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Comparative study of different types of parasites present in Water sources of district D.I. Khan

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Abstract
A total of 200 water samples were collected from different sources such as, tape water, pond water and drain water located at Madina colony, Diyalroad, D.I Khan City, Islamia colony and Zaffarabad during the period July to September 2016. The prevalence (%) of *Giardia, Cryptosporidium, Toxoplasma gondii, Balantidium coli, Fasciola hepatica and Entamoeba histolytica* in each category of water samples were determined. An overall prevalence of *Giardia* in water samples was 18.5% (30/200) and similarly, *Cryptosporidium* 19.5% (14/200), *Toxoplasma gondii* 2.8% (3/200), *Fasciola hepatica* 4.8% (4/200), *Balantidium coli* 5.78% (9/200) and *Entamoeba histolytica* 18.8% (32/200) were determined.

Keywords: Prevalence, parasites, tap water, pond water, drain water

1. Introduction
Water is considered as one of the nutrients, although it yields no calories, yet it enters into the structural composition of the cell and is an essential component of diet [1]. According to the WHO more than 80 percent of human disease is waterborne. In developing countries 60 percent population has no access to pure drinking water [2]. Waterborne diseases occur worldwide, which have the potential to cause disease in large numbers of consumers. Waterborne outbreaks have economic consequences beyond the cost of health care for affected patients, waterborne parasites are ubiquitous protozoan parasites that affect humans, domestic animals and wildlife throughout the world. From a water perspective, several protozoan parasites are important, but till now mostly *Giardia* and *Cryptosporidium* have been highlighted as significant waterborne parasites. For many years WHO took under consideration the intestinal protozoa, Giardiasis and Cryptosporidiosis are already included into the "Neglected Diseases Initiative" [3]. At least 325 water born outbreaks of parasitic protozoan diseases have been reported worldwide. *Giardia lamblia* and *Cryptosporidium parvum* account for the majority of the outbreaks, since *Entamoeba histolytica, Cyclospora cayetanensis, Toxoplasma gondii, Isospora belli, Blastocystis hominis, Balantidium coli, Microsporidia, Acanthamoeba and Naegleria fowleri* were responsible for only a small part of the reported outbreak [4]. Protozoan infections are common in humans, worldwide. In industrialized countries, the most common human parasites, protozoa transmitted by water belong to the genera *Giardia* and *Cryptosporidium* [5]. The aim of the current research work was to conduct a comparative study of different types of parasites present in water District D. I Khan

2. Materials and Methods
2.1 Study Area
The study was conducted to detect the Zoonotic parasites in different water sources of different areas such as, Madina colony, D.I Khan City, Diyal road, Zaffarabad, and Islamia colony of District D.I khan during the period July to September 2016.

2.2 Sample collection
A total of 200 water samples were collected from different sources like tap water, pond water and drain water in clean bottles. Then samples were labeled with the date of collection, source of water, and area of collection. Then all samples were brought to the Laboratory of the Department of Zoology Abdul Wali Khan University Mardan for further processing.

Table 1: Research plan for sample collection

Different Areas	Tap water	Pond water	Drain water	Total
Madina colony	20	10	10	40
Diyal road	20	10	10	40
Zaffarabad	20	10	10	40
Islamia colony	20	10	10	40
D.I Khan city	20	10	10	40
Total	100	50	50	200

2.3 Processing of sample
All the samples were filtered through Wattman filter paper # 42. Then the residual solid particles containing parasites were collected from the filter paper and stored at 4 °C for further processing.

2.4 Parasite detection
The detection of parasite was observed by means of microscopy. The slides were prepared from the samples and properly stained. Then the prepared slides were examined under the microscope for parasite detection.

2.5 Staining procedure
First of all placed a drop of water sample on a clean slide. Then left the slide to air dry for 10 to15 minutes. Then poured a drop of methanol on the slide for fixation. When the slide was dried, then poured a drop of Giemsa stain on it and left for 5 minutes. After that slide washed with distilled water.

3. Results
A total of 200 water sample were collected from tap water, pond water and drain water located at Madina colony, Diyalroad, D.I Khan City, Islamia colony and Zaffarabad from July to September 2016. The prevalence (%) of *Giardia*, *Cryptosporidium*, *Toxoplasma gondii*, *Balantidium coli*, *Fasciola hepatica and Entamoeba histolytica* in each category of water samples were determined. An overall prevalence of *Giardia* in water samples was 18.5% (30/200) and similarly, Cryptosporidium 19.5% (14/200), *Toxoplasma gondii* 2.8% (3/200), *Fasciola hepatica* 4.8% (4/200), *Balantidium coli* 5.78% (9/200) and *Entamoeba histolytica* 18.8% (32/200) were determined, all the results of water analysis of all the selected area were shown in table 1-5 and figure 1.

Table 2: Analysis of Madina and Diyal road water for parasite.

	Madina colony					Diyal road				
S. No	**Tap water**	**Pond water**	**Drain water**	**Sub total**	**%**	**Tap water**	**Pond water**	**Drain water**	**Sub total**	**%**
Giardia	2 20	2 10	3 10	7 40	17.5% 18.5%	2 20	2 10	2 10	6 40	15% 18.5%
Cryptosporidium	1 20	3 10	2 10	6 40	15% 19.5%	2 20	2 10	1 10	5 40	12.5% 19.5%
Entamoeba histolytica	1 20	3 10	3 10	7 40	17.5% 18.5%	2 10	2 10	2 10	6 40	15% 18.8%
Toxoplasma gondii	0	0	1	1 40	2.5% 2.8%	0 20	1 10	0 10	1 40	2.5% 2.8%
Balantidium coli	1 20	0 10	1 10	2 40	5% 5.8%	0	2	0	2 40	5% 5.8%
Fasciola hepatica	0 20	1 10	0 10	1 40	2.5% 4.8%	0 20	0 10	0 10	0 40	0% 4.8%

Table 3: Analysis of Zaffarabad and Islamia colony water for parasite

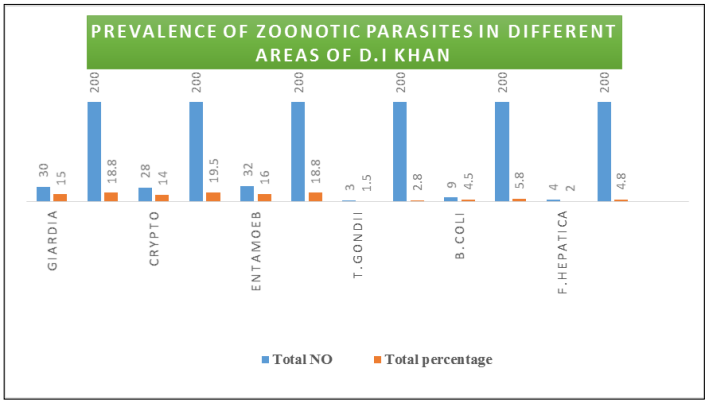
	Zaffarabad					Islamia colony				
S. NO	**Tap water**	**Pond water**	**Drain water**	**Sub total**	**Percentage**	**Tap water**	**Pond water**	**Drain water**	**Sub total**	**Percentage**
Giardia	2 20	1 10	2 10	5 40	12.5% 18.5%	1 20	0 10	5 10	6 10	15% 18.5%
Cryptosporidium	1 20	2 10	2 10	5 40	12.5% 19.5%	2 20	1 10	4 10	7 40	17.5% 19.5%
Entamoeba histolytica	1 20	3 10	2 10	6 40	15% 18.8%	2 20	3 10	2 10	7 40	17% 18.8%
Toxoplasma gondii	0 20	0 10	0 10	0 40	0% 2.8%	0 20	0 10	1 10	1 40	2.5% 2.8%
Balantidium coli	0 20	1 10	1 10	2 40	5% 5.8%	0 20	1 10	0 10	1 40	2.5% 5.8%
Fasciola hepatica	0 20	1 10	0 10	1 40	5% 4.8%	0 20	0 10	1 10	1 40	2.5% 4.8%

Table 4: Analysis of D.I. Khan city water for parasites

D.I. Khan City					
S. NO	**Tap water**	**Pond water**	**Drain water**	**Sub total**	**Percentage**
Giardia	1 20	2 10	2 10	5 40	12.5% 18.5%
Cryptosporidium	2 20	2 10	1 10	5 40	12.5% 19.5%
Entamoeba histolytica	1 20	4 10	1 10	6 40	15% 18.8%
Toxoplasma gondii	0 20	0 10	0 10	0 40	0% 2.8%
Balantidium coli	0 20	1 10	1 10	2 40	5% 5.8%
Fasciola hepatica	0 20	1 10	0 10	1 40	5% 4.8%

Table 5: Prevalence of zoonotic parasites in different areas of D.I Khan.

S. N0	Total NO	Total percentage
Giardia	30 200	15% 18.5%
Cryptosporidium	28 200	14% 19.5%
Entamoeba histolytica	32 200	16% 18.8%
Toxoplasma gondii	3 200	1.5% 2.8%
Balantidium coli	9 200	4.5% 5.8%
Fasciola hepatica	4 200	2% 4.8%



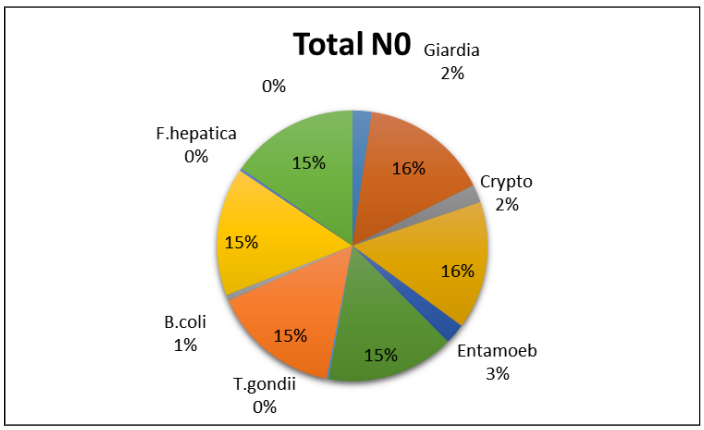


Fig 1: Prevalence of zoonotic parasites in different areas of D.I Khan.

4. Discussion

Giardia cysts and Cryptosporidium oocysts were found in tap water, pond water and drain water in areas of D.I Khan. Of all the samples, 60% (120/200) contained protozoa. Amongst these Giardia was 18.5% (30/200) and Cryptosporidium was 19.5% (14/200) the numbers of cysts and oocysts were dependent on the type of water source with low prevalence of parasites in tap water than in pond water and drain water.

This study showed the presence of *Giardia* cysts and *Cryptosporidium* oocysts in tap water, pond water and drain

water. Our findings confirm the findings of clinical studies that have shown the presence of these two parasites in the population. Both *Giardia* spp. and *Cryptosporidium* spp. are known to cause gastroenteritis and are considered two of the leading causes of waterborne diseases in the United States as reported by the Centers for Disease Control and Prevention [6]. A similar study was conducted in Srilanka that showed the levels and concentrations of *Giardia* spp. and *Cryptosporidium* spp. were higher than the result of the present studies from other countries [7-9]. This could be due to the environmental and geographical distribution of the country and locality.

In the present study, *Toxoplasma gondii* oocysts and *Balantidium coli* were found in all the water sources and were most numerous in pond water and drain water. The overall prevalence of *Toxoplasma gondii* was 2.8% (3/200), high prevalence was recorded in pond water 3.3% (5/150) and drain water 3.3% (5/150). While the lowest prevalence was recorded in tape water 2% (3/150). The prevalence of *Balantidium coli* was 5.7% (9/200). The highest prevalence was recorded in Drain water, i.e. 10%(15/150), followed by pond water 6.6%(10/150) and the lowest was recorded in tape water 0.6%(1/150). Fayer *et al* [10]. (2004) have reported that *Toxoplasma gondii* mainly spread by ingesting water contaminated with oocysts from the feces of infected cats. Recently, waterborne transmission of *T. gondii* was considered uncommon, but a large human outbreak linked to contamination of a municipal water reservoir.

In the present study, *Fasciola hepatica* and *Entamoeba histolytica* trophozoites and cysts/eggs were found in all the water sources. The overall prevalence of *Fasciola hepatica* was 4.8%(4/200), while highest prevalence was recorded in Drain water 6.6%(10/150), followed by pond water 6%(9/150) and the lowest was recorded in tape water 2%(3/150). The prevalence of *Entamoeba histolytica* was 15.8% (32/200). The highest prevalence was recorded in drain water 22%(33/150), followed by pond water 20%(30/150), while the lowest was recorded in tape water 14.6%(22/150). The presence of these parasites in the water samples was supported by Wallis *et al*. [11] (1996) who claimed that the parasitic protozoa increased in late winter and the beginning of spring in spite of its presence all over the year. Our findings were supported also by Hernandez-Chavarria and Avendano [12] (2001), who reported the presence of *E. histolytic*a and *E. coli* in samples of sewage waters and stools. Possible sources of water contamination in this study area include both human and animal (buffalo, cattle and sheep/goats), since animal sources are known to be important in the introduction of these protozoa to a water system [8].

5. References

1. Baloch MK, Jan IU, Ashour ST. Effect of septic tank effluents on quality of ground water. PJFS, 2000; 10(3-4):31-34.
2. Khan M, Ihsanullah Sharafat T, Mehmud F, Sattar A. Occurrence of pathogenic microorganisms in food and water supplies in different areas of Peshawar, Nowshehra and Charsada. PJFS. 2000; 10(3-4):31-34.
3. Savioli L. Giardia and Cryptosporidium join the. Neglected Diseases Initiative. Trends Parasitolology, (in press) 2004.
4. Kramer MH, Quade G, Hartemann P, Exner M. waterborne diseases in Europe-1986-96.J. Am. Water Works Assoc, 2001; 93:48-53.
5. Slifko TR, Smith HV, Rose JB. Emerging parasite zoonoses associated with water and food. IJP, 2000; 30:1379-1393.
6. Furness B, Beach M, Roberts J. Giardiasis surveillance in United States, 1992-1997. Morbidity and Mortality Weekly Report, 2000; 49:1-13.
7. Solo GHM, LeRoy AA, Fitzgerald LJ, Dubon JM, Neumeister SM, MK Baum. Occurrence of Cryptosporidium oocysts and Giardia cysts in water supplies of San Pedro Sula, Honduras. Revista Panamericana de Salud Publica, 1998; 4:398-400.
8. World Health Organization. Guidelines for Drinking-water quality. 3rd edition, Geneva. 2004, 121-144.
9. Quintero BW, de Ledesma L. Descriptive study on the presence of protozoan cysts and bacterial indicators in a drinking water treatment plant in Maracaibo. IJHER, 2000; 10:51-61
10. Fayer R, Jitender Dubey P, David SL. Zoonotic protozoa from land to sea, TP, 2004; 20:531-536.
11. Wallis PM, Erlandsen SL, lsaac RJL, Olson ME, Robertson WJ, Vankeulen H. Prevalence of Giardia Cysts and Cryptosporidium oocysts and characterization of Giardia spp. Isolated from drinking water in Canada. AEM, 1996; 62:2789-2797.
12. Hernandez CF, Avendendo L. Simple modification of the Baermann method for diagnosis of Strongyloidiasis. MemInst Oswaldo Cruz, Rio de Janeiro. 2001; 96:805-807.