INTESTINAL PARASITIC INFESTATION IN HEALTHY SCHOOL CHILDREN OF LALITPUR DISTRICT

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ABSTRACT

Stool sample of 515 healthy urban and rural school children of Lalitpur district in the age group between 7-12 were collected and tested for the presence of ova and cyst of helminths and protozoan. A total of 81.94% of the children were found infested with parasites. Both rural and urban children exhibited similar pattern of infestation. No association of the infestation with the localities is observed ($X^2 = 2.17$). A very great prevalence of helminths especially *Ascaris lumbricoides* and *Trichuris trichuria* compared to protozoan was observed. Among rural and urban children, total *A. lumbricoides* infestation was 73.45% and 71.66% and *T. trichuria* infestation was 27.27% and 37.91% respectively. 78.36% and 84.07% of the male, and 92.45% and 73.72% of the female children from the urban and rural respectively were found infested with the protozoan and helminths. The infestation was not associated with particular gender ($X^2 = 0.1121$). The helminth parasitic infestation rate is very high compared to protozoan parasites among the school going children, hence the parents and the children should be made aware of the problem.

Key Words: *Helminths, Protozoan, Lalitpur, Children, Prevalence, Water.*

INTRODUCTION

The human intestinal parasites in people with gastroenteritis have been reported in many studies. However, the study on healthy school children is not reported often; therefore, this study is based on healthy asymptomatic carriers of 7-12 years of age of urban and rural area of Lalitpur district where

water supply is neither good nor adequate. Further more, hygiene of people is poor.

The source of infestation is the carrier or the infested person and mode of transmission is faecal to oral in most of the cases. The faecal matter contaminates the water and soil. The consumption of such water and food contaminated with soil and

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handled by unclean hands, when consumed the ova present in them enter the gastrointestinal tract and there they hatch.

When the number of parasites is small the infestation may not be severe but there are critical limits for many parasites which when exceeded cause damage to the tissue of the host.¹ Infestation with intestinal roundworm (*A. lumbricoides*) constitutes the largest incidents of helminthiasis in human being. Children are generally more heavily infested than adults and are therefore more likely to suffer from the pathological consequences of these infestations.^{2,3} Weiss E L mentions that infection with *Ascaris lumbricoides* is rarely fatal but death may occur because of mechanical intestinal obstruction.² Therefore, detection and treatment of asymptomatic carrier of helminth and protozoal parasites is of great value in protection of children from the different pathological consequences.

In Nepal different reports on intestinal parasitic infestation among patients attending hospitals to detect the cause of diarrhea, dysentery etc. are produced by various researchers. According to Rai et al (1995) 29.1% to 44.2 % of the patients attending the Tribhuvan University Teaching Hospital during 1985-1994 had intestinal parasitic infestation. Helminths were detected more frequently than the protozoans and children had higher rate of intestinal parasite infection rate than the adults.³ *A. lumbricoides* topped the list followed by hookworm and *Trichuris trichuria*. In contrast Shakya H R (1999) has reported that in child patients seeking treatment in Tribhuvan University Teaching Hospital parasitic infestation was found in 10.6% with protozoan parasites in high prevalence than helminths.⁴ In the other hand, Chand A B reported that among the child patients attending Kanti Children Hospital 27.94% were found infested with pathogenic parasites, among

which 16.91% were protozoan parasites and 11.03% were the helminths. Among helminths *A. lumbricoides* was in greatest prevalence (6.62 %) followed by hook worm (3.31%) and *T. trichuria* (1.1%).⁵ Yet another pattern of parasitic infestation has been reported by Piya et al (2001), where 41.30 % of children attending Kanti Children Hospital were reported to be infested by intestinal parasites with *Entamoeba histolytica* topping the list 27.17 % followed by *A. lumbricoides* (9.23 %) and *Giardia lamblia* (3.8 %).⁶

MATERIALS AND METHODS

Stool samples of 515 healthy school children between 7-12 years were collected. Of these, 275 children were from rural areas of Lalitpur viz. Imadole, Tikathali, Oochu, Damaitar and Sangaun; and 240 children were from urban areas of Lalitpur viz. Balkumari and outskirts of Lalitpur. Among rural children 57% (157) were male and 43% (118) were female. Similarly among the urban children 56% (134) were male and 44% (106) were female.

The children were mostly from the uneducated families and were not satisfactory in sanitation. Their food habit was normal to that of working people with consumption of meat including buff and chicken. Though they had toilet in their school and homes, their sense of hygiene was not as good as it should have been. The most striking part is that they all consumed well water in home as well in school, which is in close proximity to the toilets.

Those children having diarrhea 2 weeks back were excluded but few children having two loose stools per day were included. More than 3 loose stools per day or passage of 3 stools in addition to normal or mothers' complaint of diarrhea were considered as diarrhea.

Questionnaire- Questionnaire were filled for all children which included age, gender, locality, source and treatment (domestic) of water, the dietary habit, hygiene, and socioeconomic condition of the family.

Examination- The stool samples were processed and examined as per standard methodology described by World Health Organization.⁷

Macroscopic examination- The stool samples were examined macroscopically for the presence of frank blood, mucus, color, and consistency.

Microscopic examination- Microscopic examination was performed as per standard methodology.⁷ The stool samples were examined by mixing a speck of stool with a drop of physiological saline under a microscope with 10x. The suspected ova, cyst, trophozoites were confirmed by viewing with 40x.

Iodine mounts were prepared when necessary, here iodine solution replaces the physiological saline and the remaining procedure is the same. The samples showing no ova or cyst were examined by concentration method, the sodium chloride floatation method.

RESULT

A very large proportion of children 81.94% (422) were found infested with different parasites - helminths and protozoans. Among them 84.58% (203) of urban and 79.63% (219) of rural children were infested (See Table No.1). Obviously, greater occurrence of helminths compared to that of protozoan was observed. Among helminths *A. lumbricoides* was the most prevalent one followed by *T. trichuria* in both rural and urban localities (See Table I). In one case cestode - *Hymenolepis nana* was also found.

Table I

Parasites among urban and rural children.

Mixed infestation was found in 25.43 % of the children. The most prevalent mixed infestation was between *A. lumbricoides* and *T. trichuria*. (See Table No II)

Table II Mixed Infestation

Number in parenthesis is the total number tested.

The infestation observed was high and at the same time there was variation of its occurrence among the male and female children from urban and rural areas. In the urban area out of 134 male children, 78.36% (105) were found infested, whereas it was 84.07 % (132) among 157 in rural area. In the same way, the infestation was observed 92.45% (98) in female children (106) from urban area and was 73.72% (87) among 118 in rural area. (See Table III) This indicates that infestation is in greater occurrence among the male children in rural area and female in urban area. However, the infestation is not associated with the gender ($X^2 = 0.1121$) and with the locality they live in ($X^2 = 2.17$).

Table III
Infestation among male and female children

Number in parenthesis is the total number tested.

DISCUSSION AND CONCLUSION

In this study of parasitological infestation among healthy school children of Lalitpur district, 81.94% were found infested. This study was focused on parasitic infestation among children as they are more commonly and heavily infested than adults due to their habit (e.g. directly or indirectly consuming soil).^{2, 3} This finding is consistent with the findings of Rai and Gurung where 69 % of the school children in Birgunj were reported infected by intestinal parasites.⁸

Since both urban and rural children were similar in their hygienic practice, dietary habit, socioeconomic condition (low), source of water (well mostly), they exhibit similar pattern of helminthic infestation. *A. lumbricoides* infestation was highest (71.66% & 73.45%) followed by *T. trichuria* (37.91% & 27.27%) in urban and rural area respectively. This finding correlates with the report of Weiss where he states 4 million people of US mostly in rural southeast are infected with *A. lumbricoides* and in developing countries more than 1 in 4 are infected (e.g. Southeast Asia 73 %, Africa 12 %, Central and South America 8 %).² This present finding is also supported by Rai and Gurung where 35 % of school children were found infected by *A. lumbricoides*, but no cases of *T. trichuria* was reported.⁸ The difference in percent prevalence between these two reports could be due to difference in localities, personal hygiene, water contamination etc. Chhetri has also reported a higher rate of parasitic infection in general school going children 70.5 % and 70 % compared to

boarding school going children 44% and 40 % who used the latrines built by Family Planning Association Nepal, in Kathmandu and Sunsari respectively.⁹

Protozoan infestation was observed very small compared to that of helminths. In a study reported by Rai et al. (1994), the annual incidence of intestinal parasitic protozoan infection among hospital attending patients seeking detection of intestinal parasites in Tribhuvan University Teaching Hospital ranged from 3.3-13.6 %.¹⁰ The difference between this report and present finding with low prevalence of the protozoan parasites could be due to the fact that the subjects are healthy in this present study. There are some other reports of helminthic infestation among children having gastroenteritis. But the occurrence of helminths in them is quite low compared to the healthy carriers observed in this study.^{4,5,6} The infestation by *A. lumbricoides*, *T. trichuria* and their mixed infestation observed in this study are very high compared to the reports of Shrestha, Thapa and Devkota and Blangero (36%, 30.94% and 27.24 % of people with gastroenteritis were infested with *A. lumbricoides* respectively).^{11,12,13}

Mixed infestation by two helminths *A. lumbricoides* and *T. trichuria* was also high 25.43 %; (25%) among urban and (22.18%) among rural children in present study. Since the ova of *A. lumbricoides* and *T. trichuria* are excreted by the infected person thus contaminating the soil and the water, vegetable etc. that comes in its contact, they are ingested along with contaminated water, soil and via contaminated fingers. All the children under the test were poor in hygiene & sanitation and consumed water from wells or taps without domestic treatment before consumption. Even in school they consumed the water from wells without treatment. Water, the source of infection in Kathmandu valley (Lalitpur, Bhaktapur and

Kathmandu) has been reported contaminated with sewage due to running of water pipe and sewage line close together, water flowing intermittently causing negative pressure thus sucking fluids and air from leaky pipe lines.^{14, 15}

The infestation was found not associated with any gender or the locality. However, Weiss suggests that no racial predilection is known, but in Nepal, genetic predisposition is described in a study of families in Nepal.²

The protective immune mechanism seems to have less value against helminths. The helminths go through a complex life cycle and protective immune mechanism appears to act only at an early stage in the life cycle.¹⁶

The carrier children being the possible source of infestation and to prevent them from getting pathological disorder they were prescribed with proper medicament. The children were advised to treat the well water prior to consumption either by filtering or boiling or both.

From present study it is evident that the helminth parasites are in great prevalence among the healthy school going children. However, the infestation depends on the hygiene and sanitation of people involved, water contamination, health education status etc.

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