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ORIGINAL ARTICLE

# Prevalence of Intestinal Parasites in a Tertiary Care Hospital in Rural Puducherry

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## ABSTRACT

That intestinal parasitic infection is a major health problem in developing countries including India is well known. Many of studies have been done in our country on this issue, but most of them are from South India and a few from North and Central India. We have ventured to study the epidemiology of intestinal parasites to find the recent changes in trend and differences from other parts of India and from other developing countries. An institution-based retrospective study was done on the stool examination reports of the past 2 year. All symptomatic patients clinically suggesting intestinal parasitic infection in the Medicine Outpatient Department were referred to the Microbiology Department for routine stool examination to detect the intestinal parasites in that population. Both the sex was included in the study irrespective. Apart from naked eye observation, each sample was examined microscopically for ova, parasites, and cysts, after preparing the sample with saline wet mount, Lugol's iodine wet mount, modified Ziehl–Neelsen stained preparation and Harada–Mori culture technique. Out of 2194 samples examined, 1246 (40.26%) were positive for parasites. The rest 948 were parasite negative. Out of those positive, 927 had only one parasite in their stool specimen, 301 had two parasites, and only 18 had three parasites. The prevalence of Entamoeba histolytica, Giardia lamblia, and Ascaris lumbricoides was the highest in that order. The prevalence of E. histolytica (~40%) was almost common throughout India. G. lamblia was the next common in rural Puducherry, but Blastocystis was the second most common in South Indian studies and those in all coastal regions of the country. Incidences of hookworm have reduced throughout India compared to that in 1980s studies. Our studies reveal that the situation of intestinal parasitic infection is a matter of concern and drastic steps should be taken to minimize the gravity of this malady.

**KEY WORDS :** Intestinal parasites, Prevalence, Rural Puducherry

## Introduction

Intestinal parasitic infections are one of the major health problems in several developing countries including India. [1] They constitute the greatest universal cause of morbidity and mortality.

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It is estimated that 60% of the world population is infested with enteric parasites.[2]

The WHO estimates that one person in every four harbors parasitic worms.[3] Intestinal parasitic infections persist and flourish wherever poverty, inadequate sanitation, insufficient health care, and overcrowding are entrenched.[4]

The prevalence of parasitic diseases depends on environmental, social, and economic factors. [5] Poverty, illiteracy, high population density, proximity with animals, and poor hygiene conditions along with unavailability of safe and potable water attribute to the higher prevalence of intestinal parasites in developing nations.[6]

Moreover, certain environmental factors such as pollution, global warming and the tropical hot, and humid weather conditions also contribute to disease. Consequently, the epidemiological pattern of the parasite varies with geographic location.

The most common parasitic infestations reported globally are Ascaris (20%), Ancylostoma duodenale (18%), Trichuris trichiura (10%), and Entamoeba histolytica (10%).[7] The WHO estimates that approximately 50 million people worldwide endure insidious amoebic infection, resulting in 40-100 thousand yearly deaths. Current estimates suggest that Ascaris lumbricoides can infest more than 1 billion and T. trichiura and hookworms can infest 795 and 740 million people, respectively.[8] In India, overall prevalence rate of intestinal parasitic infestation ranges from 12.5% to 66%, with varying prevalence rate for individual parasite. [9]

Studies reporting the overall parasitic load in the state of Puducherry have been scanty, whereas a study related particularly to soil-transmitted helminths (STHs) among school children in Puducherry have been published in the recent past.[10-12]

The most important drawback of intestinal parasitic infestations is that about 90% infected individuals remain asymptomatic [13]. Therefore, a retrospective study was undertaken by the Department of Medicine and Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, BIHER University, whereby all symptomatic patients from Medicine Outpatient Department (OPD) were referred to Microbiology Department for routine stool examination to detect the intestinal parasites in that population. The study also aims to analyze the prevalence rate of multiple parasitic infestations in this community.

## Materials And Methods

The present study is a retrospective study undertaken at a rural medical college and hospital in the southern region of India. Adult patients who reported to medical OPD of the hospital during the period of July 2015 – June 2017 with gastrointestinal symptoms and were subjected to routine stool examinations were included in the study. A total number of 2194 patients of both sexes were found to fulfill the criteria of inclusion. The age range of the patient population was 05 – 80 years.

Routine macroscopic examinations were carried out for consistency, color, presence of mucous and blood, and presence of adult worms, scolices and proglottids.

For microscopic examinations, saline wet mount, Lugol's iodine wet mount and modified Ziehl–Neelsen stained preparation were prepared as per standard protocol. Each sample was examined under microscope for the presence of ova, parasites, and cysts.

For hookworm ova were cultured using the Harada–Mori culture technique,[14] in which approximately 0.5–1.0 g of stool was smeared on one end of a filter paper and placed carefully in a test tube containing water in such a way that the smeared area was clear of the water. One third of the filter paper was then dipped into the water in the test tube. The tube was then incubated at an ambient temperature of 26–28°C and kept under observation for 1 week. The cultured filari form larvae were concentrated by centrifugation, stained using Lugol's iodine, and observed under a microscope.

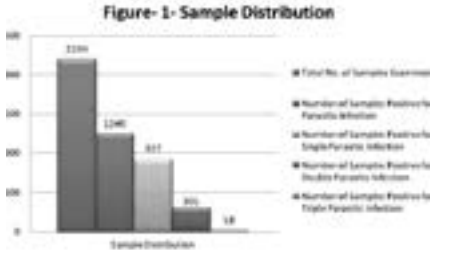
## Results

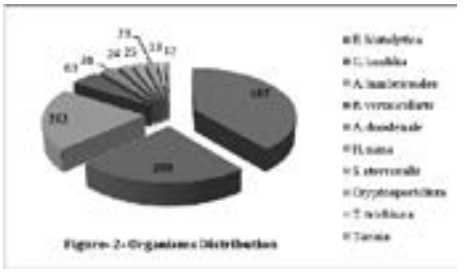
A total of 2194 stool samples received, 1246 were positive and 948 were negative. The results of the study are given in Tables 1-3 and Figures 1-3.

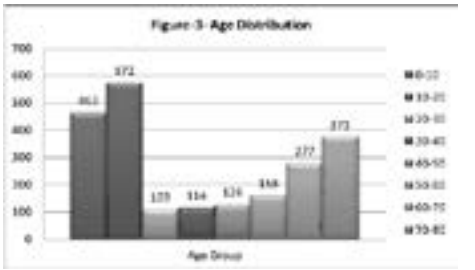
| Table 1: Intestinal parasites in stool specimens | |
|---|---|
| **Pathogen** | **No & %** |
| E. histolytica | 487 (39%) |
| G. lamblia | 299 (24%) |
| A. lumbricoides | 262 (21%) |
| E. vermicularis | 63 (05%) |
| A. duodenale | 38 (03%) |
| H. nana | 24 (02%) |
| S. stercoralis | 25 (02%) |
| Cryptosporidium | 23 (02%) |
| T. trichiura | 13 (01%) |
| Taenia | 12 (01%) |

| Table 2: Double parasitic infestation | |
|---|---|
| **Pathogen** | **No & %** |
| E. histolytica+G. lamblia | 151 (50%) |
| A. lumbricoides+E. histolytica | 52 (17%) |
| E. vermicularis+G. lamblia | 33 (11%) |
| A. lumbricoides+G. lamblia | 21 (07%) |
| A. lumbricoides+A. duodenale | 12 (04%) |
| E. vermicularis+A. lumbricoides | 09 (03%) |
| A. lumbricoides+H. nana | 07 (02%) |
| E. histolytica+H. nana | 03 (01%) |
| E. vermicularis+Taenia | 03 (01%) |
| G. lamblia+T. trichiura | 02 (0.7%) |
| A. lumbricoides+T. trichiura | 01 (0.3%) |
| A. duodenale+H. nana | 01 (0.3%) |
| E. vermicularis+H. nana | 01 (0.3%) |
| E. vermicularis+A. duodenale | 01 (0.3%) |
| E. histolytica+Taenia | 01 (0.3%) |
| G. lamblia+S. stercoralis | 01 (0.3%) |
| A. lumbricoides+S. stercoralis | 01 (0.3%) |
| E. vermicularis+S. stercoralis | 01 (0.3%) |

| Table 3: Triple parasitic infestation | |
|---|---|
| **Pathogen** | **No & %** |
| E. vermicularis+A. lumbricoides +G. lamblia | 05 (28%) |
| E. histolytica+E. vermicularis +A. lumbricoides | 04 (22%) |
| E. histolytica+G. lamblia +S. stercoralis | 03 (18%) |
| E. vermicularis+A. lumbricoides +A. duodenale | 02 (11%) |
| A. lumbricoides+A. duodenale +G. lamblia | 02 (11%) |
| A. lumbricoides+E. histolytica +G. lamblia | 01 (06%) |
| E. vermicularis+H. nana +T. trichiura | 01 (06%) |





## Discussion

Overall, our study included examination of stool specimens of 2194 persons, inclusive of both sexes age group of 05 – 80 years. These patients had some clinical signs and symptoms raising the suspicion that they might be suffering from gastrointestinal parasitic infestations. They all attended the Medicine Outpatient Department of our Medical College and were referred from there to the Microbiology Department for examination of stool, detection of ova, and cysts and adult forms of different infesting parasites. The study was done for a period of 2 years beginning from July 2015 and ending on June 2017. Out of the 2194 specimens examined, only 1246 stool specimens were found to be parasite positive whereas the rest 948 specimens happened to be parasite negative. Now, from among the 1246 parasitic cases, 301 had 02 parasite infestations and only 18 had infestations with 03 parasites. The rest 927 parasite positive patients had only one parasite in their stool specimens.

Among all, E. histolytica leads the group covering (39%) of all parasitic cases. The second place was occupied by Giardia lamblia (24%). The next in order were A. lumbricoides (21%), Enterobius vermicularis (05%), A. duodenale (03%), Hymenolepis nana (02%), Strongyloides stercoralis (02%), Cryptosporidium (02%), T. trichiura (01%), and Taenia (01%).

Among dual parasite infestation cases, a combination of E. histolytica and G. lamblia is by far the most common 50%. The nearest but quite at a lower rank is the combination of E. Vermicularis and S. stercoralis, the percentage being 0.3%. The leading combination in the triple infestation group is one of E. vermicularis, A. lumbricoides, and G. lamblia 28%. The next combination is that of E. histolytica, A. lumbricoides, and E. vermicularis 22%. The rest triple parasite combinations are equally distributed.

A similar retrospective study was done in JIPMER, Puducherry, wherein a 5-year study, compared to the 2194 samples in our study in just 2 years [2]. However, in their study method apart from direct wet mount, they also used stool concentration techniques along with Wheatley's modified trichrome staining and also modified acid-fast staining for better detection of the different types and forms of parasites. They observed in their population some parasite species such as Entamoeba dispar, Entamoeba moshkovskii, Entamoeba coli, Blastocystis, Balantidium coli, and also some members of coccidian parasite genera such as Cystoisospora Cyclospora, and Cryptosporidium. On the contrary, we noted quite a significant number of cases of H. nana and S. stercoralis, even a single number of these parasites were not found in Puducherry study. However, both in theirs and our study, E. histolytica was the most common intestinal parasite (40% in South India) proving that the percentage of population suffering from this type of parasitic, namely E. histolytica is almost exactly the same. Interestingly, present shows the presence of the H.nana and Strongloides. With the help of Modified acid-fast staining coccidian parasites has been screened.

In a study in Thailand, G. lamblia was the most frequent parasite (18.4%).[15] Furthermore, it was more common in the asymptomatic population than the symptomatic ones. The next most frequent parasite in that report was Cryptosporidium oocysts. This also was more common in asymptomatic individuals (2.5%) than in symptomatic patients (0.8%). Two other Thailand studies showed the prevalence of said parasite to be 9.1%.[16,17]

In a study from north-east India, Shillong, Meghalaya, it was shown that parasite infestations were present in 53.2% of all immunocompromised patients.[18]

We did not do any separate study for this population. A study from Morocco showed a peculiar finding that 65.7% of all pregnant women had one or more parasites when their stool was examined.[19] In a similar study from Venezuela, the prevalence rate was 73.9%.[20]

In a guideline by the US Department of Health, 2013, it is suggested that the people from developing countries of Asia, Africa, and others are highly susceptible to parasitic infestations, but among them, STH is the most important and to be looked after seriously as they lead to significant illness and even death. [21]

## Conclusion

It has been revealed from the present study that there is a gross burden of parasites in the gastrointestinal tract which leads to morbidities ranging from minor symptoms to major maladies. Although it is suggested by a guideline of the US Department of Health to first screen the population with simple differential count of WBC in blood and then to screen the stool in a large population only in those with some degrees of eosinophilia, yet the process is not based on significant evidences and a direct stool examination of all cases even the asymptomatic ones in a susceptible community is the best method of intestinal parasite detection. Our study also suggests that steps need to be taken rigorously to prevent health damage through intestinal parasitic infection in the state of Puducherry; or for all developing countries as a whole, for that matter.

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