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Original Research Article

Detection and Correlation of Fecal Occult Blood with Intestinal Parasitic Infections among Patients Attending IGIMS, Patna

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Abstract:

Background: Intestinal parasitic infections (IPIs) remain a significant global public health problem, particularly in low- and middle-income countries. Fecal occult blood (FOB) detection may provide an important indicator of gastrointestinal morbidity associated with these infections.

Objective: To determine the prevalence and pattern of intestinal parasitic infections and their correlation with fecal occult blood positivity among patients at IGIMS, Patna.

Methods: A hospital-based prospective study was conducted over 18 months, including 200 stool samples from patients of various age groups. Samples were examined macroscopically and microscopically by direct wet mount and concentration methods (formol-ether and saturated salt floatation). FOB testing was performed using the standard guaiac method. Statistical analysis was carried out using SPSS v15.0, with $p \leq 0.05$ considered significant.

Results: Intestinal parasites were detected in 26.5% (53/200) of cases. *Entamoeba histolytica* (49.05%) was the most common parasite, followed by *Giardia* (18.8%) and *Ascaris lumbricoides* (9.43%). FOB positivity was observed in 36% (72/200) of samples. Among parasitic cases, 69.8% were FOB positive ($p < 0.00001$). The highest infection rates were in children ≤10 years (50%) and adults 41–50 years (43.7%). Males (62.2%) were more frequently infected than females (37.7%). FOB positivity was strongly associated with E. histolytica.

Conclusion: A significant correlation exists between intestinal parasitic infections and FOB positivity, highlighting the diagnostic value of combining stool microscopy with FOB testing. Routine inclusion of both methods, along with community-based deworming programs, is recommended.

Keywords: Intestinal parasitic infections, Fecal occult blood, *Entamoeba histolytica*, Stool microscopy, IGIMS Patna.

Introduction

Intestinal parasitic infections are among the most persistent public health problems in many parts of the world, particularly in regions where sanitation and hygiene are inadequate. According to the World Health Organization, billions of people are infected globally, and a significant proportion experience symptoms ranging from mild gastrointestinal discomfort to life-threatening complications. These infections contribute not only to illness and death but also to poor nutritional status, impaired growth in children, and reduced work capacity in adults. The burden is greatest in tropical and subtropical countries, including India, where environmental conditions, population density, and limited resources continue to support their spread.

The parasites responsible for intestinal infections fall broadly into two categories: helminths and protozoa. Helminths such as *Ascaris lumbricoides*, *Trichuris trichiura*, hookworms, S*trongyloides stercoralis*, and *Hymenolepis nana* are transmitted mainly through soil contaminated with human feces. Protozoan parasites, including *Entamoeba histolytica* and *Giardia lamblia*, are spread through contaminated food and water and are well known causes of dysentery and persistent diarrhea. While many infections are asymptomatic, heavy worm loads or invasive protozoa can produce abdominal pain, diarrhea, anemia, malnutrition, intestinal obstruction, or even systemic complications.

The detection of blood in stool, even when not visible to the naked eye, provides important information about the severity of infection. Fecal occult blood testing (FOBT) can reveal mucosal injury and chronic blood loss that might otherwise go unnoticed. Although stool microscopy remains the cornerstone for identifying parasitic ova and cysts, it gives limited insight into the extent of tissue damage. When used alongside microscopy, FOBT offers a more complete picture of intestinal disease, helping clinicians to identify patients at risk of anemia or more serious complications.

Despite the well-established burden of intestinal parasites in India, little work has been done to examine how often these infections are accompanied by occult gastrointestinal bleeding. This study was designed to address that gap by screening patients for both parasites and fecal occult blood at the Indira Gandhi Institute of Medical Sciences (IGIMS), Patna. By assessing the prevalence of infection and its association with hidden blood loss, the study seeks to strengthen diagnostic approaches and highlight the importance of combined testing in guiding treatment and prevention strategies.

Materials and Methods

Study design: A prospective hospital-based comparative diagnostic study.

Duration: 18 months (December 2019 – May 2021).

Sample size: 200 stool samples from patients across different age groups and departments of IGIMS.

Inclusion Criteria: All stool samples submitted for routine microscopy and FOB testing.

Exclusion Criteria: Samples with visible fresh blood and repeat samples from the same patient.

Sample Collection: Fresh stool samples were collected in sterile containers, avoiding urine contamination.

Examination Methods

- **Macroscopy:** Color, consistency, odor, and mucus.
- **Microscopy:**
    - Direct wet mount (saline and iodine).
    - Concentration methods (formol-ether sedimentation and saturated salt floatation).
- **FOBT:** Standard guaiac method.

Data Analysis: Results were analyzed with SPSS v15.0. Statistical significance was defined at $p \leq 0.05$.

Results

Out of 200 stool samples examined, intestinal parasites were identified in 53 cases (26.5%), while 72 samples (36%) were positive for fecal occult blood (FOB). Among those with parasitic infections, 69.8% were also FOB positive, and this association was statistically significant ($p < 0.00001$).

Table 1: Distribution of Parasites Identified

Parasite	Cases (n)	Percentage (%)
Entamoeba histolytica	26	49.05%
Giardia lamblia	10	18.80%
Ascaris lumbricoides	5	9.43%
Ancylostoma duodenale	3	5.66%
Strongyloides stercoralis	3	5.66%
Hymenolepis nana	2	3.77%
Blastocystis hominis	2	3.77%
Mixed infections	2	3.77%

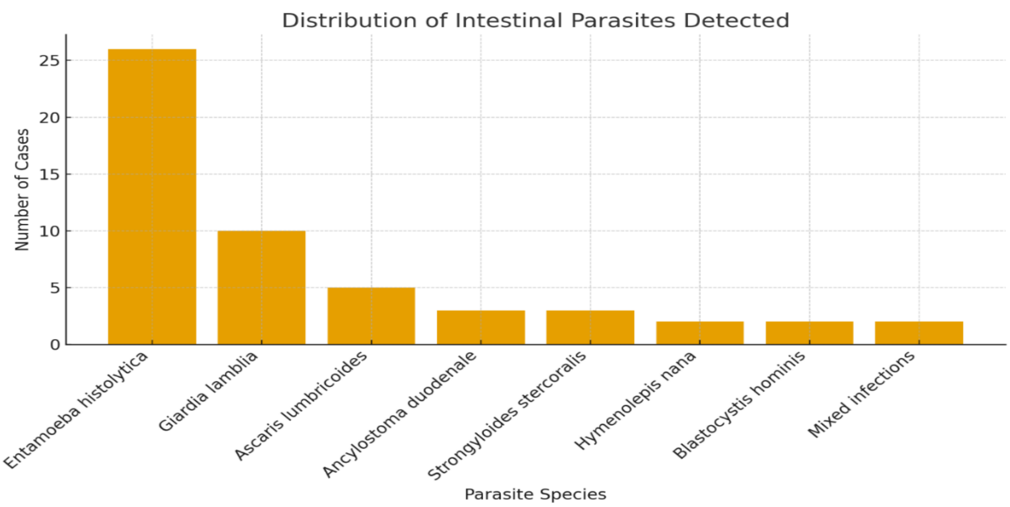

Figure 1: Distribution of Intestinal Parasites

The figure illustrates that *Entamoeba histolytica* was the most frequently identified parasite, accounting for nearly half of all infections, followed by *Giardia lamblia* (18.8%). Helminthic infections such as *Ascaris lumbricoides* and hookworm were also observed but at lower frequencies.

FOBT Correlation: Among the 53 patients with parasitic infections, 37 (69.8%) were FOB positive, compared to 35 (27.3%) of 147 parasite-negative individuals. FOB positivity was highest in cases of *E. histolytica*, followed by *Giardia lamblia*. This strong correlation underscores the clinical value of combining FOB testing with routine stool microscopy.

Table 2: Fecal occult blood positively in parasitic infected and non-infected samples

FOBT	Positive parasitic infection (%)	Negative parasitic infection (%)	Total (%)	p- value
Positive	37 (69.8)	35 (23.8)	72 (36)	< 0.00001
Negative	16 (30.1)	112 (76.1)	128 (64)	
Total	53 (26.5)	147 (73.5)	200 (100)	

Demographic Distribution

- **Age:** The highest positivity was seen in children ≤10 years (50%) and adults aged 41–50 years (43.7%).
- **Sex:** Males were more commonly affected (62.2%) compared to females (37.7%).
- **Religion:** Prevalence was higher among Muslims (45.4%) compared to Hindus (24.2%).
- **Patient type:** Outpatient samples showed slightly higher positivity (29.2%) than inpatient samples (22.9%).
- **Stool consistency:** Loose stools had the highest positivity rate (53.3%).

Table 3: Positive fecal occult blood in relation to parasitic infections

S.no	Parasite	FOB positive (%)	FOB negative (%)	Total
1	*Entamoeba histolytica*	18 (48.6)	8 (6.25)	26
2	*Giardia*	6 (16.2)	4 (3.12)	10
3	*Ascaria lumbricoides*	4 (10.8)	1 (0.7)	5
4	*Anctlostoma duodenale*	3 (8.1)	0 (0)	3
5	*Strongyloides stercoralis*	1 (2.7)	2 (1.56)	3
6	*Hymenolepis nana*	2 (5.4)	0 (0)	2
7	*Mixed infection*	1 (2.7)	1 (0.7)	2
8	*Blastocystis hominis*	2 (5.4)	0 (0)	2
Total		37	16	53

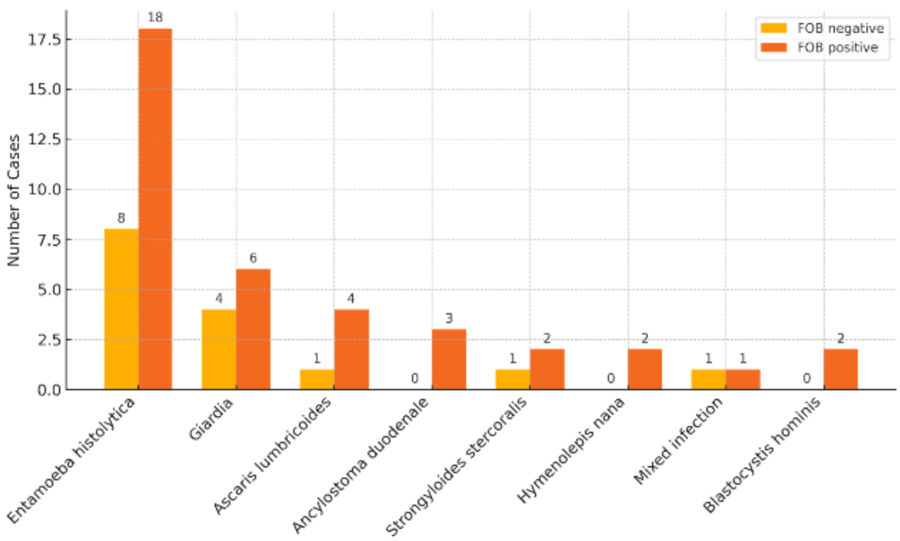

Figure 2: Positive fecal occult blood in relation to parasitic infections

Discussion

The present study demonstrated that 26.5% of stool samples were positive for intestinal parasites, and 36% were positive for fecal occult blood (FOB). Nearly 70% of patients with confirmed parasitic infections also tested positive for FOB, suggesting a strong link between gastrointestinal bleeding and parasitic infections. The predominance of *Entamoeba histolytica* (49.05%) followed by *Giardia lamblia* (18.8%) was particularly noteworthy.

Our prevalence rate is similar to that reported by Parameshwarappa et al. in Karnataka (23.3%) and Kotian et al. in Uttarakhand (28.6%), but lower than figures from rural tribal populations in central India, where prevalence often exceeds 40%. International comparisons also show variation: Alemu et al. in Ethiopia reported 30%, while rates above 50% have been documented in some African settings. These differences likely reflect variations in climate, sanitation, socioeconomic conditions, and diagnostic techniques.

The predominance of E. histolytica in this study is consistent with findings from Ghaziabad (Patel et al.) and Ethiopia (Alemu et al.), where amoebiasis remains a leading cause of dysentery. In contrast, helminthic infections were less common here than in earlier Indian surveys, which may indicate the impact of deworming campaigns and improved sanitation. However, intermittent shedding of eggs and reliance on single stool samples may also have underestimated helminth prevalence.

A central finding was the significant correlation between FOB positivity and parasitic infection. Similar associations were reported by Wakid et al. in Saudi Arabia, who found high FOB positivity among cases of amoebiasis and hookworm infection, and by Sariti et al., who demonstrated that FOB positivity was a useful marker of intestinal morbidity. In our study, *E. histolytica* showed the strongest association with occult bleeding, reflecting its invasive potential. Even though hookworm prevalence was relatively low, its contribution to blood loss and anemia remains well established.

Demographic analysis revealed higher infection rates among children ≤10 years, consistent with global evidence that school-aged children are the most vulnerable due to poor hygiene and higher exposure. The second peak in the 41–50 year age group may reflect occupational exposures, particularly in agricultural settings. Male predominance (62.2%) in our study has also been observed in other Indian studies and may reflect greater outdoor exposure, dietary factors, or occupational risks. Religious and outpatient–inpatient differences probably reflect community-level sanitation and water use, rather than intrinsic differences, but deserve further community-based investigation.

The clinical implications of these findings are considerable. Occult bleeding can contribute to chronic anemia, which is already a widespread problem in Bihar. The combination of parasitic infection and FOB positivity identifies patients at greater risk of nutritional deficits and impaired productivity. This supports integrating FOB testing into routine diagnostic protocols in endemic regions. Our findings also reaffirm the importance of concentration methods, which detected additional cases beyond direct microscopy alone. Similar benefits of concentration techniques have been reported by Garcia and Cheesbrough, emphasizing their role in increasing diagnostic sensitivity.

This study has certain limitations. Being hospital-based, the results may not fully represent the wider community. Other causes of FOB positivity, such as ulcers or malignancy, were not excluded. Molecular techniques to differentiate pathogenic *E. histolytica* from *E. dispar* were not available. Nonetheless, the strong and statistically significant association between FOB positivity and parasitic infection adds valuable evidence to the literature. Future research should explore larger community samples, employ molecular diagnostics, and assess the long-term impact of FOB positivity on anemia and growth outcomes.

Conclusion

In this hospital-based study, intestinal parasitic infections were identified in 26.5% of stool samples, most commonly due to *Entamoeba histolytica*, with higher prevalence among children, males, and outpatients. The addition of concentration techniques improved diagnostic sensitivity beyond direct microscopy, and a strong association was observed between parasitic infections and fecal occult blood positivity. These findings support the routine use of concentration methods and fecal occult blood testing alongside microscopy to improve diagnosis, and emphasize the need for stricter implementation of school-based deworming and community sanitation measures to reduce the burden of infection.

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