.3% where this figure is high compared to the national figure. In addition, the type of STH found in this study is a type *Trichuris trichiura*. Based on the intensity of infection, 18 students (43.9%) were classified as mild infections and 10 students (24.4%) were moderate infections. This incident is related to the lack of awareness of students to maintain personal hygiene such as washing hands with soap. Most of the students infected with STH were male with 19 students (46.3%), then based on age the most were 9 years old with 12 students (29.27%). This is because male students have a tendency to be more active outside the home than women and vulnerable children aged 5-10 are active children playing outside.

ACKNOWLEDGMENT

Special thanks to Special thanks to Sri Wijayanti Sulistiawati, dr, M.Imun, Dr. Widati Fatmaningrum, dr., M.Kes.Sp.GK

for their assistance in this study. This research is fully supported by the Faculty of Medicine, Universitas Airlangga. A big thanks to all participants who took part in this activity so that the event did well.

CONFLICT OF INTEREST

All Authors have no conflict of interest

ETHICS CONSIDERATION

This study was approved by the Ethical Committee of the Faculty of Medicine, Airlangga University, Surabaya, Indonesia (No. 19/EC/KEPK/FKUA/2022)

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sector.

AUTHOR CONTRIBUTION

All authors have contributed to all processes in this research, including preparation, data gathering, analysis, drafting, and approval for publication of this manuscript.

REFERENCES

1. WHO. *Soil-transmitted helminth infections*, World Health Organization. World Health Organization. 2020 [Accessed: 25 May 2022] Available at: <https://www.who.int/news-room/fact-sheets/detail/soil-transmitted-helminth-infections>
2. Kemenkes. *Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 concerning Child Anthropometry Standards*. Ministry of Health of the Republic of Indonesia. 2020 [Accessed: 15 June 2022] Available at : http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No_2_Th_2020_ttg_Standar_Antropometri_Anak.pdf
3. Kemenkes. Regulation of the Minister of Health of the Republic of Indonesia Number 15 of 2017 concerning Deworming. 2019 [Accessed: 10 December 2022] available at : http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No_15_ttg_Penanngulangan_Cacingan .pdf
4. Misbach KH. KH Imam Zarkasyi dari Gontor. Gontor Press. Ponorogo. 1996
5. Konoralma K, Rambli EV, Lalangpuling IE, Sumenge D. Hubungan Infeksi Soil Transmitted Helminths (Sth) Dengan Status Nutrisi Pada Anak Usia 6-12 Tahun Di Sekolah Dasar (Sd) Negeri 48 Manado. 2022; 1(2): 525-37.
6. Kemenkes. 2017. Peraturan Menteri Kesehatan Republik Indonesia Nomor 15 Tahun 2017 Tentang Penanggulangan Cacingan. 2017 [Accessed: 16 June 2021] Available at : http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No_15_ttg_Penanngulangan_Cacingan .pdf
7. Centers of Disease Control and Prevention. Hookworm (intestinal) : DPDx-Laboratory Identification of Parasite of Public Health Concern. 2019 [Accessed: 30 June 2021] Available at : <https://www.cdc.gov/dpdx/hookworm/index.html>
8. Hairani B, Waris L, Juhairiyah. Prevalensi Soil Transmitted Helminth (STH) Pada Anak Sekolah Dasar di Kecamatan Malinau Kota Kabupaten Malinau Provinsi Kalimantan Timur. Jurnal BUSKI. 2015;5(1): 43-8.

9. Else, K.J. *et al.* Whipworm and roundworm infections, *Nature Reviews Disease Primers*. 2020;6(1): 44 [Accessed: 4 October 2022] Available at: <https://doi.org/10.1038/s41572-020-0171-3>.
10. Afriyadi S. Putri M. Hubungan Personal Hygiene Dan Perilaku Menjaga Kebersihan Lingkungan Sekolah Dengan Kejadian Ascariasis Di SDN 04/IV Arab Melayu Kec. Pelayangan Kota Jambi. *Jurnal Akademika Baiturrahim*. 2016;5 (1): 59-71.
11. Sulistyawati S W, Kartikasari D P, Rosyanti L, Arwati H, Nugroho M Y F, Amalia F, Nugraha B D, et al. Program Edukasi dan Perbaikan Sarana PHBS di Pondok Pesantren metal Muslim Pasuruan. *Jurnal Layanan Masyarakat*. 2022; 6(1): 91-8
12. Pasaribu AP, Anggraini A, Krisnarta S, Syahril P, Djatnika S. Prevalence and Risk Factors of Soil-Transmitted Helminthiasis among School Children Living in an Agricultural Area of North Sumatera Indonesia. *BMC Public Health*. 2019 [Accessed: 11 June 2022] Available at : <https://doi.org/10.1186/s12889-019-7397-6>