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ORIGINAL RESEARCH

PREVALENCE AND CLINICO-DEMOGRAPHIC PROFILE OF GIARDIASIS AMONG PATIENTS ATTENDING A TERTIARY CARE HOSPITAL: A TWO-YEAR RETROSPECTIVE STUDY

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ABSTRACT

Giardia duodenalis is among the most prevalent intestinal protozoan parasites responsible for diarrhoeal illness. The burden of infection remains disproportionately high in developing countries, where inadequate sanitation, unsafe drinking water, and suboptimal hygiene practices sustain transmission. Giardiasis contributes substantially to gastrointestinal morbidity and manifests across a broad clinical spectrum, from asymptomatic carriage to chronic diarrhoeal disease. This study aimed to determine the prevalence of giardiasis among patients attending a tertiary care teaching hospital and to characterise the clinico-demographic profile of individuals diagnosed with Giardia infection. A retrospective observational study was conducted in the Department of Microbiology, N.S.C.B. Medical College, Jabalpur, Madhya Pradesh, over two calendar years (Jan2022 to Dec 2023). All stool specimens submitted for routine parasitological examination were included. Gross examination and direct wet mount preparations using normal saline and Lugol's iodine were performed, followed by light microscopic identification of Giardia cysts and trophozoites. Relevant demographic and clinical data were retrieved from laboratory registers and patient records and analysed using descriptive statistics. Of 946 stool samples processed, 65 were positive for Giardia duodenalis, yielding an overall prevalence of 6.87%. Year-specific prevalence was 7.98% in 2022 (38/476) and 5.74% in 2023 (27/470). Males constituted 52.31% of positive cases. The highest age-specific burden was recorded in the 0–20-year group (36.9%), followed by the 21–40-year group (32.3%) and the 41–60-year group (20.0%). Of 65 positive cases, 53 (81.54%) were symptomatic and 12 (18.46%) were asymptomatic. Among symptomatic patients, diarrhoea was the most frequent presentation (32.08%), followed by abdominal pain (26.42%) and loss of appetite (20.75%); pregnancy was documented as an associated condition in 20.75% of female cases. The present study demonstrates a clinically significant prevalence of giardiasis, with the greatest burden observed in younger age groups. Diarrhoea and abdominal pain were the predominant clinical presentations. These findings reinforce the public health relevance of giardiasis and underscore the need for strengthened sanitation infrastructure, access to safe drinking water, early laboratory diagnosis, and sustained health education in endemic regions.

Keywords: *Giardiasis; Giardia duodenalis; intestinal protozoa; diarrhoea; prevalence; retrospective study*

INTRODUCTION

Giardiasis is one of the most common intestinal protozoal infections in the world, and is a major public health problem, especially in countries with low- and middle-income levels, and limited access to safe drinking water and sanitation infrastructure [1]. The aetiological agent, Giardia duodenalis (syn. G. lamblia; G. intestinalis) is two-nucleated flagellated protozoa that colonizes the upper small intestine to produce a wide clinical spectrum of infection from asymptomatic excretion of cysts to acute and chronic gastrointestinal disease [2].

Transmission occurs primarily via the faeco-oral route through ingestion of *G. duodenalis*-contaminated water or food. The parasite is characterised by a remarkably low infectious dose and by the environmental resilience of its cyst stage,

properties that collectively facilitate widespread community transmission [3]. Children, immunocompromised individuals, international travellers, and communities lacking basic sanitation are recognised as particularly vulnerable populations [4].

The clinical manifestations of giardiasis are heterogeneous and encompass diarrhoea, abdominal cramps, flatulence, nausea, malabsorption, and anorexia. A substantial proportion of infected individuals remain asymptomatic, yet continue to shed cysts and thereby serve as reservoirs sustaining community transmission [5]. Persistent or recurrent infection is associated with nutritional deficiencies, growth faltering in children, and diminished quality of life in endemic settings [6].

Despite incremental improvements in sanitation and healthcare infrastructure, giardiasis continues to be reported across diverse geographic regions of India. Hospital-based surveillance studies remain indispensable for characterising the local burden of disease and identifying high-risk demographic subgroups [7]. Accurate data on prevalence and clinico-demographic correlates are essential for informing evidence-based prevention strategies, optimising diagnostic service delivery, and targeting health education interventions [8]. The present study was therefore undertaken to determine the prevalence of giardiasis and to characterise the clinico-demographic profile of patients diagnosed with *G. duodenalis* infection at a tertiary care teaching hospital in Central India over a two-year period.

MATERIALS AND METHOD

Study design and setting

This retrospective observational study was conducted in the Department of Microbiology, N.S.C.B. Medical College and its associated tertiary care hospital, Jabalpur, Madhya Pradesh, India. The study encompassed all stool specimens received in the clinical microbiology laboratory for routine parasitological examination between 1st Jan 2022 and 31st Dec 2023.

Inclusion and exclusion criteria

Stool samples were eligible for inclusion if they were: (i) received in the laboratory during the defined study period; (ii) submitted for routine parasitological examination; (iii) accompanied by patient demographic data; and (iv) technically adequate for microscopic analysis. Samples were excluded if they were: duplicate submissions from the same patient during a single illness episode; improperly labelled or inadequately collected; accompanied by incomplete demographic or clinical records; or otherwise unsuitable for microscopic evaluation.

Laboratory procedures

Standardised gross examination was carried out on all specimens of stool for consistency, colour and the presence of blood or mucous materials. Normal saline and Lugol's iodine solution were then used to make direct wet mount preparations. A light microscopy was carried out at ×10, Giardia cysts (oval with four nuclei and intracytoplasmic axonemes) and trophozoites (pear-shaped organisms with a ventral adhesive disc) are seen under ×40 and ×100 objective magnifications. Cases demonstrating characteristic The morphological characteristics of Giardia were considered as positive.

Data collection and statistical analysis

Data on demography and clinical variables were collected from patient case records and laboratory registers. The following factors were analysed: age, sex, calendar year of diagnosis, presence of symptoms and clinical presentation. The data were then entered into the Microsoft EXCEL (Version 2019) spreadsheet. Descriptive statistics used to analyse. Categorical variables were presented as absolute numbers and percentages.

Ethical considerations

The study was carried out with ethical guidelines of the institution. Since the study was retrospective and used existing, anonymised laboratory data, and no interaction or manipulation with patients, formal ethical committee approval was requested. Patient The confidentiality of the data was respected throughout the study as per the requirement of the Declaration of Helsinki.

RESULTS

A total of 946 stool samples were received and processed for parasitological examination over the two-year study period (January 2022–December 2023). Of these, 65 samples tested positive for *Giardia duodenalis*, yielding an overall prevalence of 6.87%. The distribution of samples and positivity rates across the study years are presented in Table 1.

Table 1. Year-wise distribution of stool samples examined and Giardia positivity (January 2022–December 2023)

Year	Total Samples Examined	Giardia-Positive Cases	Prevalence (%)
2022	476	38	7.98
2023	470	27	5.74
Total	946	65	6.87

Prevalence is the percentage of samples that were found to be positive for Giardia out of the total number of samples tested per year. According to the year-specific analysis, the prevalence in 2022 was 7.98% (38/476) and in 2023 was 5.74% (27/470) with a slight decrease of 2 percentage points in the two consecutive years. Table 2 shows the distribution of Giardia-positive cases by age group.Table 2. Age-group distribution of Giardia-positive cases (n = 65)

Table 2.

Age Group (Years)	Number of Cases	Percentage (%)
0–20	24	36.9
21–40	21	32.3
41–60	13	20.0
>60	7	10.8

Percentages may not add to 100% because of rounding. 30–40-year-old group had the highest percentage of positive cases (32.3%), followed by the 21–30-year old group (36.9%), the 41–60-year old group (20.0%) and the group older than 60 years (10.8%) which had the lowest percentage. There was a slight male predominance (52.31% vs. 47.69%) for positive cases in sex-specific analysis. The distribution of positive cases by clinical status is shown in Table 3.

Table 3.

Clinical Status	Number of Cases	Percentage (%)
Symptomatic	53	81.54
Asymptomatic	12	18.46
Total	65	100.00

Note. Symptomatic defined as the presence of one or more gastrointestinal complaints leading to medical consultation.

The majority of patients with confirmed giardiasis were symptomatic at presentation (53/65; 81.54%), whereas 12 of 65 (18.46%) were asymptomatic and identified incidentally on routine stool examination. Table 4 summarises the clinical presentations and associated conditions among positive cases.

Table 4. Clinical presentations and associated conditions among Giardia-positive cases (n = 65)

Clinical Presentation / Associated Condition	Percentage (%)
Diarrhoea	32.08
Abdominal pain	26.42
Loss of appetite	20.75
Pregnancy (associated condition)	20.75

Note. Percentages are based on the number of individuals from the symptomatic group (n = 53; counts: 17, 14, 11, 11 respectively) and are weighted so that the percentages add up to 100% as each individual with symptoms was counted in

only one of the predominant categories. Pregnancy is listed as an associated condition. It is observed in 17.2% of the female giardia-positive cases. The most common complaint was diarrhoea (32.08%) among the symptomatic patients, Abdominal pain was the next most common symptom experienced (26.42%), followed by loss of appetite (20.75%). The infection was also documented as pregnancy in 20.75% of the female patients with confirmed giardiasis, which indicates the importance of giardiosis in this group of patients.

DISCUSSION

Giardiasis persists as one of the most common intestinal protozoal infections globally and remains an important contributor to gastrointestinal morbidity, particularly in developing countries where deficiencies in sanitation and water quality perpetuate transmission [9,10]. The present retrospective study characterised the prevalence and clinico-demographic profile of giardiasis among patients attending a tertiary care hospital in Central India.

The overall prevalence of 6.87% observed in this study is broadly concordant with rates reported from comparable hospital-based studies in resource-limited settings, indicating that *G. duodenalis* remains an important parasitic pathogen despite advances in sanitation and clinical management [7]. Cross-study variability in reported prevalence is well recognised and has been attributed to differences in geographic context, environmental conditions, socioeconomic determinants, study population characteristics, and the diagnostic modalities employed [9,11].

The year-wise comparison revealed a higher prevalence in 2022 (7.98%) relative to 2023 (5.74%). Although the present retrospective design precludes definitive attribution, temporal fluctuations in giardiasis prevalence have been documented in epidemiological studies and may reflect seasonal variation in water-borne transmission, changes in community hygiene practices, or healthcare-utilisation patterns [5].

A marginal male predominance (52.31%) was observed, consistent with findings from previous hospital-based studies wherein males exhibited slightly higher rates of giardiasis [7,12]. This pattern has been attributed to greater outdoor exposure, occupational risk, and behavioural factors that may increase the likelihood of contact with contaminated water or food sources among men. The narrow sex differential in the present study, however, suggests that both sexes remain at comparable risk in this population.

The preponderance of cases in the 0–20-year age group (36.9%) is consistent with the well-established susceptibility of children and young adults to giardiasis, attributable to heightened exposure to contaminated food and water, closer interpersonal contact in household and educational settings, and comparatively less rigorous hand hygiene practices [10,13]. Moreover, immature mucosal immunity and the potential for repeated re-infection in endemic environments may amplify susceptibility in paediatric populations.

The high proportion of symptomatic cases (81.54%) in the present study is expected in a hospital-based surveillance cohort, since symptomatic individuals are more likely to present for medical evaluation and undergo stool examination [9]. Nonetheless, the 18.46% prevalence of asymptomatic carriage is epidemiologically important, as asymptomatic cyst excretors represent silent transmission reservoirs within the community. Diarrhoea was the most frequent clinical presentation (32.08%), followed by abdominal pain (26.42%) and loss of appetite (20.75%), a pattern consistent with the established pathophysiology of giardiasis.

Trophozoite attachment to the enterocyte brush border is damaged, leading to reduced absorption of nutrients, and induces mucosal immune responses, which leads to the clinical gastrointestinal symptoms observed [10]. Documentation of giardiasis in 20.75% of pregnant women in positive group is of interest as the infection can exacerbate any nutritional deficiencies that can occur during pregnancy and present a further clinical management challenge. Overall, the results of this study validate the continuing burden of intestinal parasitic disease by giardiasis in this referral centre. Although wet mount preparations are not as sensitive as antigen detection and molecular techniques, direct examination is a simple and inexpensive initial test in resource-limited areas [3]. Improved diagnostic tools as well as public health interventions such as sanitation, water safety, and community education will play a critical role in controlling the spread and clinical manifestation of giardiasis in endemic areas.

Conclusion

The present two-year retrospective study identified an overall giardiasis prevalence of 6.87% among patients undergoing stool examination at a tertiary care teaching hospital in Central India. The infection burden was highest in individuals aged 0–20 years, a marginal male predominance was observed, and the majority of cases were symptomatic at presentation. Diarrhoea and abdominal pain constituted the predominant clinical manifestations. These findings affirm that giardiasis remains a clinically relevant intestinal parasitic infection in this region. Concerted public health efforts directed at improving sanitation infrastructure, ensuring universal access to safe drinking water, promoting personal hygiene, strengthening laboratory diagnostic capacity, and sustaining community health education are warranted to reduce the burden and morbidity associated with giardiasis.

Declarations

Conflict of Interest: The authors declare no conflicts of interest.

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