Optimal for Nation: Health and Medicine
PROCEEDINGS
E-ISSN XXXX-XXXX

IDENTIFICATION OF ENTEROBIASIS INCIDENCE IN PRESCHOOL CHILDREN IN ARONGAN LAMBALEK DISTRICT WEST ACEH

Rahmayanti[1*], Siti Hadijah[2], Fitriana[3], Resssy Gerda Ciana[4]
[1,2,3,4]*Poltekkes Kemenkes Aceh, Aceh Besar*

**Corresponding author:* yantiasyan2017@gmail.com

Abstract

Enterobiasis is an intestinal infection in humans, especially children, caused by pinworms (Enterobius vermicularis). Infection by Enterobius vermicularis worms occurs worldwide, especially in tropical regions and developing countries. Enterobius vermicularis infection can occur due to the ingestion of fertilized pinworm eggs. Usually, this process occurs through dirty fingers, contaminated food, or inhalation of air containing pinworm eggs. The transmission cycle of this disease is very simple, namely the transfer of worm eggs from the anus to the hands and then to the mouth. The purpose of this study was to identify the incidence of enterobiasis in preschool children in Arongan Lambalek District, West Aceh Regency in 2025. The study design was descriptive quantitative with a cross-sectional approach. Identification was carried out in the Microbiology Laboratory of the Aceh Ministry of Health Polytechnic. A purposive sample of 22 children was selected from a population of 40 preschool children (aged 3–6 years), based on inclusion criteria: residing in Arongan Lambalek Village, aged 3–6 years, and having obtained parental written consent. Data collection was carried out using the anal swab method and data were obtained using the prevalence rate formula, then the data were presented in tabulated form. The results of the study on anal swab examination to see Enterobius vermicularis infection in preschool children in Gampong Arongan Lambalek, West Aceh in 2025 showed that of the 22 samples examined, 5 people (22.73%) were found positive for Enterobius vermicularis worm infection, and 17 people (77.27%) were not infected. It can be concluded that the incidence rate of enterobiasis in preschool children in Arongan Lambalek District, West Aceh Regency in 2025 was 22.73%.

Keywords: Identification, Enterobiasis, Pre-School Children

1. INTRODUCTION

Worm infestation remains a common health problem among children in both developed and developing countries (1)(2)(3)(4). Enterobiasis is a pinworm infection caused by the intestinal nematode parasite Enterobius vermicularis (5)(6). This worm is widespread throughout the world regardless of socioeconomic level, culture, or race (7). Humans are considered the sole host for Enterobius vermicularis. Globally, Enterobius vermicularis remains an under-recognized public health problem. This parasite infects an estimated 200 million people worldwide, with a disproportionate burden among children aged 5–10 years, who account for more than 30% of cases (8)(9)(10). This parasite has a simple and direct life cycle, and transmission occurs primarily through the fecal-oral route, autoinfection, or indirect contact with contaminated surfaces or airborne eggs. Children are most often affected due to poor hygiene, frequent hand-to-mouth

contact, and close contact at school or daycare (11). This parasite spreads easily among all family members, with frequent reinfections.

According to the WHO, the incidence of enterobiasis varies significantly among children in various countries, with an average of around 12.9% and can reach 4–28%, particularly in areas with poor sanitation (12)(13). In Indonesia, helminth infections remain a public health problem, with prevalence varying between 2.5% and 62% depending on environmental conditions, sanitation, and community hygiene practices (14). Although data on the incidence of Enterobius vermicularis infections is limited, this infection is still frequently found in children, particularly in areas with low levels of personal hygiene. This suggests that the prevalence of Enterobius vermicularis infections in children can reach more than 20%, particularly in the preschool age group, which is at high risk due to suboptimal hygiene practices (13). Meanwhile, in Aceh Province, data on the incidence of enterobiasis have not been widely reported, underscoring the need for localized research to characterize the infection.

Enterobiasis is asymptomatic in some patients, while others, especially children, may exhibit symptoms such as perianal pruritus, restlessness, loss of appetite, malnutrition, anemia, insomnia, and irritability. Ectopic enterobiasis can migrate to and involve organs such as the appendix, kidneys, and fallopian tubes, causing severe health complications(12)(15). The most common symptom of pinworm infection is itching around the anus (16). This itching most often occurs at night while the infected person is sleeping and can significantly disrupt sleep quality. Adult male pinworms measure 2 to 5 mm, and females measure 8 to 13 mm. The cecum of the large intestine is the primary site of pinworm survival, and egg-bearing females migrate at night to lay up to 15,000 eggs. Ingested eggs hatch in the duodenum, and larvae mature during migration to the large intestine (17). This disease is usually transmitted directly from an infected person to a healthy person. Transmission can also occur through habits such as sucking on toys, biting pencils, or playing in areas contaminated with pinworm eggs (18). Enterobiasis in children can affect their physical health, nutrition, and cognitive/psychological aspects. Infected children have lower weight/height (Z-score) and are more likely to be underweight and stunted (19)(20).

Arongan Lambalek District, West Aceh Regency, is an area with a vulnerable early childhood population. Initial observations in Arongan Lambalek Village of children aged 3-6 years old showed risky behaviors, such as playing in dirty places, not washing hands with soap after defecation, the habit of putting fingers and objects in the mouth, and lack of parental supervision of nail hygiene. Parents' reports of children frequently experiencing anal itching at night strengthen the suspicion of pinworm infection in the area. Therefore, this study aims to provide an overview of Enterobius vermicularis infection in preschool children in Arongan Lambalek District in 2025 as an initial step in worm prevention efforts in West Aceh Regency.

2. METHODOLOGY

This study used a quantitative descriptive design with a cross-sectional approach, which aims to describe the incidence of enterobiasis in preschool-aged children in Arongan Lambalek District, West Aceh Regency. The location of the study sample collection was in Arongan Lambalek District, West Aceh Regency, while microscopic examination was conducted in the Microbiology Laboratory of the Medical Laboratory Technology Department of the Aceh Ministry of Health Polytechnic from July to August 2025. The population in this study was 40 preschool children (3-6 years old).

A sample of 22 children was selected using purposive sampling technique based on the following criteria. Inclusion criteria: (1) children aged 3–6 years residing in Gampong Arongan Lambalek; (2) children whose parents/guardians provided written informed consent; and (3) children who were present at the time of data collection. Exclusion criteria: (1) children who had received anthelmintic treatment within the preceding four weeks; and (2) children with diarrhea or other acute gastrointestinal conditions at the time of sampling.

Specimens were collected using the anal swab method: transparent adhesive tape was applied to the perianal area in the morning before the child bathed or defecated. The tape was then affixed directly to a glass slide and examined under a light microscope at 10× and 40× magnification to detect the presence of Enterobius vermicularis eggs. This standard adhesive-

tape (Graham) technique is well-established for pinworm diagnosis and does not require additional staining (5). Data obtained from the anal swab examination were analyzed descriptively to determine prevalence.

This study was approved by the Research Ethics Committee of Poltekkes Kemenkes Aceh. Written informed consent was obtained from the parents or legal guardians of all participating children prior to specimen collection.

The prevalence calculation is carried out using the following formula:

$$\text{Prevalence } (\%) = \frac{Number\ of\ positive\ samples\ of\ Enterobius\ vermicularis}{Total\ number\ of\ samples\ examined} \times 100$$

Description:
- Positive samples = number of children in whom *Enterobius vermicularis* eggs were found during anal swab tests.
- Number of samples = all children examined.

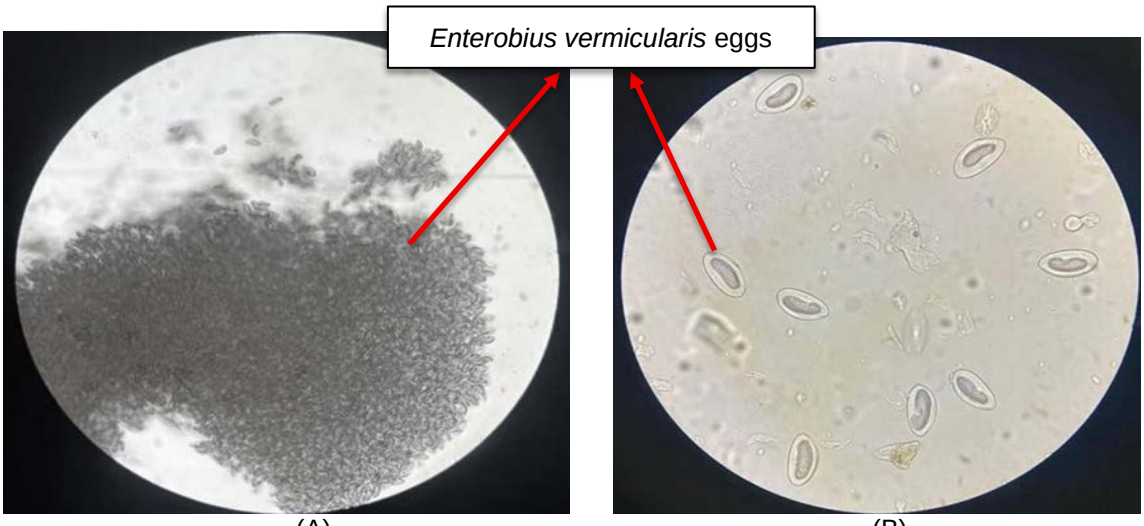
3. RESULTS

Based on laboratory examinations of 22 anal swab samples from preschool-aged children in Arongan Lambalek District, West Aceh, the results are as shown in Table 1:

Table 1. Results of Anal Swab Examination: Prevalence of *Enterobius vermicularis* in Preschool-aged Children in Arongan Lambalek District, West Aceh Regency.

No	Number of Samples	Research Result				Total	
		Positive (n)	%	Negative (n)	%	n	%
1	22	5	22.73	17	77.27	22	100

Based on Table 1, it can be seen that of the 22 samples examined, only 5 children (22.73%) were found to be positive for *Enterobius vermicularis* worm eggs, as seen in (Figure 1) and the majority of 17 children (77.27%) were negative for *Enterobius vermicularis* worm eggs.



(A) (B)

Figure 1. Microscopic Examination Results of *Enterobius vermicularis* Eggs in Positive Samples
(A) *Enterobius vermicularis* eggs filling the field of view
(B) *Enterobius vermicularis* eggs at 40x magnification

The results of an anal swab study on the prevalence of Enterobius vermicularis in preschool-aged children in Arongan Lambalek District, West Aceh Regency in 2025 showed that 5 respondents (22.73%) were positive for Enterobius vermicularis infection and also showed that the majority of respondents (77.27%) were negative or not infected with Enterobius vermicularis. This figure indicates that the incidence of enterobiasis in Arongan Lambalek District is still found, especially in preschool-aged children who have a high risk of worm infections.

Enterobius vermicularis is an intestinal nematode that frequently infects humans. Its easy transmission and simple life cycle make this infection common, especially in crowded environments and groups of children. Analysis of respondents who tested positive for infection indicates that enterobiasis can be influenced by various factors, particularly poor personal hygiene (21). Preschool-aged children have a habit of putting their hands and objects into their mouths and not washing their hands before eating. This is in accordance with the results of research by Mustar et al. (2018) who stated that the habit of washing hands before eating using clean or running water plays an important role in preventing worm infections, because washing hands with clean or running water can remove dirt, dust, and worm eggs that stick to the surface of the skin and nails on both hands (22). In addition, poor nail hygiene also greatly influences the incidence of enterobiasis, this is in line with research conducted by Salbiah (2018) which showed the rate of Enterobiasis infection in students of SDN 060818 Jalan M. Nawi Harahap, Medan Kota District was 40% while the cleanliness of the students' hands and nails was still considered poor, namely 60% (23). Other factors can also occur from contamination through contact between infected children and exposure to dust, clothing or bed linen containing worm eggs. This is in accordance with the characteristics of Enterobius vermicularis which has eggs that are infective in a short time and easily spread in crowded environments. As stated by Okta et al. (2023), there is a linear relationship between poor Clean and Healthy Lifestyle Behavior and increase in the incidence of enterobiasis in children (24).

The majority of respondents (77.27%) were negative for infection, which may reflect the positive impact of preventive efforts at the family and community level. Children in Arongan Lambalek with good hygiene habits, including regular nail clipping and handwashing, appear to be at lower risk of infection, consistent with findings Okta et al. (2022) that children demonstrating good PHBS behavior have significantly lower rates of enterobiasis (25). The active role of Posyandu and Puskesmas in delivering health education in this district is also likely to have contributed to this protective effect. In accordance with WHO recommendations, maternal and child health services at Posyandu function as promotional and preventive platforms against infections such as enterobiasis, and the role of mothers as primary health educators in the home is crucial for children's hygiene practices (26).

Although the majority of children were free from infection, the presence of 22.73% positive cases still warrants serious attention. This finding calls for integrated health interventions involving health workers, community cadres, and parents, with the goal of reducing the prevalence of enterobiasis to below 10% in line with WHO targets for Soil-Transmitted Helminthiasis control.

4. CONCLUSIONS

The incidence of enterobiasis in preschool children in Arongan Lambalek District, West Aceh in 2025 showed a prevalence of 22.73% (5 children positive) and 77.27% (17 children negative). Preventive efforts through education on Clean and Healthy Lifestyle Behavior, regular nail clipping, and compliance with periodic deworming medication are highly recommended to reduce this prevalence. This study has several limitations that should be acknowledged. First, the sample size was relatively small (n = 22 of 40 eligible children), which limits the statistical power of the findings. Second, specimen collection was performed at a single time point using one anal swab per child; the sensitivity of a single anal swab for detecting Enterobius vermicularis is approximately 50%, and WHO and CDC guidelines recommend three consecutive morning swabs to improve sensitivity. Therefore, the true prevalence may be underestimated. Third, the use of purposive sampling limits the generalizability of findings to the broader population of preschool children in Arongan Lambalek District or West Aceh Regency. Fourth, no structured assessment of risk factors such as hygiene behavior, socioeconomic status, or household crowding was performed, precluding a risk factor analysis. Additionally, individual demographic

data (sex and age subgroup) were not systematically recorded, preventing a breakdown of prevalence by demographic variables. Future studies with larger probability-based samples, multiple swab collections, systematic demographic recording, and structured risk factor data collection are recommended.

ACKNOWLEDGEMENTS

The author would like to thank the Director of Poltekkes Aceh, the Head of the TLM Department, and all parties who have helped so that this research was completed on time.

REFERENCES

1. Benzamin M, Chowdhury MZR, Chakroborty P, Ahmed A, Hussen MM, Dey RK, et al. Unmasking the role of constipation in treatment-refractory enterobiasis in Bangladeshi children. BMC Gastroenterol [Internet]. 2025 Oct 13;25(1):724. Available from: http://www.ncbi.nlm.nih.gov/pubmed/41083930

2. Rahmayanti R, Fitriana F, Darmawati D. Tingkat Pengetahuan Ibu tentang Cacingan terhadap Pencemaran Tanah Halaman Rumah oleh Telur Cacing STH (Soil Transmitted Helminths) di Gampong Jawa Kecamatan Kuta Raja Kota Banda Aceh. J Jeumpa [Internet]. 2025 May 15;12(1):1–12. Available from: https://ejurnalunsam.id/index.php/jempa/article/view/10777

3. Rahmayanti R, Hadijah S, Erlinawati E. Relationship Between Soil-Transmitted Helminths (Sth) Egg Contamination In Yard Soil To Helminthiasis Infection In Children Elementary School In Gampong Jawa Kuta Raja Sub-District Banda Aceh City. Biot J Ilm Biol Teknol dan Kependidikan [Internet]. 2023 Oct 4;11(2):178. Available from: https://jurnal.ar-raniry.ac.id/index.php/biotik/article/view/19794

4. Rahmayanti R, Razali R, Mudatsir M. Hubungan Pengetahuan, Sikap Dan Tindakan Dengan Infeksi Soil Transmitted Helminths (STH) Pada Murid Kelas 1, 2 Dan 3 SDN Pertiwi Lamgarot Kecamatan Ingin Jaya Kabupaten Aceh Besar. Biot J Ilm Biol Teknol dan Kependidikan [Internet]. 2017 Jan 31;2(2):110. Available from: https://jurnal.ar-raniry.ac.id/index.php/biotik/article/view/244

5. CDC C for DC and P. Enterobiasis. In 2019. Available from: https://www.cdc.gov/dpdx/enterobiasis/index.html#:~:text=Hosts,eosinophilic colitis associated with E.

6. Rahim AR, Hasbi N, Rosyunita R, Triani E, Parwata WSS. Prevalence of Enterobiasis Infection Among School-Aged Children in the Kebon Kongok Landfill Area, West Lombok. J Penelit Pendidik IPA [Internet]. 2023 Dec 25;9(SpecialIssue):455–9. Available from: https://www.jppipa.unram.ac.id/index.php/jppipa/article/view/5535

7. Mao F, Xu X, Tang F, Ni B, Zhang Q, Zhang J, et al. Unveiling the disparities between private and public preschools in the risk for pinworm infections in China: a multicentre cross-sectional study. BMC Public Health [Internet]. 2025 Feb 17;25(1):655. Available from: http://www.ncbi.nlm.nih.gov/pubmed/39962583

8. Sočan M, Štromajer E, Ravnik M, Mrzel M, Grilc E, Grmek Košnik I. Enterobius vermicularis infection: a cross-sectional study in preschool and school children in the North-Western part of Slovenia. Helminthologia [Internet]. 2022 Dec 30;59(4):357–63. Available from: https://reference-global.com/article/10.2478/helm-2022-0040

9. De Kostha YBNS, Pathirana SL, Handunnetti SM, Gunawardena S. Characterization of antigens of Enterobius vermicularis (pinworm) eggs. Sci Rep [Internet]. 2022 Aug 24;12(1):14414. Available from: http://www.ncbi.nlm.nih.gov/pubmed/36002555

10. Leung AKC, Lam JM, Barankin B, Wong AHC, Leong KF, Hon KL. Pinworm (Enterobius Vermicularis) Infestation: An Updated Review. Curr Pediatr Rev [Internet]. 2025;21(4):333–47. Available from: http://www.ncbi.nlm.nih.gov/pubmed/38288810

11. Jongthawin J, Mahittikorn A, Suwannatrai AT, Rattanawan C, Wangdi K, Masangkay FR, et al. Prevalence and Epidemiological Patterns of Enterobius vermicularis Infection in Thailand: A Systematic Review and Meta-Analysis. Med Sci (Basel, Switzerland) [Internet]. 2025 Sep 24;13(4). Available from: http://www.ncbi.nlm.nih.gov/pubmed/41133489

12. Lashaki EK, Mizani A, Hosseini SA, Habibi B, Taherkhani K, Javadi A, et al. Global prevalence of enterobiasis in young children over the past 20 years: a systematic review and meta-analysis. Osong public Heal Res Perspect [Internet]. 2023 Dec;14(6):441–50. Available from: http://www.ncbi.nlm.nih.gov/pubmed/38204424

13. Khayyat R, Belkebir S, Abuseir S, Barahmeh M, Alsadder L, Basha W. Prevalence of and risk factors for enterobius vermicularis infestation in preschool children, west bank, palestine, 2015. East Mediterr Heal J. 2021;27(11):1052–60.

14. Kementrian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 15 Tahun 2017 Tentang Penanggulangan Cacingan. In 2017.

15. Chhetri S, Al Mamari AH, Al Awfi MM, Al Khaldi NHN, Abed NM, Pandak N, et al. Enterobius vermicularis Related Acute Appendicitis: A Case Report and Review of the Literature. Infect Dis Rep [Internet]. 2023 Jul 10;15(4):417–24. Available from: http://www.ncbi.nlm.nih.gov/pubmed/37489396

16. Shilanabadi KF, Derakhshan FK, Raeghi S. Genotype Distribution of Enterobius vermicularis Isolates from Northwest Provinces of Iran. Ethiop J Health Sci [Internet]. 2023 May;33(3):433–40. Available from: http://www.ncbi.nlm.nih.gov/pubmed/37576175

17. Fan CK, Chuang TW, Huang YC, Yin AW, Chou CM, Hsu YT, et al. Enterobius vermicularis infection: prevalence and risk factors among preschool children in kindergarten in the capital area, Republic of the Marshall Islands. BMC Infect Dis [Internet]. 2019 Jun 18;19(1):536. Available from: http://www.ncbi.nlm.nih.gov/pubmed/31215414

18. Lee MR, Shin HE, Back SO, Lee YJ, Ju JW, Park CS, et al. Positive rates for Enterobius vermicularis eggs among preschool children in Yeosu-si, Jeollanam-do, Korea (2017-2021). Parasites, hosts Dis [Internet]. 2023 Feb;61(1):84–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/37170468

19. Akram HE, Al-Warid HS. Evaluation of Hematological Factors and Micronutrients Among Children Infected with Enterobius vermicularis. Iraqi J Sci [Internet]. 2023 Apr 30;1625–34. Available from: https://ijs.uobaghdad.edu.iq/index.php/eijs/article/view/7313

20. Dohan BAM, Al-Warid HS. Haematological and Demographic Study in Children Infected with Enterobiasis in Al Diwaniyah Province, Iraq. Iraqi J Sci [Internet]. 2022 Jan 30;107–15. Available from: https://ijs.uobaghdad.edu.iq/index.php/eijs/article/view/4549

21. Pebriyani E, Adrial A, Nofita E. Hubungan Personal Hygiene Dengan Kejadian Enterobiasis Pada Anak Usia 6-12 Tahun Di Panti Asuhan Kota Padang. J Kesehat Andalas. 2019;8(1):81.

22. Mustar YS, Susanto IH, Bakti AP. Pendidikan Kesehatan: Perilaku Hidup Bersih dan Sehat (PHBS) di Sekolah Dasar. JISIP (Jurnal Ilmu Sos dan Pendidikan) [Internet]. 2018 Jul 8;2(2). Available from: https://ejournal.mandalanursa.org/index.php/JISIP/article/view/359

23. Salbiah S. Gambaran Kebersihan Tangan Dan Kuku Dengan Infeksi Enterobiasis Pada Siswa Sekolah Dasar Di Kota Medan. J Ilm PANNMED (Pharmacist, Anal Nurse, Nutr Midwivery, Environ Dent [Internet]. 2018 Nov 5;11(2):87–92. Available from: http://ojs.poltekkes-medan.ac.id/pannmed/article/view/78

24. Okta S, Damayanti NA, Arsyad M, Ferlianti R. Hubungan PHBS dengan Enterobiasis pada Anak di Kelurahan Susukan Jakarta Timur The Correlation of PHBS with Enterobiasis in Children in Susukan Village, East Jakarta. Jr Med J. 2023;2(3):297–303.

25. Salsabella Okta NADMA. Hubungan Perilaku PHBS Anak Dengan Enterobiasis Di Rt.09/07 Kelurahan Susukan Jakarta Timur. Jr Med J. 2022;1(3):288–94.

26. Novita A. Hubungan Peran Orangtua Dengan Kepatuhan Anak Dalam Menjaga Kebersihan Diri. Media Husada J Nurs Sci. 2025;6(2):87–94.