

Intestinal parasitosis among subjects undergoing cataract surgery at the eye camps in rural hilly areas of Nepal

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ABSTRACT

Present study investigated the intestinal parasitosis among 221 subjects undergoing cataract surgery (M: 129 and F: 92; aged 13-86 years) at the eye camps in three rural hilly districts (Ramechhap, Sindhupalchok and Dhading) in 2006. Stool samples collected in clean, dry, screw capped plastic containers were examined locally by direct smear technique and anti-parasitic drugs were distributed to parasite positive subjects. The remaining stool samples were fixed with 10% formal-saline, transported to Shi-Gan Health Foundation/Nat'l Inst of Trop Med and Public Health Research, Kathmandu and re-examined by formal-ether sedimentation technique. A total of 148 samples (66.9%) were positive for some kind of intestinal parasites (F: 68.5% and M: 65.9%; $P>0.05$). Ramechhap (Manthali) and Sindhupalchok (Chautara) had higher positive rate (71.8% and 70.7%, respectively) than in Dhading (Salyantar) (60.0%) ($P>0.05$). *Tibeto-Burman* (indigenous nationalities) ethnic group had highest positive rate (70.1%) compared with *Indo-Aryan* (64.7%) and *Dalits* (57.7%). Subjects without toilet (latrine) had marginally higher positive rate (69.7%) than those having toilet at their home (65.5) ($P>0.05$). Age was independent of positive rate. Vegetarians had marginally higher parasitic infection rate compared to their non-vegetarian counterparts. Helminths were more common than protozoa. Overall, hookworm was the commonest parasite detected. However, *Ascaris* was common in Dhading District. *Entamoeba histolytica* was most common among protozoa and was followed by *Cyclospora* and others.

Keywords: Intestinal parasites, cataract patients, eye camp, Nepal.

INTRODUCTION

Cataract, an opacity that develops in the crystalline lens of the eye or in its envelope, is the leading cause of blindness in the world.¹ Though cataract may be seen in younger age, increasing age is associated with increasing prevalence of cataract. Nearly half (48%) of the world blindness is associated with age.² In Nepal, the reported prevalence of cataract is 0.6%³ and constitutes the leading cause of visual problem. Keeping in view of this fact, eye camps focusing on cataract surgery are being conducted in rural areas by different organization regularly.

In Nepal, over seventy percent of morbidity and mortality are associated with infectious diseases⁴ and is also reflected in the "top ten diseases" of Nepal.⁵ Of them, intestinal parasitosis alone constitutes one of the major causes of health problems.⁴ The reported rate of intestinal parasitosis in some rural areas approaches nearly one hundred percent^{4,6-8} has been attributed to the lack of hygienic and sanitary awareness among locals. Over 70% of households in rural communities in Nepal still do not have latrine.^{9,10} Intestinal parasitosis is more common among children. Recently, 42% of elderly subjects with

unknown visual status living in elderly homes in Kathmandu Valley have been found to be infected with one or more species of intestinal parasites.¹¹

Keeping in view of lack of latrines^{9,10} and the high prevalence of intestinal parasitosis in rural communities,^{4,6-8} it is likely that elderly subjects with cataract to have higher prevalence of intestinal parasitic infections. However, the data with regard to intestinal parasitosis among subjects undergoing cataract surgery was not available from Nepal. This report, therefore, reports the prevalence of intestinal parasitosis in subjects undergoing cataract surgery at the eye camps conducted in three hilly districts in the year 2006.

MATERIALS AND METHODS

Present study was carried out in three hilly districts namely Sindhupalchok (Chautara), Ramechhap (Manthali) and Dhading (Salyantar) during the year 2006/2007. A total of 221 (Sindhupalchok: n=58 Ramechhap: n=78 and Dhading: n=85) subjects undergoing cataract surgery were included in this study. Of them 129 were males and 92 were females. A 30 ml capacity clean, dry and screw capped plastic containers

were distributed to each of the subjects with proper instruction (in presence of their accompanying person). Instructions with regard to their age, sex, ethnicity and others related to parasitic infections were taken while receiving the stool samples.

Stool samples were examined locally by direct smear technique (saline and iodine preparation) using the microscope carried with us and anti-parasitic drugs were given to all stool positive subjects. After direct examination, stool samples were fixed in 10% formalin-saline and transported to Shi-Gan Health Foundation/ Nat'l Inst of Trop Med and Public Health Research in Kathmandu (Narayngopal Chowk) where they were examined microscopically after concentrating by formal-ether sedimentation technique method. The findings were stratified against the sex, age, ethnicity and the availability of the toilet at their home. Chi-square test was applied to see the statistical differences.

RESULTS

A total 221 samples, 148 out of total (66.9%) were positive for intestinal parasites. Positive rate in females was higher 68.5% than in males (65.9%) ($P>0.05$) (Table-1). Of the three areas, Ramechhap (Manthali) and Sindhupalchowk (Chautara) had almost same positive rate (71.8% and 70.7%, respectively) whereas Dhading (Salyantar) had lower positive rate (60.0%) ($P>0.05$) (Table-2). *Tibeto-Burman* (indigenous nationalities or *Adibashi Janajati*) ethnic group had highest positive rate (70.1%) compared with *Indo-Aryan* (high caste *Hindu*) (64.7%) and *Dalits* (lower caste *Hindu/untouchable*) (57.7%) (Table-3). Subjects without toilet (latrine) at their home had higher positive rate (69.7%) compared with having toilet facilities at their home (65.5%) ($P>0.05$). Age was independent of positive rate. Vegeterians had higher parasitic infection rate as compared to their counter parts ($P>0.05$). Age was independent of positive rate. Helminths were more common than protozoa. Overall, hookworm was the commonest parasite detected. However, *Ascaris* was common in Dhading District. *Entamoeba histolytica* was the most common among protozoa. (Table-4). Interestingly, *Cyclospora* was found to be more common than *Giardia lamblia* and others. The multi-parasitic infection was detected on 30.4% of total infected subjects.

Table-1: Distribution of parasitic infection in different genders

Gender	Total n	Pos. n	%	P-value
Male	129	85	65.9	$P>0.05$
Female	92	63	68.5	
Total	221	148	66.9	

Table-2: Distribution of parasitic infection in different study sites

Study site	Total n	Pos. n	%	P-value
Dhading	85	51	60.0	$P>0.05$
Ramechhap	78	56	71.8	
Sindhupalchowk	58	41	70.7	
Total	221	148	66.9	

DISCUSSION

To the best of our knowledge, this is the first study of its kind from Nepal done among the participants undergoing cataract surgery set in rural eye camps (about one-fifth had bilateral cataract). Overall, two-third of subjects had some kind of intestinal parasites. Earlier, similar rate of intestinal parasitosis among general population^{8,12} and school children^{13,14} had been reported in Nepal indicating that the people in the communities in Nepal have equal chances of acquiring infection irrespective of their age and visual status. This might be due to the over dispersion of parasites in the community (soil contamination). Even in Kathmandu Valley, the soil contamination rate with parasitic eggs has been reported to be 37 percent.¹⁵ In certain communities, the reported incidence is close to one hundred percent⁶⁻⁸ and has been attributed to the lack of hygienic and sanitary awareness among locals. Over 70.0% of households in rural areas do not have latrine.⁹⁻¹⁰ On the contrary, low prevalence of intestinal parasitosis have also been reported from certain areas (27%) in Nepal¹⁶ and also among hospital visiting subjects (29.1-44.2%) in Kathmandu.¹⁷ The present finding among the cataract patients (subjects with visual impairment) was not a very high when their visual status and the rural setting of their living were considered. This might be attributed to the use of toilet (latrine) even in the rural villages (supported by governmental and non-governmental agencies) during recent years.

With regard to the gender, there was no difference in the positive rate. No significant difference between two genders have also been reported from Nepal previously,^{10-12,18,19} This finding further confirmed the over dispersion of parasites in the community. Relatively, higher positive rate was observed in Ramechhap and Sindhupalchowk

Table-3: Distribution of parasitic infection in different ethnic groups

Ethnic groups	Total n	Pos n	%	P-value
Indo-Aryans	68	44	64.7	$P>0.05$
Tibeto-Burmans	127	89	70.1	
Dalits	26	15	57.7	
Total	221	148	66.9	

Table-4: Frequency of the parasites detected in different districts

Parasites	Study areas			Total n (%)
	Sindhupalchowk n (%)	Ramechhap n (%)	Dhading n (%)	
Helminthes	43 (82.7%)	64 (73.6%)	53 (80.3%)	160 (78.0%)
Hookworm	22 (42.3%)	32 (36.8%)	15 (22.7%)	69 (33.6%)
<i>A. lumbricoides</i>	11 (21.2%)	17 (19.5%)	25 (37.9%)	53 (25.9%)
<i>T. trichiura</i>	8 (15.4%)	15 (17.2%)	13 (19.7%)	36 (17.6%)
<i>S. stercoralis</i>	1 (1.9%)	-	-	1 (0.5%)
<i>E. vermicularis</i>	1 (1.9%)	-	-	1 (0.5%)
Protozoans	9 (17.3%)	23 (26.4%)	13 (19.7%)	45 (22.0%)
<i>E. histolytica</i>	2 (3.9%)	17 (19.5%)	9 (13.6%)	28 (13.6%)
<i>E. coli</i>	1 (1.9%)	2 (2.3%)	4 (6.1%)	7 (3.4%)
<i>C. cayetanensis</i>	5 (9.6%)	2 (2.3%)	-	7 (3.4%)
<i>E. nana</i>	-	2 (2.3%)	-	2 (1.0%)
<i>G. lamblia</i>	1 (1.9%)	-	-	1 (0.5%)
Total	52 (100%)	87 (100%)	66 (100%)	205 (100%)

(71.8% and 70.7%, respectively) compared with Dhading (60.0%). The relatively low positive rate in Dhading District appears to be associated with the availability of toilets in community (constructed with the support of NGOs). *Tibeto-Burman* (indigenous nationalities) ethnic group had the highest positive rate compared with *Indo-Aryan* and *Dalits*. Higher positive rate among *Tibeto-Burman* was in agreement with some of the previous reports from Nepal^{12,17,20} but not with some others.^{13,14,16,18} However, low prevalence among *Dalits* was not in agreement with their general socio-economic and hygienic status. Earlier, high prevalence of stool positive among *Dalits* has been reported.^{14,16,18} In this case, this could be due to the relatively small number of subjects *Dalit* group compared with other two groups.

Subjects without toilet (latrine) had marginally higher stool positive rate compared with having toilet facilities at their home indicating the importance of sanitary improvement at home^{19,20} and in the community as a whole. Earlier, reduction in parasite positive rate with the increase of households with latrine in a rural hilly community has been reported.⁹ Age found to be independent of parasite positive rate could be due to the visual disturbance of the subjects. Vegetarians had marginally higher parasitic infection rate as compared to their non-vegetarian counter parts. Consumption of unwashed fruits and vegetables appeared to be the source of infection among the vegetarians. However, one of the recent study conducted among elderly people living at elderly homes in Kathmandu have shown higher positive rate among non-vegetarians.¹¹

The higher helminthic infection rate observed in this study was consistent with most of the reports from Nepal.^{8,11-13,17-19} Of the overall helminth parasites detected, hookworm was the commonest one. This findings was not in agreement with previous reports in which *A. lumbricoides* were found to be the commonest one.^{4,8,17-19,21,22} However, old reports showing over 80% of hookworm infection among Nepalese are also available.^{7,23} Ten year hospital based study conducted at a tertiary hospital in Kathmandu has shown an annual incidence ranging from 3.8 to 10.7 percent.²⁴ Individually, Dhading District had *A. lumbricoides* as the commonest helminth parasite. This was in agreement with the earlier study conducted in Dhading.¹⁸ Some other studies from Nepal have shown *T. trichiura* as the commonest helminth parasite.^{12,13} One of the possible factor that caused higher positive rate of hookworm could be the relatively longer life-span and other biological factors including its mode of infection. Another cause could be the older age of the subjects included. Earlier study conducted in eastern hilly area has shown a significant increase in the hookworm positive rate with age.²⁵ *E. histolytica* was the most common among protozoa. This was in agreement with previous reports from Nepal.²⁰ Other studies, however, have shown *G. lamblia* as common protozoan parasite.^{13,18} *Cyclospora* ranking second (with 3.4%) to *E. histolytica* was unique finding of this study. The reported incidence of *Cyclospora* in Nepal range from 0.0 to 29.8 percent.^{4,26-28} Multi-parasitic infections are still common in Nepal but with variable rate of prevalence in different areas.

^{8,11,19,22} In one of the study done in western hilly area has shown very high (nearly two-third) multi-parasitic infections.¹⁹ In this study, however, multi-parasitic infection was observed in 30 percent.

Two-third of stool positive rate with hookworm among helminths and *E. histolytica* among protozoa is highly significant as both the parasites are highly pathogenic. Further, it is also important from the view point of elderly age of the subjects undergoing cataract surgery. It is advisable to distribute the anti-parasitic drugs to the subjects undergoing cataract surgery.

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