Study of parasitic infection among children of *Sukumbasi Basti* in Kathmandu valley

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ABSTRACT

Keeping in view of heavy burden of intestinal parasitosis, present study was done to find out the prevalence of intestinal parasitic infection in children (aged <16 years) of *Sukumbasi* (people living without land ownership) *Basti* (community) in Kathmandu Valley. A total of 279 stool samples collected in clean, dry and screw capped plastic container were firstly examined for the presence of adult worm and/or segments of worms. Samples fixed in 10% formal-saline were then examined microscopically after concentration by formal-ether sedimentation technique. Overall parasite positive rate was 43.3% (121/279) with no significant difference in two genders (Boys: 48.3%, 73/151; Girls: 37.5%, 48/128) (p=0.07). Altogether 11 species of parasites were detected. Of them G*iardia lamblia* was most common followed by *Entamoeba histolytica*, *Trichuris trichiura* and others. Positive rate was higher in *Tibeto-Burman* (55.0%, 77/140) and the least in *Indo-Aryan* (25.4%, 27/106) (p=0.01) ethnic groups. Children taking anti-parasitic drug in last six months had significantly low positive rate (25.4%, 15/59) than others (48.2%, 106/220) (p=0.002). Results of this study suggestive of periodic administration of anti-parastic drugs and need for improvement of sanitary/hygienic practice.

Keywords: Intestinal parasites, *Sukumbasi* children, Kathmandu, Nepal.

INTRODUCTION

Intestinal parasitosis continues to be one of the major causes of public health problems in the world, particularly in developing countries. According to WHO estimate, 3.5 billion people in the globe are affected while 450 million are ill as a result of intestinal parasitic infections, the majority being children.[1] Reportedly, nearly 10% of the world's population is suffer from amoebiasis.[2] *Ascaris lumbricoides*, hookworm and *T. trichiura* have been estimated to infect 250 million, 151 million and 45 million people, respectively accounting for thousands of deaths.[2]

Nepal is a landlocked and least developed country located in South Asia. Intestinal parasitosis still constitutes one of the major public health problems (both morbidity and mortality) in Nepal.[3] The reported prevalence varies considerably approaching nearly one hundred percent in some areas.[3-6] Polyparasitism is common in rural areas.[7] Intestinal worm infection alone ranks fourth in "top-ten-diseases" in Nepal[8] and attributing to low socio-economic, educational and poor hygienic status of the people.[3,9]

Sukumbasi denotes the people living without land ownership.[10] Thus; they are socio-economically very backward and are likely to be infected with intestinal parasites. However, to the best of our knowledge, no such data are available. This study, therefore, was done to see the prevalence of intestinal parasitosis in children of a *Sukumbasi Basti* (settlement without land ownership) in the Kathmandu Valley.

MATERIALS AND METHODS

In 2008 summer season, fecal samples from 279 children (aged 4-15 years) (Boys: 151; Girls: 128) of a *Sukumbasi Basti* in Kathmandu Valley were collected. Children were provided a clean, dry, screw capped plastic container visiting each of household in the *Basti*. Instruction with regard to fecal sample collection was given during sample container distribution. Informed consent from both the parents and children was taken.

Fecal samples were collected next morning. The collected stool samples were transported to the Research Laboratory of Shi-Gan Health Foundation/Nat'l Institute of Tropical Medicine in Kathmandu. After macroscopic examination for the presence of adult worms and/or samples were fixed in equal volume of 10% formal-saline. Microscopic examination of parasites 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 also done at time of sample collection. Chi-square test was applied for statistical analysis of results using Win Pepi software program (PEPI-for-Windows) 2004 version.

Table-1: Parasite positive rate in two sexes

	Total n	Pos. n	%	P value
Boys	151	73	48.3	0.07
Girls	128	48	37.5	
Total	279	121	43.3	

RESULTS

Out of total 279 children included in the study, 121 (43.3%) had some kind of intestinal parasites. Boys had slightly higher positive rate (48.8%) than girls (37.5%) but without significance difference (p=0.07) (Table-1). Altogether 11 species of parasites were detected. Of them G*iardia lamblia* was most common followed by *Entamoeba histolytica, Trichuris trichiura* and others (Table-2). The percentage of single parasitic infection was higher (80.1%) than multiple parasitosis (19.9%) (Table-3). Younger children (aged d"10) had marginally higher positive rate (45.4%) than older children (40.8%) (p=0.44). Positive rate was significantly higher in *Tibeto-Burman* (55.0%, 77/140) and the least in *Indo-Aryan* (25.4%, 27/106) (p=0.01) ethnic groups (Table-4). Children with the history of taking anti-parasitic drug in last six months had significantly low positive rate (25.4%, 15/59) compared with others (48.2%, 106/220) (p=0.002). Children drinking water from well had marginally lower prevalence rate (38.6%) than those drinking piped water (45.0%) (p=0.35).

DISCUSSION

Sukumbasi community being a community of people without land ownership has no proper sanitary and waste disposal system.[10] Moreover; they live in very congested settlements mostly of temporary in nature. Therefore, it is likely to have higher rate of intestinal parasitic infection particularly among children. However, present study showed not very high (43.3%) positive rate of intestinal parasitosis. To the best of our knowledge, no such study on intestinal parasitic infection in *Sukumbashi* children was available from Nepal. The reported positive rate of intestinal parasitosis in different population elsewhere in the country range from 27% to nearly 100%.[5,11,12]

Marginally higher infection rate in boys compared with girls was in agreement with the previous reports from Nepal.[12-15] On the other hand, however, this result was in contrast with other reports from the country.[16,17] This indicated that the association of gender with parasitic infection differs from one community to another and might be attributed to the socio-behavioral activities.

Of the total, eleven species of intestinal parasites detected, six were protozoa while five were helminths. Protozoan positive rate was significantly high compared with helminth parasites. This must be due to the difference in the life-cycle of these two types of parasites. Protozoan parasites are found in the feces immediately after the infection while considerably long time is taken to appear the eggs of helminth parasites in feces after deworming. Highest frequency of *G. lamblia* among the *Sukumbasi* children might be associated with poor sanitary and their personnel hygiene. Furthermore, the cyst of *G. lamblia* is resistant to the normal level of chlorination of drinking water and thus easily be transmitted through drinking water. In Nepal, drinking water is highly contaminated with fecal matter.[18,19] In contrast, some of the previous result from Nepal have reported other protozoan parasites other than *Giardia* as commonest one.[20,21] Protozoa dominating the helminths parasite was in agreement with the previous findings from Nepal.[17,20,22,23] However, other studies among general population mostly in rural areas have

Table-2: Types and frequency of parasites detected

Types of parasites	Total (n=121)	%
Helminthes	39	26.9
T. trichiura	12	8.3
A. lumbricoides	10	6.9
Hookworm	6	4.1
H. nana	7	4.8
E. vermicularis	4	2.7
Protozoans	106	73.1
G. lamblia	48	33.1
E. histolytica	30	20.7
B. hominis	6	4.1
E. coli	5	3.4
C. cayetanensis	12	8.3
E. hartmani	5	3.4
Total parasites	145	100

Table-3: Types of parasites detected

Type of parasites	Total n	%
Single Parasite	97	80.1
Protozoa	63	52.1
Helminthes	34	28.0
Multiple parasites	24	19.8
Protozoa	16	13.2
Helminthes	0	0.0
Protozoa and helminthes	8	6.6
Total	121	100

Table-4: Prevalence of parasites in different ethnic groups

Ethnic group	Total n	Pos. n	%	P value
Dalits	35	17	51.5	0.01
Tibeto-Burman	140	77	55.0	
Indo-Aryan	106	27	25.4	
Total	279	121	43.3	

found higher prevalence of helminthic infection.[4,5,13,15,23] Such discrepancies might be due to the dispersion pattern of parasites in the community and the taking of anti-parasitic drugs.

Among the helminth parasites, *T. trichiura* was most common and this finding was in agreement with the finding of other investigators in Nepal.[13-15,24] In the past, *Ascaris* was the commonest helminth parasites reported from Nepal.[4,6,25] During recent years, however, *Trichuris* is being reported as common intestinal helminthes parasite and this changing scenario appears to be due to the incomplete removal of *Trichuris* with single dose of albendazole used for deworming.[9] This is due to the special mode of attachment to caecal mucosa and longer life span.

The higher percentage of monoparasitism found in this study was in agreement with other previous results from Nepal.[15,17,26] In contrast, higher rate of multiparasitism has also been reported in a rural area of mid western Nepal.[7] Higher rate of monoparasitism with *Trichuris* as common helminth seen in this study might be due to the periodic intake of anti-parasitic drugs.

Ethnically, significantly higher infection rate found among *Tibeto-Burman* and *Dalit* children compared with *Indo-Aryan* children. This appears to be due to the difference in human development index (HDI) between *Indo-Aryans* and other ethnic groups (*Dalits* and *Tibeto-Burmans*).[27] In general, *Dalits*, have lowest HDI followed by others. However, slightly lower positive rate in *Dalit* children compared with *Tibet-Burman* found in this study appears to be due to the small sample size of *Dalit* children. However, higher positive rate among *Indo-Aryans* have also been reported in some communities.[12,13]

Children having the history of taking anti-helminthic drug in the past six months had significantly lower prevalence rate as have been reported previously.[14,28,29]

Table-5: Prevalence of parasitic infection in relation to anti-parasitic drug intake in the past six months

Anti-helminthic drug	Total n	Pos. n	%	P value
Yes	59	15	25.4	0.002
No	220	106	48.2	
Total	279	121	43.3	

This clearly indicates the importance of periodic administration of anti-helminthic drugs.

Keeping in view of the findings of the present study done in the suburb of the capital city, good hygienic and sanitary practices together with periodic administration of anti-parasitic drugs is advocated to combat the intestinal parasitic infection associated morbidity and mortality among the children of in this *Sukumbasi Basti*.

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