

Prevalence of *Entamoeba histolytica* and *Giardia lamblia* infection among patients attending Heet Hospital in Al-Anbar, Iraq

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Abstract

This study was designed to estimate the spread of *Entamoeba histolytica* and *Giardia lamblia* and study the age, sex and months effect in the infection rate. 398 stool samples (215 males and 183 females) were collected from both children and adults attending to Heet General Hospital, and some of private laboratories affiliated to Heet. The total infection rate was 64.3%. *Entamoeba histolytica* infection rate was higher (56.7%) than *Giardia lamblia* infection (7.5%). Regarding the seasonal effect on the infection rate, *E. histolytica* highest rate was observed in August (14.6%) and the lower rate was in September (9%). And the age-related infections appear to be mostly in ages older than 35 years significantly (26.63%) followed by ages younger than 15 years (16.83%). In comparison, the infection could be considered non gender specific with a shallow elevation in males (29.4%) over the rate in females (27.3%). Regarding *Giardia lamblia*, the prevalence was considered significantly lower. The seasonal related infection considered much greater in May and June (2%) compared to July, August, September (125%, 1.25%, 1%) respectively. With convergent rate of infection retention among different ages or between females (3.2%) and males (4.3%).

Introduction

Intestinal parasitic infection is considered one of the most important health problems facing the world [1], it represents one of the common sources of diarrhea distributed worldwide [2].

The prevalence of those parasitic infections correlates mainly with deficient sanitation, water pollution with the sewage, low income, and lack of personal hygiene [3] Moreover, the distribution rate improved with easier accessing among eligible hosts surrounded with encouraging environmental conditions [4]. They spread in all countries of the world due to poor sanitation [3], the estimated rate of the annual infection with *E. histolytica* represent an estimation of 480 million, among those patients; 36 million patients reached to invasive state

of the disease [5]. It has been observed that there is a direct relationship between intestinal parasite infection and socioeconomic status, this associated mainly with communities who live in thronged places with a contaminated environmental system and impaired health which are vulnerable to more infections than others [6]. Infection with parasites may occur in several ways including direct interaction with both infected patient or vector animal. Rout of ingestion encompass the oral rout by food contamination [7]. *E. histolytica* has life cycle containing two forms: trophozoite [resides in the intestinal lumen) and cyst (capable of surviving in the environment) which would explain its high transmission rate along with high motility abilities [8]. The same would be applicable on *G. lamblia* which has the highly spreading cyst stage and highly pathogenic stage causing severe inflammatory response, leading to intestinal epithelial cell (IEC) damage even without reproducing inside the lumen [9]. The study of intestinal parasites has received great interest from researchers, that found the most common intestinal parasite that causes diarrhea is dysentery amoebiasis and then *Giardia lamblia* [1].

This study was designed to determine the rate of infection with intestinal parasites (*E. histolytica* and *G. lamblia*) and study the age, sex and seasonal effect in the infection rate for patients attending Heet General Hospital, health centers and private laboratories affiliated to Heet District in Al- Anbar.

Materials and methods

Collection of samples

Three hundred and ninety-eight (183 females and 215 males) stool samples of different ages and both genders were collected for 1/5-30/9/2021 from the patients that arrivals the hospital were suffering from clinical symptoms such as diarrhea or dysentery and other digestive problems and sometimes others did not suspect any pathological symptoms, in dry, clean, sterile plastic boxes with wide nozzles and tight covers to prevent the impact of the sample or dryness or contamination [10].

Gross examination

Stool samples were examined phenotypically before being examined with a microscope until they are described or detected according to the amount of stool or their appearance (shape), color and strength, so if they are soft, watery, solid or diarrhea, this may be a guide to the quality and emergency of parasitic organisms that are found in it. In some samples, we may notice that they contain some blood and mucus.

Microscopic examination

The direct modus operandi is to put a drop of water solution (normal saline) on the slide and taken appropriate amount of stool with wooden sticks from the sample and mix it with the stool. Putting the cover slide and checking by using the magnification power (10X) and then (40X).

concentration method

By using zinc sulfate, (floatation methods), used when the numbers of parasites are low in the stool, routine microscopic examination may be fail or suspect its diagnosis. The method of work was done according to [11].

Statistical Analysis

The data were analyzed using SPSS program (ver. 18) using the Percentage, Mean, SD, and Chi square, at Probability level (0.01 and 0.05).

Results

Infection rate

Among the 398 collected samples, the total infection rate of *E.histolytica* and *Giardia lamblia* was 56.7 % and 7.5 % respectively with significant difference ($P \leq 0.05$). Table 1.

Table 1: Total infection rate of *E.histolytica* and *Giardia*

No. of Samples Examined	Parasite species	Positive	Percentage (%)
398	<i>E. histolytica</i>	226 *	56.7 %
	<i>Giardia</i>	30	7.5 %

* significant difference P value < 0.05

Infection rate according to age

The high infection rate of *E. histolytica* was recorded in the age group above 35 years old (26.63%) followed by the age group Less than 15 years (16.83%) and 15-35 years (13.31%) with significant difference ($P \leq 0.05$). While the high infection rate of *G. lamblia* was recorded in the age group above 35 years old and 15-35 years (2.75%) followed by the age group Less than 15 years (2%) with non-significant difference. Table 2.

Table 2: Infection rate of *E.histolytica* and *G. lamblia* according to age

Age	No. of Samples	<i>E.histolytica</i> Positive *	%	<i>Giardia</i> Positive **	%
Less than 15 years	129	67	16.83	8	2
15-35 years	113	53	13.31	11	2.75
More than 35 years	156	106 *	26.63	11	2.75
Total	398	226	56.7	30	7.5

* significant difference P value < 0.05, ** non-significant difference P value > 0.05

Infection rate according to months

According to months the prevalence of *E. histolytica* was highest in August (14.6%) followed by May (11.30%), June (12%), July (9.8%) and September (9%) without significant difference while the highest infection rate of *G. lamblia* was in May and June (2%) followed by July and August (1.25%) and September (1%) with significant difference ($P \leq 0.05$). Table (3).

Table 3: Infection rate of *E.histolytica* and *Giardia* according to months

Months	No. of Samples	<i>E.histolytica</i> Positive *	%	<i>Giardia</i> Positive **	%
May	79	45	11.30	8 **	2
June	82	48	12	8 **	2
July	74	39	9.8	5	1.25
August	92	58	14.6	5	1.25

September	71	36	9	4	1
Total	398	226	56.7	30	7.5

*non- significant difference P value >0.05, ** significant difference P value < 0.05

Infection rate according to gender

According to gender the prevalence of *E.histolytica* and Giardia was highest in the males(29.4%) , (4.3%) respectively than females(27.3%), (3.2%) without significant difference. Table 4.

Table 4: Infection rate of *E.histolytica* and *Giardia* according to gender

Gender	No. of Samples	<i>E.histolytica</i> Positive *	%	<i>Giardia</i> Positive *	%
Male	215	117	29.4	17	4.3
Female	183	109	27.3	13	3.2
Total	398	226	56.7	30	7.5

*non- significant difference P value >0.05.

Discussion

Prevalence of *E. histolytica* (56.7 %) in our study was significantly higher than *G. lamblia* (7.5 %). The high incidence may have suggested by the occurrence of the cysts contaminating the environment of the studied area and the infection rate improved by the continuation of the cysts in the environment for long time and resisting the harsh conditions affecting its viability or infectivity.

This agree with the results that recorded by [3] also the frequency of *E. histolytica* and *G. lamblia* (29.2% and 15,0%) respectively was recorded by [12] and [13] who found that both *G. lamblia* along with *E. histolytica/dispar*) represent the most common types of pathogenic parasites, sequentially. This high rate of infection related mainly with the type of climate in Iraq, where those parasites more common in warm climates [14]. Moreover, the simplicity of transferring the infection by wrong sanitation habits and contamination of rivers and water sources in this region which require a specified study to explore and confirm the parasitic existence in those waterbodies. Especially for the intestinal parasites who have high vulnerability for oral rout ingestion [4].

The study outputs revealed elevated recorded incidence of *E. histolytica* in ages older than 35 years, and more than 35 years and 15-35 years age group for *G. lamblia* as appear in Table 2, this may be due to type of activities in this age groups in this area exclusively in those ages, where the outdoor activities and contacting with the contaminated water bodies by swimming. Or by using of human feces for the fertilization of soil which lead to raise the chance of infection rate [15] or may be returned to contaminated food and water by fecal of reservoirs hosts such as cats, rodents and dogs, and the effect of moisture and warmth that assist separation and complete the parasite life cycle [16]. Of these results, [12] study has a divergent result from our findings regarding *G. lamblia* has the highest incidence in ages (5-14) years but *E. histolytica/dispar* being more common in the ages older than Giardial ages and extend to include ages (15-45) years as indicated in our results. By contrast; the results of [13] far away from all of above findings by indicating the ages (40-60) years to be the most vulnerable to infection which is consistent with findings of [17] and [18] the difference may

be attributed to the difference in the chances of sample collection from a specific age more than other and the accumulating effect of those ages and may be caused by weakening of the immunity by aging and chronic diseases common in those age group.

Also, this study expressed no significant contrast between the prevalence of *E. histolytica* and *G. lamblia* in males and females as showed in Table 4 this result may be return to the both male and female are evenly implicated in out and indoor life that lead to the parasite dissemination in both groups.

This was agreeing with [1]) that prove the infection rate in males and females was 16%, 19 % respectively. but disagree with the result that recorded by [3] who reported 14.6 % ,35.6% in males and females respectively. It was shown that the reason may be due their weak immune system in female. In [12] same findings obtained where males showed to be at higher risk for the most of parasites compared to females. regarding *G. lamblia*, *E. histolytica*. The fluctuation of the incidence among males and females with bias toward males could be explained by the types of habits related with same above causes that increased the whole incidence by outdoor and dealing with contaminated supplies more than females. [18] the findings of [14] were inconsistent with our results by more prevalence in females compared with males. The sex affected daily habits differ from demographic area to other and type of geological different structures would explain the difference between studies [19].

Our study showed the high infection rate of *E. histolytica* was recorded in August (14.6%) then May (11.30%) and June, July, September (12%,9.8%,9%) respectively. Result of infection rate of *Giardia lamblia* showed significant difference according to months, highest infection rate recorded in May, June (8%) followed by, July, August (5%) and then by September (4%) As shown in Table 3, this can be explained by the fact that the parasite is more active and has the ability to cause infection during the summer months or to the abundance of fruits that contaminated with the infective stages of parasites. These are agreement with [14] also agreement with [15] Who attributed those reasons to increase separation and reproduction of insects that contributed to the spread parasites during the hot months of the year.

Conclusion

The current study found a high prevalence of infection rate with the amebiasis and giardiasis in the patients that arrivals the hospital of Heet region. high infection rate of Amebiasis was in more than 35 years of age group. While the high infection rate of giardiasis was in above 35 years old and 15-35 years. It was noted that there was an effect for the months of the year in the rate of infection, but it was not affected by gender.

Reference

1. Raza, H.H. and Sami, R.A. (2009). Epidemiological study on gastrointestinal parasites among different sexes, occupations, and age groups in Sulaimani district. J. Dohuk Univ., 12(1):317-323.
2. Weber R (2020) Hunter's tropical medicine and emerging infectious diseases.
3. Al-Khaysee, G.H. and Sultan, A.A. (2008). The factors that effect the epidemiology of *Entamoeba histolytica* and *Giardia lamblia* among population of Khalis and Baledrose. Diala. Jour., 27: 92-99.

4. Mahdi NK (2022) Prevalence of Intestinal Parasitic Infections in Iraq during a Period from 2000-2020. *J Infect Dis Epidemiol* 8:268. doi.org/10.23937/2474-3658/1510268
5. Frias L, Leles D, Araujo A (2013) Studies on protozoa in ancient remains - A review. *Mem Inst Oswaldo Cruz* 108: 1-12.
6. Al-Saeed, A.T. and Issa, S.H. (2006). Frequency of *Giardia lamblia* among children in Dohuk, northern Iraq. *East. Medit. Heal. Jou.* 12(5): 555-561.
7. AL-faydawi, A.H. and Daher, M.M. (2001). Infection with *Entamoeba histolytica* in acute diarrhea, *AL-kufa J.*,5(2):175-179.
8. Guillen N. (2021). Signals and signal transduction pathways in *Entamoeba histolytica* during the life cycle and when interacting with bacteria or human cells. *Molecular microbiology.* 115(5):901-15.
9. Rojas L, Grüttner J, Ma'ayeh S, Xu F, Svärd SG. (2022). Dual RNA sequencing reveals key events when different *Giardia* life cycle stages interact with human intestinal epithelial cells in vitro. *Frontiers in Cellular and Infection Microbiology.* 12:862211.
10. Hiro, M. O. (2014). The Effect of *Entamoeba Histolytica* and *Giardia Lamblia* Infection on some human hematological parameters. *Jou. of Natu. Scie. Resea.* 4(12): 45-48.
11. Talib, A. H. and Doa'a, B. A. (2014). Epidemiological study for Intestinal parasites In Abu Ghraib and Amiriyah regions, *Ira. Vet. Med. Jou.*, 38 (2): 19-26.
12. Ihsan Mahdi Al-Saqur, Harith Saeed Al-Warid, Amjed Qays Al-Qaisi, and Hussin Salman Al-Bahadely, , "Prevalence of gastrointestinal parasites in Iraq during 2015", *AIP Conference Proceedings* 2290, 020005 (2020) <https://doi.org/10.1063/5.0027394>
13. Al-Mousawi, A. & NEAMAH, B.A. 2021. A study on intestinal parasites among diabetic patients in Najaf governorate of Iraq and its effect on some blood parameters. *Iranian Journal of Ichthyology* 8(ICA-EAS 2021): 127-132.
14. Al-Saqur, I.M., Al-Warid, H.S., Albahadely, H.S., The prevalence of some gastro-intestinal nematodes and Kean, B.H.; William, D.C. and Luminais, S.K. (1979). Epidemic of amebiasis and giardiasis in a biased population. *Br. J. Vener. Dis.* 55:375-78.
15. Kirkpatrick, C.E. and Farrell, J.P. (1984). Feline giardiasis: Observations on natural and induced infection. *Am. J. Vet. Res.* 45:2182-88.
16. Tangi, F.B.; Fokam, E.B.; Longdoh, N.A. & Eteneneng, E.J. 2016. Intestinal parasites in diabetes mellitus patients in the Limbe and Buea municipalities, Cameroon. *Diabetes Research Open Journal* 2(1): 147- 153.
17. Akinbo, F.O.; Olujobi, S.O.; Omoregie, R. & Egbe, C. 2013. Intestinal parasitic infections among diabetes mellitus patients. *Biomarkers and Genomic Medicine* 5: 44-47.
18. Agrawal, P.K.; Rai, S.K.; Khanal, L.K.; Ghimire, G.; Banjara, M.R. & Singh, A. 2012. Intestinal parasitic infections among patients attending Nepal Medical College Teaching Hospital, Kathmandu. *Nepal Medical College Journal Nepal* 14(2): 80-3.

دراسة انتشار المتحولة الحالة للنسيج والجيارديا اللمبية في الاشخاص الوافدين الى مستشفى هيت في الانبار

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الخلاصة:

معلومات البحث:

صممت هذه الدراسة لتقدير انتشار المتحولة الحالة للنسيج والجيارديا اللمبية ودراسة تأثير العمر والجنس والأشهر في معدل الإصابة. تم جمع 398 عينة براز (215 ذكور و 183 اناث) من الأطفال والبالغين الذين حضروا إلى مستشفى هيت العام، وبعض المختبرات الخاصة التابعة لهيت. وبلغت نسبة الإصابة الإجمالية 64.3%. كان معدل الإصابة بالمتحولة الحالة للنسيج أعلى (56.7%) من عدوى الجيارديا اللمبية (7.5%). لا يوجد فرق معنوي في نسبة الإصابة بالمتحولة الحالة للنسيج طبقاً لاشهر السنة وقد سجلت اعلى نسبة اصابة في شهر اب (14.6%) واقل نسبة اصابة في شهر ايلول (9%). ولأشهر السنة تأثير معنوي في نسبة الإصابة بالجيارديا إذ بلغت اعلى نسبة اصابة في شهر ايار وحزيران حيث بلغت (2%) واقل نسبة اصابة في شهر ايلول (1%). وقد تم الاثبات بان للعمر تأثير معنوي في نسبة الإصابة بالمتحولة الحالة للنسيج إذ سجلت اعلى نسبة في الفئة العمرية التي هي اعلى من 35 سنة وبلغت (26.63%) وبلغت اقل نسبة اصابة (13.31%) في الفئة العمرية من 35-15 سنة. وبينت الدراسة عدم وجود فرق معنوي للفئات العمرية في نسبة الإصابة بالجيارديا إذ بلغت اعلى نسبة (2.75%) للفئات العمرية من 35-15 سنة واعلى من 35 سنة واقل نسبة اصابة (2%) في الفئة العمرية اقل من 15 سنة. ولوحظ عدم وجود اختلافات معنوية بين الجنسين إذ ان نسبة الإصابة بالمتحولة الحالة للنسيج والجيارديا في الذكور (29.4% و 4.3%) على التوالي وفي الاناث (27.3% و 3.2%) على التوالي.

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الكلمات المفتاحية:

المتحولة الحالة للنسيج، الجيارديا، معدل الانتشار

معلومات المؤلف

الايمل:

الموبايل: