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Intestinal parasitic infection among school children

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ABSTRACT

Background: Intestinal parasitosis is a major public health problem of developing countries, children being major victims. Higher prevalence has been reported among school children, mostly in hilly regions of Nepal. This study aims at assessing prevalence of intestinal parasitosis among school children of a school in a border town of Nepal and the associated factors.

Methods: Fecal samples from the students were examined by direct smear technique and result was correlated with their socioeconomic status and hygienic behavior. The chi-square test was used for analytical assessment.

Results: The prevalence rate was 13.9%, girls being highly infected (19.1%) than boys (10.3%) (P>0.05). Entamoeba histolytica (36.0%) was the commonest parasite followed by A. lumbricoides (28.0%). The highest positive rate was found among children of 5 years and less age (29.2%) and least among those above 12 years (5.3%) (P>0.05). Those from family size 5 and less than 5 were least infected (10.5%). Children of illiterate parents (16.7%) and farmers (17.1%) were more infected than literate ones and non-farmers (P>0.05). 8.7% of positive children had multi-parasitic infection. Children drinking untreated water (15.0%) were more infected than those drinking treated water (5.5%) (P>0.05).

Conclusions: Intestinal parasitic infection was found among 17% school children. Awareness on infectious diseases, improving hygiene, and application of supportive programs for parents to elevate socioeconomic conditions may reduce the burden of infection.

Keywords: children, intestinal parasites, Nepal, socioeconomic condition, Terai.

INTRODUCTION

Intestinal parasitosis, a major public health problem in developing countries is aggravated by hot and humid climate, poverty, malnutrition, high population density, and poor health.[1] Multiple socio-economical, cultural, physiological and behavioral parameters along with illiteracy and poor sanitation influence intestinal parasitic infection.[2,3]

In Nepal, the prevalence of intestinal parasitosis is reported considerably low[4] to nearly cent percent[5,6] attributed to lower socioeconomic status and poor hygienic conditions.[7] Higher prevalence of intestinal parasitosis has been reported among children, globally.[1,8] In Nepal, 50% of diarrhoeal diseases among children is due to parasites, diarrhoea being major killer of Nepalese children.[9] The prevalence ranges from 32.6% to 72.4% among school children, provided majority of studies done in Kathmandu and rural hills.[4,10-15]

Intestinal infection affects child health and development.[16] In this paper, we report the prevalence of intestinal parasitosis and its associated factors among children of a school in Birgunj submetropolis, a southern Indo-Nepal border town.

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METHOD

This was a cross-sectional study conducted among 165 school children (Boys: 97 and Girls: 68) of age group 3 to 14 years from a local school in Birgunj, Nepal. The study was conducted from 15th July 2008 to 20th August 2008. Convenient sampling was done for the selection of the study subjects. The exclusion criteria were student below 3 years and above 14 years. Ethical approval was taken from the concerned body. A 50 ml capacity clean and dry screw capped plastic containers were distributed to each of the students with proper instruction. While receiving the stool samples, the general clinical examination of each student was done by a medical doctor accompanied by interview with a self-structured questionnaire to achieve information on socioeconomic status and hygienic behavior of the students.

Stool samples were transported to the Microbiology laboratory of National Medical College and Teaching Hospital, Birgunj and examined by direct smear technique (saline and iodine preparation). The findings were stratified against various socioeconomic and health parameters. Chi-square test was applied to see the statistical differences. Microsoft Excel 2007 was used for the data analysis.

RESULTS

Out of 165 stool samples, 23 (13.9%) samples had one or more intestinal parasites. Boys had lower positive rate (10.3%) than girls (19.1%) (P>0.05) (Table 1). *Entamoeba histolytica* (36.0%) was the commonest parasite followed by *Ascaris lumbricoides* (28.0%). The other parasites detected were *Hymenolepis nana*, hookworm and *Giardia lamblia* (Table 2).

Table 1. Distribution of parasitic infection in different genders

Gender	Total	Positive (%)	P-value
Male	97	10 (10.3)	P>0.05
Female	68	13 (19.1)	
Total	165	23 (13.9)	

Table 2. Frequency of intestinal parasites detected

Parasites	Frequency (%)
A. lumbricoides	7 (28.0)
H. nana	3 (12.0)
Hookworm	1 (4.0)
Total helminthes	11 (44.0)
E. histolytica	9 (36.0)
G. lamblia	5 (20.0)
Total protozoans	14 (56.0)
Total parasites	25 (100.0)

The highest positive rate was found among children of age group 5 years and less (29.2%) and the least among those above 12 years (5.3%) (P>0.05) (Table 3). The prevalence was found least among the children with family size 5 and less than 5 (10.5%) where as that among those with family size 6 to 10 (15.7%) and 11 and above (16.0%) was nearly equal (Table 4). Parasitic infection rate was found highest among the children belonged to illiterate parents (16.7%) as compared to those with school education (13.3%) and higher education (14.1%) (P>0.05). Of the total parasite positive children, 8.7% had multiple parasitic infections. The children from the parents with agriculture as the occupation had higher infection rate (17.1%) as compared to those from parents with occupation other than agriculture (13.1%) (P>0.05). The infection rate was higher among the children drinking untreated water (15.0%) as compared to those drinking treated water (5.5%); however, the difference was non-significant.

Table 3. Distribution of parasitic infection in different age groups

Age group	Total	Positive (%)	P-value
5 years and less	24	7 (29.2)	
6 to 8 years	52	8 (15.4)	
9 to 11 years	70	7 (10.0)	P>0.05
12 years and above	19	1 (5.3)	
Total	165	23 (13.9)	

Table 4. Distribution of parasitic infection among students from different family size

Family size	Total	Positive (%)	P-value
5 and less	57	6 (10.5)	P>0.05
6 to 10	83	13 (15.7)	
11 and above	25	4 (16.0)	
Total	165	23 (13.9)	

DISCUSSION

In this study, one-seventh of the school children were infected with some kind of intestinal parasite. This was close to the finding of Ostan *et al* in a primary school of Turkey.[17] The finding was very less as compared to a similar study in Birgunj (69.0%) conducted nearly 2.5 decades back[6] and other numerous studies in Kathmandu and rural hills of Nepal[4,10-15,18,19] as well as that among Nepalese children in Darjelling, India. [20]

The significantly low prevalence rate might be due to the increased awareness among the town dwellers regarding hygienic behaviour and environmental sanitation; however, the practice of open field defecation in the town cannot be ignored. This may also be attributed to the use of only direct smear technique to detect the parasites as well as the regular deworming program conducted during recent years especially in schools.

The higher positive rate among the girls was in agreement with the numerous studies done in Nepal[11,18,19,21] and elsewhere in the world.[22,23] The finding was just opposite to some other studies in Nepal.[6,10,14] On the other hand, equal prevalence has been reported by Sharma *et al* in Kathmandu.[13] This variation indicates that gender is independent of the parasitic infection.

E. histolytica was the commonest parasite and *A. lumbricoides* as the commonest helminth in the study. The children were more infected with protozoans than the helminthes, which was in agreement with Yong *et al*.[19] This might be attributed to the contamination of drinking water being used by the children. *A. lumbricoides* has been reported as the commonest helminthes in Nepal.[4,6,12,14,19] Protozoans dominating helminth was in contrast to most of the findings from Nepal.[6,13,24]

The decrease in the infection rate with increase in the age of the children in the study was in agreement with Rai *et al*.[4] This might be attributed to the strengthening of immune status and raise in the consciousness on hygienic behavior and environmental sanitation among school children with the increase in age. On contrary to our report, higher infection rate among the children of age group 11-14 years as compared to those of lower age group has been reported in Nepal.[11,13,15] Similarly, the infection rate was reported higher among 12 years and above by Ishiyama *et al*.[14]

The higher infection rate reported among the children belonged to illiterate parents was in agreement with the findings of Quihui *et al* in Mexico,[16] Ram *et al* in India[20] and Ostan *et al* in Turkey.[17] This showed that the level of awareness of parents interferes directly with the healthy rearing of children which signifies educational intervention as an effective means of reducing parasitic prevalence.

The infection rate found to increase with the increase in size of the family from where the school children come may be due to limited distribution of nutrition and health care and inadequate hygiene and sanitation in the crowded family. Similar trend has been reported by Karrar and Rahim among Sudanese children.[25] However, the opposite trend was reported by Rai *et al* (2005).[15]

The higher infection rate reported among children of farmers as compared to those of non-farmers in agreement with Rai *et al* in Nepal[15] and Habbari *et al* in Morocco[26] indicated the exposure of children in the farming field along with the parents as the cause of infection, resulting infection by soil transmitted helminthes. Moreover, Quihui *et al* has reported that lower educational and employment status of parents, crowded and poor living conditions and contaminated source of drinking water significantly increase the intestinal parasite.[16]

LIMITATIONS OF THE STUDY

None of the results in the study were statistically significant because of the small sample size. Moreover, as the study was limited to a single school only, similar studies need to be conducted to trace out the burden of infection among the school children in the border town, Birgunj as a whole.

CONCLUSION

The study indicates prevalence of the intestinal parasitosis among the school children was 14%. Awareness on prevention of the infectious diseases, improving hygien, and application of supportive programs to elevate socioeconomic conditions may reduce the burden of parasitic infection.

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