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Distribution of Protozoan parasites in Drinking Water in Some Regions of Basra Province

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Abstract: *The aims of this study to identified and evaluate the prevalence of drinking water contamination with pathogenic protozoan parasites. A total of102 water samples were collect from three different sources of drinking water(34 plastic bottled , 32 samples house tank and 36 samples tap water , were collected from the house distributed by two regions, Al-Shamshomia and Al-Zubir) in Basrah province, during the period of July to November 2018. Water samples were examined by direct method and by sedimentation and floatation methods. From 102 water samples45%in which Entamoeba histolytica is the most common parasites that were detected in39% water samples followed by Cryptosporidium sp.18% and then other types of algae and parasites but in lower rates.*

Keywords: *Prevalence, Water Sources, Protozoa, Basra.*

I. INTRODUCTION

Water is used for much more than drinking, it is used for irrigation and livestock watering in agriculture, swimming and boating in recreation or for industrial activities such as pulp and paper production, it is important that drinking water is kept clean, safe and reliable (Hadi and Faraj,2008).While contamination the water from sewage discharges and wild or domestical animals are important sources for untreated water (Dubey *et al*., 2005). Water-borne diseases occur worldwide and outbreaks caused by the contamination of community water systems have the potential to cause many diseases in large number of consumers (Barwick, *et al*., 2000). At least 325 water associated outbreaks of parasitic protozoan diseases have been reported worldwide (Kramer *et al*., 2001).But Possible sources of water contamination including both human and animals sources are known to be important in the introduction of protozoan to a water system (WHO, 2004). Some contaminants result in acute effects. There is a direct relation between the prevalence of some parasitic diseases and the prevalence of that etologic agent in water (Yousefi, *et al*., 2009).

In Iraq little is known about the transmission routes of *Entamoeba* Spp. and some other intestinal parasitic diseases which are endemic in country according to surveillance studies, therefore, the present study was conducted to exam tap water,house tank waterand the main sources of drinking water to check their role in the transmission of parasitic pathogens.

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II. MATERIALS AND METHODS

The study was carried on water samples from Basrah province. A total of 102 water samples were collected from three sources34Plastic bottled drinking waters; 32 samples house tank waterand36 sample stap water were collected from the house distributed by two regions Al-shamshomia and Al-Zubir. Also the water samples collected in clean and sterilized disposable plastic bottles, the samples were labelled with date of collection and site of collection and transported to the laboratory of parasites for examination. Whilst the water samples were examined by direct method and by sedimentation and floatation methods. And Slides were prepared and examined under compound microscope, the prevalence of parasites in water samples were determined. Therefore the chisquare(χ^2) test was used as a test of significance. Also the data were analyzed by using SPSS.

III. RESULTS

The contamination rates of the parasites in tap water 83% among province 36 samples from two regions Al-shamshomia and Al-Zubiar at Basrah while the contamination rates in house tank water 19% among 32 samples and the contamination rate of the parasites in Plastic bottled drinking waters29% among 34 different samples (Table 1 and Figure 1).

Table 1: Distribution of Parasites in Water Among Three Sources Water in Basrah Province.

Sources of water	No. of Examined samples / L	No. of positive samples	Percentage of positive samples
Tap water	**36**	**30**	**83%**
House tank water	**32**	**6**	**19%**
Plastic bottled drinking waters	**34**	**10**	**29%**
Total	**102**	**46**	**45%**

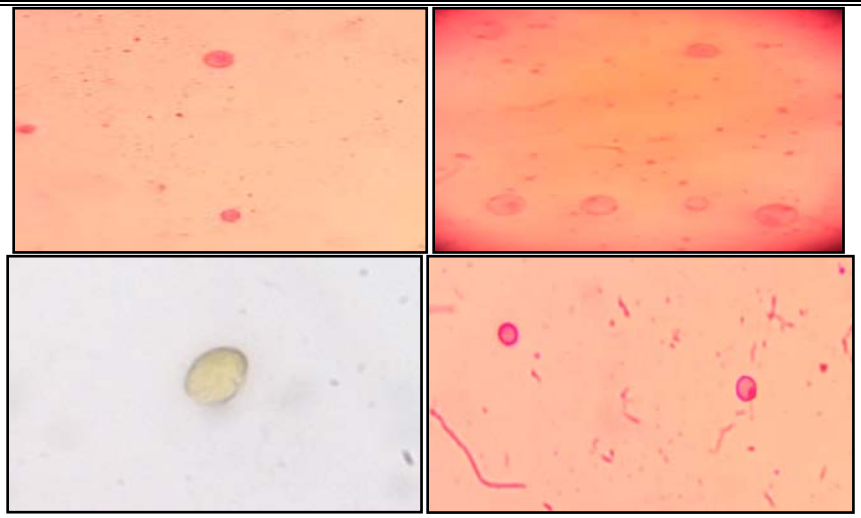

Figure (1): Some of Types of Parasites Staining with Modified Zeihl Neelsen 100X

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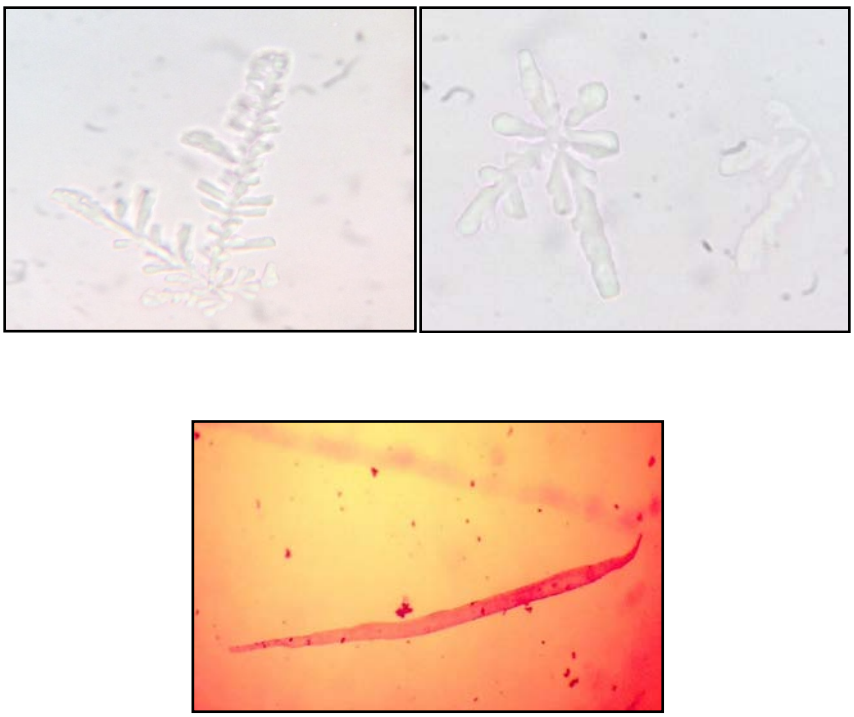

Figure (2): Some of Types of Algea Isolated from Drinking Water.

Magnification 100x oil Immersion

Entamoeba histolytica is the most common parasites that were detected in 39% water samples followed by *Cryptosporidium sp.*18% and then other types of pathogenic parasites but in lower rates. Statistically, there were significant differences ($p<0.01$) among the rates of three contamination types (Table 2).

Table (2): Prevalence of Contamination in Drinking Water According to Type of Parasites in Basrah Province

Parasites	Tap water	House tank water	Reverse Osmosis water	Percent of infected samples
Entamoeba histolytica	**30**	**10**	**-**	**39%**
Cryptosporidium sp.	**12**	**-**	**6**	**18%**
Entamoeba coli	**4**	**6**	**-**	**10%**
Cyclospora sp.	**4**	**-**	**-**	**10%**
Giardia lumbila	**4**	**-**	**-**	**4%**
Algae (diatoms)	**20**	**6**	**10**	**35%**

IV. DISCUSSION

Water supply systems in Iraq sustained major damage brought about by wars, economic sanctions, looting of

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equipment and failure to carry out regular maintenance and quality control testing and monitoring, in spite of Iraq has two major natural water sources, namely the Tigris and Euphrates rivers; Iraqi southern marshes which form a triangle region bound by three major southern cities, Thi-Qar to the west, Maysan to the northeast and Basrah to the south(Jarallah,2016).

Out of 102 water samples 46 were contaminated with different types of parasites with algae were contaminated with infective stages of protozoa of pathogenic parasites. While the high rates of water contamination observed in tap water83% followed by 29% andhouse tank water19% these are due to lake of healthy drinking water, low socio-economic status and contamination water supply (Thresa, 2000; Al-Fahdawi, 2002andYousefi, *et al.*,2009). But in the present study, five different types of parasitic were determined from the water samples. *Entamoeba histolytica* is the most common parasites that was detected in water samples 39%, followed by *Cryptosporidium sp.*18% and low rate of *Giardia lumbila* 4% also sample drinking water contamination with algae 35% same results were indicated by Al-Fahdawi (2002) and Shaikh *et al*. (2009). Many studies demonstrated that water is a major sources of amebias is and giardias is (Theresa, 2000; Al-Fahdawi, 2002; Shaikh, 2009; Yousefi, *et al*., 2009). In this study, the main protozoan parasites are *Entamoeba histolytica*, *Entamoeba coli*, *Giardia lumblia*, *Cryptosporidium sp.* And these protozoan parasites are regarded as water born pathogenic in development countries (Athari, 1986and Yousefi, *et al.* 2009). In the current study, the drinking water contamination of *C. parvum* was 18%,in contrastwith recent study in Pakistan *C. parvum* was 19.5% in tap water, pond and drain water (Ayaz *et al*. 2011).There are many factors effect on parasitic infection, animal domestic wastewater, poor life, lake hygiene and water supplying play an important roles in increased the parasitic infection (Mahdi & Jassim, 1987 ; Jarallah, 2012).

الخلاصة

تهدف الدراسة الحالية إلى اكتشاف وتحديد نسبة انتشار الطفيليات في مياه الشرب ، حيث تم جمع 102 عينة ماء من ثلاثة مصادر مختلفةمن مياه الشربفي محافظة البصرة خلال المدة الممتدة من شهر حزيران وحتى شهر تشرين الأول 2018،حيث تم فحص عينات المياه بواسطة الطريقة المباشرة وبواسطة طرق التطويف والترسيب. من مجموع 102 عينة ماء مفحوصة وجد ان نسبة تلوث العينات بالطفيليات والطحالب بلغت % 45 وتعد *Entameoba histolytica*هو أكثر الطفيليات شيوعا% 39متبوعا بطفيلي*Cryptosporidium sp.* الذي بلغت نسبة تلوث المياه 18%، كذلك تم ملاحظة وجود انواع مختلفة من الطحالب وبأعداد قليلة جدا.

V. CONCLUSIONS

The following conclusions are the main findings from the present study:

1. The results showed that *Entamoeba histolytica* is one of the most common parasites associated with diarrhea in drinking water of Basrah.
2. Seasonality of this disease is not clear in the study area, but monthly temperature is indirectly affected on the prevalence of Cryptosporidiosis.
3. Plastic bottled drinking watersare contaminated with parasites.

Recommendations

1. Routine microscopically diagnostic method is recommended and technical medical staff must be trained to diagnose the parasites in water.
2. Used small size that challenges water filtration systems and its high resistance to chlorine disinfected.

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3. Further study for the detection of metazoan parasites in drinking water.
4. Boiled or filtrated all the water are to be drunk or used to prepare food.
5. Used modified Zeihl Neelsen to stains the parasites in the water.

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