

Intestinal Protozoan Parasitic Infection among School Children

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ABSTRACT

Background: Intestinal protozoan parasitosis is highly prevalent among general population, majority of them are children. The objective of the study is to find out the prevalence of intestinal protozoan infection in school children of Sindhuli.

Methods: Stool samples were collected from school children of Sindhuli in June 2011 and investigated in National Institute of Tropical Medicine and Public Health Research, Laboratory by using formal-ether concentration method. Statistical significance was analyzed by using Chi-Square test.

Results: A total of 342 stool samples were collected and 68 (19.8%) protozoan parasites were identified. The prevalence rate of protozoa in boys and girls were 16.9% and 22.0% respectively. Altogether 5 species of protozoan parasites were detected. Of them *Entamoeba coli* was most common followed by *Giardia lamblia*, *Entamoeba histolytica*, *Blastocystis hominis* and *Endolimax nana*. Positive rate was highest in Dalit (20.3%), and least in Indo-Aryan (19.6%).

Conclusions: There is a low prevalence of intestinal protozoan parasitosis among children even though this study emphasizes the need for improved environmental hygiene i.e. clean water supplies and enhanced sanitation.

Keywords: intestinal protozoan parasite; school children.

INTRODUCTION

Intestinal parasitosis still constitutes a major public health problem in the world, particularly in developing countries.¹ WHO reported people infected by intestinal parasites at 3.5 billion and made ill by them at 450 million. Among intestinal parasites, protozoan parasite alone is responsible for different types of morbidity and mortality.² It is primarily attributed to the contamination of drinking water, inadequate sanitary conditions and poor personal hygiene.³ Protozoan parasites, *G. lamblia* and *E. histolytica* are the most common infecting man.⁴ *E. histolytica* affects approximately 50% of general population and is estimated to cause death more than 100,000 annually.⁵ *G. lamblia*, a frequent cause of diarrhoea, affects approximately 200 million people worldwide.⁶

In Nepal, incidence rate of protozoan parasites have been reported.⁷⁻⁹ In some rural area, the positive rates approach nearly one hundred percent.^{6,10} In addition, emerging parasites have also been reported.^{11,12} In this paper, we report the status of protozoan parasitosis among schoolchildren. We have chosen schoolchildren because of their great impact on intestinal parasite control in the future.

METHODS

A cross-sectional study was done in school children studying at public school in Kamalamai, Sindhuli in June-August 2011. All stool samples, collected in the clean, dry, screw capped plastic containers, were examined microscopically. Instruction with regard to fecal sample collection was given during sample container distribution. Informed consent from both teacher and children was

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taken. After collection, samples were fixed in equal volume of 10% formal-saline and carried to National Institute of Tropical Medicine and Public Health Research (NITMPHR), laboratory in Kathmandu. Microscopic examination was done by concentration method employing formal-ether sedimentation technique. All positive findings were noted. A questionnaire pertaining to predisposing factors of parasitic infections was done at time of sample collection. Statistical significance was analyzed by using Chi-Square test manually.

RESULTS

Out of total 342 children included in the study, 68 (19.8%) had some kind of intestinal protozoan parasites. Girls had slightly higher positive 183 (22.0%) than boys 159 (16.9%) but without significance difference ($\chi^2=1.57$) (Table 1). The children below 10 years (21.0%) had marginally higher positive rate than children above 10 years (19.2%) ($P>0.05$) (Table 2).

Table 1. Protozoa positive rate in two sexes

| Gender | Total n (pos. %) |
|--------|------------------|
| Boys | 159 (16.9) |
| Girls | 183 (22.4) |
| Total | 342 (19.8) |

Table 2. Protozoa positive rate in two different age group

| Age | Total n (pos. %) |
|-------|------------------|
| < 10 | 114 (21.0) |
| ≥ 10 | 228 (19.2) |
| Total | 342 (19.8) |

Table 3. Types of protozoa detected

| Types of protozoa | Total n (%) |
|-----------------------|-------------|
| Single protozoa | 47 (69.1) |
| <i>E. coli</i> | 21 (30.8) |
| <i>B. hominis</i> | 4 (5.8) |
| <i>Giardia</i> | 14 (20.5) |
| <i>E. histolytica</i> | 7 (10.2) |
| <i>E. nana</i> | 1 (1.4) |
| Multiple protozoa | 21 (30.8) |

Table 4. Prevalence of protozoa in different ethnic groups

| Ethnic group | Total n (pos. %) |
|---------------|------------------|
| Dalit | 64 (20.3) |
| Tibeto-burman | 90 (20.0) |
| Indo-aryan | 188 (19.6) |
| Total | 342 (19.8) |

Altogether 5 species of protozoan parasites were detected. Of them *E. coli* (30.8%) was most common,

followed by *G. lamblia* (20.5%), *E. histolytica* (10.2%), *B. hominis* (5.8%) and *E. nana* (1.4%). The percentage of single protozoan infection was higher (69.1%) than multiple protozoans (30.8%) (Table 3). Ethnically, prevalence of protozoan parasite was high in *Dalit* (20.3%), followed by *Tibeto-burman* (20.0%), *Indo-aryan* (19.6%) (Table 4).

DISCUSSION

The morbidity due to intestinal parasites has always been important public health problem in developing countries in tropical and sub-tropical areas.³ Investigators in Nepal have reported varying prevalence rate of intestinal parasites ranging from 20.7% to 66.6%.¹³⁻¹⁷ Prevalence of protozoan parasite alone has been reported to range from 3.3% to 45.5%.^{5,14-16} The prevalence of protozoan parasites in this study was found to be relatively low (19.8%) compared with most of the previous reports from Nepal.^{13,18,19} However, the present finding was in agreement with the findings reported earlier from Nepal.^{15,16,20,21} On the contrary, some of the report shows high prevalence of protozoan parasites than the present finding.^{17,22,23} The low positive rate found in this area appeared to be due to the relatively high literacy rate of locals, source of drinking water and toilet is located in distance and availability of toilet in all households.

Higher infection rate in girls compared with boys was in agreement with the reports from.^{19,24,25} But some of the reports from Nepal are contrary.^{14,20} This indicated that the association of gender with parasitic infection differs from one community to another and might be attributed to socio-behavioral activities. Similarly, the prevalence of protozoan parasites below ten year (21.0%) was high than above ten year (19.2%) which was in agreement with the report.¹³ This can be attributed to be associated with their unhygienic habit and age.¹³

E. coli detected as the most common protozoa was in agreement with a previous report.^{14,19,26,27} It is not in agreement with many other reports from Nepal.^{7,10,11,23} or elsewhere in the world.²⁸⁻³⁰ In those studies, *G. lamblia* topped the list of protozoa.

The higher percentage of monoparasitism found in this study was in agreement with other previous results from Nepal.^{20,24} In contrast, higher rate of multiparasitism has also been reported in a rural area of mid western Nepal.¹⁹

High prevalence among *Dalits* appeared which was in agreement with the reports.^{13,14} This might be due to with their relatively low literacy rate, unhygienic habits and low socioeconomic status compared with upper caste *Indo-Aryans* and *Tibeto-Burmans*.¹³

CONCLUSIONS

The intestinal protozoan infections remain high and appear to be due to the poor sewerage system, fecal contamination of drinking water and poor personal hygiene. Therefore, it indicates that there is a need for a comprehensive program to combat intestinal parasites associated with morbidity and mortality in Nepal.

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