

Original Research Article

Epidemiological study of intestinal parasitosis in rural area of Nepal

Kalyan Sapkota MD^{1*}, Jiwan Thapa MD², Amal Basnet MD², Bijaya Dhakal³

¹ Department of Medicine, Bharatpur Hospital, Nepal,

² Department of Medicine, National Academy of Medical Sciences, Bir Hospital, Nepal

³ Balkumari College, Narayangarh, Chitwan

ABSTRACT

Intestinal parasitosis is one of the major public health and socio-economic problems in Nepal. It is ranked among the top 10 morbidities in Nepal. Fecal samples were collected from the patients attending to different hospitals and private laboratories throughout the Myagdi district. A total of 985 participants were included in the study. The age ranged from 1 to 86 years. Commonly affected age group was of below 15 years. Male to female ratio was 1.3:1. The general prevalence of infection with different types of intestinal parasites was 14.7% (145). The fecal examination revealed different types of helminths (7.2%) and protozoan (7.5%). *Giardia lamblia* was the most common parasite (5.5%), followed by *Entamoeba histolytica* 2.0%, *Ascaris lumbricoides* 4.0%, Hookworm 1.8%, *Trichuris trichiura* 0.8%, *Hymenolepis nana* 0.4% and *Taenia spp* 0.2%. Multiple parasites were observed in 11 samples. Higher prevalence rates of parasitic infections were seen among children.

INTRODUCTION

About 70.0% of health problems and deaths in Nepal are attributed to infectious diseases. Outbreaks of diarrhea, dysentery, cholera, enteric fever and jaundice occur every year and are associated with contamination of drinking water (1). Environment is highly contaminated and most people are infected with some kinds of intestinal parasites. Intestinal parasitosis is one of the major public health and socio-economic problems in Nepal (1) It is ranked among the top 10 morbidities in Nepal [1,2].

At least one-third of the world's population is infected with intestinal parasites, making infections with these organisms one of the most common infections of humans. It is estimated that some 450 million are ill because of these infections, the majority being children [2,3]. Although these infections are usually asymptomatic and often go unnoticed, some have the potential to become chronic infections and lead to serious health consequences. Although mortality from these infections is relatively low, complications are not uncommon [1,4]. Intestinal parasitic infections are distributed throughout the world with high prevalence rates in developing countries which is mainly due to deficiency of sanitary facilities, unsafe human

waste disposal system, inadequacy and lack of safe water supply, and low socio-economic status [2-4]. The reported prevalence of intestinal parasitosis varies considerably with nearly 100% in some rural areas. Polyparasitism is common in some areas. High prevalence is attributed to poor sanitation, poverty, lack of health education, and water contamination [2,4,5].

The intestinal parasites include single-celled protozoa (water borne) and multicellular helminths (soil transmitted). The helminths consist of *Ascaris lumbricoides*, Hookworm, *Trichuris trichiura*, *Strongyloides stercoralis*, *Enterobius vermicularis*, *Hymenolepis nana* and *Taenia spp* etc.

METHODS

An epidemiological study of the prevalence of intestinal parasites in rural village of western Nepal was carried out

* Correspondence : Dr. Kalyan Sapkota,
Department of Internal Medicine, Bharatpur
Hospital, Chitwan, Nepal
E-mail : kalspk@hotmail.com

during the period August 2014 to July 2015. Fecal samples were collected from the patients attending to different hospitals and private laboratories throughout the district. Informed consent was taken from all the participants. The questionnaire was developed with four sections: a) Socio-demographic information b) Environmental condition; c) behavior habits and d) Complaints.

A total number of 985 samples of stool were collected in clean universal container at 9 am in morning. Thus, obtained fecal samples were examined for the presence of parasites both macroscopically and microscopically. Microscopic examination was done by direct smear method.

RESULTS AND OBSERVATION

A total of 985 participants were included in the study. The age ranged from 1 to 86 years. Commonly affected age group was of below 15 years. The 5-10 years group showed the highest prevalence of parasitic infection. Incidence was slightly higher in male (Male: female ratio was 1.3:1). The general prevalence of infection with different types of intestinal parasites was 14.7% (145). The fecal examination revealed different types of *Giardia lamblia* was the most common parasite (37.2%), followed by *Entamoeba histolytica* 13.1%, *Ascaris lumbricoides* 26.9%, *Ancylostoma duodenale* 11.7%, *Trichuris trichiura* 5.5%, *Hymenolepis nana* 2.7% and *Taenia* spp 1.3%. Multiple parasites were observed in 11 samples. Higher prevalence rates of parasitic infections were seen among children and were also found to be associated with families with lower income and lower education level.

The cyst positive rate of intestinal protozoa infections was 37.2% and 13.1% for *Giardia lamblia* and *Entamoeba histolytica* respectively (Table 1). The egg positive rate of helminth infections was 26.9%, 11.7%, 5.5% and 5.5% for *Ascaris lumbricoides*, Hookworm, *Trichuris trichiura* and others respectively. Mixed parasitic infection was seen in 11 (7.5%) case.

Table : 1 Types of Intestinal parasites detected in stool

| Type of parasite | No.of positives | Percent (%) |
|--------------------------------|-----------------|-------------|
| Protozoa | | |
| <i>Entamoeba histolytica</i> | 19 | 13.1 |
| <i>Giardia Lamblia</i> | 54 | 37.2 |
| Helminthes | | |
| <i>Ascaris Lumbricoides</i> | 39 | 26.9 |
| Hook worm | 17 | 11.7 |
| <i>Trichuris trichiura</i> | 8 | 5.5 |
| <i>Hymenolepsis nana</i> | 4 | 2.7 |
| <i>Taenia</i> spp | 2 | 1.3 |
| <i>Enterobius vermicularis</i> | 2 | 1.3 |

Table :2. Age wise distribution of intestinal parasites

| Age group (Year) | Male | Female | Total (%) |
|------------------|------|--------|------------|
| < 10 | 28 | 19 | 47 (32.4%) |
| 10-20 | 12 | 13 | 25 (17.2%) |
| 20-30 | 14 | 9 | 23 (15.9%) |
| 30-40 | 11 | 6 | 17 (11.7%) |
| > 40 | 17 | 16 | 33 (22.7%) |
| Total | 82 | 63 | 145 |

DISCUSSION

In this study, the infection rate was 14.7% with commonly affected age group being under 20 years of age (49.2%) (table 2). The general prevalence rate of infection was significantly higher in other studies: 30.1 %, 66.6 % and 44% in studies done by Agrawal et al (6), Sharma et al (7) and Yong et all (8) respectively. The infection rate was slightly higher in male as was similar in other studies (6-8) Helminths infestation was 49.7% and protozoan infection 50.3%. All helminth parasites detected in this study were soil-transmitted helminths. This agrees with the rate of soil contamination with helminth parasite eggs in the Kathmandu Valley (7).

The prevalence of protozoal and helminthic infestation was similar indicating dominance of soil and drinking water related problem. Several previous studies (9,10,11) showed *A. lumbricoides* as the commonest helminth as similar to this study however few other studies had hookworm (7,8) as the commonest helminth. Some reports from Nepal and outside the country has reported high level of multiple parasite infestations especially in poor and marginalized people and people with low level of education. (7,8,9).

The results of this study indicate that *A. lumbricoides* infestation was the commonest helminth infection and *G. lamblia* was the commonest protozoan infection. This may be due to the presence of the source of infection in the area studied and frequent feco-oral spread of infection among children. Also, contamination of the soil by human feces (especially for *Ascaris* and *Trichuris*) in combination with a high degree of overcrowding and a low-income level increases the susceptibility to parasitosis. (11,12)

The most common mode of presentation was diarrhea, followed by nonspecific abdominal pain, failure to thrive, loss of appetite etc. Intestinal symptoms were the commonest presentation in other studies as well (9,10,13). Younger age group was found to be more infected with intestinal protozoa compared to adult population. But soil transmitted intestinal helminths were seen equally in younger and adult population (12). Higher prevalence

was associated with families of low socio-economic status and low education level.

CONCLUSION

Intestinal parasitosis is one of the common morbidity in Nepal although regular deworming is practiced in some part. It is more common in younger age group (<15 Yrs). *G. lamblia* was the commonest protozoan infection while *A. lumbricoides* was the commonest helminth infection. Direct smear method of stool microscopic examination can be used in peripheral settings where concentration method may not be available. Effective and regular deworming with anti-helminth medicines should be done in all the school going children to reduce the burden of carrier state of soil transmitted helminths in community. Further field survey is needed to determine the prevalence of carrier state of intestinal parasite in general population in rural Nepal.

AUTHORS' AFFILIATION

Department of Medicine, Bharatpur Hospital, Nepal¹,
Department of Medicine, National Academy of Medical Sciences, Bir Hospital, Nepal²
Balkumari College, Narayangarh, Chitwan³

REFERENCES

- Rai SK. Parasitic diseases in Nepal. In: Arizon K, Chai J, Nawa Y, Takahashi Y. (Food-Borne Helminthiasis in Asia (Vol-1 of Asian Parasitology). Federation Asian Parasitol 2005; 41: 305-11.
- World Health Organization. First WHO report on neglected tropical diseases: working to overcome the global impact of neglected tropical diseases. In First WHO report on neglected tropical diseases: Working to overcome the global impact of neglected tropical diseases 2010. WHO.
- Prevention and control of intestinal parasitic infections. Report of a WHO Committee. World Health Organization, 1987. Accessed on Nov 21, 2016 from <http://apps.who.int/iris/handle/10665/41298>
- Report of the WHO Informal Consultation on the use of chemotherapy for the control of morbidity due to soil-transmitted nematodes in humans. Geneva, World Health Organization, 1996
- Intestinal protozoan and helminthic infections. Report of a WHO Scientific Group. Geneva, World Health Organization, 1981. Accessed on Nov 21, 2016 from <http://apps.who.int/iris/handle/10665/41519>
- Kathmandu N. Intestinal parasitic infections among patients attending Nepal Medical College Teaching Hospital, Kathmandu, Nepal. Nepal Med Coll J. 2012;14(2):80-3.
- Sharma BK, Rai SK, Rai DR, Choudhury DR. Prevalence of intestinal parasitic infestation in schoolchildren in the northeastern part of Kathmandu Valley, Nepal.
- Yong TS, Sim S, Lee J, Ohrr H, Kim MH, Kim H. A small-scale survey on the status of intestinal parasite infections in rural villages in Nepal. The Korean journal of parasitology. 2000 Dec 31;38(4):275-7.
- Rai SK, Kubo T, Nakanishi M, et al. (1994) Status of soil-transmitted helminthic infection in Nepal. J Jpn Assoc Infect Dis 68: 625-630.
- Gyawali N, Amatya R, Nepal HP. Intestinal parasitosis in school going children of Dharan municipality, Nepal. JTrop Gastroenterol 2009; 30: 145-7.
- Shrestha A, Rai SK, Basnyat SR, Rai CK, Shakya B. Soil transmitted helminthiasis in Kathmandu, Nepal. Nepal Med Coll J 2007; 9: 166-9.
- Shakya B, Bhargava D, Shrestha S, Rijal BP. Intestinal Parasitosis. J Inst Med (Nepal) 2009; 31: 13-6. 13. Shakya B, Rai SK, Singh A and Shrestha A. Intestinal parasitosis among the elderly people of Kathmandu Valley, Nepal. Nepal Med Coll J 2006; 8: 243-7.