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Prevalence of intestinal parasites found in Al-Razazza Lake, Iraq

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Key words: Protozoa, *Ascaris*, *Cryptosporidium*, *Strongyloides*, *Hymenolepis nana*, *Balantidium coli*

Abstract

The current study revealed to contamination of fresh water with twelve genus and species of parasites and protozoa: *Ascaris lumbricoides* (28%), *Toxocara canis* (7.5%), *Strongyloides* sp. (9.3%), Rhabditae larvae (8%), *Hymenolepis nana* (18.6%), *Cryptosporidium* sp. (33.3%), *Giardia lamblia* (22.6%), *Entamoeba histolytica* (12%) , *Entamoeba coli* (20.6%), *Balantidium coli* (11.8%), *Coleps hirtus* (30%), and *Nyctotherus ovalis* (10.6%) in all studied areas for the first time. Significant differences at the rate of pollution in fresh water with parasites and protozoa among studied areas.

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Introduction

Water pollution is still the important point in public health of human and animals that causing many disease and death in the entire world (Pink 2006). West 2006 was account for 14,000 or more human deaths daily. Previous study of Razazza Lake by Al Jwahery and Hmeed, 2015 who aimed to pollution which has resulted from population activities affecting the quality of the streams of Al Hussenia River the results show an increase in some physical and chemical properties of the water of the two streams. However, there is no survey for pathogen in their areas.

The contaminations of community water systems may lead to Outbreaks have the potential to cause disease in large number of consumers (Barwick *et al*., 2000). Water borne parasites are ubiquitous protozoan parasites that affect humans, domestic animals and wildlife throughout the world. At least 325 water associated outbreaks of parasitic protozoan diseases have been reported worldwide (Kramer *et al*., 2001). Razzaza lake water temperature (15–31) C^{o}, DO (4.05–7.3)mg/l, salinity (1.98–2.52) ppt., TSS (4748–8157)mg/l, pH (5.11–8.7)(Hashim and Al-Taee, 2015); These climatic conditions are suitable for survival pathogen that affect public health. The study area was chosen for its importance in pumping drinking water to Karbala province in addition to swimming by some young people and teenagers. The aim of current study to demonstrate the prevalence of protozoa and parasites in fresh and semi salt water in study area for first time which is considered a public health hazard for drinking or swimming.

Materials and methods

Study area

Razazza Lake is located in Karbala province, Fresh water samples were collected from five tertiary zones area as follow:

A- Karbala main drainage/Hi Al Abaas/Road of Karbala, Baghdad.

B- Al Hussenia River/Al Rawdatain/Karbala Al Hurr Tourist Road.

C- Karbala main drainage/Baghdad Al Hurr Road/Al Jamalia.

D- Al Hussenia River/The intersection of Al Jamalia/Al Hurr area/Al Hurr Road/ Al Jamalia.

E- Al Hussenia River/Intersection of Al - Hurr Road Baghdad.

Samples collection

A total of 150 water samples were collected from the five areas mentioned above 30 samples from each one in a clean and sterilized bottle from May to October 2017. The samples were labeled with name of area and the date of collection, and were transported to the Iraq Natural History Research Center and Museum, University of Baghdad for testing, staining with Zeal Nelson and diagnosis.

Results

The current study recorded twelve genus and species of parasites and protozoa: *Ascaris lumbricoides* (28%), *Toxocara canis* (7.5%), *Strongyloides* sp. (9.3%), Rhabditae larvae (8%), *Hymenolepis nana* (18.6%), *Cryptosporidium* sp. (33.3%), *Giardia lamblia* (22.6%), *Entamoeba histolytica* (12%), *Entamoeba coli* (20.6%), *Balantidium coli* (11.8%), *Coleps hirtus* (30%) and *Nyctotherus ovalis* (10.6%) in all studied areas.

Significant differences at the rate of pollution in fresh water with parasites and protozoa among studied areas. Area A recoded high rate 91.9% while area B lowest rate 8.3% Table 1 & Fig. 1-12.

Table 1. Prevalence of parasites and protozoa in raw water of studied areas.

Species	Class	Stage	Area 1	Area 2	Area 3	Area 4	Area 5	%
Ascaris lumbricoides	Nematode	Egg	18	---	15	---	9	28
Toxocara canis	Nematode	Egg		---	---	---	---	7.3
Strongyloides sp.	Nematode	Egg	11	---	5	---	---	9.3
Rhabditae	Nematode	Larvae	9	---	4	---	---	8

Hymenolepis nana	Cestode	Egg	8	---	---	11	---	18.6
Cryptosporidium sp.	Protozoa	Oocyst	17	6	17	4	3	33.3
Giardia lamblia	Protozoa	Cyst	20	---	11	6	5	22.6
Entamoeba histolytica	Protozoa	Cyst	12	---	---	---	8	12
Entamoeba coli	Protozoa	Cyst	10	---	13	---	6	20.6
Balantidium coli	Protozoa	Ciliate	12	---	4	---	4	11.8
Coleps hirtus	Protozoa	Ciliate	9	---	---	---	20	30
Nyctotherus ovalis	Protozoa	Ciliate	25	---	---	16	---	10.6
Total of species		12	11	1	7	4	7	
Percentage of pollution/area			91.6	8.3	58.3	33.3	58.3	

*Significant difference among studied areas p< 0.01.

Fig. 1. *Ascaris lumbricoides* egg, direct from water, 40X.

Fig. 2. *Toxocara canis* egg, direct from water, 40X.

Fig. 3. *Strongyloides* sp. egg direct from water, 40X.

Fig. 4. Rhabditae larva, direct from water, 10X.

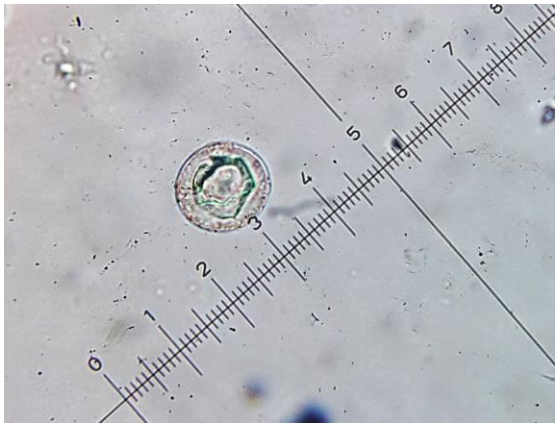

Fig. 5. *Hymenolepis nana* egg, direct from water, 40X.

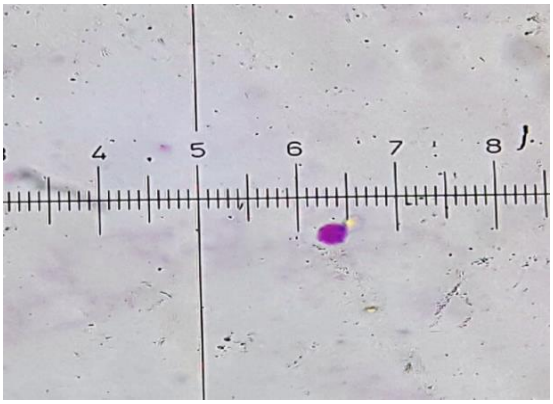

Fig. 6. *Cryptosporidium* sp. oocyst, Zeal Nelson stain, 40X.

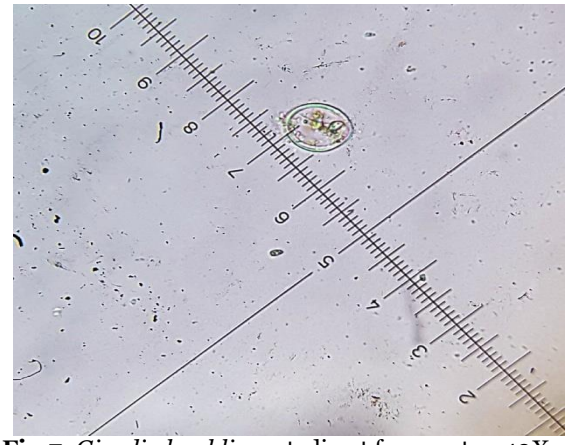

Fig.7. *Giardia lamblia* cyst, direct from water, 40X.

Fig. 8. *Entamoeba histolytica* cyst, direct from water, 40X.

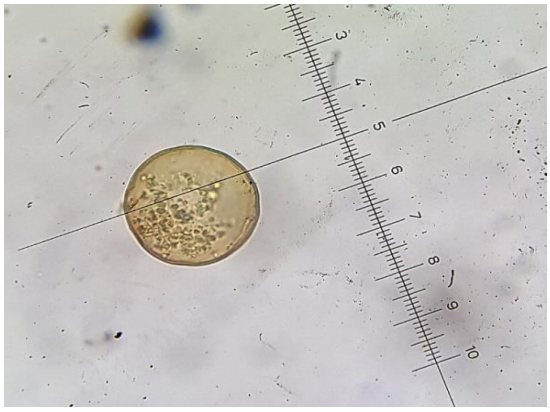

Fig. 9. *Entamoeba coli* cyst, direct from water, 40X.

Fig. 10. *Balantidium coli* cilia, direct from water, 40X.

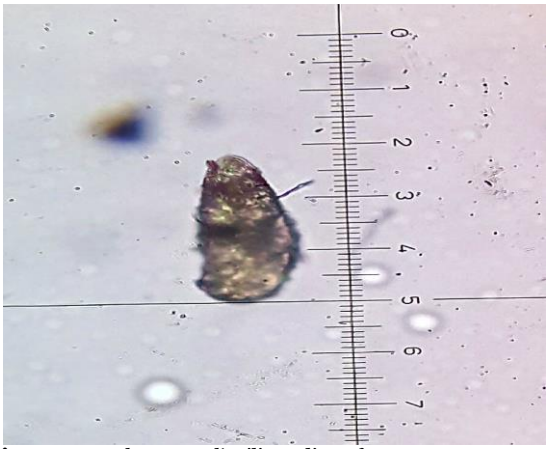

Fig. 11. *Nyctotherus ovalis* ciliate, direct from water, 40X.

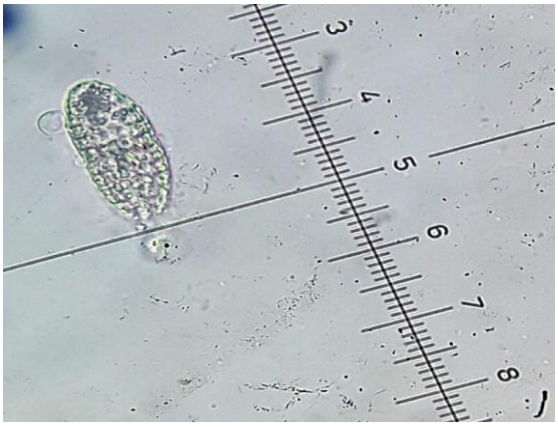

Fig. 12. *Coleps hirtus* ciliate, direct from water, 40X.

Discussion

The current study revealed to contamination of fresh water with twelve genus and species of parasites and protozoa with different rates among studied areas. That difference is due to the mixing of the sewage with the entrances of the rivers in some areas.

This topic point for public health for human and animals both, that similar to Dubey *et al.*, 2005 who revealed to the contamination from sewage discharges and wild or domestic animals is important source for pollution water. The studied areas were selected (for the first time) for its importance in both drinking and swimming.

The results of current study were similar to a previous study in the province of Babylon, the emergence of common six types of parasites are: *Giardia lamblia, Cryptosporidium* sp. *Entamoeba coli , Balantidium coli, Hymenolips nana and Entamoeba histolytica* were repeated with the study of Al-Dulaimi, 2013 in drinking water of Babylon province; That revealed to risk on public health.

Cryptosporidium sp. appeared in all studied areas and recorded high prevalence 33.3% in the current study that was similar to Hadi & Makawi 2013, who recorded 31.6% in fresh water of Tigris River; Then, Hadi 2014 found *Cryptosporidium* sp. in drinking water in Baghdad city. The current study pointed to water pollution with *Entamoeba histolytica* 12% and *Giardia lamblia* 22.6%, Which is a significant result; It seems that E*ntamoeba histolytica* and *Giardia lumblia* were endemic in Karbala province where Recently, Al Saqur, *et al*., (2017) revealed that the infection rate of people in Karbala province were 7080 (9.8%) 3493 (4.8%) in *Entamoeba histolytica* and *Giardia lamblia* respectively.

Entamoeba coli 20.6% in current study was similar to Al-Dulaimi 2013, who recorded *Entamoeba coli* 19.5% in tank water, rivers and wells water in three districts (Abi-Gharaq, Al-Kefel and Al-Neil) in suburban of Babylon. The appearance of *Ascaris lumbricoides* 28% in water indicates its contamination with human stool that mean contamination with sewage that risk especially for swimmer in studied areas (Hernandez-Chavarria and Avendano, 2001).

The appearance of *Toxocara canis* 7.3% in area A only indicates to polluted water with dogs feces, the sources of water contamination including both human and animal sources are known to be important in the introduction of pathogen to a water system (WHO, 2004). *Strongyloides* sp. appeared in two stages egg and Rhabditiform larva 9.3% + 8% respectively. This result was similar to Hadi & Macawi 2013 who found it in Tigris River.

The presence of *Coleps hirtus* in studied areas was similar to Zahraa 2013, who studied the protozoa community of the water and sediment at Tigris river bank in Baghdad city. This ciliate protozoa was living free in fresh water but Szekelyl and Magdolna, 1992 recorded as ectoparasite to fish and lead to death. This ciliate was attached to the epithelium with their cytostoma and often covered the body surface in large masses. Previously known only as a coprophagous species or a predator of protozoans.

Nyctotherus ovalis appeared in D Area only that indicated to large amount of Cockroach *Periplaneta Americana* in the fresh water which harbor this ciliate in their gut, (Al-Mayali and Al-Yaqoobi, 2010). This result may be attention point because the insects vector reproduction and outbreak fastness in summer season like a housefly and cockroach (Al-Zubaidy and Aubaid, 1996). Urban drainage systems also aim to avoid damage from flooding after rainfall (Butler and Davies, 2004).

The current study concluded that fresh water of these five studied areas harbor many pathogen and the water inadvisable for drinking without treatment and inadvisable for swimming for all ages especially children (Al-Haidari *et al*., 2000). Abu Mourad 2004, pointed to the malnutrition and water contamination with different pollutant responsibly to caused many parasitic infections. In addition to the sanitation and low of personality of cleaning (Al-Dulaimi, 2007) and many of people living in these areas were countryside and farmers lead to incidence of these parasites (Al-Mosa, 2002).

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