Original Article

Intestinal parasitic infection among children less than five year of age visiting Children's Hospital of Kathmandu.

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Abstract

Introduction: Intestinal parasitosis is a worldwide concern and cause significant morbidity and mortality, particularly in developing countries like Nepal. The current study aims to identify the status of intestinal parasitosis among children less than five years of age visiting Kanti Children Hospital.

Methods: Hospital based cross sectional study was conducted from January 2017 to December 2017 among children less than 5 years of age visiting Kanti Children's Hospital. Parasites were detected by using standard microbiological procedures.

Results: Among a total of 770 stool specimens collected, intestinal parasites were detected in 7.4% cases. Children of age group 49-60 months were found to be infected more often followed by 37-48months with higher frequency seen in summer season in the month of May and June. Altogether five species of parasites were detected, among which three were protozoan and two were helminths. The most common parasite identified was*Giardia lamblia* (4.3%) followed by *Entamoebahistolytica*(2.2%) and*Hymenolepis nana*(0.5%).

Conclusion: The study indicated that there is still burden of parasitic infection in Nepal among children. Hence, there is a need to incorporate effective prevention and control strategies including healtheducation and environmental hygiene.

Keywords: Intestinal parasitosis, parasites, *Entamoeba histolytica, Giardia lamblia*, children Nepal.

Introduction

Intestinal parasitic infection is a serious public health problem throughout the world particularly in developing countries[1] .They cause iron deficiency anaemia, growth retardation and many other physical and mental health problems[2].Parasitic infections like amoebiasis, ascariasis, ancylostomiasis and trichuriasis are common among the top ten infections in the world[3].

Globally, two billion individuals were infected with intestinal parasites; out of which majorities were children in resource-poor settingsand nearly 300 million infected patients are severely ill[2, 4].In developing countries, at least 750 million episodes of diarrhoea occurs per year and results in five million deaths[5]. In Nepal, about 70% of health problems are due to infectious diseases; and diarrheal disease alone is one of the major causes of morbidity and mortality[6]. But in 2016/2017, 1,184,120 cases of Diarrhoea were reported of which 0.44 percent suffered from severe dehydration (increased from 0.2 percent the previous year). The national incidence of diarrhoea per 1,000 under-5 year olds decreased from 422/1,000 in 2015/2016 to 400/1000 in FY 2016/2017[7]. Higher prevalence of these infestations is closely correlated to poverty, poor environmental hygiene and impoverished health services[8].

An intestinal worm has been one of the major causes of visiting health care facilities in the country. It was

the number one cause of morbidity for the healthcare visit in the year 2008/2009[3]. The present study was conducted with an aim to find situation of the parasitic infections among children visiting Kanti Children Hospital, Maharajgunj, Kathmandu.

Method

The study was carried out in Tribhuvan University Institute of Medicine, Department of Microbiology/ Public Health Research Laboratory, Maharajgunj Medical Campus, Kathmandu after obtaining ethical approval from Institutional Review Board (IRB) of Institute of Medicine. A total of 770 stool samples were collected from the children under 5 years of age visiting Kanti Children's Hospital with acute diarrhoea in the period between January to December 2017. Written informed consent was obtained from the children's parents or guardians before enrollment. From each participating child, clinical data were obtained and a stool sample was collected in a sterile container. The collected stool samples were investigated for detection of parasitic infection, all stool samples were subjected to microscopic examination by wet mount preparation method using normal saline and iodine. They were also processed using formalin acetate concentration method and examined microscopically by observing oocyst, cyst and trophozoites of protozoa and larva or eggs of helminthes. In addition a modified Ziehl Neelson staining procedure was used for identification of coccidian parasites, including *Cyclosporacayetanensis* and *Cryptosporidium* species from the stool samples.

Results

Within the study period, a total of 770 samples were collected, among which 490 were male and 280 were female. This study demonstrated that curable intestinal parasitosis remains prevalent in Kathmandu Valley. Intestinal parasites were detected in 7.4% (57/770) of tested stool samples. Altogether five species of parasites were detected, among which three were protozoans and two were helminths. Among protozoans, *Giardia lamblia*(33/770= 4.3%) was the most common organism whereas *Hymenolepis nana* (4/770=0.5 %) was the most common helminth detected as depicted in table:1.

Table: 1 Distribution of parasites:

Pathogen	No.of cases (%)
Parasite	**57 (7.4%)**
Giardia lamblia	33 (4.3%)
Entamoeba Histolytica	17 (2.2%)
Entamoeba Coli	2 (0.3%)
Ascaries Lumbricoides	1 (0.1%)
Hymenolepsis nana	4 (0.5%)

Parasite detection was marginally higher in male 8% (39/490) than in female 6% (18/280) (Table: 2).

Table 2: Gender-wise distribution of enrolled cases.

Gender	Total enrolled Diarrheal patients	Number of Intestinal Parasites
Male	490	39 (8%)
Female	280	18 (6%)
Total	**770**	**57**

Age wise distribution of intestinal parasite cases

The prevalence of parasitic infection was seen highest in children of age group 49-60 months (4/4) followed by 37-48 months (12/25) as shown in figure 1.

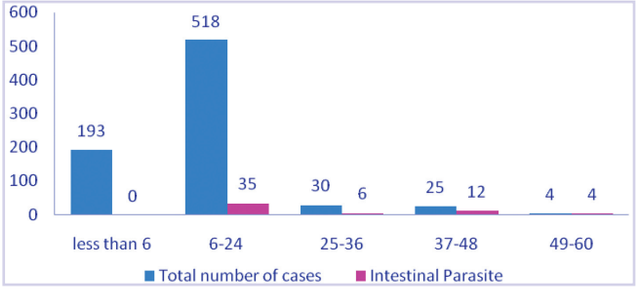

Figure 1: Age wise distribution of intestinal parasite cases

Month wise occurrences of parasitic infection:

In this study, frequency of isolation of parasite was found to be highest during the month of May and June as depicted in figure: 2.

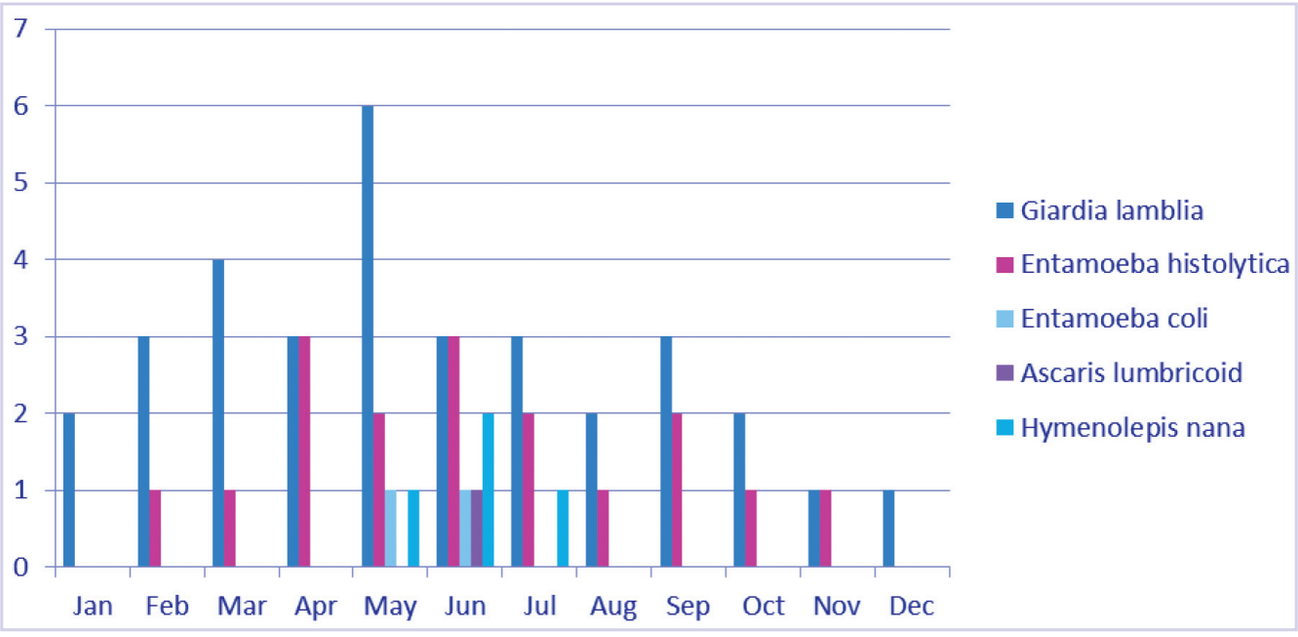

Figure 2: Month wise occurrences of parasitic infection

Clinical history and parasite detection among total enrolled cases:

Abdominal pain was the most common symptom among the 770 children with acute diarrhoea as shown in figure 3.

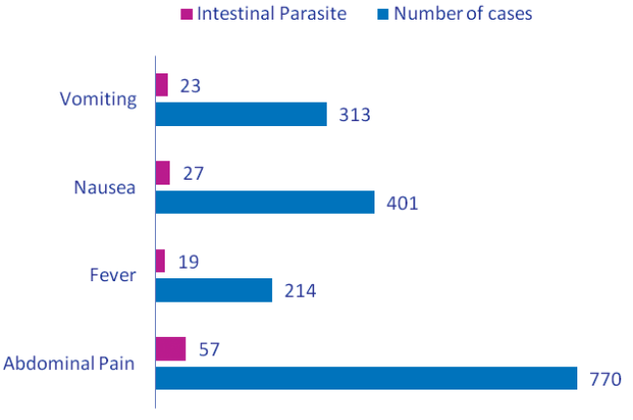

Figure 3: Clinical history and parasite detection among total enrolled cases

The degree of dehydration among enrolled cases was more likely to be some to severe as shown in Table 3

Table 3: Degree of Dehydration

Degree of Dehydration	Total number of cases	Intestinal Parasite
No	0	0
Some	683	36
Severe	87	21

Out of 770 enrolled children 742 presented frequency of diarrhoea between 3-15 timesfor last 24 hours as shown in table 4.

Table 4: Diarrhoea frequency

Diarrhea Frequency	Total number of cases	Intestinal Parasite
3-15	742	40
16-35	28	17

Distribution of cases by source of drinking water

For drinking purpose, tap water was used by 62% (480/770) families, jar water by 21% (158/770) and well/tube well water by 17% (132/770) families as shown in figure 4.

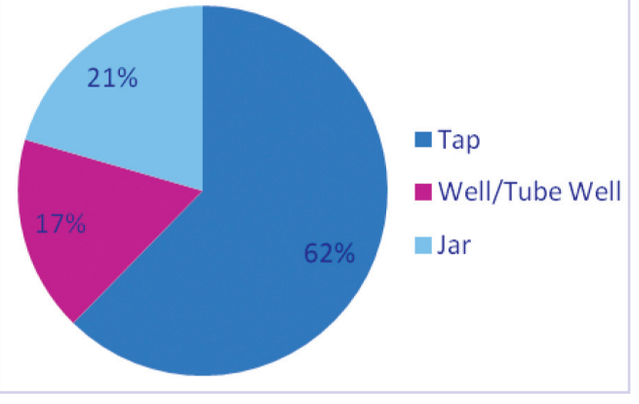

Figure 4: Distribution of cases by source of drinking water

Distribution of diarrheal cases by treatment of drinking water.

In this study, out of 770 total cases 293 families uses filtered water and 242 families used boiled for drinking purpose and among them 14 and 33 cases had parasitic infection respectively, similarly untreated water using families were 235 among which 33 cases had parasitic infection as depicted in figure 5.

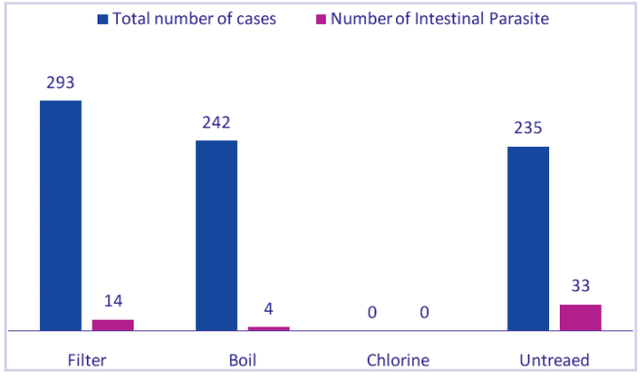

Figure 5: Distribution of cases by treatment of drinking water.

Distribution of intestinal parasite positive cases according to parent/guardian's education:

Highest positive cases of intestinal parasite were found among children whose parents/guardians were illiterate(12/57), whereas 17/239 of positive cases were found among children whose parent/guardian's education was up to primary school level as shown in figure 6.

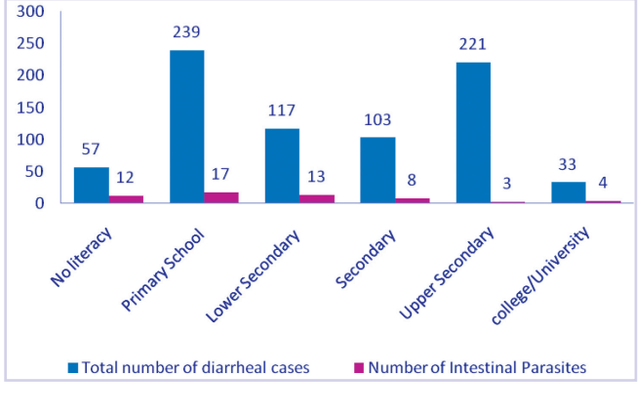

Figure 6: Distribution of intestinal parasite positive cases according to Parent/guardian's education:

Discussion

In this study, intestinal parasitic infection was seen in 7.4 % cases. The prevalence rate was much lower in our study than that reported earlier from other parts of Nepal[5, 6, 8, 9] . The lower prevalence rate in this study may be attributed to the awareness regarding personal and community hygiene, environmental sanitation and improved socio economic status[9].

Altogether five species of parasites were detected, among which three were protozoans and two were helminths. Among them *Giardia lamblia*(33/770= 4.3 %) was the most common organism which agreed with that in previous studies[10-12]followed by *Entamoebahistolytica* (17/770=2.2%) and *Hymenolepis nana* (4/770=0.5 %). *Giardialamblia* are a major cause of acute and chronic diarrhoea, and their prevalence was reported to be 10–50% in developing countries. [13] Humans are theprimary reservoir for the protozoan, and infection usually occurs via the ingestion of cysts from fecally contaminated food and water[14].

Gender wise distribution of parasitic infection showed higher prevalence in male (8%) than female (6%)which is statistically not significant (P>0.05). Most of the studies done at different parts of Nepal have reported equal infection rate in males and females[6, 9, 15], which suggested that parasitic diseases were independent of genders in Nepal. Similar findings were also reported by few studies conducted in general population of Nepal[16, 17].

The prevalence of parasitic infection was seen highest in children aged ≥24 months as compared to children aged <24 months. This might be explained by the older children's contact with faecally-contaminated soil while playing, which could predispose them to parasitic infection. [18]

In this study, isolation of parasite was found to be highest during the month of May and Junei.e rainy season, when children spend more time outside, work in the fields and might eat more frequently unwashed vegetables and fruits from the garden[19]. Similar result was reported in other studies as well[20, 21] .

On the basis of clinical symptom abdominal pain was the most common symptom among the 770 children with acute diarrhea. Whereas, degree of dehydration among enrolled cases was more likely to be some to severe. Out of 770 enrolled children 742 presented frequency of diarrhea between 3-15 times for last 24 hours.

In Nepal, approximately 3500 children die annually because of water-related illnesses[22]. In this study, for drinking purpose, tap water was used by 62% (480/770)

families, jar water by 21% (158/770) and well/tube well water by 17% (132/770) families. Out of 770 total cases 293 families uses filtered water and 242 families used boiled for drinking purpose and among them 5% and 2% cases had parasitic infection respectively, similarly untreated water using families were 235 among which 14% cases had infection. In Nepal, different sources of water are used for different domestic purposes such as washing, bathing, and crop irrigation [23]; therefore, data regarding drinking water alone might not be sufficient to support the fecal–oral route of transmission. In contrast, protozoan analysis of water samples is expensive and time consuming, particularly in developing countries[24]. Thus, data regarding the actual source of contamination remain unknown.

Moreover, under-five children born from illiterate parents were more infected (12/57). Educational levels of mothers were closely associated with the prevalence of intestinal infections[3, 25]. Public health interventions such as the provision of clean water, community health education, observation of food hygiene, and maintenance of functioning sanitation systems are fundamental to long-term intestinal parasite control[26]. To control the spread of intestinal parasitic infections in the setting there should be effective implementation of intervention activities.

Conclusion

This study revealed that there is a still burden of intestinal parasitic infections, especially protozoan group of parasites thataffect the health of children including anaemia, growth retardation, and mental health problems. Hence, there is a need to improve on environmental hygiene,drinking water, sanitation and health education, which would be crucial for effective control of intestinal parasitic infections among children of Nepal.

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Conflict of interest: None declared.

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