

INFECTION OF PROTOZOAN AND HELMINTH PARASITES AMONG THE OUT-PATIENTS OF DHAKA MEDICAL COLLEGE HOSPITAL

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Abstract: The intestinal parasites and their prevalence and intensity of infestation was investigated. A total of 793 stool samples were examined from the out patients of Dhaka medical College Hospital. Eggs and larvae of six species of intestinal parasites were recovered, of which two species were protozoans: *Entamoeba histolytica* Schaudinn, 1903; and *Giardia intestinalis* (Lambl, 1859) and four species of helminthes: *Ascaris lumbricoides* Linnaeus, 1758; *Trichuris trichiura* (Linnaeus, 1771) Stiles, 1901; *Ancylostoma duodenale* (Dubini, 1843) Creplin, 1845; and *Enterobius vermicularis* (Linnaeus, 1758)]. The overall prevalence of infestation was 43.253% and egg per gram (EPG) of infestation was slightly higher in males than females. Prevalence of intestinal helminth was found higher than intestinal protozoans. Among the six species of intestinal parasites, *Ascaris lumbricoides* showed highest prevalence (21.689%) and *Enterobius vermicularis* lowest prevalence (1.008%). Among the patients of the hospital, highest prevalence (83.333%) was observed in 0 - 10 years age group and lowest (30.167%) in 51 - 60 years age-group.

Key words: Out-patients, intestinal parasites, prevalence, intensity

INTRODUCTION

Parasites present continual and unacceptable threat to the well-being of millions of people and to domestic animals in all parts of the world and the cost of parasites in terms of human misery and economic loss is incalculable. The poorest people in the world suffer the greatest burden of infection is beyond doubt. It increases disease productivity, which is associated with intestinal parasite burdens (Gilgen *et al.* 2001). World Health Organization (WHO 1987) reported that in 1987 there were about 480 million people infected with *E. histolytica* and 30 million developed invasive forms of amoebiasis of these at least 40,000 died consequently mainly due to fulminating colitis or liver abscess. Amoebiasis is a significant world-wide health problem, especially in developing countries. It is presently one of the third most common causes of death by parasitic diseases. Infection by *E. histolytica* is ubiquitous and about 500 million people each year have amoebiasis of which only 10 experience symptomatic disease (Walsh 1986, WHO 1997).

Diarrhoea is a major public health problem world-wide, especially in children. One in ten child deaths result globally from diarrhoeal disease before

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their fifth birthday, resulting in about 800000 fatalities worldwide annually, most occurring in sub-Saharan Africa and south Asia (Liu *et al.* 2010, WHO 2005). In south Asia, diarrhoea accounts for 26.1% of childhood deaths with a peak incidence in their early years of Life (Walker *et al.* 2012).

Giardia is endemic in Bangladesh and the reported prevalence of infection ranges from 4 to 21% with diarrhoea (Alam and Khanum 2005, Khanum *et al.* 1998). The prevalence of giardiasis was higher among the children between the ages of 5 and 15 years. Children at young ages are the most vulnerable for parasitic infections and tended to have higher intensity compared to any other age group (Anderson 1986, Khanum *et al.* 1999). Male children are more susceptible than female because of their staying habit from outside the house (Stephenson 1987).

Shakur and Ehsan (1993) investigated the intestinal parasites of children aged between 0 and 5 years in Dhaka Shishu Hospital. Their study showed *Giardia intestinalis* in 21%. *Giardia* was the first of these organisms to be associated with human disease, and there have been many documented cases of water borne giardiasis since 1970s. Khanum *et al.* (2001) reported highest incidence of ascariasis, trichuriasis and hookworms between the age group of 11 and 20 years. The prevalence of ascariasis and trichuriasis decline with age whereas, ancylostomiasis increases with age (Saha and Chowdhury 1981). As man is the only reservoir of the helminthiasis in most of the cases, so infected people should be treated with anti-helminthics (Khanum *et al.* 1997).

Khanum *et al.* (2005) carried out a study on the children of 2 and 12 years old in two different rural areas (Gazirchat, Savar, Dhaka and Kutumbopur, Comilla) in Bangladesh and found higher prevalence in males than females in both the study areas and hookworm infection was the highest among the age group of 6.1 - 8 (34.28%) in both the areas.

The objective of the present study was to determine the prevalence and intensity of intestinal protozoan and helminth parasites among the male and female out-patients (1 - 60 years) of Dhaka Medical Collage Hospital.

MATERIAL AND METHODS

A total of 793 stool specimens were collected from Dhaka Medical College Hospital. The patients were from 1- 60 years of age. The patients were divided into 6 age groups: 0 - 10, 11 - 20, 21 - 30, 31 - 40, 41 - 50 and 51 - 60 years. This study was a cross sectional type of study to find the prevalence of intestinal parasites among the out patients conducted by interviewing to ascertain their perception and habit with regard to protozoan and helminth infections in the patients. The survey covered the period from November 2007 to October 2008.

The faecal specimens were received in the morning between 8 a.m. and 12.30 p.m. and examined on the day of collection. Before macroscopic examination of stool samples information regarding age and sex were recorded. At first the stool was examined with naked eye. The formol-ether technique was performed according to the method described by Cheesbrough (1987). The sample (1 g) was placed in a test tube and 5 ml of normal saline was added and it was then centrifuged at 3000 rpm for 3 min and supernatant was discarded. The process was repeated until the supernatant was clear. The sediment was examined using 10X objective with the condenser. The 40X objective was used to identify the small cysts and eggs. Data generated was analyzed by the SPSS Software-15 for mean analysis, correlation and Chi-square tests.

RESULTS AND DISCUSSION

A total of 793 human stool samples were examined in Dhaka Medical College Hospital for gastrointestinal parasites, of which eggs and larvae of six species of gastrointestinal parasites including the protozoans and helminthes were found. Of the six species two were protozoans (*Entamoeba histolytica* and *Giardia intestinalis*) and four were helminth (*Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma duodenale* and *Enterobius vermicularis*). During the study period, the overall prevalence of infection was 43.253% in the patients of Dhaka Medical College Hospital. Among the patients, the prevalence was higher in female (46.732%) than in males (41.067%) (Table 1).

Table 1. Prevalence and EPG of intestinal parasites in male and female separately

Patients of DMCH	Male	487	200	41.067	293	1.465
	Female	306	143	46.732	202	1.412
	Combined	793	343	43.253	495	1.443

Khanum *et al.* (2005) carried out a study on the children of 2 - 12 years old in two different rural areas (Gazirchat, Savar, Dhaka and Kutumbopur, Comilla) of Bangladesh. The prevalence was higher in males than females in both the study areas and hookworm infection was the highest among the age group of 6.1 - 8(34.28%) in both the areas. Muttalib *et al.* (1976) reported *Entamoeba histolytica*, *Entamoeba coli*, *Giardia*, *Ascaris*, hookworm, *Trichuris*, *Fasciola buski*, *Strongyloides*, *Hymenolepis nana* and *Oxyuris vermicularis* from rural children of Bangladesh. Chowdhury (1978) investigated intestinal parasitic infections in the populations of Dhaka and reported eight species of parasites. Khaled (1983) found eight species of intestinal parasites in members of Bangladesh rifles, and Islam *et al.* (1983) recorded five species of nematodes from the patients of Barisal Medical College and Hospital.

In DMCH most of the patients are from old Dhaka and from slum areas where hygienic conditions are very poor. Muttalib *et al.* (1976) reported higher prevalence (57.77%) of infection in boys than in girls (42.23%). Comparatively high prevalence of infestation was reported by Khanum and Alam (2005). The probable causes of higher prevalence of infection in females may be due to low immunity, repeated pregnancies, lack of health education and malnutrition. In the present investigation, the overall prevalence (30.264%) of helminthes was found higher than the protozoans (12.988%) in the out patients of this hospital. The prevalence of infection of different species of intestinal parasites varied from one another. Prevalence of *A. lumbricoides* was highest (21.689%) and *E. vermicularis* was lowest (1.008%), while the remaining four species: (*E. histolytica*, *G. intestinalis*, *T. trichiura*, and *A. duodenale*) were 10.214, 2.774, 6.052 and 1.513%, respectively (Table 2).

Table 2. Prevalence and EPG of each species of gastrointestinal parasites in human

Group	Parasites (cyst/ova)	Patients of DMCH				
		Total sample exam	No. of infected samples	Prev. (%)	No. of cyst/ova Per gm	(±Sd)
Protozoa	<i>Entamoeba histolytica</i>	793	81	10.214	115	1.419
	<i>Giardia intestinalis</i>	793	22	2.774	30	1.363
	Overall protozoa	793	103	12.988	145	1.407
Helminth	<i>Ascaris lumbricoides</i>	793	172	21.689	249	1.447
	<i>Trichuris trichiura</i>	793	48	6.052	55	1.145
	<i>Ancylostoma duodenale</i>	793	12	1.513	26	2.166
	<i>Enterobious vermicularis</i>	793	8	1.008	20	2.5
	Overall Helminth	793	240	30.264	350	1.458

Saha and Chowdhury (1981) reported 75% of children (under 5 years) of Rangpur and Dinajpur districts were found to be suffering from helminth disease. Khaled (1983) recorded 41% of helminth infections in the soldiers of Bangladesh rifles. Reinthaler *et al.* (1988) stated that contaminated drinking water is clearly the main source of the high levels of protozoan infection. But in the present study higher rate of parasite infection with helminth suggest that these parasites have highly effective distribution and contact mechanism from one person to another.

The prevalence of *E. histolytica*, *G. intestinalis* and *A. lumbricoides* were higher in females than in males and the prevalence of remaining three species (*T. trichiura*, *A. duodenale* and *E. vermicularis*) were higher in males than in females. Intensity of *E. histolytica*, *G. intestinalis*, *A. lumbricoides*, and *A.*

duodenale were higher in males than in females and remaining two species (*T. trichiura* and *E. vermicularis*) were higher in females than in males (Table 3).

Table 3. Prevalence of each species (protozoan and helminth) of gastrointestinal parasites in male and female hosts

Parasites	Sex	Total sample examined	No. of infected patients	Prevalence	Total cysts/ gm	(±Sd)
<i>Giardia intestinalis</i>	Female	306	37	12.091	51	1.378
	Male	487	13	2.669	19	1.461
<i>Ascaris lumbricoides</i>	Female	307	9	2.941	11	1.22
	Male	487	98	20.123	145	1.479
<i>Trichuris trichiura</i>	Female	306	74	24.183	104	1.405
	Male	487	31	6.365	33	1.06
<i>Ancylostoma duodenale</i>	Female	306	17	5.555	22	1.29
	Male	487	8	1.642	19	2.375
<i>Enterobius vermicularis</i>	Female	306	4	1.307	17	1.75
	Male	487	6	1.232	13	2.166
	Female	306	2	0.653	7	3.5

The present results revealed that prevalence of *E. histolytica* was highest (54.16%) in 0 - 10 years age group while, prevalence of *G. intestinalis* (8.33%), *E. vermicularis* (4.16%) and *A. duodenale* (36.31%) were highest in 0 - 10 years age group. Prevalence of *A. lumbricoides* was highest (36.31%) in 51 - 60 years age group and of *T. trichiura* was highest (10.06%) in 51 - 60 years age group. Prevalence in 0 - 10 years age group and lowest (1.55%) in 21 - 30 years age-group (Table 4). Intensity of *E. histolytica* was highest (1.5) in two age groups 41 - 50 and 51 - 60 years and lowest (1.333) in 11 - 20 years age group. While, intensity of *G. intestinalis* was highest (2.0) in 0 - 10 and 51 - 60 years age group. Intensity of *A. lumbricoides* found highest (2.25) in 1 - 10 years age group and that of *T. trichiura* was highest (1.22) in 41-50 years age group. Intensity of *A. duodenale* was highest (2.5) in 51 - 60 years age group and *E. vermicularis* was highest (4.0) in 0 - 10 years age group (Table 4).

Muttalib *et al.* (1976) studied the intestinal parasites of rural children of Bangladesh. They found highest (63.09%) prevalence with *E. histolytica* and (14.68%) rate of infection with *Giardia* in 1-year-old children. In case of *A. lumbricoides*, highest (97.11%) prevalence in 7 years old children and prevalence of *T. trichiura* was highest (62.59%) in 11 years old children. Reinthaler *et al.* (1988) reported highest (12%) prevalence of *E. histolytica* in 16 - 30 years age group and prevalence of *Giardia* was highest (7.8%) in 2 - 5 years age group. In case of *A. lumbricoides*, reported highest (65%) prevalence in 2 - 5 years age

Table 4. Overall prevalence and intensity of different protozoan helminth parasites in different age groups

Parasites	Age groups (years)	Total sample examined	No. of infected patients	Prevalence (%)	Total cysts/ gm	(±Sd)
<i>Giardia intestinalis</i>	11 - 20	94	15	15.957	20	1.333
	21 - 30	129	14	10.852	19	1.357
	31 - 40	176	11	6.25	15	1.363
	41 - 50	191	12	6.282	18	1.5
	51 - 60	179	16	8.983	24	1.5
	0 - 10	24	2	8.333	4	2
	11 - 20	94	4	4.255	6	1.5
	21 - 30	129	6	4.651	8	1.333
	31 - 40	176	5	2.840	5	1
	41 - 50	191	3	1.570	3	1
<i>Ascaris lumbricoides</i>	51 - 60	179	2	1.117	4	2
	0 - 10	24	8	3.333	18	2.25
	11 - 20	94	5	5.319	11	2.2
	21 - 30	129	18	13.953	28	1.565
	31 - 40	176	37	21.022	52	1.405
<i>Trichuris trichiura</i>	41 - 50	191	39	20.418	58	1.487
	51 - 60	179	65	36.312	82	1.261
	0 - 10	24	-	-	-	-
	11 - 20	94	5	5.319	5	1
	<i>Ancylostoma duodenale</i>	31 - 40	176	11	6.25	12
41 - 50		191	9	4.71	11	1.222
51 - 60		179	18	10.05	21	1.166
<i>Ancylostoma duodenale</i>	0 - 10	24	2	8.333	4	2
	11 - 20	94	-	-	-	-
	21 - 30	129	2	1.550	3	1.5
	31 - 40	176	4	2.272	9	2.25
	41 - 50	191	-	-	-	-
<i>Enterobius vermicularis</i>	51 - 60	179	4	2.234	10	2.5
	0 - 10	24	1	4.166	4	4
	11 - 20	94	-	-	-	-
	21 - 30	129	1	0.775	3	3
	31 - 40	176	1	0.568	2	2.0
	41 - 50	191	3	1.570	8	2.666
	51 - 60	179	2	1.117	3	1.5

group. Similarly, prevalence of *T. trichiura* was highest (32.5%) in 2 - 5 years age-group and highest (25.4%) prevalence of *A. duodenale* in 6 - 15 years old children. In a study, de Silva *et al.* (1997) investigated the morbidity and mortality due to ascariasis, re-estimated and analyzed the sensitivity of global numbers at risk. Brooker *et al.* (2006) and Bethony *et al.* (2006) worked on the global epidemiology, ecology and control of soil-transmitted helminth infection: ascariasis, trichuriasis and hookworm.

CONCLUSION

Like other Asian countries, helminthiasis, anaemia and malnutrition (altogether Nutritional Anemia and Iron Deficiency: NAID) still remain as a major public health problem in Bangladesh. Since health-care seeking behaviour and child caring practices largely depend on the socio-cultural background and may vary across communities. Health problems may also need special attention according to geographical regions, district boundaries and economic-context (Anwar 2002).

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