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Original Research Article

A Retrospective Study of Parasites Causing Gastroenteritis in Patients Attending Tertiary Care Hospital, Valsad, South Gujarat

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Abstract

Background: Intestinal parasitic infections remain a cause of gastrointestinal morbidity in India. Their detection varies by geographical setting, patient population, and diagnostic method. Local laboratory surveillance can describe the parasites encountered in routine clinical practice.

Objective: To determine the proportion of stool samples positive for intestinal parasites and describe the distribution of detected organisms among patients attending a tertiary-care hospital in Valsad, South Gujarat.

Materials and Methods: This retrospective, laboratory-based observational study was conducted in the Department of Microbiology, GMERS Medical College and Hospital, Valsad, Gujarat, from 1 November 2023 to 31 October 2025. A total of 1,357 stool samples were examined macroscopically and microscopically using direct saline and 1% Lugol's iodine wet mounts. Recorded findings were summarised by parasite group, individual taxon, age group, and sex.

Results: Intestinal parasites were detected in 65 of 1,357 stool samples, giving a sample positivity rate of 4.79%. Protozoa accounted for 53 positive samples (81.54%) and helminths for 12 (18.46%). The most frequent finding was the *Entamoeba histolytica/dispar* complex (50/65; 76.92%), followed by *Strongyloides stercoralis* (9/65; 13.85%), *Giardia lamblia* (3/65; 4.62%), *Hymenolepis nana* (2/65; 3.08%), and *Trichuris trichiura* (1/65; 1.54%). Among positive cases, 44 (67.69%) were male and 21 (32.31%) were female. Patients older than 25 years accounted for 36 positive cases (55.38%).

Conclusion: The sample positivity rate was 4.79%, and the E. histolytica/dispar complex was the predominant microscopy finding. These data describe the spectrum detected in a tertiary-care laboratory in South Gujarat. Species-specific testing would be needed to distinguish E. histolytica from morphologically similar species.

Keywords: Intestinal parasitic infections; stool microscopy; *Entamoeba histolytica/dispar* complex; protozoa; helminths; retrospective study, Valsad, south Gujarat, India.

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Introduction

Intestinal parasitic infections remain an important cause of gastrointestinal morbidity and may be associated with diarrhoea, abdominal discomfort, dysentery, malabsorption, and nutritional consequences. Transmission varies by parasite and may occur through ingestion of contaminated food or water, faecal–oral spread, or exposure to infective stages in contaminated soil. Soil-transmitted helminths are associated with environmental contamination and inadequate sanitation, and their control includes improved sanitation, health education, and appropriate preventive chemotherapy in eligible populations. [1] Hospital-based laboratory studies can describe the organisms detected among patients whose stool samples are submitted for testing. However, the proportion of positive samples in a hospital series cannot automatically be interpreted as community prevalence. It may be influenced by referral patterns, the clinical indications for testing, the diagnostic methods used, and whether multiple specimens from the same patient are included.

Routine stool microscopy remains useful for identifying many intestinal parasite stages, but it has limitations. In particular, microscopy cannot reliably distinguish *Entamoeba histolytica* from morphologically similar species such as *E. dispar* and *E. moshkovskii*. [2] Accordingly, findings based on morphology alone should be interpreted as the *E. histolytica/dispar* complex unless species-specific testing was performed.

The present study was undertaken to describe the proportion of stool samples positive for intestinal parasites and the distribution of detected organisms in a tertiary-care hospital in Valsad, South Gujarat, over a two-year period. The age and sex distribution of positive cases was also summarised.

Review of Literature

Intestinal parasitic infections and their public health relevance: Intestinal parasites include protozoa and helminths with different life cycles, routes of transmission, and clinical consequences. Infection may be asymptomatic or may cause diarrhoea, abdominal symptoms, dysentery, malabsorption, and nutritional effects. Soil-transmitted helminths are associated with faecal contamination of soil where sanitation is inadequate; prevention relies on improved sanitation, health education, and appropriate control programmes. [1] The diagnostic and epidemiological interpretation of stool microscopy findings must also account for method sensitivity and morphological overlap between certain organisms. [2]

Evidence from Indian hospital-based studies: Studies from Indian tertiary-care hospitals have reported variable positivity rates and parasite distributions. Patel and colleagues examined 1,170 stool samples in Surat, South Gujarat, and reported 65 positive samples (5.56%). *Giardia lamblia* and *Hymenolepis nana* were among the commonly reported parasites. [3] This regional study provides a useful comparator for the present investigation.

In Ahmedabad, Dhamecha and colleagues detected parasites in 72 of 847 stool samples (8.5%). The leading reported findings were *Entamoeba histolytica* and *Giardia intestinalis*, with protozoa predominating in their study. [4] Chandrashekar and colleagues examined 2,355 stool samples at a tertiary-care centre in South India and reported a positivity rate of 7.9%. Protozoal findings were common, and *Entamoeba* was the leading protozoal organism reported. [5]

Ulaganeethi and colleagues conducted a five-year retrospective study in Puducherry covering 2014–2019. Of 3,267 stool samples, 303 (9.3%) were positive. Their diagnostic approach included direct wet-mount microscopy and concentration techniques, and the study identified both protozoa and helminths. [6] Praharaj and colleagues analysed 257,588 stool samples over seven years at a tertiary-care hospital in Vellore and reported 22,864 positive samples (8.9%). *Giardia intestinalis* was prominent across several age groups, while the distribution of some helminths varied with age. [7]

More recent studies also demonstrate regional variation. Kanani and colleagues reported 29 positive samples among 1,283 samples examined in South Gujarat, corresponding to approximately 2.3%; helminths accounted for a larger proportion of findings than protozoa. [8] At AIIMS Kalyani, Bhaumik and colleagues reported intestinal parasitosis in 6.8% of 532 subjects. The *Entamoeba histolytica/dispar* complex was the most frequent finding, followed by *Giardia species.* [9]

Collectively, these reports show that both the overall positivity rate and the leading parasite vary between settings. The results should be compared cautiously because the studies differ in population characteristics, sampling period, diagnostic protocol, and potentially in whether the denominator represents samples or unique patients. The present study adds two-year laboratory data from Valsad to this regional evidence base.

Aim and Objective: To identify different intestinal parasites causing gastroenteritis in patients attending our hospital.

Materials and Methods

Study design and setting: A retrospective, laboratory-based observational study was conducted in the Department of Microbiology, GMERS Medical College and Hospital, Valsad, Gujarat, India. The study period extended from 1 November 2023 to 31 October 2025.

Study population and eligibility: The study included 1,357 stool samples submitted to the Microbiology laboratory for routine parasitological examination during the study period. Samples were received from patients attending the outpatient and inpatient departments. Specimens in leaking containers or with absent or incorrect identification labels were excluded from the study.

The analysis was based on retrospectively available laboratory records.

Specimen examination [10-13]: Stool specimens were assessed macroscopically and microscopically using standard laboratory procedures.

Macroscopic examination: Gross appearance, consistency, and colour were assessed. Visible blood or mucus was recorded.

Direct saline wet mount: A small amount of stool was emulsified in physiological saline on a clean glass slide, covered with a coverslip, and examined

microscopically. This preparation was used to look for morphological features of intestinal parasites, including motile trophozoites, cysts, ova, and larvae. [2]

Lugol's iodine wet mount: A separate preparation was made using 1% Lugol's iodine. The preparation was covered with a coverslip and examined microscopically. Iodine was used to enhance internal structures in protozoan cysts; it does not permit assessment of trophozoite motility. [2]

Both preparations were examined using 10× and 40× objective lenses.

Routine microscopy cannot reliably distinguish between *Entamoeba histolytica* from *E. dispar*. [2] So microscopy-only findings were reported as the *E. histolytica/dispar* complex as species-specific antigen detection or molecular confirmation was not performed.

Data collection and analysis: Available laboratory and patient-record variables included parasite detection status, recorded parasite, age, sex, and outpatient or inpatient status where documented. Data were entered into Microsoft Excel and checked for completeness and internal consistency. Missing information was treated as unavailable rather than as a negative finding.

The primary outcome was the proportion of examined stool samples in which at least one intestinal parasite was detected, calculated as:

Sample positivity rate (%)

$$= \frac{\text{Number of parasite positive stool samples}}{\text{Total stool samples examined}} \text{ X } 100$$

Individual parasite findings and demographic characteristics among positive cases were summarised as frequencies and percentages. The percentages for parasite taxa, age groups, and sex were calculated using 65 positive samples as the denominator, as applicable.

Ethical considerations: The study involved retrospective review of routine laboratory records with Ethical approval from Institutional Human Ethics Committee, GMERS Medical College & Hospital Valsad.

Results

Overall sample positivity: During the two-year study period, 1,357 stool samples were examined. Intestinal parasites were detected in 65 samples, giving an overall sample positivity rate of 4.79%. The remaining 1,292 samples (95.21%) had no intestinal parasites detected by the examination performed.

Distribution of protozoa and helminths: Of the 65 positive samples, 53 (81.54%) were classified as protozoal findings and 12 (18.46%) as helminthic findings.

Species-wise distribution: The *Entamoeba histolytica/dispar* complex was the most frequently recorded finding, identified in 50 positive samples (76.92%). *Strongyloides stercoralis* was detected in 9 samples (13.85%), *Giardia lamblia* in 3 (4.62%), *Hymenolepis nana* in 2 (3.08%), and *Trichuris trichiura* in 1 (1.54%) (Table 1, Figure 1)

Table 1: Distribution of recorded intestinal parasite findings among positive stool samples (n = 65)

Parasite finding	Number	Percentage (%)
Entamoeba histolytica/dispar complex	50	76.92
Strongyloides stercoralis	9	13.85
Giardia lamblia	3	4.62
Hymenolepis nana	2	3.08
Trichuris trichiura	1	1.54
Total	**65**	**100.00**

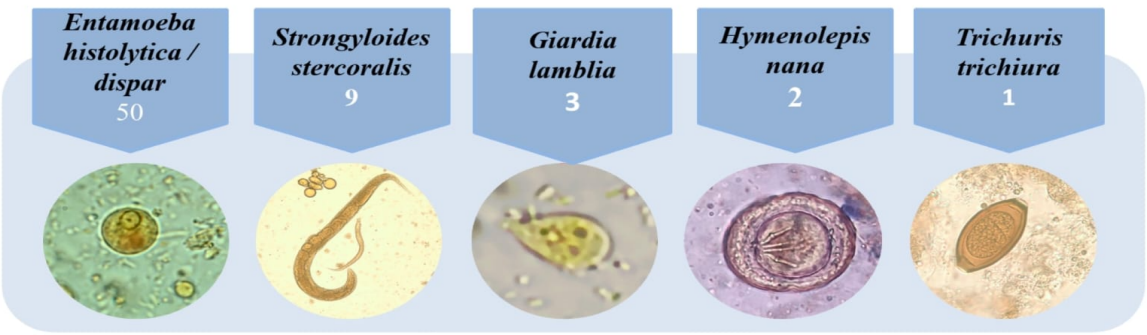


Figure 1: Parasites isolated during our study

Age-wise distribution of positive cases: The largest number of positive cases occurred among patients older than 25 years (36/65; 55.38%). 13 (20.00%) were in the 15–25-year group, 7 each (10.77%) were in the 1–4-year and 5–14-year groups, and 2 (3.08%) were in children younger than 1year. (Table 2, Figure 2)

Table 2: Age distribution of parasite-positive cases (n = 65)

Age group	Number	Percentage (%)
Below 1 year	2	3.08
1–4 years	7	10.77
5–14 years	7	10.77
15–25 years	13	20.00
Above 25 years	36	55.38
Total	**65**	**100.00**

Sex-wise distribution of positive cases: Among positive cases, 44 (67.69%) were male and 21 (32.31%) were female. (Table 3, Figure 2)

Table 3: Sex distribution of parasite-positive cases (n = 65)

Sex	Number	Percentage (%)
Male	44	67.69
Female	21	32.31
Total	**65**	**100.00**

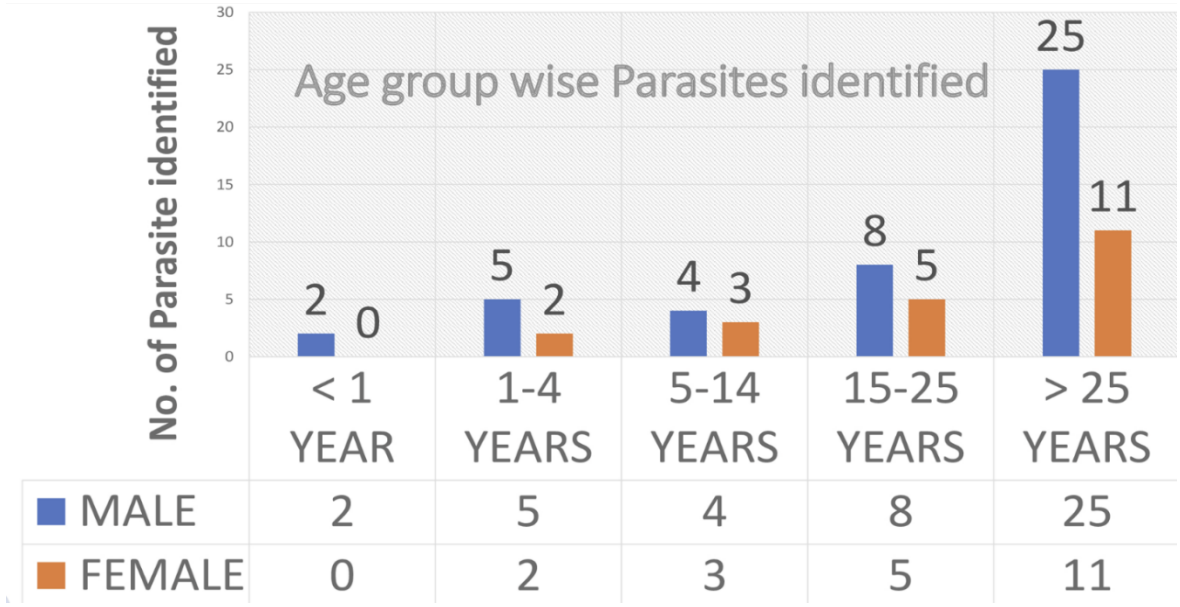


Figure 2: Age group and gender wise Parasites identified

Discussion

In this two-year retrospective study, intestinal parasites were detected in 65 of 1,357 stool samples, giving a sample positivity rate of 4.79%. Protozoa accounted for 81.54% of positive samples and helminths for 18.46%. The *Entamoeba histolytica/dispar* complex was the predominant finding, followed by *Strongyloides stercoralis*. These results describe the parasitic findings detected in routine laboratory practice at a tertiary-care hospital in South Gujarat.

Overall positivity compared with Indian studies: The 4.79% positivity rate in the present study was close to the 5.56% reported by Patel and colleagues in Surat, where 65 of 1,170 stool samples were positive. [3] The geographical proximity makes this study a relevant comparator, although the differences in study period, patient selection, and laboratory procedures limit direct inference.

Higher positivity rates were reported by Dhamecha and colleagues in Ahmedabad (72/847; 8.5%) [4] and Chandrashekar and colleagues in South India (7.9% of 2,355 samples). [5] Ulaganeethi and colleagues reported a positivity rate of 9.3% among 3,267 samples in Puducherry over five years. [6] Praharaj and colleagues, in a seven-year Vellore analysis of 257,588 samples, reported 22,864 positive samples (8.9%). [7] In contrast, Kanani and colleagues reported a rate of approximately 2.3% in South Gujarat, [8] while Bhaumik and colleagues found a rate of 6.8% among 532 subjects at AIIMS Kalyani. [9]

Thus, the positivity rate in Valsad was similar to the earlier Surat study, lower than the rates reported in Ahmedabad, South India, Puducherry, Vellore, and West Bengal, and higher than that in the recent South Gujarat study. [3-9]

These comparisons are descriptive. Differences in referral populations, the clinical indications for stool testing, diagnostic methods, and sample-level versus patient-level denominators may contribute to the variation. The figures should not be interpreted as directly comparable estimates of community prevalence.

Protozoal and helminthic findings: Protozoa predominated in the present study. A similar pattern was described by Dhamecha and colleagues and by Chandrashekar and colleagues. [4.5] By contrast, Patel and colleagues reported a greater proportion of helminthic findings than protozoal findings in Surat, [3] and Kanani and colleagues also reported helminths as the larger group in their recent South Gujarat study. [8] These differences indicate that the relative distribution of protozoa and helminths varies across hospital-based investigations. Possible explanations include differences in patient populations, exposure patterns, specimen selection, and diagnostic methods. Concentration techniques may improve the recovery of certain helminth eggs and larvae, while selected protozoa may require specialised staining, antigen detection, or molecular testing. However, the present study did not evaluate environmental exposures or compare diagnostic methods; therefore, these factors cannot be established as causes of the observed distribution.

***Entamoeba histolytica/dispar* complex:** The *E. histolytica/dispar* complex accounted for 50 of 65 positive samples (76.92%) and was the dominant finding. Bhaumik and colleagues also reported the *E. histolytica/dispar* complex as the most frequent finding, accounting for 61.1% of detected infections. [9] Dhamecha and colleagues reported *E. histolytica* as their most frequently identified organism. [4] In contrast, *Giardia* was the leading parasite in the Surat study by Patel and colleagues[3] and in the Vellore analysis by Praharaj and colleagues. [7] The variation illustrates that the predominant reported parasite differs between study settings.

Interpretation of the *Entamoeba* finding requires particular caution. Conventional stool microscopy cannot reliably distinguish *E. histolytica* from the morphologically similar *E. dispar*. As species-specific antigen testing or molecular confirmation was not performed, the result was described as the *E. histolytica/dispar* complex.

Species-specific antigen assays or molecular methods may help resolve this uncertainty where clinically indicated and available. This distinction is important because species identification can affect clinical interpretation and treatment decisions.

***Strongyloides stercoralis* and other parasites:** *Strongyloides stercoralis* was detected in 9 positive samples (13.85%), making it the second most frequent finding. Strongyloidiasis is clinically important because autoinfection can sustain infection for prolonged periods, and immunosuppression may precipitate hyperinfection or disseminated disease. Ulaganeethi and colleagues also reported *Strongyloides* among the helminths identified in Puducherry, [6] while Praharaj and colleagues described age-related variation in the distribution of this parasite. [7] *Giardia lamblia* was detected in three samples (4.62%). This was a less frequent finding in Valsad than in the Surat and Vellore studies, where *Giardia* was reported as the leading parasite. [3,7] *Hymenolepis nana* was detected in two samples (3.08%) and *Trichuris trichiura* in 1 (1.54%). Although less frequent, these findings remain relevant to routine diagnosis. The absence of other parasites from the present results cannot be interpreted as evidence that they are absent from the wider community, because detection depends on the organisms present, the intensity of infection, the specimens examined, and the sensitivity of the method.

Age and sex distribution: Adults older than 25 years accounted for 55.38% of positive cases, and males accounted for 67.69%. These percentages describe the distribution of positive cases, not the risk of infection in each demographic group.

Other studies demonstrate that age distributions can differ. Praharaj and colleagues reported the highest percentage of parasitic findings in children aged 6–10 years and noted that the distribution of individual parasites varied with age. [7] Ulaganeethi and colleagues reported higher positivity among adults than children in their study. [6]

Diagnostic and public health implications: Direct saline and Lugol's iodine wet mounts are inexpensive and practical for routine stool examination. However, the sensitivity of microscopy depends on specimen quality, parasite burden, timing of examination, and laboratory expertise. [10] The variation across published studies reinforces the need to consider diagnostic methods when comparing positivity rates. Additional concentration procedures, stains, antigen assays, or molecular methods may improve detection or identification of selected parasites.

The results support continued attention to safe drinking water, sanitation, food safety, and hand

hygiene. However, water sources, sanitation practices, socioeconomic conditions, and individual exposure histories were not assessed in this study. No causal relationship between these factors and the detected infections can therefore be inferred.

Strengths and limitations: The study provides a two-year description of 1,357 stool samples from a microbiology laboratory in a tertiary-care hospital in South Gujarat and documents the spectrum of parasites detected in routine practice. Its limitations include the retrospective, one hospital-based design; inability to distinguish *E. histolytica* from *E. dispar* without confirmatory testing.

Conclusion

In this two-year retrospective study at a tertiary-care hospital in Valsad, intestinal parasites were detected in 65 of 1,357 stool samples, yielding a sample positivity rate of 4.79%. Protozoa accounted for most positive findings, and the *Entamoeba histolytica/dispar* complex was the predominant microscopy finding, followed by *Strongyloides stercoralis*. The positivity rate was similar to that reported in an earlier Surat study but differed from estimates in other Indian tertiary-care settings. The findings provide local laboratory surveillance data and highlight the importance of appropriate diagnostic interpretation, particularly the limitations of microscopy in differentiating *E. histolytica* from related species.

Continued surveillance and improved diagnostic assessment, alongside established sanitation and hygiene measures, may strengthen local understanding and management of intestinal parasitic infections.

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