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Investigation of the Trichomonas *Hominis* and Some other Parasites in Cases of Diarrhea Accompanying Children Arriving to the Obstetrics and Gynecology Hospital in Ramadi / Iraq

Abdulkhalik Alwan Mohemeed[1] Thaer Abdulqader salih[*2] Qutaiba Ali Saleh Khalaf AL- juboori [3]

[1]college of education for pure sciences / Tikrit university/Iraq
[2] college of education for pure sciences / university of Anbar/Iraq
[3] ministries of education/Iraq
Email: thaerparasit@yahoo.com

ABSTRACT

During the period from May / 2019 till May / 2020, T. hominies and some other intestinal parasites causing diarrhea in children under the age of six were investigated after samples collecting throughout months of the year and by 200 feacal samples, it was found from the study that 97 infected samples with intestinal parasites, and that the *T. hominies* and *B. hominies* parasites are the least prevalent primary parasites in the Iraqi environment, and the ratio reached 2% for both, while the most prevalent parasites were *E. histolytica* by 39.2%, while the rest of the other parasites were of varying values among them, The results showed that the rural areas were more infected than the urban areas, and that the age of 2-4 years was the most vulnerable age group for intestinal parasites, and the results also showed that the most months in which the prevalence of infection was found was in July, and that the males were more infected than the females.

Keywords: Trichomonas hominis, Obstetrics and Gynecology Hospital, , Epidemiological.

Correspondence:
Thaer Abdulqader salih
college of education for pure sciences / university of Anbar/Iraq
Email: thaerparasit@yahoo.com

INTRODUCTION

Trichomonas hominis belongs to the Trichomonadidae family and is also called *Pentatrichomonas hominis*. This parasite lives in the digestive system of many vertebrates such as humans, apes, pigs, dogs, cats and rats [1],[2],[3],[4],[5] . This type was initially considered a commensalism organism in the digestive system but was later identified as a potential animal-source parasite and as a causative agent for diarrhea [6], [7], [8], [9]. *T. hominis* has also been associated with Irritable Bowel Syndrome, systemic lupus erythematosus and rheumatoid arthritis in humans [7], [10], [11]. Therefore, its impact on human and animal health remains unstable.

Diarrhea is a serious disease and widespread, where 25% of children with diarrhea die in the world because of the loss of large quantities of body fluids leading to dehydration and death, and parasites that cause diarrhea are spread in all segments of society, but they are more common in the tropics and semi Tropical, also takes into account the increased prevalence of intestinal parasites in areas with a population increase , as well as lack of health care and lack of commitment to public cleanliness , in addition to the presence of hosts carrying insects and rodents in the transmission of pathogens to humans [12]

Intestinal parasites are present in Iraq in different ages and in both the rural and urban environments, as the rural environment provides natural conditions for the emergence of such parasitic diseases while the urban environment provides social conditions for the emergence of such diseases, and several studies have been conducted on the epidemiology of intestinal parasites for what they reflect of negative effects on human and animal health [13],[14], [15], [16],[17],[18].

Due to the lack of studies on the prevalence of pathogenic parasites that cause diarrhea in children in Iraq in general and in Al-Anbar Governorate / Ramadi city in particular, this study aimed to: Investigate the prevalence of *T. hominis* in children 1-6 years old and the presence of other parasitic species causing Cases of diarrhea and dehydration in children coming to the Obstetrics and Gynecology Hospital in Ramadi city / Iraq.

METHODS

200 samples were collected from the faeces of children with diarrhea, taking into account the symptoms of dysentery, accompanied by blood or mucus, or watery feacal of patients arriving at the Obstetrics and Gynecology Hospital in Ramadi city / Iraq, for the period from 1/5/2019 to 1/5/2020 The samples were collected in clean and sterile plastic cups. A questionnaire was used that included the date of sample collection, the patient's gender, age, type and phase of the parasite that caused the infected, and residence.

The macroscopic examination of the samples was performed, which included the general appearance such as textures, color and the presence of mucus and blood or not, then a microscopic examination was carried out where the direct smear method was used using neutral saline solution, the method of applying a similar drop of iodine solution to the sample and examined it and the method of pigmentation with the Giemsa stain and the modified Ziehl-Neelsen stain , The Chi-squared test was used for the purpose of inferring significant differences at the 0.05 probability level [19] .

RESULTS AND DISCUSSION

The results of our current study showed that the number of patients with intestinal parasites reached 97 infected hospital references who suffer from diarrhea cases with an infection rate of 48.5%, while the number of reviewers who did not show parasitic infections reached 103 individuals and a percentage of 51.5%. Table (1).

Table 1. Number and percentages of infected and uninfected auditors

Total samples	Auditors (arrivals patients to the hospital)			
	Infected		Non – infected	
	%	Number	%	Number
200	% 48.5	97	% 51.5	103

Explain [20] that intestinal disease parasites have achieved an infection rate of 20.8% of all diarrhea samples accompanying patients. As for the rest of the samples, they were positive for the presence of viruses percentage 19.6%, and bacteria by 2.8%, while mixed and joint infection was 9.8%, and that the most common parasites *Giardia duodenalis* and *Cryptosporidium* spp. , The reason was the unhealthy environment in which they lived and the poor health awareness and contamination of food and water in the parasitic stages affected, in addition to the weak management and control of diseases that were not at the required level, not to mention the lack of financial allocations to address and treat diseases, in addition to that the cysts phase of parasitic protozoa is characterized by its resistance For chemical sterilizers, including chlorine, and severe environmental conditions, such as dehydration and wide ranges of pH, this is what [18] also explained.

Table (2) shows the registration of ten types of intestinal parasites, eight of which are protozoa and two types of helminthes, and the results indicated that there were significant differences between parasites and patient gender at a level of significance p≥ 0.05, It was found that males were more susceptible to infection compared to females, as males had 53.71134% compared to 46.28866% for females. And the incidence of intestinal parasitic protozoa was as follows Entamoeba *histolytica*, *Giardia lambellia*, *Entamoeba coli*, *Cryptosporidium parvum* and *Isospora* spp. And *Cyclospora* spp. *Trichomonas hominies*, *Blastocystis hominis*, *Ascaris* spp. And *Hymenolepis nana*. Figure (1).

Table 2. Parasitic Infection Prevalence by Gender and Parasite Type.

Parasitic Infection	Host gender					
	Male		Female		Total	
	Number	%	Number	%	Number	%
E. histolytica **(cyst and trophozoite)**	**20.3**	20.92784	**18.9**	19.48454	**39.2**	40.41237
G. lambellia **(cyst and trophozoite)**	**15.6**	16.08247	**13.7**	14.12371	**29.3**	30.20619
E. coli **(cyst and trophozoite)**	**7.2**	7.42268	**5.4**	5.56701	**12.6**	12.98969
Crypt. parvum **(Oocyst)**	**2.1**	2.164948	**1.3**	1.340206	**3.4**	3.505155
Isospora spp **(Oocyst)**	**1.6**	1.649485	**1.1**	1.134021	**2.7**	2.783505
Cyclospora spp **(Oocyst)**	**1.3**	1.340206	**1**	1.030928	**2.3**	2.371134
Trich. hominies **(Trophozoite)**	**1**	1.030928	**1**	1.030928	**2**	2.061856
Blastocystis hominis **(cyst)**	**1**	1.030928	**1**	1.030928	**2**	2.061856
Ascaris spp **(ova)**	**1**	1.030928	**1**	1.030928	**2**	2.061856
Hymenolepis nana **(ova)**	**1**	1.030928	**0.5**	0.515464	**1.5**	1.546392
Total	**52.1**	**53.71134**	**44.9**	**46.28866**	**97**	**100**

χ^2 calculated = 4.04, χ^2 Tabular (0.05) = 9.11

Our current study is Agree with [21] [22] stated that males are more infected than females and that *E. histolytica* is the most prevalent parasite followed by *G. lambllia*, and that parasites are more prevalent in rural areas than in urban areas, In addition to the occurrence of infection rates at ages under four years of age higher than those over the age of four, The reason was attributed to poor services and frequent mixing of males outside the home , and to weather heat , To the lack of chemicals used to sterilize drinking water, and to the economic situation of families with limited incomes, whose livelihoods are usually in crowded and close places,

In addition to the lack of drugs used to treat and the emergency that Iraq is going through, not to mention the habit and nature of domestic animal breeding in these areas and the spread of insects, including flies, which is a mechanical carrier of many parasites to humans, In addition to the accumulation of water swamps in the streets and having fun at this age with water (stagnant water) may help in the spread of intestinal diseases , in addition to that children at the age of 4-6 suffer from poor defecation and urination in unspecified places and this would raise the rates of infection due to direct mixing between children, The researchers also explained above that infection rates in hot months are higher than in cold months, and they explained the reason that hot weather is more suitable for parasites to live in cold weather, in addition to the large prevalence of intermediate transporters (flies, cockroaches, and other insects).

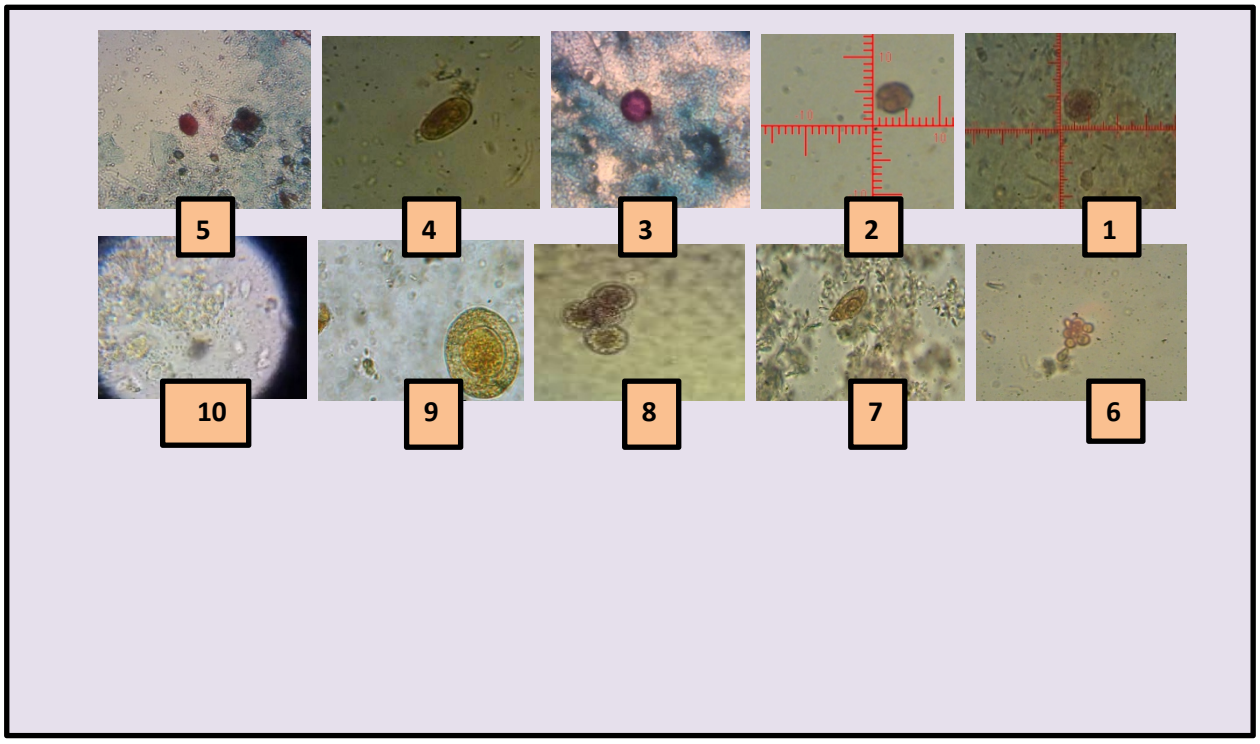

Figure 1. Explain

1- *Cryptosporidium spp*. 2- *G. lambellia* . 3- *Cyclospora spp*. 4- *E. coli*. 5- *E. histolytica*. 6-*T. hominis*. 7- *H. nana*. 8-*A. lambricodes* . 9-*Isospora spp*. 10-*Blasto. Hominis*.

The results of our research showed in Table (3) that there were significant differences between the parasite infection rates and the age of the affected person at the probability level p≥ 0.05, where the highest incidence of intestinal parasites was recorded in the age group 2-4 years, reaching 48.86%,

While the age group 1 day - 2 years recorded the lowest infection rate, reaching 23.50%. The reason for the high outcome of the infected in the aforementioned age group may be due to their lack of health awareness and their lack of commitment to health conditions and habits, in addition to their collective mixing in playing outside their homes Which facilitates the transmission of pathogens among them during friction with each other and with the external environment as well as exposure to pathogens leading to diarrhea that enter through the mouth into the intestinal cavity through contamination of fingers and hands or others ,Also reliance on industrial feeding and contamination of breastfeeding tools and toys is also an important factor in the transmission of infection, as well as children's lack of an integrated immune system compared to the older age groups [23] .

Table 3. Distribution of parasitic infection rates according to the age group studied

Parasitic Infection	Age Group							
	From 1 day to two years		From two years to four years		From four years to six years		Total	
	Number	%	Number	%	Number	%	Number	%
Entamoeba histolytica **(cyst and trophozoite)**	**9.6**	24.4898	**18.5**	47.19388	**11.1**	28.31633	**39.2**	40.41237
Giardia lambellia **(cyst and trophozoite)**	**7.3**	24.91468	**14.6**	49.82935	**7.4**	25.25597	**29.3**	30.20619
Entamoeba coli **(cyst and trophozoite)**	**2.4**	19.04762	**6.7**	53.1746	**3.5**	27.77778	**12.6**	12.98969
Cryptosporidium parvum **(Oocyst)**	**0.9**	26.47059	**1.5**	44.11765	**1**	29.41176	**3.4**	3.505155
Isospora spp **(Oocyst)**	**0.7**	25.92593	**1.1**	40.74074	**0.9**	33.33333	**2.7**	2.783505
Cyclospora spp **(Oocyst)**	**0.4**	17.3913	**1.1**	47.82609	**0.8**	34.78261	**2.3**	2.371134
Trichomonas hominies **(Trophozoite)**	**0.4**	20	**1**	50	**0.6**	30	**2**	2.061856
Blastocystis hominis	**0.4**	20	**1**	50	**0.6**	30	**2**	2.061856
Ascaris spp **(ova)**	**0.4**	20	**1.1**	55	**0.5**	25	**2**	2.061856

***Hymenolepis nana* (ova)**	**0.3**	20	**0.8**	53.33333	**0.4**	26.66667	**1.5**	1.546392
Total	**22.8**	**23.50515**	**47.4**	**48.86597**	**26.8**	**27.62886**	**97**	**100**

χ^2 calculated = 11.5, χ^2 Tabular (0.05) = 35.7

Table (4) shows the significant differences between the parasite infection rates and the months of the year at the level of significance p≥0.05. The highest infection rate was recorded in July, reaching 32.48%, while the lowest infection rate in December was 1.75% , It was also observed that there is fluctuation in the infection rates among other parasites in the remainder of the year, that the cause of infection in July may be due to the high temperature of the air, which helps in the growth of pathological parasites and also helps in the spread of intermediate hosts that transmit these parasites, Also, the high temperature will lead to human drinking large quantities of fluids, and when the appropriate health conditions are not available, these fluids will be sufficiently contaminated to infect humans and contaminate them with these parasites that cause diarrhea .

In addition to the poor health and economic conditions and eating foods rich in carbohydrates, it works to increase infection with parasites because carbohydrates are an appropriate medium for parasite growth, and the absence of a health and environmental control role in educating society and in preparing a healthy environment suitable for living and fighting insects and stray dogs and rodents that carry diseases will help to Exposure of children to pollutants of all kinds, as a result of ignorance of this age group for general and healthy conditions [24][25] .

Table 4. Distribution of parasitic infection numbers and rates according to year months studied

Month of year	**Infected**					
	Male		**Female**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Jan.	**1.3**	2.495202	**1**	2.227171	**2.3**	2.371134
Feb.	**1.7**	3.262956	**1.2**	2.672606	**2.9**	2.989691
Mar.	**2.2**	4.222649	**1.8**	4.008909	**4**	4.123711
Apr.	**4.3**	8.253359	**3.7**	8.240535	**8**	8.247423
May	**4.6**	8.829175	**4**	8.908686	**8.6**	8.865979
Jun.	**6.3**	12.09213	**5.9**	13.14031	**12.2**	12.57732
Jul.	**16.8**	32.24568	**14.7**	32.73942	**31.5**	32.47423
Aug.	**7.2**	13.81958	**5.9**	13.14031	**13.1**	13.50515
Sept.	**4.1**	7.869482	**4**	8.908686	**8.1**	8.350515
Oct.	**1.3**	2.495202	**1**	2.227171	**2.3**	2.371134
Nov.	**1.3**	2.495202	**1**	2.227171	**2.3**	2.371134
Dec.	**1**	1.919386	**0.7**	1.55902	**1.7**	1.752577
Total	**52.1**	**53.71134**	**44.9**	**46.28866**	**97**	**100**

χ^2 calculated = 6.3, χ^2 Tabular (0.05) = 19.1

Table (5) showed that the parasitic infection rates showed significant differences at the probability level of p≥0.05 with the residence (environmental decline), as it was found that the rural areas are more vulnerable to infection with these parasitic types than in urban areas, as the highest rate of infection in the regions In males gender, it reached 31.8%, while the lowest percentage was in urban areas for the female gender and was 19%, the reason for the spread of these parasites in rural areas may be due to the large number of farm animal husbandry and lack of commitment to health conditions and soil pollution and drinking water in those areas in addition to the ablution of the people of those areas from the running water of the animals in which the animals float, as well as the scattered insects and others [21],[22] .

Table 5. Distribution of parasitic infection numbers and rates according to the studied residential (environmental regression) areas

Parasitic Infection	**Residential areas (environmental regression)**									
	Urban				**Rural**				**Total male and female**	
	Male	**%**	**Female**	**%**	**Male**	**%**	**Female**	**%**	**Total**	**%**
***E. histolytica* (cyst and trophozoite)**	**9.2**	9.484536	**8.7**	8.969072	**11.1**	11.4433	**10.2**	10.51546	**39.2**	40.41237
***G. lambellia* (cyst and trophozoite)**	**5.6**	5.773196	**6.1**	6.28866	**10**	10.30928	**7.6**	7.835052	**29.3**	30.20619

E. coli **(cyst and trophozoite)**	**2.8**	2.886598	**1.4**	1.443299	**4.4**	4.536082	**4**	4.123711	**12.6**	12.98969
Cryp. parvum **(Oocyst)**	**0.6**	0.618557	**0.6**	0.618557	**1.5**	1.546392	**0.7**	0.721649	**3.4**	3.505155
Isospora spp (Oocyst)	**0.5**	0.515464	**0.4**	0.412371	**1.1**	1.134021	**0.7**	0.721649	**2.7**	2.783505
Cyclospora spp (Oocyst)	**0.4**	0.412371	**0.4**	0.412371	**0.9**	0.927835	**0.6**	0.618557	**2.3**	2.371134
Trich. hominies **(Trophozoite)**	**0.3**	0.309278	**0.4**	0.412371	**0.7**	0.721649	**0.6**	0.618557	**2**	2.061856
Blast. hominis **(cyst)**	**0.3**	0.309278	**0.4**	0.412371	**0.7**	0.721649	**0.6**	0.618557	**2**	2.061856
Ascaris spp (ova)	**0.3**	0.309278	**0.4**	0.412371	**0.7**	0.721649	**0.6**	0.618557	**2**	2.061856
H. nana **(ova)**	**0.3**	0.309278	**0.2**	0.206186	**0.7**	0.721649	**0.3**	0.309278	**1.5**	1.546392
Total	**20.3**	20.92784	**19**	19.58763	**31.8**	32.78351	**25.9**	26.70103	**97**	**100**

χ^2 calculated = 5.18, χ^2 Tabular (0.05) = 23.7

As for *B. hominis* and *T. hominis* whose prevalence was weak compared to other parasites in the Iraqi environment, perhaps because the prevalence of infection is more likely for those who suffer from immunodeficiency, whether due to immunodeficiency diseases or the incomplete immune system in children. Although *B. hominis* is one of the most prevalent parasitic organisms in the world, in the United States infection was around 23% of the population in year 2000. In less developed regions, it was noted that the infection rate reached 100%. It has been found that infection rates increase in people working in animal husbandry [25-30] .

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