



Study prevalence of *Entamoeba histolytica* and its effect infection on the rate of red blood cells in Kirkuk city

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Abstract: The current study aimed to determine the extent of infection with *Entamoeba histolytica* among residents of Kirkuk city who visitor Kirkuk General Hospital, the total number of those examined was 60 individuals, including males and females, and for the age groups (1-40).

Microscopic examination of stool samples was done for detectin *Entamoeba histolytica*. The results showed that rate of infection with this parasite was 78%, infection with this parasite is affected with several factors such as gender, as the infection rate in males increased and reached 81%, and the infection rate in females was lower reached 75%, the reason for the high rates of parasitic infection in males is attributed to the behavior of males in dealing with the environment surrounding them because working conditions abroad. According to infection with this parasite to age group there was a clear differences, it recorded the highest infection rate in the age group (1-10) years it reached 83%, while the lowest infection rate was among people aged (20) and (40) years it reached 73%.

It was also shown that infection with the dysentery amoeba parasite causes a decrease in red blood cells in males and females, as it was recorded at (4.63) cells/mcL and (3.91) cells/mcL respectively.

Keywords: *Entamoeba histolytica*, red blood cells, kirkuk.

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Introduction

Amoebiasis is caused by *Entamoeba histolytica* parasite that lives in the lumen of the host's large intestine and feeds on the mucous membrane of the large intestine and red blood cells, these parasites secrete enzymes that break down the mucous membrane of the large intestine, and they go deep into the intestinal wall, destroying its cells and forming painful ulcers. Thus, dysentery occurs (Mortimer& Chadee, 2010).

Entamoeba histolytica lives in two forms the active phase of the life cycle trophozoite in which the amoeba is able to move and reproduce, but it does not transmit the disease. The other form is cyst a form in which it is immobile, but is able to withstand the harsh living conditions surrounding it (Bruckner,1992).

Amoeba becomes large in size in intestine where ranging in diameter from 30-40 microns, and inside each vesicle there are four nuclei, this amoeba vesicles come out with the stool of a sick person which transmitted to food and drink by flies and cockroaches, and when a healthy person swallows it the infection occurs and the disease spreads (Kantor, 2018).

Amoeba transmission usually does not cause any disease and is not accompanied by any symptoms, but amoeba can cause

dysentery in people with a weak immune system and in men who engage in homosexual relations (Marie& Petri ,2014).

Red blood cells contain the pigment hemoglobin, which is the protein that carries iron in the blood. It is found in the red blood cells of vertebrates, and represents about 94% of the dry components of red blood cells(Ford,2013).

The normal range of red blood cells for adult men is usually between 4.7 - 6.1 million red blood cells / microliter of blood, and the normal range of red blood cells for adult women is between 4.2 - 5.4 million red blood cells / microliter of blood (Surgenor,2012).

The aim of this study is determining the prevalence of *Entamoeba histolytica* in kirkuk city according to age and sex and study the effect of infection with it on the rate of red blood cells.

Material & methods

Sample collection

(60) stool samples were collected from visitors in Kirkuk General Hospital of both sexes and from different age groups ranging from 1 to 40 years, during the period from 1/11/2023 to 1/1/2024. Whole information was recorded about each person from whom a sample was taken, including: Name, age,

and gender. The stool samples were placed in clean bottles with lids to prevent contamination, retain moisture and prevent drying because dehydration kills the vegetative stages.

Sample examination

In the beginning, stool samples were examined visually to people who showed clinical symptoms associated with the disease, such as diarrhea, vomiting, intestinal disorders, and fever. Then microscopic examination of the stool samples was performed by taking a sufficient amount of stool from different areas of the sample and placing it on a clean glass slide. Then a few drops of 0.9% Normal Saline solution were added, then a few drops of iodine solution were added, the slide cover was placed on the sample and the glass slides were examined. We use the lower magnification power (4x) and then the higher magnification power (40x) for detecting the parasite (Tanyuksel& Petri,2003).

Blood samples collection

Blood was collected using a 3 ml syringe from People whose stool examination results were positive for the presence of *Entamoeba histolytica*, and placed the blood sample in plastic tubes with tight caps containing the anticoagulant EDTA to measure the rate of red blood cells by using a Complete Blood Count device.

Results and discussion

The results of the current study showed that the rate of infection with the parasite was 78%, which is higher than what was recorded by Ahmed& Jasim (2003) in Kirkuk city, where the rate of infection with the parasite was 61.8 %, while the rate of infection in the current study was lower than what was recorded by Obaid (2016),where it reached 89.7%. This discrepancy in the total infection with the parasite is due to the difference in the economic and health levels between different regions, as well as weak health and cultural awareness, and the lack of preventive measures taken (Table 1).

Table (1): the prevalence of *Entamoeba histolytica* in the study sample

Number of examined samples	Infected people		Non infected people	
	NO.	%	NO.	%
60	47	78	13	22

It was noted from the results of the current study that the rate of infection of males with the parasite was the highest (81%), while the rate of infection of females was the lowest (75%). The reason for the high rates of parasitic infection in males to females is attributed to the behavior of males in dealing with the environment surrounding them due to outside work conditions. This result is consistent with what was found by (Al-Bayati ,2000), where she found that the infection rate in males was higher than the infection rate in females, (Table2).

Table (2): the prevalence of the parasite by gender

Gender	Number of examined	Infected people	Non Infected people
Male	36	7 (19%)	29(81%)
Female	24	6(25%)	18(75%)

In the current study, the percentages of *Entamoeba histolytica* infection were calculated according to age groups. It was shown from Table (3) that the highest infection rate was in the age group (1-10) years, reaching 83%, followed by the age group (21-30) years with an infection rate of 81%. While the lowest infection rate was in the age groups (1-20) and (31-40), at a rate of 73%. The increase in infection in children under 10 years old may be attributed to their being less aware of personal hygiene and the rules of general hygiene(Taher& Mohamed,2022). The reason for the high rate of infection with the dysentery amoeba parasite in adults is attributed to social customs frequent activities outside the home and eating exposed, unhealthy foods ((Bakr *et al.*,2024). The results of this study are close to the results of Al-Shirifi(2000) in Tamim Governorate.

Table (3): shows the prevalence of the parasite according to age groups

Age group	Number of examined	Infected people	Non Infected people
1-10	18	3(17%)	15(83%)
11-20	15	4(27%)	11(73%)
21-30	16	3(19%)	13(81%)
31-40	11	3(27%)	8(73%)

It was found from the results of this study that people suffering from amoeba dysentery will have a decreased rate of red blood cells, as it was (4.63) cells/mcL in males and (3.91) cells/mcL in females, *Entamoeba histolytica* parasite lives in the lumen of the host's large intestine and feeds on the mucous membrane of the large intestine and red blood cells, these parasites secrete enzymes that break down the mucous membrane of the large intestine destroying its cells and forming painful ulcers(Mortimer& Chadee, 2010),(Table 4).

Table (4): the rate of red blood cells /mcL for examined people.

Red blood cell rate	Infected people	Non Infected people
Male	4.63	5.12
Female	3.91	4.87

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