The prevalence of Entamoeba histolytica infection in Iraqi infants and children with diarrhea in Diyala province with unusual presentation

Hala Yaseen Kadhem1 and Entisar Mahdi Hamad2* AbeerAaid ABDULAMEER3
1Department of Anatomy, College of Medicine, University of Diyala, Iraq. 2Department of Nursing, Technical Institute Baquba, Central Technical University, Iraq.
3 MSc. Ministry of health/ Diyala Health Department / Al-Batool Hospital

Abstract

It is worthwhile to conduct epidemiological studies to investigate the prevalence fact of *Entamoeba histolytica* in the world. It is no secret that is one of water protozoan parasite which is cause Amebiasis infection is *Entamoeba histolytica*. In Iraq, previously, there was no interest in tracking minor parasitic infections Due to the government's high interest in water sterilization, proper sewage treatment, in addition, the health awareness. Currently, due to poor planning and environmental neglect which led to increase the spread of parasitic diseases especially Amebiasis which is still be an important health problem. However, there was little data on prevalence of this parasite in Iraq. This data was important to take decision in order to assign limited public health resources for treatment and prevention of Amebiasis. therefore, these types of studies could make a strengthen the urgency of this innovation.
In our study, 210 of population have been evaluated and their age was between (1 up to 60 month). Living in diyala province. A questionnaire was organized which include age, sex, residence and general stool examination.The spread of the disease has been linked to the quality of drinking water, food pollution and health situation ignoration. *Entamoeba histolytica* had a high prevalence by impacting high ratio of infants from 1-30 months (82%). the common infection was in the males. In addition, all of participants were urban. In conclusion, local governments and health departments should take the necessary preventive measures to limit the spread of all bacterial or parasite diseases by working hard and diligently to solve such health dilemmas.

Key words: *Entamoeba histolytica*, Prevalence, Age, Sex, Diyala
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Introduction

Amebiasis caused by *Entamoebahistolytica* which is an intestinal parasite exist in Worldwide, several studies have been indicated that *Entamoebahistolytica* is infect 50 million of people and cause 40,000 to 100,000 deaths annually, it is one of the largest cause of mortality from parasitic infection like malaria and schistosomiasis. (1, 2,3). In developing countries Amebiasis is one of the most important health problems (4,5). Environmental conditions play a major role in prevalence of *Entamoeba histolytica*, such as social, economic, demographic and hygiene-related behavior which is effect on the transmission and distribution of parasitic infections (6,7).A numerous studies identified that drinking water quality, ingestion of raw vegetables, place of residence and age as important risk factors (8).Because transmission is frequently associated with contaminated food and water, some researchers speculated that young infants are not expected to develop amebiasis very often. More severe disease is associated with young age, malnutrition and immunosuppression (9). This is contrary to the

results of our current study. the prevalence of Amebiasis in SSA countries, have been reported 30 %,. Numerous studies involving Saudi Arabia and Egypt have classified Amebiasis as a common serious illness. Where studies found that more than 50% of diarrhea infection caused by *E. histolytica*(10) The same is true for Mexico and South America (11). Because of few or no data about the important protozoan infection also the encumbrance of amebiasis figures are an important agent for the allocation of restricted public health purses for efforts at prevention and treatment. In addition, to find out the causes of the spread of the infection. Therefore, we conducted a survey study accompanied by some analysis related to the investigation of *E. histolytica* where our study showed that there is a significant case of Amebiasis in children who are less than sixty months of age at the governorate level, which is contrary with some previous researches

Materials and methods

Our study was carried out at main tertiary care hospital at al-batool hospital throughout the period from January 2021 to May 2021. Infants and children have been chosen between the ages of 1-60 months recruited in the study. The population selection was taken from Diyala district where located in the Southeast part of Baghdad The provinces of central Iraq. Diyala district has a population approximately 1.400 million. The data were taken from 210 patients who have infected by *Entamoeba histolytica*. This study was approved by the research and ethical committee of college of medicine / university of diyala.

Some exclusion criteria were considered which involved; Patients less than 1 month, and more than 60 months, patients who have wasted and nerveless malnourished, immunodeficiency also extra intestinal infection Who have completely recovered. Some cases who are treated before two months have been excluded because we thought these cases may related to Clostridium difficile-associated diarrhea or antibiotic-associated pseudomembranous colitis.

All data have been recorded for our study which included name, age, gender, household use of tap water, address, household sanitary and hygiene conditions, nationality, residence and if there are animals living in their houses or not.

Fecal samples were collected from cases for the ocular and microscopic examination purpose

Results

The data have been collected then analyzed, we found that according to gender, the infected males more than infected females where the males infection reached to 58% while the females were 42% as show in the figure 1.

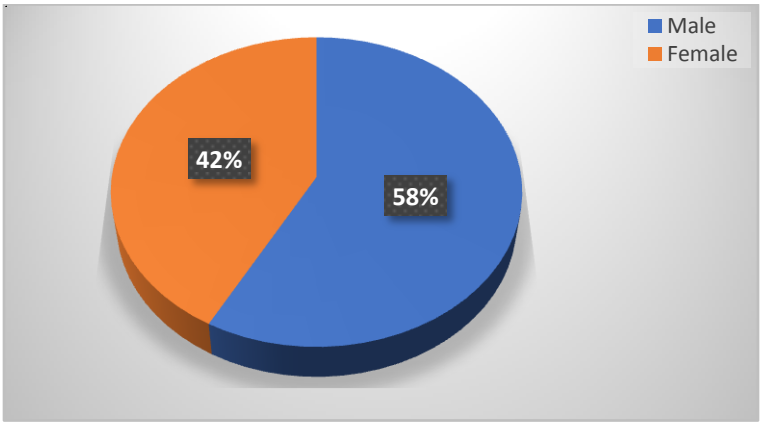

Figure 1: The ratio of male and female who are infected by ***Entamoebahistolytica*** (total patients= 210)

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The number of patients with ***Entamoeba histolytica*** was sorted according to age. Our study found that the largest proportion of patients were from the ages of 11-20 months at a rate of 37%. It was followed by those aged less than 10 months with 23%, then 21-30 months with 22%, while the persons who are aged 41-50 months was 10% and their age 31-40 were 8% as shown in figure 2.

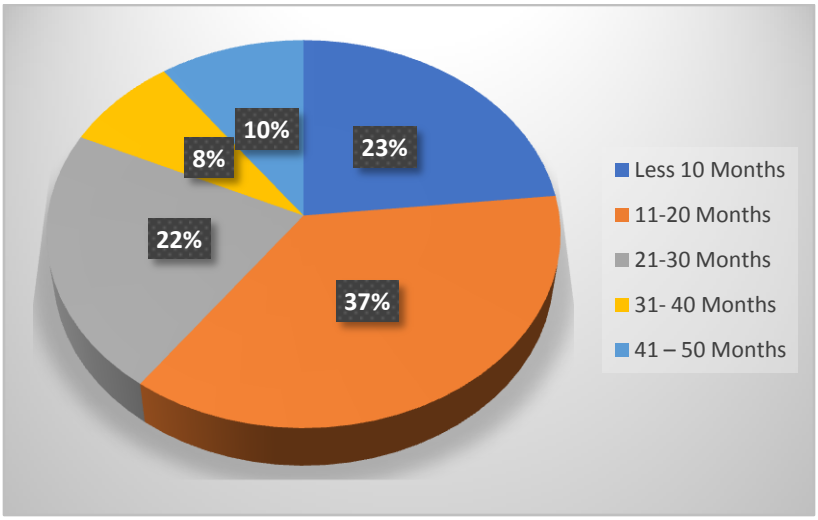

Figure 2: The incidence of ***Entamoeba histolytica*** according to age (total patients= 210)

Surprisingly, most of those infected with ***Entamoeba histolytica*** were from the urban population, the percentage was 73%, while it was 27% among the rural. As in the figure 3.

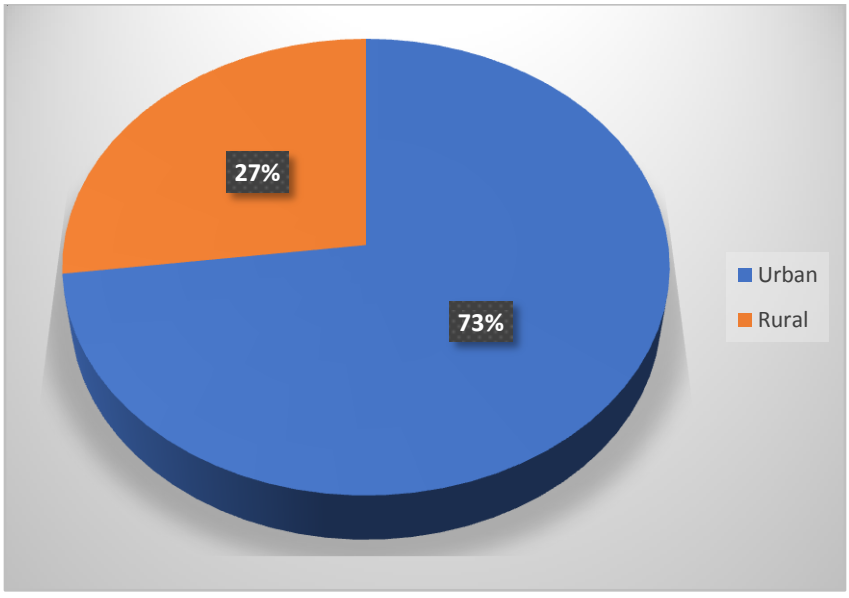

Figure 3: The incidence of Entamoeba histolytica according to address (total patients= 210)

A questionnaire was made about whether there is animal husbandry, the largest percentage of people infected with *Entamoebahistolytica* are non-breeders of animals with a percentage of 71%, while the percentage of non-breeders of infected animals was 29%. As in the figure 4.

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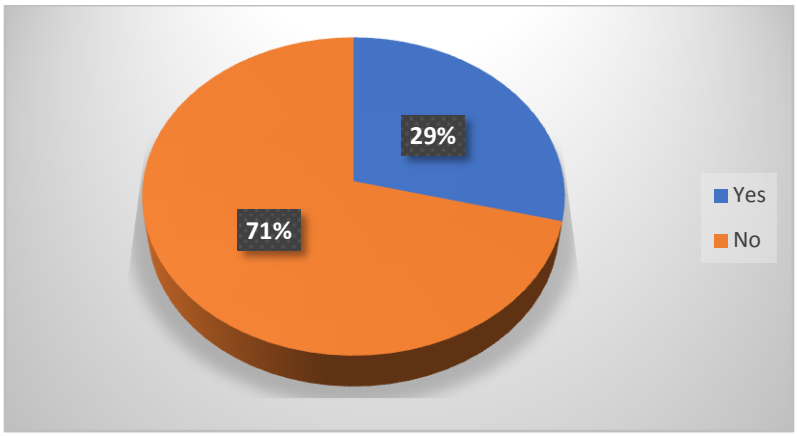

Figure 4: The incidence of Entamoeba histolytica according to animal husbandry (total patients= 210)

A stool sample was taken from each patient for the purpose of examination and evaluation. physically, the feces was watery, the color were different, the brown color of feces were 38%, followed by the yellowish feces 33% and the greenish feces 29% of the infection persons. As in the figure 5.

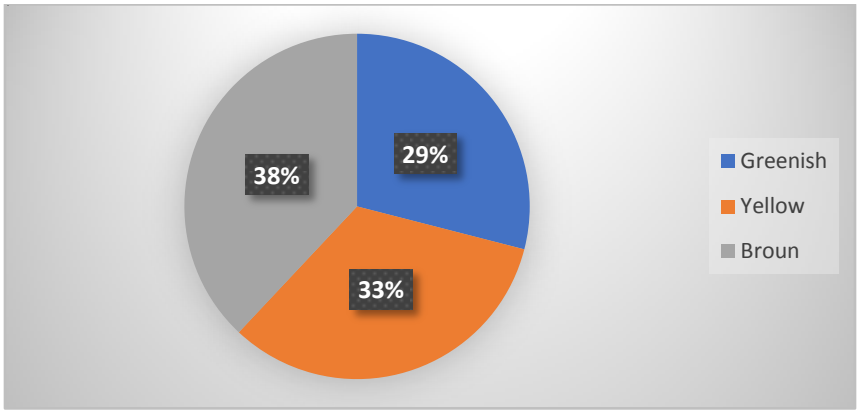

Figure 5: The color of feces in the patients who are infected by Entamoeba histolytica (total patients= 210)

Further more, Pus cells, cyct and red blood cells were investigated in genral stool exam, we found that most of the patients who are infected by Entamoeba histolytica have at least one plus of pus cell in 63.8%, follwoed the the patients who have 2 plus of pus cells in rate of 31.9%. the patients who have more than 3 or 4 plus of pus cells were very little as show in table 1. According to existance of cyct of entamoeba histolytica, 100% of participants who were infected have 1plus of cyct as in table 1. Further more, the red blood cells were exist in feces more than 79% of patients have one plus of red blood cells, followed 12.8% of patients have2 plus of red blood cells and little of patients have 3 or 4 plus of red blood cells. As in the table 1.

Table 1; Pus cell, Cyst and RBCs amount in general stool examination

Plus	**Number**	**Percentage**
Pus cell		
1 plus	134	63.8 %
2 plus	67	31.9 %

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3 plus	5	2.3 %
4 plus	4	1.9 %
CYST		
1 plus	210	100 %
RBCs		
1 plus	167	79.5 %
2 plus	27	12.8 %
3 plus	14	6.6 %
4 plus	2	0.9 %
Total Number 210		

Discussion

The nations evolution describe as the daily concern for the individual life on this earth, all countries, even that exist in third World countries. the most of their important priority is to ensure a healthy, safe, disease-free situation. This succeeds by taking care of the sources of life which involve provide sterilized drinking water, good and clean nutrition, environmental concern, diligent follow-up of kindergartens and primary schools, etc..,. Numerous studies have been confirmed that the most common amoebiasis infections are not transferred by cyst like Entamoeba coli, E. nana, E. hartmanni, all types can infects both of gender and in equally(1). While other studies found that the *Entamoeba histolytica* can infect the males more than females because of their formal structure.

During the past three years, an unusual increase in *Entamoeba histolytica* was observed between the ages of 10-50, and medical statistics in Diyala Governorate / Iraq confirmed this. When following up on amoebiasis infected cases, we found that the percentage of infected males was higher than that of females. One of the most important reasons for this is the inability to track children's behavior and toys over time, as well as contamination of food, clothing and even bedding. Moreover, the hormonal effects are different depending on the gender therefore will effect on the immune system and the accuracy of its effectiveness.

Moreover, the number of patients with *Entamoeba histolytica* who are aged 11-21 months were the vast majority of those less than 10 months also 21-30 months, respectively. This can be explained by the possibility of a moderately active immunity that led to a weak response. This view was consistent with other studies which demonstrated a weak immune response of IgA against the CRD active site of *Entamoeba histolytic* (12). Surprisingly, we found a high incidence of infection in urban areas compared to rural areas. It is unfortunate that the reason is attributed to the lack of services provided at the health and environmental levels, as most urban areas in Iraq suffer from weak health monitoring and follow-up, high environmental pollution, lack of The vegetation led to air and food pollution.

In addition, the vast majority of infected people do not have domestic animals for breeding. This may indicate that there is no relationship between animals and infection.The infection rate of *Entamoebahistolytica* took a complex curve in Iraq, especially in Diyala province. Most studies have indicated that *Entamoeba histolytica* infections have very mild symptoms, up to asymptomatic (13,14). Contrary to what our current study found, where all the

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participants in our study were suffering from abdominal pain with severe or moderate diarrhea that changes color from one person to another, so faecal samples were taken for the purpose of examination under the microscope. Morphologically, most of the samples had brown stool color. This could be explained by an increase in the percentage of bile secretion in the liver to digest fats, or it could be due to disorders resulting from injury in the digestive system. Others had yellow stools. The reason could be different sources of nutrition, or there are physiological problems in the digestive process that interfered with the infection.

The presence of the amount of pus cell, cyst, and RBCs was evaluated. We found that the amount of pus cells, cyst and RBCs are not less than 1 plus (1plus= 10 or more in each field), some of participants were have more than 1plus, indicated that the severity of the *Entamoeba histolytica* infection which led to sever infalmitory of daigestive system.

Conclusion

According to our study, the parasite appeared to pose a new danger to society because of the emergence of severe symptoms and somewhat resistant to treatments. The increase in this strange spread is caused by health and environmental pollution and the lack of interest of local governments in this aspect, which led to an increase in infection. Children's health should be taken care of by ensuring a healthy environment in kindergartens and primary schools. Diligent follow-up of restaurants and shopping stores, spreading health awareness, and issuing preventive instructions that limit the spread of infection.

References

1. Walsh, J. A. 1986. Problems in recognition and diagnosis of Amebiasis: Estimation of the global magnitude of morbidity and mortality. Rev. Infect. Dis. 8:228–238.
2. World Health Organization 1997.. Amebiasis. Wkly Epidemiol Rec 72: 97–100. Parasitol. 110: 331–334. 3. Jackson, T. F. H. G. 2000. Epidemiology, p. 47–63. In J. I. Ravdin (ed.), Amebiasis. Imperial College Press, London, United Kingdom.
3. Haque R, Mondal D, Kirkpatrick BD, et al. Epidemiologic and clinical characteristics of acute diarrhea with emphasis on *Entamoeba histolytica* infections in preschool children in an urban slum of Dhaka, Bangladesh. Am J Trop Med Hyg. 2003;69:398-405.
4. World Health Organization. 2005. Global water supply and sanitation assessment 2000 report. World Health Organization, Geneva, Switzerland.
5. Norhayati M, Fatmah MS, Yusof S, Edariah AB. Intestinal parasitic infections in man: a review. Med J Malaysia. 2003;58:296-305.
6. World Health Organization. 1997. Amebiasis. Wkly. Epidemiol. Rec. 72:97-99. [PubMed] [Google Scholar].
7. Benetton ML, Goncalves AV, Meneghini ME, Silva EF, Carneiro M. Risk factors for infection by the *Entamoeba histolytica/E. dispar* complex: an epidemiological study conducted in outpatient clinics in the city of Manaus, Amazon Region, Brazil. Trans R Soc Trop Med Hyg. 2005;99:532-40.[Links].
8. Ilikkan DY, Ilikkan B, Vural M. Amebiasis in infancy in the middle-high

eISSN 1303-5150

socioeconomic class in Istanbul, Turkey. Pediatr Infect Dis J. 2005;24:929-30.

9. Hotez, P.J., Kamath, A. 2009. Neglected tropical diseases in sub-Saharan Africa: Review of their prevalence, distribution and disease burden. PLoS Neglected Tropical Diseases 3:8.
10. Mote, K.E., Makanga, B. and Kisakye, J.J.M. 2005. Prevalence of intestinal parasites among school children in Moyo district, Uganda. Health Policy and Development Journal.3:2.
11. Haque, R., Mondal, D., Duggal, P., Kabir, M., Roy, S., Farr, B. M., … Petri, W. A. (2006). *Entamoeba histolytica Infection in Children and Protection from Subsequent Amebiasis. Infection and Immunity, 74(2), 904–909.* doi:10.1128/iai.74.2.904-909.
12. Gatti, S., G. Swierczynski, F. Robinson, M. Anselmi, J. Corrales, J. Moreira, G. Montalvo, A. Bruno, R. Mascrati, Z. Bisoffi, and M. Scaglia. 2002. Amebic infections due to the *Entamoeba histolytica-Entamoeba dispar* complex: a study of the incidence in a remote rural area of Ecuador. Am. J. Trop. Med. Hyg. 67:123-127. [PubMed] [Google Scholar].
13. Jackson, T. F., V. Gathiram, and A. E. Simjee. 1985. Seroepidemiological study of antibody responses to the zymodemes of *Entamoeba histolytica*. Lancet i:716-719. [PubMed] [Google Scholar].
14. Haque R, Mondal D, Kirkpatrick BD, et al. Epidemiologic and clinical characteristics of acute diarrhea with emphasis on *Entamoeba histolytica* infections in preschool children in an urban slum of Dhaka, Bangladesh. Am J Trop Med Hyg. 2003;69:398-405.