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Research Article

Prevalence of intestinal parasites among patients of a tertiary hospital in Ambala city, Haryana, India

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ABSTRACT

Background: Intestinal parasitic infestation is major public health problem in the world. Gastrointestinal (GI) protozoa and helminthes flourish in settings characterized by warm temperatures, humidity, poor sanitation, dirty water, and substandard and crowded housing. Various sanitation programmes are launched in India from time to time. Our present study was conducted to know the prevalence of Intestinal parasitism among patients with gastrointestinal symptoms in rural area surrounding Mullana, Ambala, Haryana, India; which will tell us about the effect of these sanitation programmes in this area.
Methods: The present study was conducted between November 2010 to August 2012 in the Department of Microbiology, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, Haryana. Specimen was stool of the patient. The study was conducted on 500 consecutive stool samples received in the Department of Microbiology and processed as per departmental protocol.
Results: Total of 500 consecutive stool samples were processed within a period of 21 months (November 2010 to August 2012). The overall prevalence of intestinal parasite infections was 7.8%. Giardia lamblia 12 (30.76) was the most common parasite followed by *E. histolytica* 7(17.9) among protozoa and *H.nana* 4(10.25) followed by *Ascaris lumbricoids* 3(7.69) among helminths.
Conclusions: The decrease in prevalence of intestinal parasites especially in soil-transmitted helminths in patients attending hospital evidences the success of sanitation programmes, health education, improved sanitation and a healthy lifestyle.

Keywords: Intestinal parasites, Soil- transmitted helminths (STH)

INTRODUCTION

Intestinal parasitic infestation is major public health problem in the world. It is estimated that 3.5 billion people are involved globally and 450 million are suffering as a result of these infections, majority being children1. Gastrointestinal (GI) protozoa and helminthes flourish in settings characterized by warm temperatures, humidity, poor sanitation, dirty water, and substandard and crowded housing. Infection rates are highest in children living in sub-Saharan Africa (SSA), followed by Asia and then Latin America and the Caribbean (LAC).[2,3] The problem is more in rural areas than urban areas. Poly parasitism is also seen in some areas.[4]

There are reports of isolation of various parasites such as Entamoeba histolytica, Giardia lamblia commonly being isolated, amongst protozoa, others parasites are *Cryptosporidium species, Balantidium coli, Trichuris tichura, Ascaris lumbricoides, Strongyloides stercoralis, Enterobius vermiculris, Hymenolepis nana, Ancylostoma duodenale* with variation in prevalence of individual

parasites.[5-8] Our knowledge of how these parasites modulate and sustain host - parasite relationships and their complex interplay with human immune systems has only begun to emerge in recent years and is far from complete.[9] This is partly attributable to the fact that these parasites had been largely brought under control in wealthier Europe and the USA during the time of their sanitation revolution at the turn of the 19th Century.[10] Various sanitation programs are launched in India also from time to time.[11]

Our present study was conducted to know the prevalence of Intestinal parasitism among patients with gastrointestinal symptoms in rural area surrounding Mullana, Ambala, Haryana, India; which will tell us about the effect of these sanitation programs in this area.

METHODS

The present study conducted between November 2010 to August 2012 in the Department of Microbiology, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, Haryana. Specimen was stool of the patient. The study was conducted on 500 consecutive stool samples received in the Department of Microbiology.

Selection of patient

It comprised of patients attending the OPD and/or admitted in the hospital for any reason, whose stool sample was received in the Department of Microbiology.

Sample collection and transport

Fresh faecal samples were collected in a dry, clean, wide mouthed, leak-proof container under standard techniques after proper history of the patient.[12]

Sample processing

The samples thus received in the Department of Microbiology were processed as per departmental protocol.[13]

RESULTS

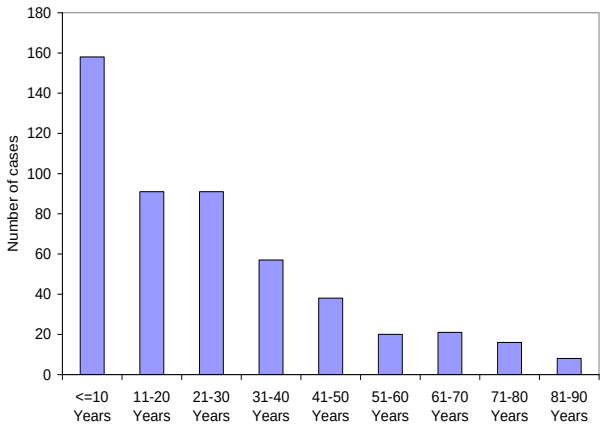

Figure 1: Age distribution of subjects.

The age of subjects ranged from 13 days to 90 years with maximum number of cases being <10 years of age (31.6%). There were 91 (18.2%) cases each in age group 11-20 and 21-30 years respectively and a total of 57 (11.4%) were aged between 31-40 years. The proportion of cases in age group 51-60 years, 61-70 years, 71-80 years and 81-90 years comprised less than 5% each. Minimum number of cases (n=8; 1.6%) were between 81 to 90 years. Mean age of cases was 25.02±21.35 (median 21) years.

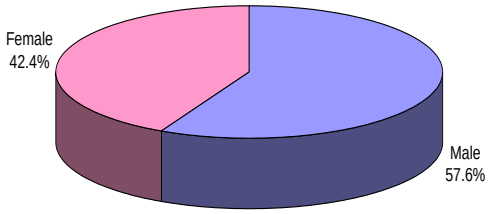

Figure 2: Sex distribution of subjects.

Majority of subjects were males (n=288; 57.6%). There were only 212 (42.4%) females. Male to female ratio of the subjects was 1.36:1.

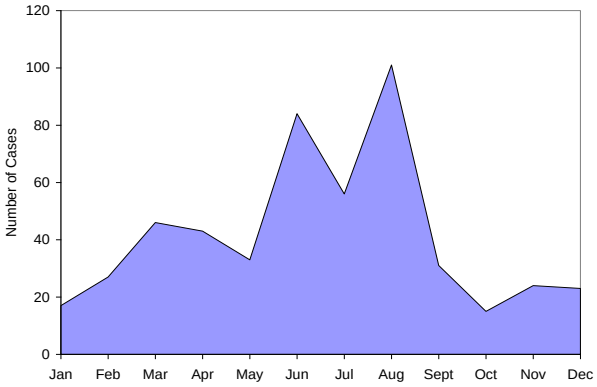

Figure 3: Month wise distribution of total subjects.

Peak incidence was observed during the months of June, July and August while months September to February showed minimum incidence. The incidence started to rise from month of March and attained the peak in the month of August.

Diarrhoea/loose motions (n=229; 45.8%) was the most common symptom followed by abdominal discomfort/pain in abdomen (n=141; 28.2%). Weight loss (n=87; 17.4%) and anemia (n=73; 14.6%) were some of the other common presenting symptoms. Among other symptoms were loss of appetite (n=46; 9.2%) and chronic pain abdomen (n=20; 4.0%). A total of 57 (11.4%) presented with miscellaneous symptoms. There were 30 (6%) subjects who had come for routine investigations and had no specific symptoms. (Table 1)

Table 1: Distribution of symptoms of subjects.

S. No.	Symptoms	No. of Subjects	Percentage
1.	Abdominal discomfort/ Pain in abdomen	141	28.2
2.	Chronic pain abdomen	20	4.0
3	Anemia	73	14.6
4	Weight loss	87	17.4
5	Diarrhoea/Loose motions	229	45.8
6	Loss of appetite	46	9.2
7	Routine/No specific symptoms	30	6.0
8	Miscellaneous	**57**	11.4

Table 2: Age distribution of cases.

Age Group	No. of Cases (n=39)	% (Out of Total Positive)
≤10 Years	12	30.7
11-20 Years	7	17.9
21-30 Years	6	15.38
31-40 Years	4	10.25
41-50 Years	2	5.12
51-60 Years	4	10.2
61-70 Years	1	2.56
71-80 Years	1	2.56
81-90 Years	2	5.12

Maximum number of positive cases was in age groups <10 to 30 years. The proportion of positive cases was seen to be decreasing with increasing age (Table 2).

Among positive cases, proportion of males was higher (64.10%) as compared to that of females (35.89%) (Table 3).

Maximum positivity was observed in the months of July (25.64%) and in the month of Aug (15.58%) (Table 4)

Diarrhoea/Loose motions (n=25; 64.10%), and abdominal discomfort (n=15; 38.46%) comprised of the most common presenting symptoms. Anemia, Loss of appetite (n=4; 10.25%) and weight loss (n=3; 7.69%) and chronic abdominal pain (n=2; 5.12%) were some of the less common complaints. A total of 2 (5.12%) cases had miscellaneous complaints while 1 (2.56%) case was detected during routine investigations (Table 5).

Table 3: Sex distribution of cases.

Sex	No. of Cases (n=39)	% (Out of Total Positive)
Males	25	64.10
Females	14	35.89

Table 4: Seasonal distribution of cases.

Month	No. of cases (n=39)	% (Out of Total Positive)
Jan	1	2.56
Feb	3	7.69
Mar	4	7.7
Apr	3	7.7
May	1	2.56
Jun	5	12.8
Jul	10	25.64
Aug	6	15.58
Sept	3	7.69
Oct	1	2.56
Nov	1	2.56
Dec	1	2.56

Table 5: Distribution of symptoms of cases.

S. No.	Symptoms	No. of Cases (n=39)	% (Out of Total Positive)
1.	Abdominal discomfort/ Pain in abdomen	15	38.46
2.	Chronic pain abdomen	2	5.12
3.	Anemia	4	10.25
4.	Weight loss	3	7.69
5.	Diarrhoea/Loose motions	25	64.10
6.	Loss of appetite	4	10.25
7.	Routine/No specific symptoms	1	2.56
8.	Miscellaneous	2	5.12

Table 6: Distribution of parasites in total subjects (wet mount examination).

Finding	Positive (n=39)	
	No.	%
Eggs of hookworm	1	2.56
Egg of Ascaris lumbricoids	3	7.69
H. nana	4	10.25
Giardia lamblia	12	30.76
E. coli	6	15.38
Entamoeba histolytica	7	17.9
E. hartmanni	1	2.56
Endolimax nana	2	5.12
Isospora	1	2.56
Iodamoeba Butschlii	1	2.56
Balantidium coli	1	2.56

The overall prevalence of intestinal parasite infections was 7.8%. *Giardia lamblia* 12 (30.76) was the most common parasite followed by *E. histolytica* 7(17.9) among protozoa and *H. nana* 4 (10.25) followed by

Ascaris lumbricoids 3(7.69) among helminths. Very lowprevalence of Hookworm 1(2.56%) (Table 6).

DISCUSSION

The present study was carried out in the Department of Microbiology, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, Haryana. It comprised of patients attending the OPD and/or admitted in the hospital for any reason, whose stool sample was received in the department of Microbiology.

In the present study, parasitic infection was seen in 39 (7.8%) patients out of the total 500 cases. Studies from different parts of India[14-17] and outside India[18-21] have reported a parasitic prevalence rate of 25 to 70%. Prevalence rate in our study was low and is suggestive of better awareness of personal hygiene and environmental sanitation in the study population.

In the present study we encountered high prevalence of intestinal protozoan parasitic infection when compared to helminthic infections. *G. intestinalis*, *E. histolytica* and *E. coli* were the most common intestinal parasitic infection among the study population. These protozoan parasites can be transmitted orally by drinking contaminated water. The water supply is really an important risk factor for protozoan infections. Several large outbreaks of Giardiasis have resulted from the contamination of municipal water supplies with human waste.[22] The ingestion of contaminated water is a common problem in India countrywide due to lower quality of water and faulty sewage lines. The problem is greater in the rural areas that do not have proper municipal water network or sewage system.[23]

The prevalence of soil transmitted helminthes infections in our study was low when compared to other studies from Izmir and Cambodian.[24,25] Different studies have reported higher prevalence of *A. lumbricoides* (21.7, 20.8, 40.7 and 34.9%), *T. trichiura* (16.3, 15.3, 4.8 and 25.8%) and Hook worm (18.5 and 19.1%).[26] This, low prevalence of soil transmitted helminths infection can be because of improved environmental sanitation, good personal hygiene like washing hands before eating and after using the toilet, clean and safe preparation of food, use of slippers, agricultural and industrial hygiene.

Maximum number of samples under study were obtained from <10 years of children (31.6%). Almost half of samples (49.8%) were obtained from amongst those within 20 years of age. The patients referred in general complained of different gastrointestinal disorders. Prevalence of gastrointestinal disorders has been reported to be higher in age group <20 years from Indian subcontinent. Khan H also observed that around 44% of their study population with gastrointestinal disorders was within 20 years of age.[27] The tendency to consume unhygienic and street food, experimentation with different food stuffs and general lower immunity in young population could be the reason for this.

Among specimen obtained, majority were from males (57.6%). Only 212 (42.4%) samples comprised of females. This is in contrast with the observations made by Chang et al.[28] who observed that gastrointestinal disorders were more common in females as compared to males. Halder et al,[29] too in their longitudinal study evaluated that gastrointestinal disorders observed the preponderance of females (52%) over males (48%). The result in our study could be because of the difference in hospital healthcare seeking behavior of Indian population mostly in rural area wherein females are generally tended to seek hospital healthcare only for life-threatening problems and for minor ailments they generally seek home remedies.[30,31]

Seasonal variability was observed in number of samples obtained during different months. Maximum number of cases was reported during June, July and August. Seasonal variability in prevalence of gastrointestinal disorders has been reported extensively in literature. It has been reported to be maximum during the rainy season because of the availability of favorable conditions for growth of microbes and possibility of opportunistic infections.[32] Seasonal variation in prevalence has also been reported in developed and developing countries in temperate and tropical regions.[33-37]

Diarrhoea/loose motions, abdominal discomfort/pain in abdomen and anemia were some of the most common clinical symptoms of subjects enrolled in the study. These are some of the commonly associated symptoms with infectious intestinal diseases. Diarrhoea/loose motions are most common among the younger age groups and considering the fact that almost half the cases in the present study were below 20 years of age this finding can be explained easily. In a study by Borooah[38] the prevalence of diarrhoea among children has been reported to be as high as 61.7%.

CONCLUSION

In conclusion, our up-to-date knowledge of local intestinal prevalence, as provided in this study, confirms sanitation programmes as a valid measure to reduce the prevalence of Intestinal parasite sespecially Soil-transmitted helminths, but also the need for continuing the efforts in control strategies of protozoa, including proper municipal water network or sewage system, health education and improving access to sanitation.

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