Intestinal parasitic infections among patients attending Nepal Medical College Teaching Hospital, Kathmandu, Nepal

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ABSTRACT

This study was conducted to find out the prevalence of intestinal parasitic infection among patients attending Nepal Medical College Teaching Hospital, Kathmandu from July 2011 to February 2012. A total of 312 stool samples collected in a clean, dry screw capped plastic container were examined using the formal-ether concentration and sucrose-flotation techniques. Overall parasite positivity rate was 30.1% with significant difference between males (34.2%) and Female (26.3%) ($p<0.05$). Out of total positive, 90.4% had single parasitism whereas 9.6% had multiple parasitism. Children aged ≤5 years were found to be highly infected (35.8%), followed by 6-15 years (32.1%) and >15 years old (26.9%). Rate of infection was significantly higher among patients from inside Kathmandu Valley (31.1%) than outside valley (17.4%) ($p<0.05$). *E. histolytica* (38.5%) and Hookworm (10.6%) were the commonest protozoa and helminthes respectively. Other parasites detected were *G. lamblia* (26.0%), *E. coli* (1.0%), *T. trichiura* (7.7%), *A. lumbricoides* (6.7%), *H. nana* (5.8%) and *Taenia* species (3.8%). Out of total parasites detected, 65.4% were protozoa and 34.6% were helminthes. Positive rate was higher in *Dalit* (37.5%) and *Aadibasi-Janjati* (34.3%) than *Brahman-Chhetri* (22.6%) ($p<0.05$).

Keywords: Prevalence, intestinal parasites, patients, Nepal

INTRODUCTION

Intestinal parasitic infections are endemic worldwide and constitute a major public health problem. It is responsible for causing significant morbidity and mortality all over the world particularly in developing countries. Nepal is small improvised country located in South-Asia, where 70.0% of morbidity and mortality are associated with infectious diseases.[1] Among the various types of infectious diseases, intestinal parasitic infection alone constitutes one of the major causes of health problems.[1] Previous studies in Nepal, have reported prevalence rate of intestinal parasitosis vary from low to nearly hundred percent.[2-4] In Nepal, giardiasis, ascariasis, amoebiasis, ancyclostomiasis and taeniasis are common intestinal parasitic infection.[5] Intestinal protozoan infection and helminthic infection rank third and fourth respectively in Nepal.[6]

A hospital based study in Nepal showed prevalence of intestinal parasitosis varies from one study to another.[7-12] The prevalence ranged from 29.1- 44.2% in a study carried out by Rai *et al* over one decade at TU Teaching Hospital, Kathmandu. Other hospital based studies in Kathmandu have reported the prevalence of 49.0% and 30.0%.[10,12] However, study conducted by Shakya *et al* among patients visiting a medical college at the southern border of Nepal over two year showed comparatively lower rate of prevalence (20.7%). Very recently, Khanal *et al* reported 21.4% prevalence rate among hospital visiting patients in Deukhury Valley, Dang, Nepal.

In developing country like Nepal, it is impossible to ignore burden of parasitic infection usually categorized as a disease of poverty. Thus, in this paper we report the prevalence of intestinal parasitic infection among patients attending Nepal Medical College Teaching Hospital (NMCTH), which may be fruitful to formulate strategies for the control of intestinal parasitosis among patients attending NMCTH.

MATERIALS AND METHODS

The study was carried out from July 2011 to February 2012 at NMCTH, Kathmandu. The studypopulations were all the patients seeking for stool examination at NMCTH during study period. Ethical approval was obtained from Nepal Medical College Institutional Research/Review Committee (NMC-IRC). An official permission to undertake the study was obtained from the office of NMCTH. A total of 312 patients were enrolled in the study. They were provided with clean, dry, screw capped and properly labeled plastic container for the collection of the stool sample. A single stool sample was collected along with the filled questionnaire including patient's name, age, sex and ethnic group. Fecal samples were examined for the presence of

parasites both macroscopically and microscopically. Microscopic examination was done by wet mount (Saline mount and Iodine preparation) and modified acid fast staining method. Macroscopic examination was done by concentration method employing formal-ether sedimentation where as diarrheal samples were also subjected to Sheather's sucrose flotation techniques. The significance in difference of quantitative data was analyzed by Chi-square test. A 95% confidence interval and less than 5% level of significance was used to check for association between independent and dependent variables.

RESULTS

Out of total 312 patients included in the study, 94 (30.1%) were positive for one or more parasites. The prevalence of parasitic infection was significantly higher among males (34.2%) than females (26.3%) ($p<0.05$) (Table-1). Significantly highest infection rate was observed in the children aged ≤5 years (35.8%), followed by 6-15 years (32.1%) and >15 years age group (26.9%) ($p<0.05$) (Table-2). The prevalence of intestinal parasitic infection was found to be highest in *Dalit* (37.5%) followed by *Aadibasi-Janjati* (34.4%) and *Brahman-Chhetri* (22.6%) (Table-3). The difference was also statistically significant ($p<0.05$). Rate of infection was higher among patients visiting NMCTH from inside Kathmandu Valley (31.1%) than from outside (17.4%) ($p<0.05$) (Table-4). Altogether 8 species (3 protozoan and 5 helminthes) of intestinal parasites were detected. Out of total parasites detected, 65.4% were protozoan and 34.6% were helminthes. *E. histolytica* (38.3%) and Hookworm (10.6%) were the commonest protozoan and helminthes respectively. The other parasites detected were *G. lamblia* (26.0%), *E. coli* (1.0%), *T. trichiura* (7.7%), *A. lumbricoides* (6.7%), *H. nana* (5.8%) and *Taenia* species (3.8%) (Table-5). Multiple parasitism was detected in 9.6% where as 90.4% had single parasitism (Table-6).

Table-1: Gender wise prevalence of intestinal parasitic infection

Gender	Total no.	Positive no. (%)	p- value
Male	152	52 (34.2)	0.004
Female	160	42 (26.3)	
Total	312	94 (30.1)	

Table-2: Prevalence of intestinal parasites based on age group

Age group	Total no.	Positive no. (%)	p-value
≤5 years	81	29 (35.8)	p= 0.033
6-15 years	53	17 (32.1)	p*= 0.012
>15 years	178	48 (26.1)	p**= 0.005
Total	312	94 (30.1)	

Note:p= p value between ≤5 years and 6-15 years children, p*= p value between 6-15 years and >15 years children, p**= p value between ≤5 years and >15 years patients.

Table-3: Prevalence of intestinal parasitic infection based on Ethnic group

Ethnic group	Total no.	Positive no. (%)	p- value
Brahman-Chhetri	115	26 (22.6)	p= 0.003
Aadibasi-Janjati	181	62 (34.3)	p*= 0.038
Dalit	16	6 (37.5)	p**= 0.012
Total	312	94 (30.1)	

Note: p= p value between *Brahman-Chhetri* and *Aadibasi-Janjati*, p*= p value between *Aadibasi-Janjati* and *Dalit* and p**= p value between *Brahman-Chhetri* and *Dalit.*

Table-4: Place wise prevalence of intestinal parasitic infection

Group	Total no.	Positive no. (%)	p-value
Valley inside	289	90 (31.1)	0.004
Valley outside	23	4 (17.4)	
Total	312	94 (30.1)	

DISCUSSION

In the eight month study period (July 2011 to February 2012), nearly one third (30.1%) of patients seeking parasite detection in their fecal samples were found to carry one or more intestinal parasites. This finding was in contrast with some previous studies conducted among patients in different hospitals of Nepal[8,11] and elsewhere in the world.[13] However, the finding of this study was also in agreement with previous hospital records conducted in Nepal.[7,9,10,14] The remarkably higher prevalence in the present study as compared to the previous ones might be due to the place and time differences of the study anduse of concentrationtechnique for the detection of parasites which might have increased the parasitic detection rate. Similarly, reports by Uga *et al* showed higher prevalence of intestinal parasites in Kathmandu Valley.

In this study in gender wise basis, intestinal parasitic infection rate was found higher among males (34.2%) than females (26.3%). The difference was found to be statistically significant ($p<0.05$). This finding was in contrast with previous studies.[10-12,15-17] The findings of this study were in agreement with some previous reports.[14,18] Although studies in Nepal and elsewhere in worlds have reported parasitic infection being gender independent, higher prevalence among boys than girls in the study population might be due to occupation and

Table-5: Frequency of intestinal parasites detected

Types of parasite	Total Positive no. (%)
Protozoa	**68 (65.4)**
E. histolytica	40 (38.5)
G. lamblia	27 (26)
E. coli	1 (1)
Helminthes	**36 (34.6)**
Hookworm	11 (10.6)
T. trichiura	8 (7.7)
A. lumbricoides	7 (6.7)
H. nana	6 (5.8)
Taenia species	4 (3.8)
Total parasites	**104 (100)**

behavioral factors. Generally increased mobility of the male or their more active and wandering nature increases the risk of infection.

Significantly higher prevalence of intestinal parasitic infection was found among people living inside Kathmandu Valley (31.1%) than those living outside (17.4%) ($p<0.05$). This outcome is supported by the previous report.[19] Higher prevalence among people inside the valley might be due to the direct disposal of sewage into stream, use of sewage water in irrigating fields, improper water supply, unplanned rapid urbanization, poor hygiene and sanitary condition, wide dispersion of parasites etc. in the valley.[19] This could also be due to involvement large number of people inside Kathmandu Valley and their occupation than outside in the study. Since most of the patients visiting NMCTH were from Jorpati, VDC (Includes Gokarna, Tinchuli, Attarkhel, Besigaun etc.). The major occupation of people living here is agriculture. So again, poor personal hygiene, use of sewage water in irrigating vegetable fields, low socio-economic status, lack of education and health awareness might be the reason behind higher prevalence.

Based on the age of patients included in the study, the highest prevalence of intestinal parasitosis was found among children aged ≤5 years (35.8%), followed by 6-15 years age (32.1%) group. It was found to be lowest among people aged >15 years (26.9%) which includes middle aged people and elderly people. The finding was also found to be statistically significant ($p<0.05$). The highest rate of prevalence among children was in agreement with the previous reports.[9,11,14] The higher prevalence among children might be due to lack of proper care of children by their parents, unhygienic behavior, lack of public health awareness and lack of sanitation. On the other hand, previous studiesreported high prevalence rate among adults and elderly patients.[10,13,20]

Table-6: Pattern of parasitic infections among patients

Types of infection	Total positive no. (%)
Single parasite	**85 (90.4)**
Protozoa	59 (62.8)
Helminthes	26 (27.6)
Multiple parasite	**9 (9.6)**
Protozoans	1 (1.1)
Helminthes	2 (2.1)
Protozoa + Helminthes	6 (6.4)
Total	**94 (100)**

Altogether 8 species of intestinal parasites were detected, three were protozoa and remaining five were helminthes. In the present study, protozoan positive rate (65.4%) was found to be higher in comparison to helminthic parasites (34.6%). This might be due to the differences in the life-cycle of these two types of parasites. Protozoan parasites are found in the faces immediately after infection while considerably longer time is taken to appear the eggs of helminthic parasite in faces after deworming. This finding was in agreement with the various previous findings from Nepal.[2,10,20,21] However, other studies among general population have found higher prevalence of helminthic infection.[3,4,22,23]

In the present study, among the various parasites detected, the most common was *E. histolytica* (38.5%), the protozoan parasite. This finding was in agreement with previous reports.[8,10,11] However it was in contrast with other similar studies in Nepal.[9,12] High prevalence of *E. histolytica* might be due to consumption of raw fecal contaminated water because of poor sewerage system in Kathmandu Valley.

Similarly, among the helminthes, hookworm (10.6%) was the commonest parasite in the study group, followed by *T. trichiura* (7.7%) and *A. lumbricoides* (6.7%). High prevalence of hookworm among the helminthes was in agreement with the previous reports.[24-26] However, this finding was in contrast to most other findings reported earlier in which *A. lumbricoides* topped the list.[9,11] High prevalence of hookworm might be due to open defecation that may cause the contamination of soil with hookworm larva and then farming in the field with bare foot. Low prevalence of *A.lumbricoides* might be due to intake of anti-helminthic drug particularly albendazole because albendazole usually clear *A. lumbricoides* at the beginning.

The prevalence of monoparasitism was higher (90.4%) than multiparastism (9.6%) in the study population. This finding was in agreement with the previous reports.[10,12,27] But higher percentage of multiparasitism has also been reported.[28] The higher rate of monoparasitism with *E.*

histolytica might be due to the consumption of raw fecal contaminated water.

Ethnic wise, overall prevalence of intestinal parasitic infection was found to be higher among *Dalit* (37.5%) than *Aadibasi-Janjati* (Indigenous nationalities) (34.3%) and *Brahman-Chhetri* (22.6%). The difference was also found to be statistically significant ($p<0.05$). It was consistent with the previous studies.[2,16]However, higher positive rate among *Adibasi-Janjati* and *Brahman-Chhetri* have also been reported.[17,23,25,29]This could be due to low literacy rate, lack of health awareness, poor hygienic condition etc. *Dalit* face social discrimination from other ethnic group, especially regarding contact, sharing water or dining together. In short, people of other ethnic group view them as ignorant and socially inferior. That's why, they have low literacy rate, lack of health awareness, low socioeconomic status and socially inactive.

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