

INTESTINAL PARASITIC INFESTATION IN AN URBAN SLUM OF LUCKNOW CITY

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ABSTRACT

Background: Intestinal parasitic infections are globally endemic and are a major public health problem of concern. The prevalence is high in developing countries more in Asian countries for eg. India, Bangladesh, etc probably due to poor sanitary conditions and improper hygiene practices. The present community-based study to determine the prevalence of intestinal parasitic infestation in an urban slum area of Lucknow. **Materials and Methods:** This cross-sectional study was conducted between January 2019 – June 2019. Residents of an Urban Slum which is covered under the urban health training center of the Integral Institute of Medical Science and Research, Lucknow. A structured predesigned and pretested questionnaire was used. The cases were studied by doing home visits. All member of the family was interviewed. Consent was taken from the study subjects before data collection. The data was entered and analyzed with the Microsoft Excel software. **Results:** The overall prevalence rate of intestinal parasitic infections was 13.75%. Entamoeba histolytica was the most common parasite which caused infection in both female and male. Between the 31-40-year age group was highly infected due to intestinal parasite. Patients who were infected with intestinal parasite their patients were suffering from abdominal pain, constipation, fever, diarrhea, and nausea or vomiting. **Conclusions:** This study reveals that intestinal parasite infections are a public health problem in our study population. Entamoeba histolytica was the most common parasite and the 31-40-year age group was highly infected. Large scale studies should be done frequently in order to detect the prevalence and variations in the epidemiology of parasites.

Keywords: infestation, Sanitation, prevalence, parasitic

INTRODUCTION

Parasitic infections triggered by protozoa and helminths are the main global health problems. The prevalence of parasitic infections varies with the level of hygienic practices and it is usually higher in tropics and sub-tropics than in more moderate climates (1-3). In addition, poverty, undernourishment, high population density, the inaccessibility of potable water, low health position, and a lack of personal cleanness provide ideal conditions for the development and spread of intestinal parasites. Other barricades to decreasing the rates of parasitic infections include inadequate

parasitic disease investigation, neglect of the problem in developing countries (4). The most common parasitic infections stated globally are those of Enterobius vermicularis, Ascaris lumbricoides, Trichuris trichiura, Ancylostoma duodenale/Necator americanus, Giardia lamblia, and Entamoeba histolytica (1-6). It is projected that the worldwide prevalence of A. lumbricoides infection is greater than 1200 million cases and that the prevalence of T. trichiura and the hookworms A. duodenale and N. americanus is between 700 and 800 million patients (7). The prevalence of E. histolytica ranges from 5

percent to 81 percent, and the parasite is estimated to affect approximately 480 million people worldwide (2,4). Moreover, *G. lamblia* is the most frequent intestinal parasite in the United States (8), whereas *T. trichiura* (18.8%), *A. lumbricoides* (47.0%), and hookworms (17.2%) are the most common causes of intestinal parasitic infections in China (9). As India is considered a developing country, intestinal parasitic infections are the main health problem. Epidemiological surveys of these infections are significant because they reflect the sanitary conditions of the public and deliver basic data for the control of forthcoming infections. Several community-based surveys conducted in India have shown a varied range (11.50-97.40%) of prevalence rates (3,6,10). In view of the scarcity of available information on the prevalence of parasitic infections in Uttar Pradesh, India, we performed the present community-based study to determine the prevalence of intestinal parasitic infestation in an urban slum under the urban health training centre of IIMS&R, Lucknow.

MATERIALS AND METHODS:

This cross-sectional study was conducted between January 2019 – June 2019. **Study population:** Residents of an Urban Slum which is covered under the urban health training centre of Integral Institute of Medical Science and Research, Lucknow. **Sample size:** Optimal sampling size was calculated based on a prior prevalence rate of 15.9%.(11) Samples sample size estimations for a proportion with 95% CI and 80% power were calculated by the formula $4PQ/L^2$ where P is the prevalence; Q is 100-P and L is the absolute precision i.e.5%. The approximate sample size came out to be 80.

Data collection and analysis of stool samples:

The cases were studied by doing house to house visits. All members of the households were interviewed. Information relating to age, sex, food hygiene, hand hygiene, sanitary facilities, water drinking, was obtained from each patient using a structured questionnaire. Informed consent was obtained from all the patients. A single stool sample was collected from each subject on a subsequent day, and in 30 percent of the cases, samples were collected on the successive 2nd or 3rd days. Firstly, a microscopic examination of the stool was done to find the sign of blood, mucus, parasitic segments, or whole parasites. The direct saline and iodine mounts

were scientifically examined under the low-power objective (10×) with low light intensity and were then switched over to the high dry objective (40×). The saline and iodine preparations from each concentrated sample were examined likewise under 10× and 40× enlargements. Smears were made from the samples that revealed protozoan cysts while using the concentration procedure and were stained using the trichrome staining procedure. For keeping the internal validity of the results, all slides were observed by the same microbiologist. To confirm quality control, all of the laboratory trials, including the collection and handling of the samples, were approved out in agreement with the CLSI guidelines (12-14).

Inclusion criteria: Urban Health Training Centre of the Department of Community Medicine, Integral institute of medical sciences and research, Lucknow, India. This urban health centre is situated in Sarvodaynagar and caters to a huge urban population of the Lucknow city

Exclusion criteria: Those who were not willing to participate in this study. History of anti-parasitic medication in past four weeks. Preservation of sample: For the preservation of the sample, a solution containing formalin 10%, Glycerin 20%, and distilled water 70% was used, because the morphology of helminth eggs, larvae, protozoan cyst, and coccidial forms are well preserved and formalin preserved specimen are suitable for concentration technique.

Ethical Clearance: The present study was approved by the Institutional Ethics Committee. To adhere to ethical norms for using human subjects for medical research, all patients and/or their guardian/parents were informed about the objectives and goals of the present study. Physician and laboratory personnel explained the results of the test and in case of positive results; the study population received appropriate treatment.

Statistical Analysis: The data were entered and analyzed with the Microsoft Excel software and results were present in the form of tables and analysis of data was generally descriptive, involving the determination of frequencies.

RESULTS:

This investigation is an attempt to estimate the prevalence of intestinal parasites, in our study area. In the present study, a total of 80 samples were collected from the study population residing in an urban slum covered under an urban health training

centre. Out of all samples examined, 11 samples were found to be positive.

Figure 1 shows that *Entamoeba histolytica* was the most common parasite (63.6%) followed by *Blastocystis hominis* (18.2%) and *Giardia lamblia*

(9.1%). *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Trichomonas hominis*, *Hymenolepis nana*, *Enterobius vermicularis* were not detected in any of the samples. (Figure 1)

Figure: 1 Prevalence of each parasite in total samples

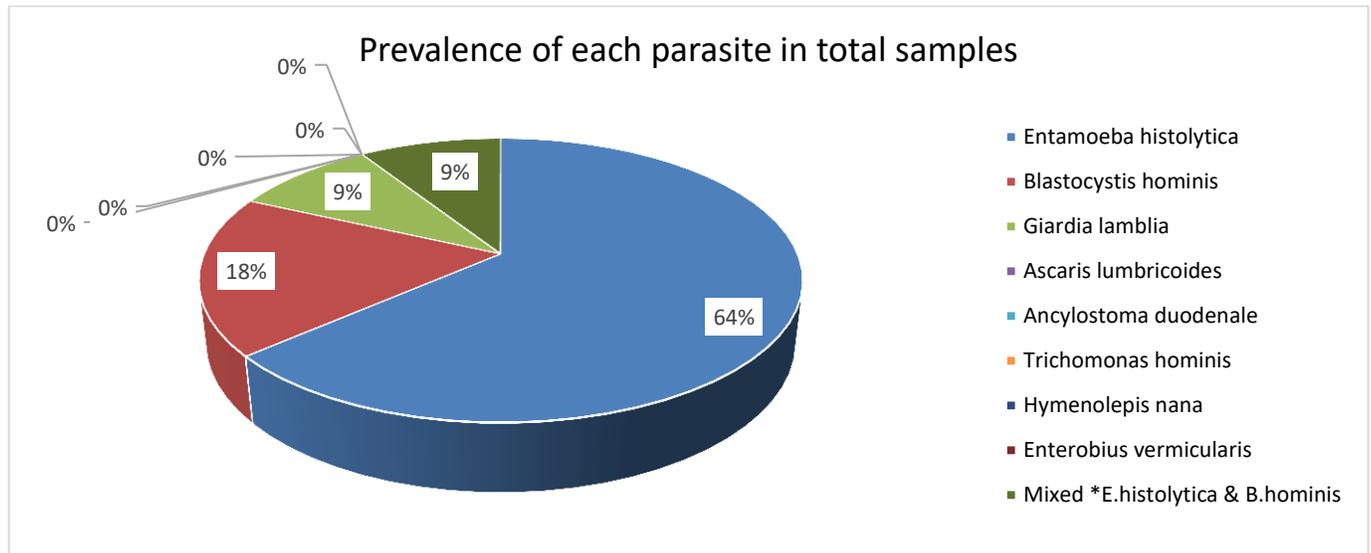


Table: 1 Gender – wise prevalence of intestinal parasite (n=11)

Name of parasites	Number of parasites (%)	Male (%)	Female (%)
Entamoeba histolytica	7 (63.6)	4 (80)	3 (50)
Blastocystis hominis	2 (18.2)	1 (20)	1 (16.7)
Giardia Lamblia	1 (9.1)	0(0.0)	1 (16.7)
Ascaris lumbricoides	0(0.0)	0(0.0)	0(0.0)
Ancylostoma duodenale	0(0.0)	0(0.0)	0(0.0)
Trichomonas hominis	0(0.0)	0(0.0)	0(0.0)
Hymenolepis nana	0(0.0)	0(0.0)	0(0.0)
Enterobius vermicularis	0(0.0)	0(0.0)	0(0.0)
Mixed type	1(9.1)	0(0.0)	1 (16.7)
Total	11 (100)	5 (100)	6 (100)

Table 1 shows that out of 80 samples 5 males (45.5%) and 6 females (54.5%) patients were found to be positive for at least one parasite. Entamoeba histolytica was the most common parasite in males as compared to females followed by Blastocystis hominis, in which both male and female patients were equally infected, and the only female patient was infected with Giardia lamblia. Ascaris lumbricoides, Ancylostoma duodenale, Trichomonas hominis, Hymenolepis nana, Enterobius vermicularis were not noticed in any gender. (table 1)

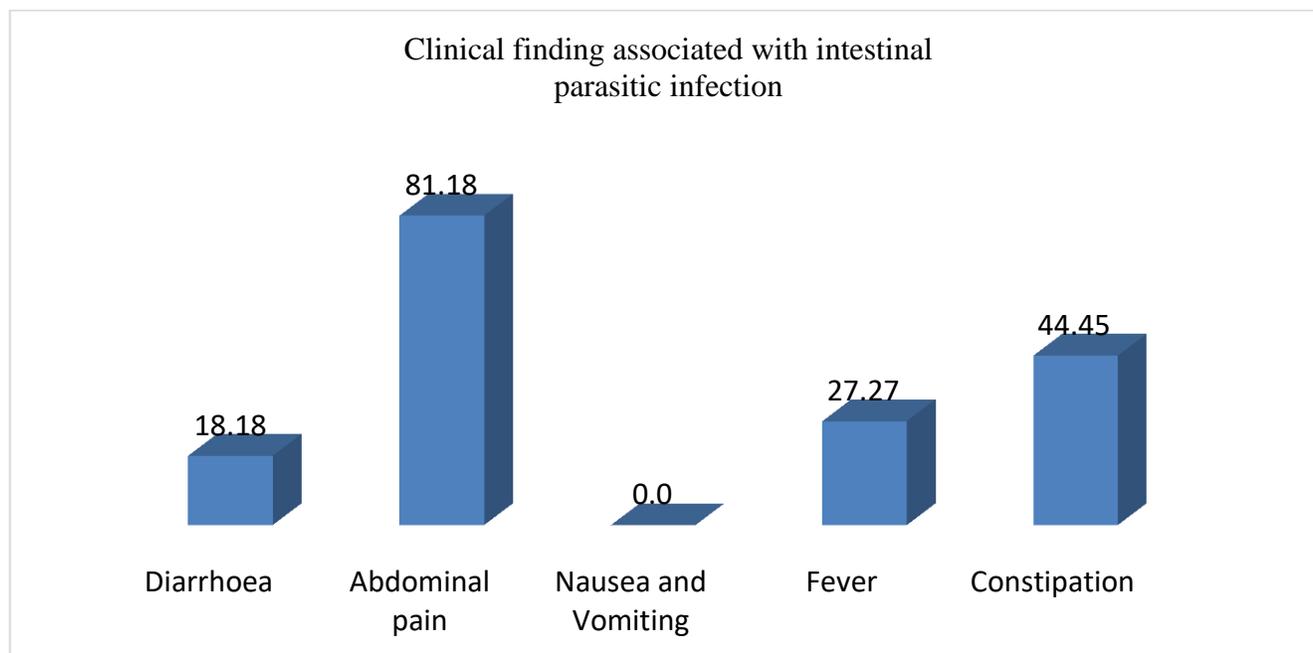
Table 2 shows as the age group increases from 11 years to 40 years, the parasitic infection increases. we found that higher infection was seen in 31-40-years age group patients (36.36%) and the least infection was seen in 11-20 and 61-70 age group patients (9.09%). All age groups show an approximately similar distribution of parasitic infections while the age group 51 -60 had not any infection. (table 2)

Figure 2 illustrates the clinical finding associated with intestinal parasitic infection. In which maximum patients were suffering from abdominal pain (81.18%) followed by constipation (44.45%), fever (27.27%), and diarrhea (18.18%). There were no patients having symptoms of nausea and vomiting. (figure 2)

Table 2: Distribution as per age in Infected patients (n = 11)

Age group (years)	Number of patients	Percentage (%)
11 – 20	1	9.09
21 – 30	2	18.18
31 – 40	4	36.36
41 – 50	3	27.27
51 – 60	0	0
61 – 70	1	9.09

Figure: 2 Clinical finding associated with intestinal parasitic infection



DISCUSSION:

A total of 80 samples was studied and the overall prevalence of intestinal parasites in the stool samples among the study population was found to be 13.75% which is much lower than the overall India prevalence range because of a lesser sample size (15). In our study, we found that the prevalence of intestinal parasitic infection in the urban slum area of Lucknow is 13.75% compared to a previous report where prevalence in the urban slum was 15.19%, 11.25%, and 23.4% (11,16-18). In this study, we found that *Entamoeba histolytica* is the most common parasite (63.6%) followed by *Blastocystis hominis* (18.2%) and *Giardia lamblia* (9.1%) found in an infected person. A single person was infected with both *E. histolytica* and *B. hominis* parasite (9.1%). We also found that *A. lumbricoides*, *Hymenolepis nana*, and Hookworm, etc. are not common anymore because these days' people are more concerned about their hygiene. The previous study also suggests that *E. histolytica* was the most common parasite found in an infected person (79%) as compared to infection rates of *G. Lamblia* which is lesser by 5% in number (11,18). In the present study, *Entamoeba histolytica* was the most common parasite (63.6%) followed by *blastocystis hominis* (18.2%) and *Giardia lamblia* (9.1%). Other similar studies by Manochitra et al. (15) and Mareeswaran et al. (18) reported that among the stool samples displaying protozoal infections, *E. histolytica* and *G. lamblia* showed a high prevalence of 80% than the helminthic infections (*A. duodenal*, *A. lumbricoides*, *T. Trichur*) which was 20%. About one-third of the world, more than two billion people, are infected with intestinal parasites. About many of three hundred million individuals are severely ill with these worms and of those, at least 50% are school-age children. (19) Age is a significant risk factor for Intestinal parasitic infections (20) and the pre-school and school-going children have been reported to be at maximum risk for Intestinal parasitic infections. (21) Parasitic infections are usually common in the pediatric age group as children are more vulnerable populations because of their unhygienic practices. (22) In contrast to the finding of other studies, the present study shows that the patients belonging to the age group of (31-40) were highly infected with the parasitic infection and 27.27% of the patients belonging to the age group of (41-50) were infected with parasitic and the rest were least infected with parasitic infection. Surprisingly patients of age group (51-60) were not infected anyhow. Diarrhea due to parasites affects all age groups but the pediatric age

group affected most commonly. (23) Various studies have shown significant parasitic diarrhea in different pediatric age groups (24-26), but no such significance was reported for any age group in the current study, like some different studies (27,28). According to Alemu, et al., (29) reported that those Individuals between the age group of 10- 14 years are not following handwashing practices after toilet were significantly associated with Intestinal parasitic infections. Many previous studies failed to show this difference, might be, due to other confounding factors. Many intestinal parasites are spread through the feco-oral route, because of these family members, who share toilet, are usually primary sources of infection. To avoid such transmissions, frequent, and proper handwashing after the toilet is strongly recommended. (30-32).

CONCLUSION:

This study reveals that intestinal parasite infections are a public health problem in our study population. *Entamoeba histolytica* was the most common parasite and the 31-40 year age group was highly infected. The percentages parasitic infestations show the poor personal hygiene and poor sanitation and water supply of the urban slums. Attention therefore directed towards improving the water supply and sanitation and sanitary conditions. Large scale studies should be performed repeatedly in order to observe the prevalence and changes in the epidemiology of parasites.

CONFLICT OF INTEREST – There is no conflict of Interest

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