

## Intestinal Parasitosis among School Going Children

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### ABSTRACT

**Introduction:** Intestinal parasitic infection among children possesses a critical public health issue in Nepal. Intestinal parasites infect the gastrointestinal tract of humans and take up the nutrition from the host and cause abdominal discomfort, dysentery, mechanical irritation of intestinal mucosa, malabsorption syndromes and obstruction.

**Methods:** Study was conducted to determine parasitosis among school going children of Kathmandu Valley. A total of 187 collected stool samples were subjected to proceed by direct wet mount microscopy exam, formal-ether concentration technique, Sheather's sucrose floatation technique and modified acid fast staining technique.

**Results:** The occurrence of intestinal parasitosis was 51.9%. The higher prevalence of parasitic infection was in girls (58.0%) than boys (46.5%) and in age group of 8-12 years (58.8%). There was no statistical significant of parasitic infection with gender wise ( $p=0.117$ ) and age group wise ( $p=0.361$ ). Similarly, out of 129 symptomatic cases only 75 cases were found positive for one or more types of parasites but the occurrence was statistically significant ( $p=0.011$ ). There was high occurrence of parasitosis in school going children not following hygienic practice (60.2%), the result was statistically significant ( $p=0.003$ ). Altogether nine different types of parasites were detected; *Cryptosporidium parvum* (32.16%) was most common followed by *Cyclospora cayetanensis* (26.31%), *Giardia lamblia* (22.80%), *Entamoeba histolytica* (9.35%), *Entamoeba coli* (5.27%), *Strongyloides stercoralis* (1.76%), *Ascaris lumbricoides* (1.17%), *Entamoeba hartmani* (0.59%) and *Trichuris trichiura* (0.59%). In totality, mixed parasitic infection (58.8%) was higher than single parasitic infection (41.2%).

**Conclusion:** The outcome of this study revealed that intestinal parasitic infections remain highly endemic in school children of Kathmandu valley. This suggests proper diagnosis and specific treatment including apply to preventive measure is required to lower the parasitic burden.

**Key words:** *Cryptosporidium* spp., *Cyclospora* spp., Intestinal parasitosis.

### INTRODUCTION

All parasitic infections do not cause disease of clinical significance; both parasitic and host factors are involved in parasitosis.<sup>1</sup> Intestinal parasitic infections (IPIs) are linked to lack of sanitation, lack of access to safe drinking water and improper hygiene. About one third

of the world, more than two billion people is infected with intestinal parasites. Approximately, 300 million people are severely ill and of those, at least 50% are school-age children.<sup>2</sup> Intestinal parasitosis is one of the major public health and socio economic problems

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in Nepal though a hospital based study have shown a declining trend during a period of ten years.<sup>3</sup>

Therefore, the present study has been designed to analyse present situation of parasitic infections among school going children in Kathmandu valley and its relation with behavioral pattern and life style of the children relating to health.

## METHODS

A total of 187 stool samples were collected from school going children of Kathmandu valley in a screw capped plastic container. The duration of research period was from November 2008 to January 2009. All the samples were processed in Microbiology Laboratory of National College. A questionnaire on age, sex, hygienic practice and gastrointestinal symptoms were filled and used for analysis. Each fresh stool sample was examined by naked eye and under microscope. Microscopic examination of sample was performed after standard formal-ether concentration technique for all intestinal parasites. Sheather's sucrose floatation method followed by modified acid fast staining was conducted for detecting oocysts of *Cryptosporidium* spp. and *Cyclospora* spp. All the *Cyclospora* positive specimens were stored at ambient temperature in 2.5% potassium dichromate for about 10 days and were examined for sporulation. The data obtained were analyzed by statistical software SPSS (11.5).

## RESULTS

The prevalence of parasitic infection was found to be 51.9% (97/187) in which 27.3 % (51/187) were girls and 24. 6% (46/187) were boys. The prevalence was higher among girls (58.0%) than boys in school going children (46.5%) which was not statistically significant (Table 1).

**Table 1: Gender wise distribution of entestinal parasites**

Description	Children (n)	Parasite Positive (n)	%	p-value
Boys	99	46	46.5	P=0.0117
Girls	88	51	58.0	
<b>Total</b>	<b>187</b>	<b>97</b>	<b>51.9</b>	

The prevalence of parasitic infection was highest in age group 8-12 years (58.8%) followed by age group 5-8 years (53.3%) but the result was statistically insignificant (Table 2).

**Table 2: Age group wise distribution of Intestinal Parasites**

Age Group	Children (n)	Parasite Positive (n)	%	p value
3-5 years	46	20	43.5	p=0.361
5-8 years	107	57	53.3	
8-12 years	34	20	58.8	
<b>Total</b>	<b>187</b>	<b>97</b>	<b>51.9</b>	

The occurrence of parasitic infection in symptomatic case (58.1%) was higher than in asymptomatic case (37.9%) (Table 3).

**Table 3: Symptom wise distribution of intestinal parasites**

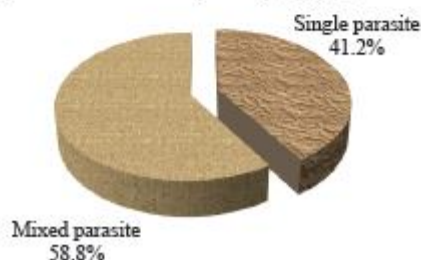
Symptoms	Children (n)	Parasite Positive (n)	%	p value
Symptomatic	129	75	58.1	p=0.011
Asymptomatic	58	22	37.9	
<b>Total</b>	<b>187</b>	<b>97</b>	<b>51.9</b>	

The occurrence of parasite in school going children without following hygienic practice (60.2%) was higher than with following good hygiene practice (37.7%) The symptoms and hygienic practice was found statistically significant with infestation of parasites (Table 4).

**Table 4: Distribution of parasitic infection with hygiene practice**

Hygiene Practice	Children (n)	Parasite Positive (n)	%	p value
Following	69	26	37.7	p=0.003
Not Following	118	71	60.2	
<b>Total</b>	<b>187</b>	<b>97</b>	<b>51.9</b>	

According to different types of parasitic infections; mixed parasitic infection (58.8%) was higher than single parasitic infection (41.2%) (Fig. 1).



**Fig. 1: Distribution of single and multiple intestinal parasites**

Among 97 positive cases, 171 parasites were detected. *Cryptosporidium parvum* (32.16%) and *Strongyloides stercoralis* (1.76 %) was found most common among protozoa and helminthes respectively (Fig. 2).

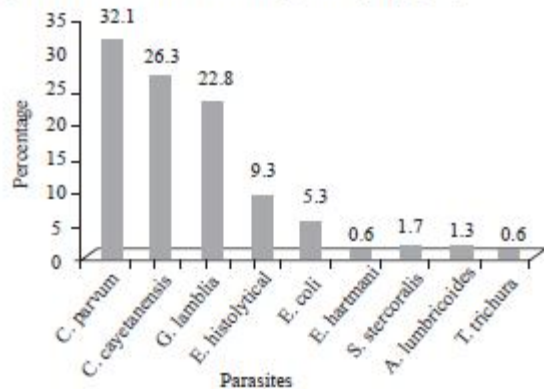


Fig. 2: Distribution of different types of intestinal parasites

## DISCUSSION

The parasitic infection was found to be 51.9% in our study. The finding of the present study was in agreement with the finding of Uga et al (2004), Mehraj et al. (2006) and Ishiyama et al (2001).<sup>4,6</sup> The finding was lower than the finding of Sherchand et al. (1997) and Rai et al. (2002), who reported the prevalence above 65.0%.<sup>7,8</sup> The differences in geographical settings, socioeconomic conditions and cultural practices might be the reasons for the differences in the prevalence of the parasitic infections in the different parts of the world.<sup>9</sup>

Due to highly increasing population of Kathmandu valley and inadequate sanitary facility, the dispersion of intestinal parasite is very high. This may consequently contaminate the leaky water supply of the Kathmandu valley as a result of which people consuming contaminated water is at high risk of acquiring parasitic infestation.<sup>3</sup> Other factors such as poorly treated drinking water, lack of personal hygienic practices, lack of proper and adequate treatment, lack of proper diagnosis, consumption of undercooked food, consumption of improperly washed fruits and raw vegetable may have also contributed to the higher prevalence.<sup>3,10</sup> The use of concentration technique and modified acid fast staining technique might have also increased the detection rate of the eggs, cysts and oocysts of the intestinal parasites.<sup>10</sup>

Present study showed prevalence of parasitic infection as 46.5% and 58.0% among boys and girls in school going

children respectively which was statistically insignificant. This indicates the equal chance of harboring infective agents in both groups. The finding of the present study was in agreement with the findings of Uga et al (2004), Sherchand (1997) and Rai (2005).<sup>3,4,7</sup> Current study revealed the higher prevalence of intestinal parasitic infection among the age group 8-12 years. However, the result was not found statistically significant. Singh et al (2004) found higher (27%) parasitic infection in age group 5-6.<sup>11</sup> Similarly, Poudyal et al. (2006), Uga et al (2004), Sherchand et al (1997) and Kimura et al (2005) also found higher prevalence of parasites in children with age less than 10 years.<sup>4,7,12,13</sup> As the effects and burdens produced by parasitic disease vary greatly from region to region, demographic groups, occupation; the burden of different parasitic diseases also vary with age. Intestinal worms produce the highest burden in children with age of 5-14 years.<sup>1</sup> This might be due to the higher outdoor activities of the studied subjects as a result they have higher exposure rate to the sources and reservoir of the infecting agents.<sup>3</sup>

The occurrence of the parasitic infection in symptomatic cases was 58.1% which was statistically significant ( $p=0.011$ ). The finding of the at hand study agreed with the finding of Sherchand et al (1996) and Adhikari et al. (2006) who reported the highest prevalence of parasitic infections among children and adults with abdominal discomforts.<sup>10,14</sup> The occurrence of parasite in school going children without following hygienic practice (60.2%) was higher than with following hygienic practice (37.7%). The significant result ( $p=0.003$ ) of this study was in accordance with the result of Takemasha et al (2001) and Shakya et al (2006).<sup>15,16</sup>

The children drinking filtered or safe water, washing hand using soap and water and with clean hand and trimmed nail are less infested to intestinal parasites than children who don't undertake hygienic practice.<sup>1</sup>

Altogether nine different types of intestinal parasites were detected in the stool sample. *Cryptosporidium parvum* (32.16%) and *Strongyloides stercoralis* (1.76 %) was found most common among protozoa and helminthes respectively. In contrary to our research, the research conducted by Easow et al. (2005) found *G. lamblia* as the most common intestinal parasite.<sup>17</sup> Sharma et al. (2004) found *E. coli* as most common intestinal parasite.<sup>18</sup> All of above researchers found protozoa as most common intestinal parasites but Rai et al (1997) found *A. lumbricoides* as most common intestinal

parasite, which is a soil transmitted helminthes.<sup>19</sup> This unusual result may be due to high prevalence of the *C. cayetanensis* and *C. parvum* in our study.

According to different types of parasitic infections; mixed parasitic infection (58.8%) was higher than single parasitic infection (41.2%). The findings of present study is in accordance with research conducted by Ishiyama et al (2001), Eleonar et al (2004) and Uga et al (2004) where mixed infection was found higher than single infection with occurrence of 46.9%, 34.2% and 23.0% respectively.<sup>4,6,20</sup> The higher occurrence of mixed parasitosis than single type of parasitosis clearly suggests that there is higher dispersion of multiple parasites in Kathmandu Valley.<sup>20</sup>

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## CONCLUSION

The intestinal parasitosis is still prevalent causing the major public health problems in school children. *C. parvum* was the most common protozoal parasite. Effective control strategies as well as knowledge and proper hygienic education are necessary to combat the high parasitic infections.

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