

PREVALENCE OF INTESTINAL PARASITES IN CHILDREN OF BHEERKOT, SYANGJA, NEPAL

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ABSTRACT

This study was carried out to determine the prevalence of intestinal parasitic infections among the children of age group 4-12 years in Bheerkot Municipality of Syangja District, Nepal, at an altitude of 1088 m above sea level. The research was conducted among 50 children i.e., 24.27% of total children population of that age group. Among 50, 21 (42%) and 29 (58%) were male and female respectively, on which parasitic infection was observed in 42.85% of male population and 31.03% of female population, but there was no association of gender for the infections of intestinal parasites. This indicates that the association of gender with intestinal parasitic infection differs from one community to other and might be attributed to socio-behavioral activities. The samples were examined under optical microscope (low power-10X and high power 40X). The major intestinal parasites detected were *Giardia lamblia* (Lambl), *Entamoeba histolytica* (Schaudinn), *Entamoeba coli* (Grassi) and *Trichuris trichiura* (Linnaeus). In conclusion, among above mentioned parasites, *Giardia lamblia* was found with higher prevalence infecting 16 of total children, we recommend for improvement in the drinking water habit and proper sanitation in the people of Bheerkot-3 and need of effective social awareness programs.

Key words: Prevalence, stool, parasites, sanitation, infection, precaution.

INTRODUCTION

Intestinal parasites are those parasites which are generally found inhabiting in gastrointestinal tract or intestinal wall of living organism causing various abdominal disorders and diseases in humans and other animals. It is proved that children are more prone to intestinal parasitic infections. Intestinal parasites constitute a global health burden in numerous developing countries due to fecal contamination of water and food, sympathetic climatic, environmental and socio-cultural factors enhancing parasitic transmissions (Dhanabal *et al.*, 2014).

Nepal is a landlocked country located in southern region of Asia. The reported prevalence varies considerably cent percent in some areas (Thapa

Magar *et al.*, 2011). In Nepal morbidity and mortality rate is found high among the children below the age of 4 year due to the consumption of contaminated water (Maharjan *et al.*, 2013). Poly parasitism is common in rural areas of Nepal and intestinal diseases rank fourth in "Top Ten Diseases" in Nepal (Fact sheet MoHP, 2008). The high prevalence is attributed to poverty, lack of awareness, failure to practice proper hand washing after defecation, unsafe drinking water and use of improper toilets (Shrestha *et al.*, 2016). Some common types of intestinal parasites found to infect the humans in Nepal are: *Giardia lamblia* (Lambl), *Ascaris lumbricoides* (Linnaeus), *Entamoeba histolytica* (Schaudinn), *Balantidium coli* (Malmsten), *Enterobius vermicularis* (Linnaeus), etc.

(Maharjan *et al.*, 2013).

As the intestinal parasites are more likely to infect children rather than adults, they should be given good education and practice regarding the personal hygiene and sanitation to fight against those parasite. People should be advised not use open toilets and should discourage their children from using open toilets. They should take in mind that their children do not play in mud, swamp and dirt and prohibit their children from consuming open and contaminated food and water (Shrestha *et al.*, 2016).

Intestinal parasitic infection are the most common global health burden particularly in the developing countries mainly due to the low socio economic factors, fecal contamination of water and food, and poor sanitation practices enhancing parasitic transmissions (Dhanabal *et al.*, 2014). Intestinal parasites are a major cause of health problem particularly among the children in developing countries (Shrestha *et al.*, 2016). Intestinal parasites are mainly differentiates into two main groups: protozoa and helminthes. Protozoa are single celled microscopic eukaryotes. Cyst and trophozoites are the two main stages of life cycle of protozoa. Protozoal infection produces a variety of clinical manifestation depending upon the tissues affected. The most common intestinal protozoan parasites includes *Entamoeba histolytica*, *Cyclospora cayetanensis* and *Cryptosporidium* spp. (Haque, 2007). Infection particularly with *Entamoeba histolytica* and *Giardia lamblia* causes significant morbidity and mortality in developing countries where water quality, waste disposal, sanitation and hygiene conditions are poor (Kunwar *et al.*, 2016).

Helminths are multi-cellular, large and worm like parasite. Adult, larva and egg are the important

morphological forms of helminths. Helminths also known as soil transmitted helminths are cosmopolitan and their infections are common in countries with poor hygiene and low socio economic status (Parija, 2004). There are mainly four important species of soil transmitted helminths (STHs) that infect humans: *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm) and *Ancylostoma duodenale* (Dubini) and *Necator Americanus* (Charles Stiles) (hookworms). Mortality rate is very rare in STHs infection but heavy infections with STHs may cause malnutrition and anaemia, thus affecting the mental and physical development of children (Kunwar, 2016).

Intestinal parasitic infection are responsible for morbidity and mortality worldwide, especially in developing countries and in people with other diseases or low immune system (Tandukar *et al.*, 2015). The transmission of parasites occurs commonly through the contaminated food items such as uncooked vegetables, meat and unwashed fruits, contaminated drinking water (Malla *et al.*, 2004; Das *et al.*, 2006). Apart from mortality and morbidity, intestinal parasites have been associated with physical weakness and poor education achievement in children (Abossie and Seid, 2014).

Objectives of the present research work were, to study the prevalence of intestinal parasites in children of age group 4-12 years, to know the causative factors for the intestinal parasitic infection in the particular children group and to compare the presence of parasites among the children on the basis of their gender.

MATERIALS AND METHODS

Study area

The study area includes ward number three of Bheerkot municipality of Syagnja district that lies in 28° 2' 12" N and 83° 47' 58" E and towards

west of capital city Kathmandu (Figure 1). It is in the center of Syangja district and comprises villages like Bajadi, Kegha, Banethok, etc. It takes about 2 hours to reach Bayarghari Bazaar, the main bazaar area of the municipality from where we have to travel by jeep for about 45 minutes to reach the study area. The population is not that dense in some villages but in villages like Kegha, Banthok the population is quite dense. The estimated population of the children from 4 to 12 years of age is 256 according to the health worker in the sub-health post.

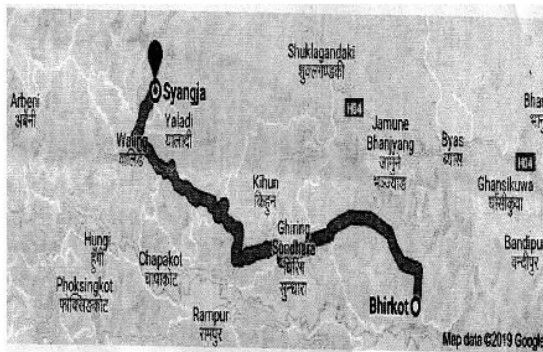


Figure 1. Location map of study area.

Sampling size

A total of 60 children were enrolled for the convenient sample collection but only 50 of them took part for sample submission that is around 24.27% of the children population living up in the study area of that age group. Authorized people of the school, health post and the parents were informed about the procedure of the study before the collection of sample was carried out.

Sample collection

For the sample collection, each children were described about the importance of the examination of the stool for detection of intestinal parasites and were requested to answer various questions about their hygiene, nutritional behavior and health condition from the questionnaire. They were given a clean

plastic container and a bamboo stick along with the oral instruction about the procedure of bringing stool in the container and were advised not to contaminate the stool with water and urine. The containers were labeled with specific code numbers for each children. Children of age below five years were helped by their parents as well. Next morning the containers with stool were collected back from the children and were given a soap each as a symbol of thanks giving and awareness.

Inclusion and exclusion criteria

Children of age group 4-12 years with all demographic and ethnic groups were included and those children who have taken anti-parasitic drug within last 6 months were excluded. The gathered information from the questionnaire includes name, age, sex, address, water drinking habit, nutritional behavior, personal hygiene practice and history of anti-parasitic drugs used.

Preservation and transportation of samples

The collected stool samples were immediately mixed with 10% formalin, then the containers were sealed spill proof and kept in a box making sure it does not moves while transporting. Then the stool samples were transported and were processed in Kaski Model Hospital and Regional College of Science and Technology with the help of technical personnel.

Laboratory processing

Each stool sample was processed with and examined by two ways method following Rai (1996).

Macroscopic examination: The direct observation of each sample was done for color, consistency and presence of mucus, blood, and adult worms or segments of worms.

Microscopic examination: The microscopic examination was done for the detection of

protozoan cysts, oocysts, trophozoites and larva and eggs of helminthes. This was carried out by use of normal saline and Gram's iodine and observed in a microscope. Few droplets of saline or iodine was kept on the middle of the glass slide and the pinch of stool sample was mixed up with the saline or iodine and covered by the cover slip and the slide was mounted to the microscope. First it was observed at low power (10X) followed by high power (40X).

Data analysis

The observed data was recorded in a log and was calculated statistically for appropriate results using simple mathematical formulae and chi-square test. The association of intestinal infection with gender was checked by comparing the calculated chi-square value with tabulated chi-square value in significance level of 0.05.

RESULTS

A total of 50 samples from children of age group 4-12 years were collected for the study. Among them, 18 samples were positive to the infection that is 36% of the total samples collected. Out of the total male samples i.e., 21, 9 of them were found to be positive with infection and of the total female samples i.e., 29, 9 were found to be positive with parasitic infection. Among the different intestinal parasites detected *Giardia lamblia* (88.88%) was found to be dominant in infecting the children, followed by *Entamoeba histolytica* (38.88%), *Entamoeba coli* (27.78%) and *Trichuris trichiura* (5.56%). Among all the infected children, eight of them were infected by multi parasites while 10 of them were infected by only one parasite. Looking at the distribution pattern of parasites on the basis of the age of the children, the study found that age group 4-6 years had only one infection, age group 7-9 had 6 infections and age group 10-12 had 11 infections with intestinal parasites. The prevalence of intestinal parasite among the

children of age group 4-12 years in Bheerkot-3 of Syangja district was found to be 36%.

Giardia lamblia was found to be dominant intestinal parasite followed by *Entamoeba histolytica*, *Entamoeba coli* and *Trichuris trichiura*. The only found helminth parasite was *Trichuris trichiura* and all other infection were due to protozoan parasites. Mixed infection of helminthes and protozoan was found only in a single sample while other 7 of 8 poly-parasitism cases were protozoans. Out of 18 infected samples 10 were found to be single parasitism type.

Although other factors like age, gender and food habit were insignificant with the prevalence of parasitic infection, periodic administration of the anti-parasitic drugs played an important role in prevalence of intestinal parasites.

DISCUSSION

Nepal is a landlocked country and is also least developed country with a poor sanitation practice leading more susceptible to intestinal parasites. Furthermore, children have low level of knowledge about health education and personal hygiene, so this study also aims on their public awareness towards the diseases caused by the intestinal parasites. To the best of our knowledge this is the first work ever conducted in the study area so far.

In the present study the prevalence of intestinal parasites among the children of age group 4-12 years was found to be 36%. This result is somehow similar to the study carried out by Malla *et al.* (2004) in Sarlahi district of Nepal which showed the prevalence of 41.77%.

In this study, 94.44% of the infection was found to be due to protozoan parasites and only 5.56% of the infection was due to helminthic parasites. In the total of positive parasitic infection, 44.44%

of them was found poly-parasitic infection and 56.56% was found to be single parasitic infection. This result showing higher infection due to protozoan parasites and lesser due to helminthic parasites resembles to the results of the study conducted by Tandukar *et al.* (2015) in which 81.5% due to protozoan parasites and 18.5% due to helminthic parasites was reported among the school children. Similarly, Bhattachan *et al.* (2015) reported the dominance of protozoans over helminthes i.e., 59.2% and to 40% in the school going children of Chitwan district. In the present study, the dominancy of protozoans may be due to the difference in life-cycle of protozoans and helminths.

As reported by Albonica *et al.* (1999), the high prevalence rate of intestinal parasitic infection is associated with intake of contaminated water, open defecation habit and poor sanitary practices. Similarly, Shrestha *et al.* (2012) found high prevalence of parasitic infection in the children reporting gastrointestinal problem within last six months, children from agriculture based families, children with poor personal hygiene and low education level.

Likewise Tandukar *et al.* (2015) also found that poverty and lack of health awareness are also risk factors in the intestinal parasitic infection. According to Malla *et al.* (2004) malnutrition is also an important risk factor for the parasitic infection as it results in poor physical development and impaired resistance to infection.

From the present study, the prevalence of intestinal parasites was found to be 9 (31.03%) among the female samples and 9 (42.85%) among the male samples taken for the laboratory processing. However, it was statistically insignificant. In the past studies in different study area, Mukhiya *et al.* (2012) and Bhattachan *et al.*

(2015) reported higher prevalence of intestinal parasites in females than in males. While in the studies conducted by Golia *et al.* (2014) showed the higher prevalence in males than in females. This indicates that the association of gender with intestinal parasitic infection differs from one community to other and might be attributed to socio-behavioral activities.

CONCLUSION

The major intestinal parasites detected were *Giardia lamblia*, *Entamoeba histolytica*, *Entamoeba coli* and *Trichuris trichiura*. Among the above mentioned parasites, *Giardia lamblia* was found with higher prevalence infecting 16 of total children. We recommend for improvement in the drinking water habit and proper sanitation in the people of Bheerkot-3 and need of effective social awareness programs.

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