

Family Cluster of Enterobius vermicularis Infection: A Case Study of Western Rajasthan

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Abstract

Enterobiasis, caused by Enterobius vermicularis, is one of the most common intestinal helminthic infections worldwide, particularly affecting children and individuals living in crowded environments with poor sanitation. Transmission occurs mainly through the fecal–oral route and autoinfection facilitated by contaminated hands, bedding, clothing, and household items.

The parasite primarily inhabits the caecum, appendix, and colon. Female worms migrate to the perianal region at night to lay eggs, causing intense nocturnal perianal itching (pruritus ani), which is the characteristic symptom of enterobiasis.

Keywords: Enterobius Vermicularis, Enterobiasis, Pinworm Infection, Household Transmission, Family Cluster, Pediatric Parasitosis, Stool Microscopy

Case Description

We present a case of a 7-year-old female child, a resident of Jodhpur, Rajasthan. She is a school-going girl with a history of tap-water consumption. She presented to the Pediatric Outpatient Department (OPD) of Umaid

Hospital, associated with Dr. S. N. Medical College, Jodhpur, on 10.12.2025 with the chief complaints of abdominal pain, diarrhea, perianal and perineal itching, pain in the legs, and difficulty sleeping at night.

On eliciting a detailed history regarding the itching, it was noted that the symptoms were more pronounced at night. Her mother reported observing adult worms in the perianal region in the morning as well as in the stool for the past three months. The patient had previously consulted a local Primary Health Centre, where she was prescribed antidiarrheal medications, but the symptoms persisted and gradually worsened.

The patient also complained of anorexia, weight loss (2 kg), and lethargy over the last three months. However, there was no history of fever or vomiting. She was not a known case of any chronic illness and had no known drug or food allergies.

A stool sample was collected and subjected to macroscopic and microscopic examination. On macroscopic examination, an adult female pinworm was identified. Microscopic examination of the stool sample

using normal saline wet mount revealed planoconvex eggs of *Enterobius vermicularis* under 10× and 40× magnification. An ultrasonographic examination of the abdomen revealed mesenteric lymphadenopathy.

Further inquiry into the patient's living conditions revealed close household contact. Stool samples were subsequently collected from family members who were living with the child and sharing blankets and other household items. Microscopic examination of stool samples from both parents also demonstrated the presence of *Enterobius vermicularis* eggs.

Introduction

One of the most common emergency abdominal operations world-wide is for suspected acute appendicitis¹. Appendicitis is defined as an inflammation of the appendix characterized by abdominal pain. It is a malady that occurs when the insides of the appendix are blocked. The diagnosis of acute appendicitis is based on the patient's history, physical examination, laboratory evaluation, and abdominal imaging. The classic symptoms include the aforementioned vague periumbilical pain, as well as anorexia, nausea, intermittent vomiting, migration of pain to the right lower quadrant of the abdomen, and low-grade fever. In approximately 90% of patients presenting with these symptoms, the diagnosis of acute appendicitis has been made. The most common treatment is laparoscopic appendectomy². A wide spectrum of cases have been cited as causes of appendicitis, and among the rarest are neuroendocrine tumours, serrated adenomas, low-grade appendicular mucinous neoplasms, hyperplastic polyps, and intestinal parasites.³

In Taiwan, the control of pinworm infection among school children should be considered to a success. The prevalence was reduced from 19.9% in 1986 to 2.5% in 2001 after a 15-year population-based control.⁴ Mass

examination, treatment, and follow-up should be continued until the eradication of the infection. However, this large-scale control project was put to an end in 2001 and the control works then become tasks undertaken by the health-related agencies in each county/city government. In order to determine the status of pinworm infection among school children after this change in the control works, we examined 118,190 school children from 25 counties/cities in 2007 and found 2.4% (0.6e6.6%) were infected with pinworm, indicating the prevalence remains at a low level after the control works transferred to the local governments.⁵ Large-scale mass screening and treatment projects for pinworm infection among pre-school children in Taipei have been carried out since 1990. The positive rate significantly reduced from 4.3% in 1990 to 0.40% in 2007.⁶

Enterobius vermicularis, also known as "pinworms" is considered the most common helminth infection (although being the least pathogenic), affecting the gastrointestinal tract of children worldwide⁷. It accounts for 4–28% of such infections⁸⁻⁹ and has been well recognized for hundreds of years. In 1634, Fabricius Hildanus described appendicitis pinworms for the first time¹⁰. There are few case reports of pinworms that show coincidentally in surgical or histologic autopsy specimens, particularly in the appendix. The eggs of these pinworms spread by the fecal oral route¹¹⁻¹².

Globally, *E. vermicularis* remains an under recognized public health concern, affecting an estimated 200 million children, with over 30% of cases in those aged 5–10 years¹³⁻¹⁴. A recent meta-analysis estimated a pooled global prevalence of 12.9% among children, with the highest rates in Europe (24.9%), followed by South America (14.3%), Asia (13%), Africa (2%), and North America (1.9%)¹⁵. The same analysis reported substantial heterogeneity, highlighting the need for country-specific

epidemiological data to guide targeted control strategies.

In Thailand, enterobiasis was historically a major public health issue, with prevalence reaching up to 65% before 2000, particularly in the central region¹⁶. Over the past two decades, improved sanitation, school-based deworming, and health education have contributed to a

marked decline in infections¹⁷⁻¹⁸. Nevertheless, the burden remains disproportionately high among socioeconomically disadvantaged groups, including immigrant children, hill tribe communities, and children in orphanages, reflecting persistent disparities in living conditions, sanitation, and healthcare access¹⁹⁻²⁰.

Clinical and Biochemical Profile

Parameter	Index Case (Child)	Father	Mother
Age / Sex	7 yrs / Female	Adult / Male	Adult / Female
Socioeconomic Status	Lower	Lower	Lower
Symptoms	Perianal itching, insomnia	Perianal itching	Perianal itching
Stool Microscopy	Adult worm + eggs	Adult worm + eggs	Adult worm + eggs
Hemoglobin (g/dL)	10.2	12.8	11.6
TLC (/μL)	8500	7800	8000
Eosinophils (%)	8	6	7

Geographic Distribution

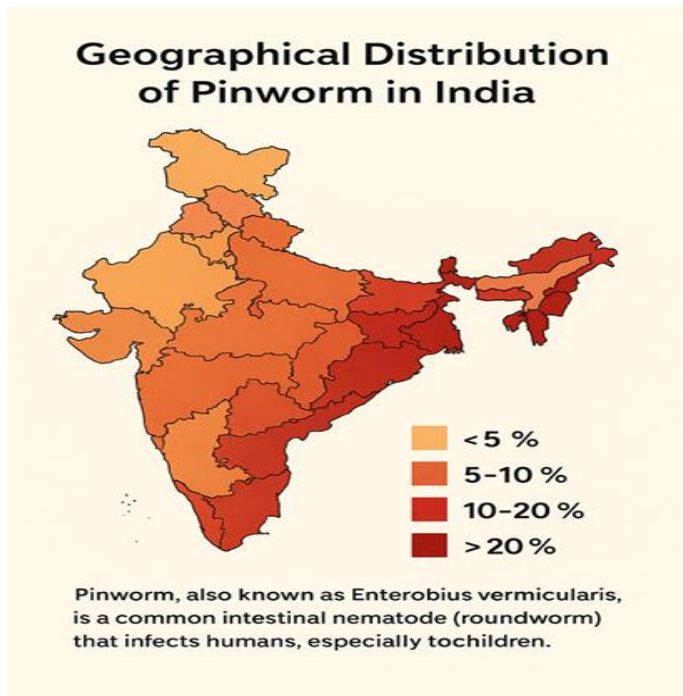


Figure 1: *Enterobius vermicularis* has a worldwide distribution with higher prevalence among children living in overcrowded conditions and areas with poor

sanitation. In India, infections are commonly reported from rural and peri-urban regions.

Macroscopic and Gross Findings



Figure 2: Macroscopic examination of stool specimen showing adult *Enterobius vermicularis* visible to the naked eye. Slender, whitish, thread-like worms are seen embedded within the fecal matter, consistent with adult

pinworms and correlating with microscopic confirmation of enterobiasis.

Microscopic Finding



Figure 3: High power objective (HPO)(40× objective) photomicrograph of stool wet mount in iodine saline showing a characteristic egg of *Enterobius vermicularis*. The egg is oval and asymmetrical with a flattened side (planoconvex or D-shaped appearance) and a smooth, thick, translucent shell. A coiled larva is visible within the egg. Surrounding fecal debris is seen in the background, supporting the diagnosis of enterobiasis.



Figure 4: High power objective (HPO)(40× objective)

photomicrograph of a stool wet mount prepared in normal saline showing an egg of *Enterobius vermicularis*. The egg is oval and asymmetrical with a characteristic planoconvex (D-shaped) morphology and a smooth, thick, translucent shell. Internal granular contents representing the developing larva are visible against a background of fecal debris, confirming the diagnosis of enterobiasis.



Figure 5: Low-power (4× objective) photomicrograph of a stool wet mount showing an adult *Enterobius vermicularis* (pinworm). The worm appears as a slender, elongated, translucent nematode with gently curved body contours and smooth cuticle, seen amidst fecal debris. The morphology at low magnification is characteristic of adult pinworm and supports the diagnosis of enterobiasis.

Clinical Biochemistry Laboratory Report

Biochemistry Test Results

- Liver function parameters are within normal limits.
- No biochemical evidence of hepatic dysfunction.

Complete Blood Count (CBC) – Detailed Report

Patient Investigation: Complete Blood Count (CBC)

CBC Parameters

Parameter	Result	Unit	Reference Range	Remark
Hemoglobin (HGB)	10.2	g/dL	12.0–15.0	Low
RBC Count	3.84	$\times 10^6/\mu\text{L}$	3.80–4.80	Low-normal
Hematocrit (HCT)	31.2	%	36.0–46.0	Low
MCV	81.3	fL	83.0–101.0	Low
MCH	26.6	pg	27.0–32.0	Low
MCHC	32.8	g/dL	31.5–34.5	Normal
RDW-SD	38.2	fL	37–54	Normal
RDW-CV	13.0	%	11–16	Normal
Platelet Count	262	$\times 10^3/\mu\text{L}$	150–420	Normal
MPV	9.6	fL	9–13	Normal
WBC Count	6.97	$\times 10^3/\mu\text{L}$	4.00–10.00	Normal

Differential Leukocyte Count (DLC)

Parameter	Result	Unit	Reference Range	Remark
Neutrophils	40.5	%	40–80	Normal
Lymphocytes	46.3	%	20–40	High
Monocytes	4.8	%	2–10	Normal
Eosinophils	8.1	%	1–6	High
Basophils	0.3	%	0–2	Normal
Neut# (Absolute)	2.83	$\times 10^3/\mu\text{L}$	2.0–7.0	Normal
Lymph# (Absolute)	3.23	$\times 10^3/\mu\text{L}$	1.0–3.0	High
Mono# (Absolute)	0.33	$\times 10^3/\mu\text{L}$	0.2–1.0	Normal
Eos# (Absolute)	0.56	$\times 10^3/\mu\text{L}$	0.02–0.50	High
Bas# (Absolute)	0.02	$\times 10^3/\mu\text{L}$	0.02–0.10	Normal

Impression

- Mild microcytic hypochromic anemia – suggestive of iron deficiency.
- Eosinophilia – suggestive of parasitic infestation or allergic etiology.
- Clinical correlation advised.

Discussion

This family cluster highlights the high transmissibility of *Enterobius vermicularis*. Autoinfection and spread through contaminated hands, clothing, and bedding are common. Simultaneous treatment of all household members along with strict hygiene measures is essential.

Conclusion

This case highlights the high transmissibility and familial clustering of *Enterobius vermicularis* infection, particularly in settings with close household contact and suboptimal hygiene practices. The presence of characteristic clinical features such as nocturnal perianal itching, along with confirmatory microscopic findings, underscores the importance of maintaining a high index of suspicion for timely diagnosis.

The detection of infection in multiple family members emphasizes the need for simultaneous screening and treatment of all close contacts to prevent reinfection and interrupt transmission.

Additionally, health education regarding personal hygiene, environmental sanitation, and proper handwashing practices plays a crucial role in controlling the spread of enterobiasis.

Overall, this case reinforces the significance of integrating clinical evaluation with laboratory diagnosis and adopting a family-centered management approach for effective control and prevention of *Enterobius vermicularis* infection.

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