



RESEARCH ARTICLE

MICROBIOLOGY

SOIL TRANSMITTED HELMINTHS IN A RURAL POPULATION OF PUDUCHERRY- A HOSPITAL BASED STUDY**SUNIL SHIVEKAR*, PAVAN CHAND¹ AND GOPAL RANGASAMY²**

* Asst. Prof, Department of Microbiology, SMVMCH, Puducherry 605 107

1_ Asst. Prof, Department of Microbiology, SMVMCH, Puducherry 605 107

2_ Professor and Head, Department of Microbiology, SMVMCH, Puducherry 605 107

**SUNIL SHIVEKAR**

Asst. Prof, Department of Microbiology, SMVMCH, Puducherry 605 107

ABSTRACT

The incidence of soil transmitted helminthic infections was assessed among the patients from a rural part of Puducherry, southern coastal region of India. These patients had attended various outpatient departments in our hospital with various gastrointestinal tract complaints and anemia. Total 2600 patients were screened for parasitic infection over a period of one year (2007-2008) by using standard parasitological techniques. Out of these 417 were positive for parasitic infections of which 286 patients had helminthic infections. Males were more infected than the females. The helminths identified were Hookworm (86.36%), *Strongyloides stercoralis* (6.29%), *Ascaris lumbricoides* (2.79%), *Trichuris trichiura*, (1.04%), *Enterobius* (1.04%) and *Hymenolepis* (2.44%)



KEYWORDS

Soil transmitted helminths, Infection, Puducherry

INTRODUCTION

National Family Health Survey (NFHS) figures showed the high incidence of helminthic infestations associated with anemia among adult men, children and in pregnant women. This is mainly due to chronic blood loss from the gastrointestinal tract ¹.

The incidence of soil transmitted helminthic infections varies with the geographical location, climatic condition, socio- economic status, customs, personal hygiene, sanitation facility, potable drinking water supply and health care facilities ².

The most common clinical presentations of soil-transmitted helminthic (STH) infection include failure to gain weight, loss of appetite, fatigue, diarrhoea, anemia, abdominal pain and discomfort. The STH infections are a major cause of morbidity and mortality in poor and developing countries particularly among the children and immunocompromised ³.

Four nematodes are commonly found because of their widespread prevalence and distribution, which results in hundreds to millions of human infections every year. These include the large roundworm, *Ascaris lumbricoides*, the whipworm *Trichuris trichiura*, and two species of hookworm, *Necator americanus* & *Ancylostoma duodenale* ⁴.

The update on global distribution of STH reveals the highest rates of *Ascaris* infection in China, Southeast Asia, and in coastal regions of the West and in Central Africa. *Trichuris* infections reach their highest prevalence in Central Africa, Southern India, and Southeast Asia. Hookworm infections are common throughout Sub-Saharan Africa as well as in South China and Southeast Asia ⁵.

A recent change in social and economic conditions as well as implementation of control

programs in some regions of the world has changed the global picture of helminthic infections and its complications. The major objective of the present study is to provide understanding of the disease burden due to soil transmitted helminthic infections in this part of the country, which will provide a basis for development of new tools to control the helminthic infestations and their complications.

MATERIALS AND METHODS

A total of 2600 stool samples were collected from patients who had attended the various outpatient departments of our hospital with the complaints of failure to gain weight, loss of appetite, fatigue, diarrhoea, chronic cough in children, abdominal pain with discomfort and anemia. Stool sample was collected in screw capped labeled plastic container. A morning spot stool sample was collected and examined macroscopically and microscopically for the presence of adult worm, ova, cysts, trophozoites, larva, mucus and blood within two hours, by direct saline and iodine wet mount preparation methods. All samples negative for parasites were re-examined by ethyl acetate sedimentation and ZnSO₄ floatation method ⁶ and observed under high power lens, Photographs were taken with microscope attached camera and were used for further identification by standard morphological characters ⁷.

RESULTS

A total number of 2600 patients were screened for intestinal parasites. The overall positivity rate for intestinal parasites was found to be 417(16%). Of these 286(68.58%) had



helminthic infections and 131(31.41%) had other than helminthic infections (Table 1)

Six species of soil transmitted helminths were recovered from the stool samples, the most common was Hookworm followed by *Strongyloides stercoralis*, *Ascaris lumbricoides*, *Trichuris trichiura*, *Enterobius vermicularis* & *Hymenolepis nana*. (Table 2)

The infection by hookworm were predominant with (86.36%) followed by *Strongyloides stercoralis* (6.29%), *Ascaris lumbricoides* (2.79%), *Trichuris trichiura* (1.04%), *Enterobius* (1.04%) & *Hymenolepis* (2.44%). (Figure 1)

In the present study males had marginally higher incidence as compared to females (54.55% vs. 45.46%). (Table 1).

Table 1
Parasitic infections among rural population.

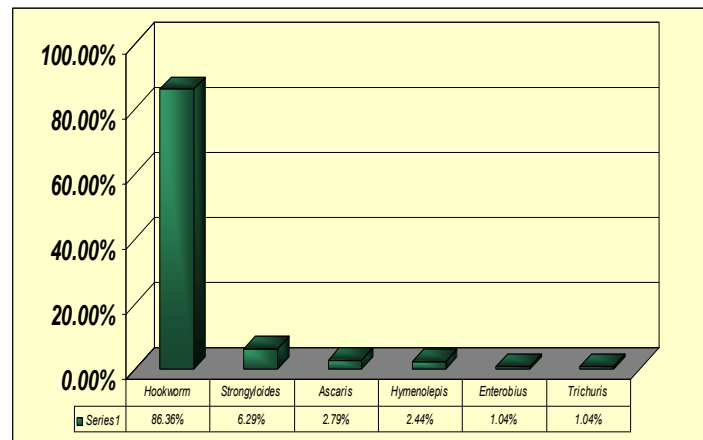
Stool Samples	Male	Female	Total
Total specimen tested	1400	1200	2600
Helminths Positive	156	130	286(68.58%)
Other than helminths Positive	75	56	131(31.41%)
Total Positive	231 (55.40%)	186 (44.60%)	417 (16.00%)

Table: 2
Total helminths positive: - 286/417(68.58%)

Helminths	No of cases
Hookworm	247
Strongyloides	18
Ascaris	08
H.nana	07
Enterobius	03
Trichuris trichura	03



Figure 1
Percentile distribution of helminthic infections.



DISCUSSION

The present study showed a high incidence rate of STH (68.58%) and no significant difference among males and females was noted. Studies conducted by Wani SA et al from Kupwara (71.15%)³, Wable VR. et al from Bombay (85.17%)², Rao VG et al from Madhya Pradesh (59.5%)⁸, have also reported a similar high incidence of intestinal parasitosis. The studies conducted in other developing countries also showed the high incidence^{9, 10, 11}.

The high incidence of STH in this area highlights the poor sanitary facility and various environmental factors like open-air defecation which results in contamination of the soil with helminths eggs. These eggs further mature in the moist soil and become infective to human. In this area the practice of not using footwear during daily activities is very common which may be a contributory factor.

Hookworm (86.36%) was the most common intestinal parasite found in the present study. A high incidence of hookworm infection was also observed by other workers^{12, 13}. In contrast the report from Mumbai & Kupwara shows *Ascaris* as common helminths^{2, 3}. This may be due to geographical condition, good sanitary facility

and use of footwear which would have reduced the incidence of hookworm in these areas.

High STH infections may not have directly resulted in poor economic growth, but is clearly one of several contributing factors. Guyatt has reviewed the studies that link STH infection and productivity in adults. Anemia arising from STH infection is often associated with reduced work output and also impaired cognitive ability and effects on school attendance among children. In turn, the poor economic growth of some countries has meant continuing poor levels of sanitation and high prevalence of STH¹⁴.

CONCLUSION

The present study clearly indicates that STH infections must still be considered as the most common infection of humankind. Although, in some regions, there has been a precipitous decline in STH incidence because of economic development and implementation of specific control measures, in many regions the incidence is still equivalent to those estimated 50 years ago.

The growth stunting potential of helminthic infection is well known. It can lead to or aggravate malnutrition and anemia through



decline in food intake and or an increase in nutrient wastage. Thus considering the high risk status, there is urgent necessity to impart primary health education to combat the helminthic infections in this part of the country.

The availability of proper sanitation system, proper waste disposal system and drinking water supply will also help in reducing the risk of infection caused by STH.

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