

PREVALENCE OF INTESTINAL PARASITIC INFECTIONS IN PATIENTS ATTENDING A TERTIARY CARE HOSPITAL IN EASTERN BIHARRandhir Kumar¹, Priyanka Paul Biswas², Tarannum Yasmin³, Aninda Sen⁴, Udayan Ganguly⁵**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Parasitic protozoa and helminths are responsible for some devastating and prevalent diseases of humans. Intestinal parasitic infections are a major health problem in India. While little study has been carried out regarding the problem in India, almost no study on the burden of intestinal infections has been done in Bihar. **OBJECTIVE:** The objective of the study was to estimate the prevalence of intestinal parasitic infections (IPI) in the patients attending outdoor patient department in Katihar Medical College & Hospital. Fecal samples were examined for intestinal parasites by direct microscopy, and by microscopy following modified acid fast staining in HIV infected patients. **MATERIAL AND METHODS:** This study was carried out from June 2011 to February 2013. The study population consisted of individuals of all age groups, belonging to both the sexes, including children, pregnant woman and elderly individuals. A total of 2780 samples were examined by saline and Lugol's iodine preparation. The negative samples were examined by formol ether concentration technique. Modified acid fast staining of fecal samples in HIV infected patients was also done. **RESULTS:** The result showed that the prevalence of parasitic infection was 10.71%. Out of this ,86.6% were single infections, 12.8% were double infections and 0.67% showed triple infections. *Ascaris lumbricoides* (28.5%) and *Giardia lamblia* (18.5%) were the most common intestinal helminthes and protozoans isolated. A single patient with HIV infection was co-infected with *Cryptosporidium parvum*. The infected cases were more in the age group between 1-10years, more commonly among the male population. **CONCLUSION:** The prevalence of the helminthic infections is more than the prevalence of protozoal infections in this geographic region. Clinical microbiologists must follow standard laboratory procedures when screening stool samples so as to improve the chances of finding the parasites. An integrated approach of drug treatment and focused participatory hygiene education is required to control the parasite load among rural population. These measures would mitigate the severity of frequent outbreak of parasitic infestations.

KEYWORDS: Intestinal parasitic infections (IPI).

INTRODUCTION: Rapid industrialization and a shift of the population from rural to urban areas have caused deterioration in the environmental quality.⁽¹⁾ Poor sanitation and scarcity of potable drinking water contribute to rapid spread of these intestinal parasitic infections (IPIs) among people who are illiterate and belong to the low socio-economic class, and are unaware of the importance of sanitation, personal and environmental hygiene with respect to health.⁽²⁾ Helminthic parasitic infections put a severe strain on the nutrition of children, and as a result of this morbidity, they are at an increased risk to the detrimental effects like poor cognitive performance and physical growth.⁽²⁾

The frequency of parasitic infestation varies with age and sex of the general population. Parasitic infestation in the pregnant individuals and in the reproductive age population can be

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responsible for intrauterine growth retardation. IPIs can be responsible for nausea, vomiting, diarrhea, malabsorption, malaise, fatigue, depression, weight loss, fever and gastrointestinal obstruction. Lack of knowledge of prevalence of parasites in a particular geographical area may lead to the misdiagnosis of IPI's as appendicitis and other inflammatory bowel diseases.⁽³⁾

The most important drawback of IPI's is that about 90% of infected individuals remain asymptomatic.⁽⁴⁾ The prevalence of intestinal parasitic infections varies in different geographical regions.⁽⁵⁾ Environmental factors also play a role in the incidence of IPI as hot and humid tropical climate favor increased parasite prevalence.⁽⁶⁾ It then becomes important to know the disease burden of parasitic infestations in the communities. Limited recorded data is available in this regard.

This study was undertaken in the department of microbiology, at a tertiary health care center and Medical College in Eastern Bihar to get a true idea about the existence of intestinal parasites and their prevalence in this area.

MATERIALS AND METHODS:

Study Population: A prospective study was carried out in the department of Microbiology for a period of one year and nine months (June 2011 to February 2013). The study population included patients of both sexes and all age groups including children, pregnant women and elderly individuals attending the outpatient and inpatient departments of a medical college hospital in eastern Bihar. A total of 2780 samples with symptoms suggestive of parasitic infections coming to the tertiary care hospital for whom stool examination for parasites was advised by clinicians were included in the study. Patients who had taken anti-parasitic drug during the last two months were also excluded from the study.

Methods of Stool Examination: Stool specimens were collected in wide mouth containers without any preservative. The stool samples were subjected to gross and microscopic examination. Naked eye examination was done for intestinal worms and segments of *Taenia* species. The microscopic examination was accomplished by normal saline preparation and Lugol's Iodine preparation directly from the stool.⁽⁷⁾ The negative samples were examined by formol ether concentration technique.⁽⁸⁾ Modified Ziehl-Neelsen stain was used for the identification of coccidian parasites only in case of HIV infected patients.⁽⁹⁾

RESULTS: A total of 2780 stool samples were examined out of which 298(10.7%) revealed the presence of parasites. Of the 298 positive cases, 259 (86.9%) were positive by normal saline and iodine preparation and an additional 39(13.1%) parasites were detected by formal ether concentration technique. Among these 298 samples, 258(86.6%) samples were infected with at least one parasite, 38(12.8%) were infected with two parasites and 2(0.67%) were infected with three parasites.

Protozoans formed 60(20.1%) of the total parasitic infestations while helminthic infestation was seen in 238(79.9%) samples. The most common pathogenic intestinal parasite was *Ascaris lumbricoides* 28.5% followed by *Ancylostoma duodenale* 22.5%, *Giardia lamblia* 18.5% and *Trichuris trichiura* 10.7% [Table 1]

Among the intestinal protozoa, *G. lamblia* was the most common parasite being present in (18.5%) cases followed by *Entamoeba histolytica* (1.34%) and *Cryptosporidium parvum* (0.33%).

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Among the helminthes, *A. lumbricoides* (28.5%) followed by *A. duodenale* (22.5%), *T. trichiura* (10.7%), *Enterobius vermicularis* (9.6%), *Strongyloides stercoralis* (0.67%), *Hymenolepis. nana* (7.0%) and *Taenia sp.* (1.3%) were the common parasites (Table 1).

Among the study population, 1593 were males and 1187 were females. The total number of positive cases with (IPI) was more in male 174/298(58.4%) as compared to females 124/298(41.6%). Maximum number of positive cases in males (66.7%) were in the age group 1 – 10 years and in females (62.2%) were in the 21 - 30 years (Table 2).

Existence of two different parasites in the same sample was observed most commonly with *A. lumbricoides* and *A. duodenale* (28.9%) followed by *A. lumbricoides* & *T. trichiura* (23.7%), and *A. duodenale* & *T. trichiura* (18.4%) (Table3). A single patient with HIV infection was co-infected with *C. parvum*.

DISCUSSION: Stool examination for parasitic ova, cysts, trophozoite and larvae remains the gold standard for laboratory diagnosis for IPI's.⁽¹⁰⁾ Lack of knowledge of prevalence of parasites in a particular geographic area may lead to misdiagnosis of IPI's as appendicitis and other inflammatory bowel diseases.⁽¹¹⁾ Studies outside India have reported a parasitic prevalence rate of 25 to 70%.⁽¹²⁾ Prevalence rate of IPI study was low (10.71%) in our study population as compared to other studies. In the absence of substantial community based study on the lifestyle of the rural population, this low rate of IPI cannot be explained.

The high incidence of IPI in males in the age group of 1 – 10 (particularly during infancy) is probably due to crawling habits which increases their contact with soil and accidental transfer of parasites there from, to the mouth. Traditionally, girls of the same age group (1-10) are more prone to be restricted indoors amongst the study populations. This probably explains the lower incidence of IPI in this age group (among girls) as compared to the age group 11–20yrs, when the girl child is made to perform all kinds of household as well as outside chores particularly in the rural population.

The prevalence of helminthic ova was 79.9% whereas the rate of protozoal infection was 20.1%. Study by Sehegal et al. found that prevalence rate of protozoal infection was 81.2% whereas that of helminthes was 18.8%. They found that the commonest pathogen in children and pregnant women was *G. lamblia* (21.4% and 6.9%, respectively) followed by *E. histolytica* (5.3% and 4.6%).⁽³⁾ In a recent study by Srihari et al, it was found that *E. histolytica* was the commonest parasite (43.8%) followed by *C. parvum* (29.8%) and *G. lamblia* (10.53%).⁽¹³⁾ In Marothi and Singh's study, *E. histolytica* was the commonest parasitic protozoa (10.5%) followed by *G. lamblia* (3.9%), and among helminthes, *A. lumbricoides* was the commonest (2.8%).⁽¹⁴⁾

Our study showed that the most common intestinal parasite was *A. lumbricoides* (28.52%). The symptoms and complications of infections caused by *A. lumbricoides* can be classified into the following: 1) pulmonary manifestations and hypersensitive reactions, 2) intestinal symptoms, 3) intestinal obstructions, and 4) hepatobiliary and pancreatic symptoms. The prevalence of ascariasis occurs in tropical countries where the warm, wet climate provides environmental conditions that favor year-round transmission of infection.

Transmission mainly occurs via ingestion of contaminated water and food. Children playing in contaminated soil may acquire the parasite from their hands.⁽¹⁵⁾ Some authors have reported low prevalence of ascariasis (22.2%) as compared to our study.⁽¹⁶⁾ On the other hand, other authors have

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reported that prevalence of *A. lumbricoides* (28.4%) was the highest, followed by *G. lamblia* (7.2%), *T. trichiura* (4.9%) and *T. saginata* (3.7%).⁽¹⁷⁾

Among the intestinal protozoa, *G. lamblia* was the most common parasite being present in 18.5% cases, followed by *E. histolytica* in 1.34% cases. Other studies show that the prevalence of *E. histolytica* (43.86%) was the highest, followed by *C. parvum* (29.82%) and *G. lamblia* (10.53%).⁽¹⁸⁾ Giardiasis can be responsible for severe malabsorption syndrome and *Entamoeba histolytica* infection, if not treated, can be responsible for amoeboma, toxic megacolon, peritonitis and liver abscess.⁽¹⁸⁾

The isolation rate of other intestinal parasites like *A. duodenale* (22.5%) followed by *T. trichiura* (10.7%) was also high in our study. Such findings are usually seen in areas with lack of hygiene, practices such as open air defecation (due to lack of sanitary latrine in most houses) in the rural area, working and walking barefoot in soil, leading to increased transmission of the filariform larva.

Other studies showed low prevalence of *S. stercoralis* (3.51%) and *A. duodenale* (1.75%) as compared to our study which could be due to the geographical variation in distribution of different parasites, effective health education and public health services, in the study area.⁽¹⁹⁾ The prevalence of *E. vermicularis*, even though found in low rate (9.06%), is alarming. The transmission of such parasites occurs easily and autoinfection is common among the male population.

The prevalence of intestinal taeniasis is very low in our study being (1.33%). Authors have reported (7.01%) cases of taeniasis, probably due to mixed diet, consumption of undercooked pork and beef by the population. However, we have not identified any tapeworm as *T. solium* with scolex and gravid segment from any of the cases.⁽³⁾

In our study, 12.8% samples showed double parasitic infection. The most common association was seen between *A. lumbricoides* & *A. duodenale* (28.9%). Co-infection with these parasitic diseases occurs with regularity because of similar predisposing factors for transmission. The rate of double parasitic infections was found to be higher (32.8%) when compared to other studies, where the association was observed most commonly between *E. histolytica* and *G. lamblia* (25.7%) followed by *E. vermicularis* and *Entamoeba coli* (3.1%) and *G. lamblia* and *H. nana* (2.3%).⁽²⁰⁾

CONCLUSIONS: The occurrence of intestinal parasitic infection is quite high in the study population and the intestinal helminthes are more common than protozoans in our study. In most of the cases, intestinal parasitic infestation spreads due to low standards of personal hygiene, poor sanitation, non-usage of toilets and an illiterate population. This study emphasizes the need for health education, good sanitation, personal hygiene, proper cooking of food, safe drinking water and use of foot-wear especially amongst the rural population.

Parasite	No. of positive cases	% of total infection
<i>A. lumbricoides</i>	85	28.5
<i>A. duodenale</i>	67	22.5
<i>G. lamblia</i>	55	18.5
<i>T. trichiura</i>	32	10.7
<i>E. vermicularis</i>	27	9.6

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H. nana	21	7.0
E. histolytica	4	1.34
Taenia sp.	4	1.3
S. stercoralis	2	0.67
C. parvum	1	0.33

Table 1: Prevalence of common intestinal parasite in the sample

Age in years	No. & (%) of positive cases in male	No. & (%) of positive case in female	Total No.(%) of positive cases
1-10	50 (66.7)	25 (33.3)	75
11- 20	47 (54.0)	40 (46.0)	87
21- 30	17 (37.8)	28 (62.2)	45
31- 40	30 (69.8)	13 (30.2)	43
41- 50	7(53.9)	6 (46.2)	13
51- 60	16 (69.6)	7 (30.4)	23
61- 70	7 (58.3)	5 (41.7)	12
Total	174 (58.4)	124 (41.6)	298

Table 2: Age and sex wise distribution of positive cases with IPI

Type of infection	No. of infection (%)
Double infection	
A. lumbricoides + A. duodenale	11 (28.9)
A. lumbricoides + T. trichiura	9 (23.7)
A. duodenale + T. trichiura	7 (18.4)
G. lamblia + T. trichiura	6 (15.8)
E. vermicularis + A. lumbricoides	4 (10.5)
E. vermicularis + G. lamblia	1 (2.6)
Total positive double infection	38
Triple infection	
A. lumbricoides + T. trichiura + A. duodenale	1(50%)
T. trichiura + A. duodenale + S. stercolaris	1(50%)
Total Positive triple infection	2

Table 3: Pattern of parasitic infection

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