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Prevalence of Intestinal Parasites Among the Patients Visiting Sub-Regional Hospital, Dadeldhura, Nepal

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Abstract

Intestinal parasitic infections caused by intestinal helminthes and protozoa are the most common human infections endemic throughout the world especially in tropical and subtropical countries including Nepal. This study was conducted to study the prevalence of intestinal parasites among patients visiting Sub-Regional Hospital, Dadeldhura, Nepal. Altogether 480 stool samples were collected from April 2017- October 2017. Microscopic examination of stool was done by using formal-ether concentration technique in the Microbiology Laboratory of Sub-Regional Hospital, Dadeldhura Nepal. The overall prevalence rate was found to be 10.625%. The prevalence of parasitic infection was higher in males (52.94%) than in females (47.06%). In the age group below 15 years, the prevalence was found to be higher (52.94 %) than other age groups. Total 6 species of intestinal parasites; 2 (33.33%) were protozoan parasites viz. cysts and trophozoites of *Giardia lamblia*, and cysts of *Entamoeba histolytica*, and 4 (66.67%) were helminths viz. ova of *Ascaris lumbricoides*, *Trichuris trichuria*, *Hymenolepis nana*, and *Ancylostoma duodenale*. The infection rate was found to be higher in people taking normal tap water. The study concluded that intestinal protozoan infection is still a public health problem of concern among the people of Dadeldhura. The prevalence of intestinal protozoan infection was found to be high in children and low educated groups in Dadeldhura. Thus, health education along with infection management actions and awareness programs for sanitation improvements are required to reduce protozoan infections.

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1. Introduction

The intestinal parasites can be defined as parasitic micro-organisms living in the intestine and cause intestinal parasitic infections (Desta, 2014). Intestinal parasitic infections are fecal-derived diseases known to affect preferably the poorest and deprived communities in low and middle-income countries of tropical and subtropical regions (Hotezet al., 2014). They are broadly classified into two groups; unicellular protozoans like *Entamoeba histolytica, Giardia lamblia, Balantidium spp*. *Cryptosporidium spp*., etc., and helminths like *Ascaris lumbricoides, Trichuris trichiura, Necator americanus, Ancylostoma duodenale,* etc. (Desta, 2014).

Incidence of intestinal parasitic infections (IPIs) is common in low-income countries and is associated with socio-economic and environmental factors like population density, literacy, drinking water quality, personal hygiene, environmental sanitation, etc.(Duedu et al., 2015). The social and environmental conditions in low-income countries can be ideal for poor hygiene-related protozoan parasitic diseases transmission. IPIs are persistent in urban areas where overcrowding of neighborhoods, promiscuity, inadequate sanitation, and mostly unhygienic conditions are common (Joint Research Commission of the European Union, 2008).

Intestinal protozoan infections such as giardiasis and amoebiasis are also known to cause considerable morbidity and mortality. Recent estimates in 2010 indicated that intestinal protozoan infections like amoebiasis and giardiasis were harmful than the most common soil-transmitted helminthiasis(Kuete et al., 2015). *Entamoeba histolytica* is distributed throughout

the world and is a substantial health risk in almost all countries where the barriers between human feces and food and water are inadequate. Infections caused by *Giardia spp*., *Cryptosporidium spp*., and *Microsporidia spp.* are known to hinder human health significantly (Alamet al., 2013).

Nepal is a developing country with several rural, sub-urban, and unsystematically urbanized areas with unsanitary conditions, untreated drinking water, and other associated risk factors. Hence, there are many places, including the study area, with a potential prevalence of intestinal parasites in Nepal. Thus, this study was conducted to determine the prevalence of intestinal parasites among the patients visiting Sub-Regional Hospital, Dadeldhura of Nepal.

2. Materials and Method

2.1 Study design and setting

A cross-sectional study was conducted in the Microbiology laboratory of the Department of Microbiology, Sub-Regional Hospital, Dadeldhura. The study was conducted from April 2017 to October 2017. All the clinical stool samples submitted to the hospital for analysis were examined for the presence of intestinal parasites.

2.2 Participants and variables

All the patients, from both the inpatient and the outpatient departments, who were referred by attending physicians for stool examination, were included in the study. The patients and/or their guardians were verbally informed about the study and verbal consent was taken from them. Demographic characters like age and gender were collected from request forms submitted by patients during sample submission in the laboratory. The source of drinking water being used by the patients was known by the personal interview method.

2.3 Sample

The stool samples submitted by patients in the lab of the hospital were included as a sample for this study. The samples were accepted if the containers were properly labeled, not contaminated with urine and patients were not on anti-parasitic drugs or other antibiotics, otherwise rejected. A total of 480 samples were accepted and examined during the study period. Among the 480 samples, 250 (52%) were male and 230 (48%) were female patients.

2.4 Examination of stool samples

Stool samples were examined microscopically for intestinal parasites using the formal-ether concentration technique. All the preparations were examined under a compound microscope using 10X and 40X magnification and looked for the presence of eggs or larvae or adult forms of helminths and cyst or trophozoites of intestinal protozoans. Identification of the parasites was done by studying observed morphology and referring to the parasitological identification manual (Desta, 2014; Cheesbrough, 2000).

2.4.1 Formal-ether concentration technique

A stool sample of about 1 gm (pea-size) was mixed in a falcon tube with 10ml of 10% V/V formal water and emulsified using a sterile glass rod. The emulsified sample was sieved in a clean beaker using a gauze pad. The suspension was transferred into another falcon tube and 4 mL of diethyl ether was added. The mixture was mixed properly by inverting several times. The suspension was then centrifuged at 3000 Rpm (750-1000 g) for 1 minute. The layer of fecal debris was broken using a glass rod and the supernatant along with the fecal debris was discarded. The sediment was transferred to a clean glass slide, covered with a clean coverslip, and was examined under a light microscope at 10X and 40X magnification(Cheesbrough, 2000).

2.5 Statistical analysis

The Chi-square test was applied for statistical analysis of results using the IBM SPSS 20 software program. The association of intestinal parasitic infections with different variables was tested. Results were considered significant if P-values were less than 0.05.

3. Results and Discussion

From a total of 480 stool samples examined, 51 (10.625%) were found positive for one or more intestinal parasites. A total of 6 species of intestinal parasites were identified. Among them, 2 (33.33%) were protozoan parasites and 4 (66.67%) were helminths. The identified protozoans were *Giardia lamblia* (cysts in 13 samples and trophozoites in 10 samples), and *Entamoeba histolytica* (cysts in 20 samples), while the helminths were *Ascaris*

*lumbricoides (*ova in 3 samples), *Trichuris trichuria* (ova in 1 sample), *Hymenolepis nana (*ova in 3 samples), and *Ancylostoma duodenale* (ova in 2 samples). The cyst of *E. histolytica* was predominant with 20 (38.46%) positive cases, followed by a cyst of *G. lamblia* with 13(25%) positive cases.

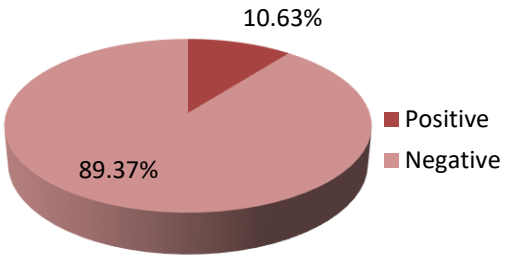

Figure 1: Prevalence of intestinal parasites

As shown in table 1 the infection was more common in males than females. Out of 51 positive samples, 27 (52.94%) were male and 24 (47.06%) were female. Fig. 2 shows that the prevalence of protozoan infection was seen higher in the age group less than 15 years. A total of 27 positive cases (52.94%) were from the age group less than 15 years, 13 positive cases (25.49%) were from the age group of 16 to 30 years, and 11 positive cases (21.57%) were from the age group more than 30.

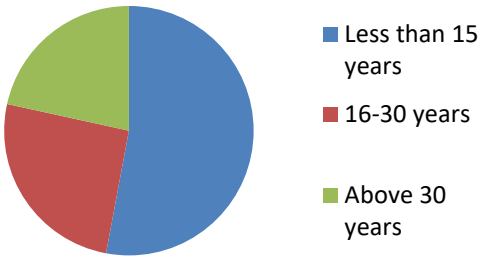

Figure 2: Frequency of parasitosis in different Age Groups

Among 480 patients interviewed, 469 (97.71%) were using tap water, 7 (1.46%) were using boiled water and 4 (0.83%) were using filtered water for drinking purposes.

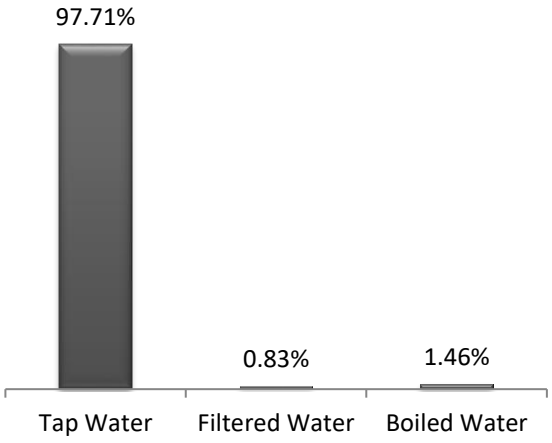

Figure 3: Sources of Water Used

Although more than one-third of the children were infected in this study with any one type of parasites, the result is found to be less prevalent on parasitic infection than on research was done by Thapa Magar *et al*., 2011 at Kathmandu valley which was 43.3% and higher than observed by Khanal *et al*., on 2011 at Kathmandu (17.6%) and Chandrashekhar *et al*., at Kaski (21.3%) on 2005(Thapa Magar et al., 2011; Khanal et al., 2011; Chandrashekhar et al.,2005). This investigation showed the report of the very high positive rate of intestinal parasitic infections according to previous research among children elsewhere in the country (Mukhiya et al., 2012). The overall prevalence of our study was less than this report.

Table 1: Gender wise prevalence of intestinal parasites

Parasites	Males	Female	Total
Cyst of *Giardia*	6	7	13
Cyst of *E. histolytica*	11	9	20
Ova of *A. lumbricoids*	2	1	3
Ova of *H. nana*	2	1	3
Ova of *Hookworm*	0	2	2
Ova of *T. trichuria*	0	1	1
Trophozoit of *G. lamblia*	4	6	10
Total	**25**	**27**	**52**

A marginally higher positive rate of infection among boys as compared to girls was observed in this study which might be due to more outdoor activities of male children. This result agrees with the data of the study done by Shrestha *et al*., 2012.

4. Conclusion

Intestinal parasitosis in the hospital visiting patients is still prevalent as a major public health problem in the Dadeldhura district. On examining 480 stool samples of patients visiting Sub-Regional Hospital, Dadeldhura, 51 (10.625%) were found positive for one or more intestinal parasites. This result concluded poor hygiene and sanitary conditions, improper water supply, and uneducated family. To prevent this infection, appropriate health education should be given to children and their parents concerning disease transmission, personal hygiene, and safe drinking water. Efforts from the municipality to improve the quality of the drinking water supply and the types of toilets being used will certainly lower the number of parasitic infections in such areas.

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Conflicts of Interest

The authors declare that they do not have any conflict of interest.

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