



## IDENTIFICATION OF CRYPTOSPORIDIUM. SP AND BLASTOCYSTIS. SP

Yanti Rahayu<sup>1,2</sup>, Rauza Sukma Rita<sup>3</sup>, Ilmiawati<sup>4</sup>, Nuzulia Irawati<sup>5\*</sup>

<sup>1</sup>Program Doctoral of Biomedical Science, Faculty of Medicine, Universitas Andalas, Limau Manis, Padang, Sumatera Barat 25175, Indonesia

<sup>2</sup>Departement of Medical Laboratory Technology, Universitas Syedza Saintika, Jl. Prof. Dr. Hamka No.228, Air Tawar Tim., Padang, Sumatera Barat 25132, Indonesia

<sup>3</sup>Departement of Biochemistry, Faculty of Medicine, Universitas Andalas, Limau Manis, Padang, Sumatera Barat 25175, Indonesia

<sup>4</sup>Departement of Pharmacology and Therapeutics, Faculty of Medicine, Universitas Andalas, Limau Manis, Padang, Sumatera Barat 25175, Indonesia

<sup>5</sup>Departement of Parasitology, Faculty of Medicine, Universitas Andalas, Limau Manis, Padang, Sumatera Barat 25175, Indonesia

\*nuzuliairawaty@med.unand.ac.id

### ABSTRACT

Intestinal protozoan infection is still a major health problem in children, because children are most often in contact with soil as a source of infection and are a significant threat, but are often overlooked to public health until severe or chronic complications because many of them are usually asymptomatic or only manifest mild symptoms. The purpose of this study was to determine the incidence of *Cryptosporidium* sp, *Blastocystis* sp infections in school children in Pasir Sebelah, Padang City. This type of research is descriptive categorical, the sample is primary data with a sample size of 66 children using consecutive sampling techniques. Data were collected through direct interviews with caregivers and anthropometric measurements conducted by trained enumerators using standardized tools. This study was analyzed univariately and presented in the form of a frequency distribution table. This study obtained the results of intestinal protozoan infections in children found *Cryptosporidium* sp 42.4% added and *Blastocystis* sp 31.8%. Intestinal protozoan infections were higher in the 7-10 year age group 51.5% and higher in girls 54.5%. The conclusion of this study was that the incidence of intestinal protozoan infections was quite high in children at Elementary School 23 Padang City. Conclusions: these children need special attention, and immediate treatment for infected children and counseling on education and prevention of diseases caused by intestinal protozoa.

Keywords: *blastocystis* sp; children; *cryptosporidium* sp; intestinal protozoa

### How to cite (in APA style)

Rahayu, Y., Rita, R. S., Ilmiawati, I., & Irawati, N. (2025). Identification of *Cryptosporidium*. Sp and *Blastocystis*. Sp. Indonesian Journal of Global Health Research, 7(5), 137-142. <https://doi.org/10.37287/ijghr.v7i5.6627>.

## INTRODUCTION

Parasitic infections are a major health problem with more than 3.5 billion people infected globally. Parasitic infections cause 450 million and 200,000 annual morbidity and mortality, respectively. Protozoal infections are among them (Tegen, et al., 2020). Intestinal protozoan infections are confirmed as the leading cause of diarrhea, especially in children, and are a significant, yet often overlooked, threat to public health. These infections are often overlooked until severe or chronic complications develop because many of them are usually asymptomatic or only manifest mild symptoms (Osman et al, 2016., Bahmani et al., 2017). *Entamoeba histolytica*/dispar, *G.lamblia*/duodenalis, and *Cryptosporidium* spp. are the major pathogenic intestinal protozoan species commonly reported globally. *Entamoeba histolytica* has an annual incidence of five million cases, affects approximately 500 million people worldwide, and results in 50 million annual symptomatic illnesses and 100,000 deaths. *G. lamblia*/duodenalis infects 280 million people annually, and the global prevalence of *Cryptosporidium* is 1 to 4.5% in developed countries and 3 to 20% in developing countries (Tegen, et al., 2020).

Infections caused by protozoa are still a health problem in developing countries such as Indonesia. Although eradication has been carried out for a long time with medication and others, the prevalence of this disease is still quite high because the chain of transmission by the source of infection continues to occur (Nurhayati, 2015). In Indonesia, infections caused by intestinal protozoa can be found in urban and rural areas. Species that can cause intestinal protozoa infections are such as *Entamoeba histolytica*, *Giardia lamblia* and *Blastocystis hominis*. Where *Entamoeba histolytica* comes from the Rhizopoda class, *Giardia lamblia* comes from the Mastigophora class and *Blastocystis hominis* comes from the Sporozoa class (Charisma et al., 2015). Parasites included in opportunistic intestinal protozoa that are often found in humans are *Cryptosporidium* sp, *Cyclospora cayetanensis*, *Isospora belli* and *Blastocystis hominis* (Maryanti et al, 2015). Based on a study conducted in Nepal, 194 school children's stool samples were collected and examined, the prevalence of intestinal parasites was 26 (13.40%). The most common type of protozoa was *Giardia lamblia* 11.34%. Each 1.03% of cases were infected by *Hymenolepis nana* and hookworm (Nofita, et al., 2015) The results of another study conducted on 400 school children including all age groups of both sexes in primary and secondary schools from urban and rural areas in Iran found a prevalence of 169 (42.3%) positive for one or more intestinal protozoa.

The most common types of Protozoa found were *Blastocystis hominis* (21.3%) and *Entamoeba coli* (4.5%) (Bahmani, et al., 2017). Another study in Tripoli, Lebanon found a very high prevalence recorded 85% (212/249) children were found positive for intestinal parasites. *Blastocystis* spp. showed the highest infection rate (63%), followed by *Dientamoeba fragilis* (60.6%), *Giardia lamblia* (28.5%) and *Cryptosporidium* spp. (10.4%) (Osman et al., 2016. Sungkar et al., 2015). Based on research conducted in Gabon, Central Africa, the prevalence of *Blastocystis hominis* was 48.6%, *E. coli* 22.2%, and *E. histolytica* 9.3%. The results of another study conducted on 766 healthy adults in Paranaguá Bay, Brazil showed that 327 people (42.7%) were infected with intestinal protozoa. The type of protozoa most found in the study was *Blastocystis* sp. followed by *Endolimax nana* and *Giardia lamblia*. Another study in the Mahajang area, Madagascar, found a very high prevalence of intestinal protozoa, which was 72.8% (Greigert et al., 2018, Segui et al., 2018, Mbondoukwe et al., 2018). The purpose of this study was to determine the incidence of *Cryptosporidium* sp, *Blastocystis* sp infections in school children in Pasir Sebelah, Padang City.

## METHOD

The research conducted was a categorical descriptive study with the population in this study were children at SD N 23 Pasir Sebelah Padang City. The sample was children with inclusion and exclusion criteria. Inclusion criteria were children aged 6-15 years and were willing to be respondents. While the Exclusion Criteria were children who did not want to be research respondents, the total sample was 66 people. The sampling technique used was the "consecutive sampling" technique. With the Sample work procedure by dropping one drop of 2% eosin solution and lugol, feces were taken sufficiently using a stick, and mixed with 2% eosin drops and lugol, homogenized using a stick, then covered with deck glass. Examined using a microscope with a magnification of 10x and gradually enlarged up to 40x to ensure protozoa.

## Research Design

This research was conducted with categorical descriptive research, the sampling technique used was the "Consecutive sampling" technique. This research was carried out for sampling and sample examination was carried out in February 2025.

## Population and Sample

The population in this study were children at SD N 23 Pasir Sebelah, Padang City. The sample was children with inclusion and exclusion criteria. Inclusion criteria were children aged 7-15 years and willing to be respondents. While the Exclusion Criteria were children who did not want to be research respondents, the total sample was 66 people.

## Research Variable

The variables in the research are the number and percentage of samples identified as having intestinal parasite infections and the types of parasites identified in the research samples.

## Data Collection Procedure

Sample examination is carried out microscopically by adding 10% formalin to the feces sample, then the feces are examined using the direct method, with the Sample work procedure by dropping one drop of 2% eosin solution and lugol, feces are taken sufficiently using a stick, and mixed with 2% eosin drops and lugol, homogenized using a stick, then covered with a deck glass. Examined using a microscope with a magnification of 10x and gradually enlarged up to 40x to ensure protozoa. Data analysis is carried out quantitatively descriptively.

## Ethical Consideration

The research with ethics approval number 22/UN.16.2/KEP-FK/2025 was granted approval by the Ethics Committee of the Faculty of Medicine, Universitas Andalas, on January 10, 2025. During the approval process, the Ethics Committee of the Faculty of Medicine, Universitas Andalas, carefully reviewed the research protocol to ensure that the study adheres to the applicable ethical standards, while safeguarding the fundamental rights of humans, animal test subjects, and the overall well-being of research participants.

## RESULT

Based on table 1. The total number of male subjects is less than female subjects, which is 36 people and female subjects are 30 people. Based on the age of the most subjects, namely 7-10 years old, totaling 34 people (51.5%). In this study, the average age of the subjects was 9.12 years with a median of 9 years and the youngest age was 7 years and the oldest age was 17 years.

Table 1.  
Distribution of Respondents Based on Characteristics

Characteristics	f	%
Age		
7-10 year	34	51,5
10-14 year	32	48,4
Gender		
Man	30	45,4
Woman	36	54,5

Based on Table 2, the total number of intestinal protozoa infections obtained based on direct staining was 49 people.

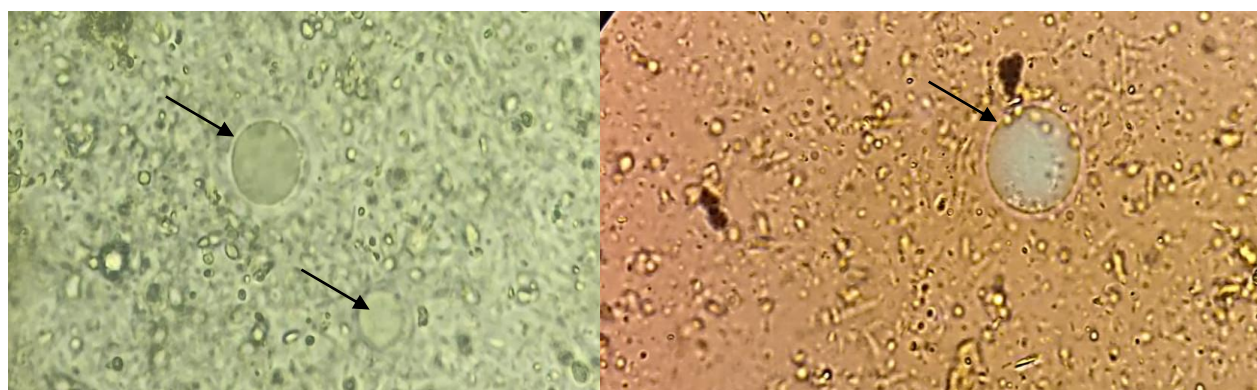
Table 2.  
Frequency Distribution of Intestinal Protozoan Infections

Intestinal Protozoa Species	Direct Coloring	
	f	%
<i>Cryptosporidium</i>	28	42,4
<i>Blastocystis sp</i>	21	31,8

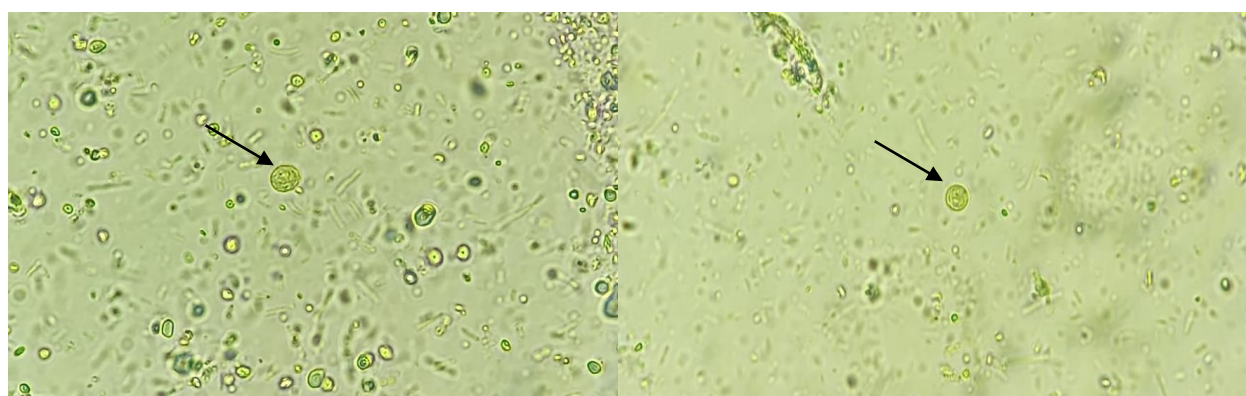
Based on Table 3, the stages found in *Blactocystis sp.* were 8 vacuolar stages, 12 granules, 1 cyst, and *Cryptosporidium spp.* were 5 granules, 16 vacuoles, and 7 cysts.

Table 3.  
Frequency Distribution of Intestinal Protozoa Infections Based on Stage

Intestinal protozoa species	Stadium	f	%
<i>Blactocystis sp</i>	Vakuolar	8	12,4
	Granular	12	18,1
	Kista	1	1,5
	Ameboid	0	0
<i>Cryptosporidium spp</i>	Vakuolar	16	24,2
	Granular	5	7,5
	Kista	7	10,6
	Ameboid	0	0



Picture 1. *Blastocystis Sp*



Picture 2. *Cryptosporidium Sp*

## DISCUSSION

Protozoa In this study, the incidence of intestinal protozoa infection is still quite high, the risk factors that cause it include residents with low levels of education, low socioeconomic levels, water sources that do not meet health requirements for drinking, do not have toilets and clean water facilities, wastewater disposal and poor waste management (Winerungan et al., 2020, Fitri et al., 2017) Intestinal protozoa infections are high in children aged 6-12 years. The high parasitic infection in school-age children is caused by several habits such as the habit of not washing hands before eating, the habit of biting nails or sucking fingers in children and the habit of not cutting nails once a week (Aditia et al., 2017, Dhubyan et al., 2022). Intestinal protozoa that are emerging diseases include *Blastocystis spp.*, *Cryptosporidium spp.* and *Cyclospora cayetanensis*. The prevalence of *Blastocystis spp.* infection has been shown to be influenced by host susceptibility as well as population type, socio-demographic characteristics, housing risk factors, deficiencies in food hygiene, water contamination, and contact with dangerous fauna, providing similar results to recent studies (De et al., 2019) *Cryptosporidium sp* and *Blastocystis sp* have emerged as important causes of endemic or

epidemic diarrhea in children and adults worldwide. The spread of parasites from human to human occurs indirectly through the environment, namely through oocysts in contaminated water, food or soil. In endemic areas, risk factors associated with infection include contaminated water or food, contact with soil or animals, type of sanitation and low socioeconomic status (Ompusungga et al., 2019). The prevalence of *B. hominis* varies from country to country. In general, the prevalence of *B. hominis* is higher in developing countries than in developed countries. This is related to poor hygiene, exposure to animals, and consumption of drinking water contaminated with parasites (Nofita et al., 2015, Carolina et al., 2019, Barua et al., 2015).

## CONCLUSION

Based on the results of the research that has been conducted, it was concluded that the incidence of intestinal protozoa infection in healthy children in Padang City was *Blactocystis* sp of 31.8% and *cryptosporidium* sp of 42.4% with an age of 7-15 years. Further research is needed on the incidence of intestinal protozoa by adding several inclusion and exclusion criteria as well as more sensitive examination methods.

## REFERENCES

- Bahmani, P., Maleki, A., Sadeghi, S., Shahmoradi, B., & Ghahremani, E. (2017). Prevalence of intestinal protozoa infections and associated risk factors among schoolchildren in Sanandaj City, Iran. *Iranian journal of parasitology*, 12(1), 108.
- Barua, P., Khanum, H., Haque, R., Najib, F., & Kabir, M. (2015). Establishment of *Blastocystis hominis* in-vitro culture using fecal samples from infants in slum area of Mirpur, Dhaka, Bangladesh. *Acta Medica International*, 2(1), 40-47.
- Carolina, A., Halleyantoro, R., & Dewi, D. P. (2019). Perbandingan Prevalensi Infeksi *Blastocystis Hominis* Pada Anak Dengan Diare Dan Tidak Diare Di Randudongkal. *Jurnal Kedokteran Diponegoro (Diponegoro Medical Journal)*, 8(1), 20-25.
- Charisma, A. M., & Fernita, N. F. (2020). Prevalensi protozoa usus dengan gambaran kebersihan personal pada anak SD di Ngingas Barat, Krian Sidoarjo. *Jurnal analisis kesehatan*, 9(2), 67-71.
- De la Luz Galván-Ramírez, M., Madriz-Elisondo, A. L., Ramírez, C. G. T., Rameño, J. D. J. R., de la O Carrasco, D. A., & López, M. A. C. (2019). Enteroparasitism and risk factors associated with clinical manifestations in children and adults of Jalisco state in western Mexico. *Osong Public Health and Research Perspectives*, 10(1), 39.
- Dhubyan Mohammed Zaki, Z. (2022). Prevalence of *Entamoeba histolytica* and *Giardia lamblia* associated with diarrhea in children referring to Ibn Al-Atheer Hospital in Mosul, Iraq. *Archives of Razi institute*, 77(1), 73-79.
- Greigert, V., Abou-Bacar, A., Brunet, J., Nourrisson, C., Pfaff, A. W., Benarbia, L., ... & Poirier, P. (2018). Human intestinal parasites in Mahajanga, Madagascar: The kingdom of the protozoa. *PLoS One*, 13(10), e0204576.
- Izzati, R., Nofita, E., Suchitra, A., Rusjdi, S. R., Rustam, R., & Meinapuri, M. (2024). Profil Infeksi *Blastocystis* sp. pada Penderita Karsinoma Kolorektal. *Jurnal Penelitian Kesehatan" SUARA FORIKES"(Journal of Health Research" Forikes Voice")*, 15(3), 587-590.
- Julianti, F., Rusjdi, S. R., & Abdiana, A. (2017). Hubungan infeksi protozoa intestinal dengan status gizi murid sekolah dasar di Kecamatan Ulakan Tapakis Kabupaten Padang Pariaman. *Jurnal Kesehatan Andalas*, 6(1), 13-19.
- M'bondoukwé, N. P., Kendjo, E., Mawili-Mboumba, D. P., Koumba Lengongo, J. V., Offouga Mbouoronde, C., Nkoghe, D., ... & Bouyou-Akotet, M. K. (2018). Prevalence of and risk factors for malaria, filariasis, and intestinal parasites as single infections or

- co-infections in different settlements of Gabon, Central Africa. *Infectious Diseases of Poverty*, 7, 1-17.
- Maryanti E, Lesmana SD, Mandela H. (2017). Detection of Opportunistic Intestinal Protozoa in Children with Diarrhea at the Pekanbaru Inpatient Health Center. *J Ilmu Kedokt.* 9(1):22. doi:10.26891/jik.v9i1.2015.22-26.
- Nurhayati, N. (2015). Gambaran Infeksi Protozoa Intestinal Pada Anak Binaan Rumah Singgah Amanah Kota Padang. *Majalah Kedokteran Andalas*, 34(1), 60-69.
- Ompusunggu S, Bedah S, Wulamdari Y. (2019). Research Article *Cyclospora cayetanensis* Infection Rate in Patients with Gastrointestinal recurrent in humans, and transmitted by food or drinking water which is epidemic in children and adults worldwide. The spread of the parasite from humans . 2019;5(1).
- Osman, M., El Safadi, D., Cian, A., Benamrouz, S., Nourrisson, C., Poirier, P., ... & Certad, G. (2016). Prevalence and risk factors for intestinal protozoan infections with *Cryptosporidium*, *Giardia*, *Blastocystis* and *Dientamoeba* among schoolchildren in Tripoli, Lebanon. *PLoS neglected tropical diseases*, 10(3), e0004496.
- Purba Y, Mahyudi. (2016). Analysis of Intestinal Protozoa Levels in the Community Aged 40-50 Years Old Plantation Workers in Negeri Juhar Village, Karo Regency. *Public Health and the Environment*. 2016;422–33.
- Seguí R, Muñoz-Antoli C, Klisiowicz DR, Oishi CY, Köster PC, De Lucio A, et al. Prevalence of intestinal parasites, with emphasis on the molecular *Fakultas Kedokteran Universitas Andalas*
- Seguí, R., Muñoz-Antoli, C., Klisiowicz, D. R., Oishi, C. Y., Köster, P. C., de Lucio, A., ... & Carmena, D. (2018). Prevalence of intestinal parasites, with emphasis on the molecular epidemiology of *Giardia duodenalis* and *Blastocystis* sp., in the Paranaguá Bay, Brazil: a community survey. *Parasites & vectors*, 11, 1-19.
- Sungkar, S., Pohan, A. P., Ramadani, A., Albar, N., Azizah, F., Nugraha, A. R., & Wiria, A. E. (2015). Heavy burden of intestinal parasite infections in Kalena Rongo village, a rural area in South West Sumba, eastern part of Indonesia: a cross sectional study. *BMC Public Health*, 15, 1-6.
- Tegen, D., Damtie, D., & Hailegebriel, T. (2020). Prevalence and Associated Risk Factors of Human Intestinal Protozoan Parasitic Infections in Ethiopia: A Systematic Review and Meta-Analysis. *Journal of parasitology research*, 2020(1), 8884064.
- Winerungan CC, Sorisi AMH, Wahongan GJP. (2020). Intestinal Parasite Infections in Residents Around Sumompo Final Disposal Site, Manado City. *J Biomedik Jbm*. 2020;12(1):61-67.
- Yuwanda, A. N., Rahmayuni, R., Visgun, D. A., Rahmi, A., Rifai, H., & Dwiridal, L. (2022). Characterization of magnetic minerals of iron sand Pasia Nan Tigo Padang Beach using X-Ray diffraction (XRD). *Indonesian Journal of Applied Physics*, 12(1), 35-47.