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SHORT COMMUNICATION

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Infection by *Entamoeba Histolytica* Among Children Attending Maysan Pediatric and Maternity Hospital in Amarah City

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Abstract

Background: Most parasites impose some level of damage to their hosts. Factors such as the number of parasites, the site of infection, the size and mobility of the parasite, along with the host's physiological condition and whether it serves as an intermediate or final host, affect the severity of infections in both humans and animals.

Objectives: To determine the prevalence of *Entamoeba histolytica* infection in children under the influence of some risk factors.

Materials and Methods: A total of 1213 stool samples were collected from children attending Maysan Pediatric and Maternity Hospital in Amarah City, Maysan Governorate, southern Iraq. Microscopy examination examined the samples for cysts and trophozoites of *E.histolytica*. Month, sex, and stage of infection were among several factors taken into account.

Results: *E. histolytica* infection was generally reported as 12.0%. Infection was somewhat more prevalent in males (6.3%, n=76), and females (5.8%, n=70), with no statistical difference (P > 0.05). Infection was significantly associated with the month of the year (P < 0.05); May had the highest incidence (3.5%, n=43) and January had the lowest incidence (1.4%, n=17). There was also a statistically significant correlation between infection and the diagnostic stages (cyst, trophozoite, combined). In brief, we found that frequency of infection 12.0%. The infection was rather higher in males than in females and may be due to behavioral factors.

Conclusion: Infection by *E. histolytica* in children in Amarah City does not differ from other studies in Iraq generally. The current study found that infection in children was higher in males than in females, and this agrees with numerous studies stating that males are more exposed to infection than females due to behavioral factors.

Keywords: Entamoeba histolytica, Prevalence, Amebiasis, Children

1. Introduction

Human parasites are a major public health problem; most parasites cause some damage to the host. There are several factors that determine the severity of infection in humans or animals. This effect depends on the number, the infection sites, and the size and movement of the parasite, as well as the physiological state of the infested person and whether the hosts are intermediate or final. The negative impact of parasites occurs through several methods, such as toxins.

Parasites can produce toxic materials that lead to injury to the host. For example, *Schistosoma*, *E.histolytica*, and *Plasmodium* parasites [1–4]. *E. histolytica* is a common cause of diarrheal illness, amebiasis. The disease caused by such protozoa is considered common in particular developing countries characterized by weak health systems. Many investigations have shown that *E. histolytica* infects over 50 million people and is a major cause of 73,000 deaths [5–7]. The

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infection is not restricted to a limited age group or certain sex [8]. Contaminated food and water with feces contain cysts and are a common source of infection. Most cases arise from human carriers of mature cysts, which pass in formed or semi-formed stools [9]. Animals such as monkeys, dogs, and probably pigs are naturally infected with *E. histolytica*, although these animals are only a small source of human infection in rural areas compared with humans themselves [10]. Stool examination to test for the existence of trophozoites or cysts, immunological testing, PCR, and biopsy of intestinal lesions are used for diagnosing aggressive amoebiasis [11, 12].

Very limited epidemiological research has been conducted on amebiasis in Maysan province. This paper aims to assess the prevalence of infection while also considering several risk factors, such as sex, time of year, and stages of infection, specifically among children living in Aamrah City, Iraq.

2. Materials and methods

The study was performed at Maysan Pediatric and Maternity Hospital in Amarah city, Maysan Province, southern Iraq, over a five-month period from January to May 2024. A total of 1213 stool specimens were collected from children aged between 1 and 10 years who attended the hospital for various health problems.

Fresh stool samples were obtained from each child using sterile, clean containers provided by the hospital. The samples were labeled with patient information including age, sex, and collection date. Samples were transported to the laboratory for immediate examination.

The direct smear method was used for parasite detection. A small amount of stool was taken from different parts of the sample using sterile sticks and placed on a clean glass slide. Two to three drops of 0.9% normal saline were added to mix the sample. The smear was then covered with a cover slip and examined under a light microscope at 40x magnification [13].

Information on the patients' sex and the month of sample collection were recorded to assess possible correlations with infection prevalence. The stage of the parasite detected in positive samples (cyst, trophozoite, or combined infection) was also noted. The prevalence was achieved by the prevalence = (total number with sickness) / (population at danger for the sickness) [14, 15].

All figures have been expressed as percentage rates; significant differences were determined using the Chi-square test with the SPSS program version 26. Differences were considered significant at a P-value < 0.05."

Table 1. The prevalence of infection by E. histolytica infection among children.

	frequency	%
Non –Infected	1067	88.0
Infected	146	12.0
Total	1213	100.0

Table 2. The relationship between the stage of diagnosed infection and children.

			Samples		
			Non-infected	Infected	Total
stage	Cyst	No	0	119	199
		% of total	0.0%	9.8%	9.8%
	Trophozoitc	No	0	2	2
		% of total	0.0%	0.2%	0.2%
	Common	No	0	25	25
		% of total	0.0	2.1%	2.1%
	Absent	NO	1067	0	1067
		% of total	88,0%	0.0%	88.0%
Total		NO	1067	146	1213
		% of total	88.0%	12.0%	100.0%

*Common: double infection cyst as well as trophozoite, *Absent: neither cyst nor trophozoite has been noticed.

3. Results

A total of 1213 stool samples were collected. Among them, 146 samples were positive for *Entamoeba histolytica*, giving an overall prevalence of 12.0%, while 1067 samples (88.0%) were negative (Table 1).

A statistically significant association was observed between infection and the stage of infection. The cyst stage was the most frequently detected, followed by the combined stage, while the trophozoite stage was the least detected.

The results presented in (Table 2), the p-value was 0.000 with 3 degrees of freedom. Since this value is less than 0.05, the results are considered statistically significant. This indicates a strong association between the stages and the examined individuals.

Regarding the distribution by month, the highest number of infections was recorded in May, while the lowest was recorded in January. Statistical analysis showed a significant association between infection and month ($p < 0.05$).

The results presented in (Table 3), the p-value was 0.003 with 4 degrees of freedom. Since this value is less than 0.05, the results are considered statistically significant. This indicates a strong association between month and the infection.

It is necessary to perform statistical analysis to evaluate the association between sex and infection. According to the results, the prevalence of *E. histolytica* infection was higher in males (6.3%, n=76) than in females (5.8%, n=70), as shown in (Table 4), The p-value for the test was 0.615, which is greater than

Table 3. The relationship between month and infection.

			Non-infected	Infected	Total
Month	January	No. % Of Total	259	17	276
			21.4%	1.4%	22.8%
	May		222	43	265
			18.3%	3.5%	21.8%
	April		181	21	202
			14.9%	1.7%	16.7%
	February		236	35	271
			19.5%	2.9%	22.3%
	March		169	30	199
			13.9%	2.5%	16.4%
Total			1067	146	1213
			88.0%	12.0%	100.0%

Table 4. The infection count compared by children's sex.

			Non-Infected	Infected	Total
Sex	Male	NO	579	76	655
		%of Tolal	47.7%	6.3%	54.0%
	Female	NO	488	70	558
		%of Tolal	40.2%	5.8%	46.0%
		NO	1067	146	1213
Tolal		%of Tolal	88.0%	12.0%	100.0%

0.05, indicating that the difference is not statistically significant. Therefore, there is no significant association between infection and sex.

4. Discussion

The prevalence of infection in children who attended the children's hospital was 12.0%. This ratio is lower than the 18.72% recorded in Baghdad [16]. Take the specimen count, However, when comparing our outcomes with the 35.7% reported from Basra province for those over 45 years, it is clear that the infection rate for children is much less than that for adults; this may be due to behavioral factors [17, 18]. Naser [19] found that the high infection prevalence is in infants, while Nassar et al. [20] reported that the highest infection rate was in adults. However, the rise in the prevalence of *E. histolytica* in children can be ascribed to their greater activities, such as mobility and exposure to different environments. Moreover, children often have weaker immune systems.

Cysts of *E. histolytica* can remain vital and infective in a moist, cool environment for at least 12 days. In water, they can live up to 30 days. However, water levels in rivers have become low in recent years, and this may be one of the factors that spread several infections. Perhaps there are many reasons for this, such as standards of personal hygiene and a lack of social support, which increases the chance of spreading infection [21–24].

It is an important thing to identify which stage is more abundant. So, a link was also made between the infection stages: cyst, trophozoite, and combined. The static analysis demonstrated a significant connection among stages of infection at $P < 0.05$. It was shown that the dominant diagnosed stage was the cyst, followed by the combined stage, and the least was the trophozoite stage.

The relationship between infection and the month of the year according to the study, indicates a highly significant result that agrees with the findings from Basrah [20]. It revealed a stronger connection between time and infection. However, the high number of parasite reports in May was (43), 3.5%. It was found that there is a high rate of infection in December (67%) [19].

In Amarah city, previous studies reported higher infection rates in males than in females using different diagnostic methods [25, 26]. Similarly, the present study showed a higher prevalence in males (6.3%, n=76) than in females, which was confirmed by Kadhem et al. [27] who reported an approximate outcome in Diyala Province, Iraq. This finding is consistent with results from Samarra City, which also reported slightly higher infection rates in males [18]. It may be attributed to the fact that males are more susceptible than females to infectious diseases the main reason for that are differences in the immune response so men be more suitable to danger of microbial infections [28]. The reason for these differences; physiological changes, especially hormonal or ecological factors include the difference in exposure to pathogens due to different behavior among males and females [29]. However, Ibrahim [30] recorded that the infection rate in females was equal to that in males (9.74%-9.83%) respectively. Generally, infection with Protozoan parasites are particularly well known in babies and children, because they have not yet advanced a completely efficient immune system [31].

5. Conclusion

Infection by *E. histolytica* in children in Amarah City does not differ from other studies in Iraq generally. The current study found that infection in children was higher in males than in females, and this agrees with numerous studies stating that males are more exposed to infection than females due to behavioral factors.

Ethical approval

This study was performed in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of the Amarah Institute of Technology, Southern Technical University, Iraq.

Author's contribution statement

Ali Idan Al-musaedi designed the study, analyzed the data, wrote the paper with input from second author. **Ahmed hussain Rahim**, performed the collection of samples for experiments and microscopic test.

Conflict of interest

The authors declare that there is no conflict of interest.

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