

Original Article

Changing trend in prevalence of intestinal parasites in patients attending a tertiary care hospital in Lucknow

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Abstract

Background: Intestinal parasitic infections are one of the commonest causes of morbidity in third world countries including, India. The aim of this study was to determine the prevalence of common intestinal parasitic infections in relation to demographic details of patients, attending a tertiary care hospital in Lucknow.

Materials and Methods: A retrospective study was conducted from 1st January 2014 to 31st December 2014 in the Department of Microbiology, of Integral Institute of Medical Sciences and Research, Dasauli, Kursi road, Lucknow. A total of 755 samples from patients attending the OPD and IPD of the hospital with gastrointestinal symptoms were included in the study.

Results: Out of total 755 samples, 133 (17.6%) samples were found to be positive for at least one parasite. *Entamoeba histolytica* was the most common parasite (9.3%) followed by *Blastocystis hominis* (3.3%), *Giardia lamblia* (3%), *Ascaris lumbricoides* (1.3%), *Ancylostoma duodenale* (0.4%) and *Hymenolepis nana* (0.3%). Infection was more common in males (10%) than females (7.55%), 21-40 yrs. age group (40%).

Conclusion: Intestinal parasitic infection is quite high and intestinal protozoa are more common than helminths in our study. We are first to report high prevalence of *B. hominis* in stool samples from North India. This study emphasizes the need to study further the reasons behind decrease in prevalence of helminthic intestinal parasites along with health education, good sanitation, personal hygiene, and health awareness to decrease prevalence of intestinal protozoa.

Introduction

Intestinal parasitic infections are globally endemic and constitute major public health problem, especially in the tropical and subtropical regions (1,2). They are widely prevalent in third world countries due to poor sanitation, inadequate personal hygiene, low level of education and lack of awareness about safe drinking water (3). According to the World Health Organization (WHO), more than one billion (almost 15-20%) of the world's population is chronically infected with parasites (4). In India

overall prevalence rate of intestinal parasitic infection ranges from 12.5% to 66% with varying prevalence rate for individual parasite (5,6). Globally, the intestinal parasitic infections such as soil-transmitted helminth (STH) and protozoa infections have been recognized as one of the most significant causes of illnesses and diseases especially among disadvantaged communities (7). In India prevalence of the protozoa infections is higher than that of helminths with *E. histolytica* leading with a prevalence of 43.9% (8). Amoebiasis, Giardiasis,

Ascariasis, Hookworm infection, and Trichuriasis are among the most common intestinal parasitic infections worldwide. These infections are responsible for high levels of morbidity and mortality, nutritional deficiencies including iron deficiency anemia, seizures, portal hypertension, chronic diarrhea and impaired physical development in children (9, 10, 11).

The aim of this study was to determine the prevalence of common intestinal parasitic infection in relation to demographic, socioeconomic status as well as the seasons of the year in patients attending an upcoming tertiary care hospital in North Lucknow.

Materials and Methods:

A retrospective study was conducted during the period of 1st January 2014 to 31st December 2014 in the Department of Microbiology laboratory of Integral Institute of Medical Sciences and Research, Dasauli, Kursi road, Lucknow. The study was approved by the Institutional Ethical Committee. A total of 755 stool samples from patients having complaints of gastrointestinal symptoms attending Integral Institute of Medical Sciences and Research hospital were processed. All samples were subjected to routine macroscopic and microscopic examination. Macroscopic examination included colour, consistency, presence of mucus / pus / blood / any parasite. Microscopic examination was done by

normal saline and Lugol's iodine wet mount preparation after Formol Ether sedimentation technique and observed under low (10x) and high (40x) power. The mounts were screened for any protozoan trophozoite / cyst and helminthic ova which were identified on the basis of their characteristic morphological features.

Results

A total of 755 stool samples were analyzed, out of which, 133 samples were found to be positive for parasitic infections, with a prevalence rate of 17.6%. Among positive samples *Entamoeba histolytica* was found to be the most common parasite in 70 (9.3%) cases, followed by *Blastocystis hominis* in 25 (3.3%), *Giardia lamblia* in 23 (3%), *Ascaris lumbricoides* in 10 (1.3%), *Ancylostoma duodenale* in 3 (0.4%) and *Hymenolepis nana* in only 2 (0.3%) cases (Table 1, Figure 1).

Parasitic infections were more common in male patients (10%) compared to their female (7.55%) counterparts. Statistically significant difference was found in male female distribution of *E. histolytica* was seen ($p < 0.05$) (Table 2). In different age groups 21-40 years group (6%) was most commonly affected followed by 5-20 years, 41-60 years, 0-5 years and lastly >60 yrs, with a prevalence rate of 3.8, 3.2, 3 and 1.6% respectively (Table 3).

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Table 1: Prevalence of intestinal parasites in positive stool samples

Name of parasite	N (%)
<i>E.histolytica</i>	70 (9.3)
<i>B. hominis</i>	25 (3.3)
<i>G.lambia</i>	23 (3.0)
<i>A. lumbricoides</i>	10 (1.3)
<i>A.duodenale</i>	3 (0.4)
<i>H. nana</i>	2 (0.3)
TOTAL	133 (17.6)

Figure 1: Prevalence of different intestinal parasites

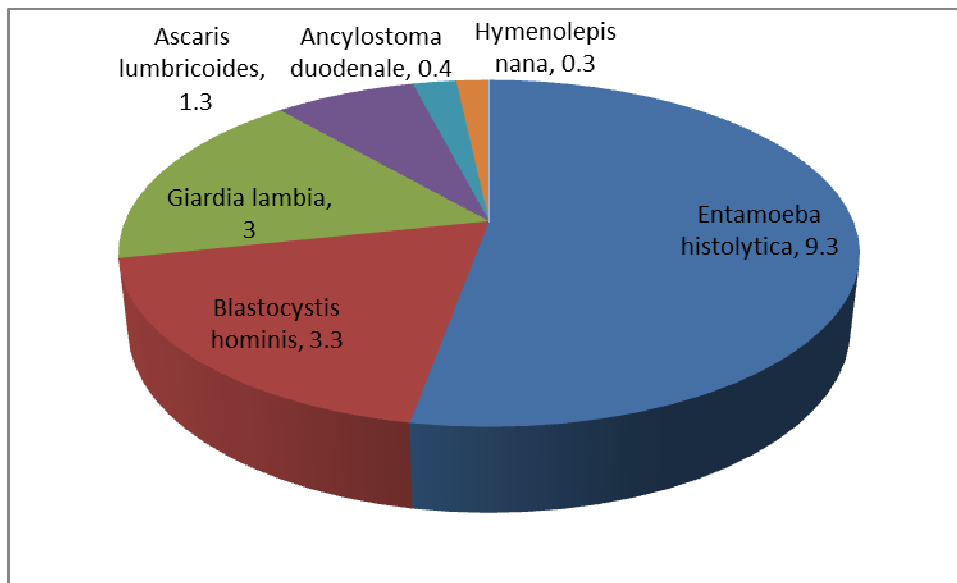


Table 2: Gender based distribution of intestinal parasites

Name of parasites	Total Number (%)	Male n (%)	Female n (%)	M: F Ratio	p value
<i>Entamoeba histolytica</i>	70 (9.3)	44 (5.8)	26 (3.5)	1.7:1	0.041*
<i>Blastocystis hominis</i>	25 (3.3)	10 (1.3)	15 (2.0)	1:1.5	0.424
<i>Giardia lamblia</i>	23 (3.0)	10(1.3)	15 (1.7)	1:1.5	0.424
<i>Ascaris lumbricoides</i>	10 (1.3)	7(0.9)	3(0.4)	2.5:1	0.344
<i>Ancylostoma duodenale</i>	3 (0.4)	3 (0.4)	00	N.A.	0.250
<i>Hymenolepis nana</i>	2 (0.3)	2 (0.3)	00	N.A.	0.500
TOTAL	133 (17.6)	76 (10.0)	57 (7.6)	1.3:1	0.118

Table 3: Distribution of various intestinal parasites in different age groups

PARASITE	N (%)	0-5 yrs	5-20yrs	21-40 yrs	41-60yrs	>60 yrs
<i>E.histolytica</i>	70 (9.3)	14	10	26	15	5
<i>B.hominis</i>	25 (3.3)	3	5	7	6	4
<i>G.lambia</i>	23 (3.0)	3	4	10	3	3
<i>A lumbricoides</i>	10 (1.3)	2	7	1	-	-
<i>A. duodenale</i>	3 (0.4)	-	2	1	-	-
<i>H .nana</i>	2 (0.3)	1	1	-	-	-
Total N (%)	133 (17.6)	23 (3.0)	29 (3.8)	45 (6.0)	24 (3.2)	12 (1.6)

Table 4: Prevalence of common intestinal parasites reported between 2010 -2014 from India

Study details Authors, year and place of study	Sample size		Prevalence (%) of common intestinal parasites					
	N	+ ve %	<i>E. histolytica</i>	<i>G. lamblia</i>	<i>B. hominis</i>	<i>A. lumbricoides</i>	<i>H. nana</i>	<i>A. duodenale</i>
Ragunathan et al., 2010 (Puducherry)	1172	34.56	-----	7	-----	43.21	7.66	28.89
Aher and Kulkarni, 2011 (Ahmednagar)	624	30.4	3.9	13.5	-----	1.9	4.5	0.9
Rashid et al, 2011 (Bareilly)	320	22.81	2.5	6.25	-----	9.68	2.18	-----
Bisht et al, 2012 (Ghaziabad)	335	38	55.3	40.4	-----	-----	24.2	3.12
Singh et al, 2012 (Indore)	7215	13.9	5.9	3.28	-----	.05	0.2	.05
Kotian et al, 2013 (Srinagar, UK)	327	11.62	0.92	3.06	-----	1.53	2.14	2.75
Present study, 2014 (Lucknow)	755	17.6	9.3	3	3.3	1.3	0.3	0.4

Discussion

Out of total 755 stool samples examined during the study, 133 (17.6%) were positive for at least one parasite, which is comparable to previous studies by Singh et al. (13.9%) (12), Kotian et al (11.62%) (13). However, many studies have reported higher prevalence rate in the range of 22.81-55.65% and few studies have reported low prevalence of around 6.63% (6, 11, 15) (Table 4). Various studies from India have reported a prevalence rate in the range of 12.5% to 66% (16, 17, 18). Nevertheless, prevalence rate is comparable to a previous study done by Nitin S et al, in Alambagh and Mati area of Lucknow, in which overall prevalence of intestinal parasites was 11.5%, (5.4% in Alambagh and 20.8% in Mati)(19). The wide variations in the prevalence of intestinal parasites are multifactorial and related to

quality of potable water, personal hygiene and sanitation and other environmental conditions.

In our study male patients were more commonly affected (10%) compared to their female counterparts (7.6%), male female ratio was 1.3:1 (Table 2). This is comparable to few previous studies by Singh et al and Rao et al (20, 21). This can be explained by more outdoor activities by them compared to females, however reverse ratio has been reported by few workers (13, 22). It can be inferred that results depend on daily activities and personal hygiene rather than type of gender (12). In age-wise distribution, 21-40 yrs age group was the commonest (6%) followed by 5-20 years (Table 2). This can be result of higher outdoor activities by the persons belonging to middle age, young adult and adolescent age groups.

Protozoan intestinal parasites namely *Entamoeba histolytica*, *Giardia lamblia* and *Blastocystis hominis* were cause of infection in majority (15.6%) of patients compared to helminths (2.0%). This is comparable to previous studies done by Singh et al and Bisht et al., but few other workers have reported helminths as major intestinal pathogens (6, 11-15) (Table 4).

Decrease in prevalence of soil transmitted helminthes can be explained by efforts taken up by WHO in deworming the population at risk, particularly school age children (SAC) to meet the Millennium Development Goals (MDG). Currently, only about 10 per cent of SAC and 20 per cent of preschool children who are at risk of acquiring intestinal helminth infections are dewormed against the target set by WHO to regularly treat at least 75 per cent of SAC at risk of morbidity (23). One of the important finding of this study is prevalence of *B. hominis* (3.3%) cases, which has not been reported from North India at such a good prevalence rate. Kumar et al. have reported only two cases of *B. hominis* from North India previously (24) The organism was initially considered to be a commensal, but later observations and studies strongly suggest it to be a pathogen. Although this is supported by strong clinical and scientific evidences, the virulence factors, pathogenicity and other risk factors involved

in disease manifestation are still obscure (25). Patients infected with *Blastocystis* frequently present with gastrointestinal complaints and are treated with the intention to eradicate the parasite (26) and recent data also suggest that *Blastocystis* causes symptoms frequently. Therefore, therapy should be limited to patients with persistent symptoms subsequent to a complete work up for alternative etiologies (27).

Conclusion

Following important conclusions can be drawn from the study, first, mass deworming programme of SAC by WHO are showing results by decrease in prevalence of STH, second, *B. hominis* is emerging as a new protozoan enteric pathogen and needs better laboratory techniques for diagnosing and last but not the least, higher prevalence of protozoan parasites reaffirms the need of interventional measures, health education of school going children, maintenance of proper hand hygiene, provision of safe drinking water, proper waste disposal, identifying and treating infected as well as asymptomatic individuals.

Nevertheless, a larger cross sectional population based study is needed to confirm findings of our study, especially prevalence and role of *B. hominis* in gastrointestinal pathogenesis.

Conflicts of interest – None declared.

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