



Comparative Study Between Attendance Patients to Babylon Teaching Hospital in Babylon and Al- Alawiyah Children's Hospital in Baghdad Infected with Intestinal Parasites / Original article

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Abstract

This study included detecting the rate of human infection with intestinal parasites on patients arriving the laboratories of Babylon Teaching Hospital and Al-Alawiya Children's Hospital In Baghdad for the period from beginning of January 2023 to the end of December 2023. The total number of examined people in the former hospital was 796, infected patients were (384 with 48.49%), The highest percentage of parasites recorded were *Endameba coli* (85.47%) followed by *E. histolytica* (63.44%) then *Trichuris trichura* (45.9%) the others parasites were *Giardia lambelia* (39.09%) *Enterobius vermicularis*(34.71%), *Chilomastix mesnili* (31.5%), *Ancylostoma duodenale* (19.04%), *Hymenolpis nana* (18.48%), *Ascaris lunmbricoides* (17.22%). While the result of the study in Al-Alawiya Children's Hospital In Baghdad, the total number of examined people was 520 ,with infected patients was (179 with (34.4%). The highest percentage of infection also was with *E.coli* (69.3%) followed by *E.histolytica* (58.6%) , *Trichuris trichiura* (45.9%), *G.lambalia* (25.84%), *E vermicularis* (21.83%), *A lumbericoides* (18.36%) *H nana* (15.71%), and %). Female patients were more(52%) infected in Babylon than male also the percentage of female infection in Baghdad was higher in(38%). Age group(1-10 year) was more (56.81%) than the others groups in Babylon ,also in Baghdad the former group recorded the highest (51%) . The current study proved that the infection of parasites in Babylon was higher than in Baghdad.

Keywords: *Entamoeba histolytica*, *Giardia lamblia*, intestinal protozoa and *Enterobius vermicularis*



المستخلص

شملت الدراسة مقارنة معدل الاصابات بالطفيليات المعوية للمرضى المراجعين لمختبرات , مستشفى بابل التعليمي ومستشفى اطفال العلوية في بغداد للفترة الممتدة منذو بداية شهر كانون الثاني 2023 ولغاية نهاية شهر كانون الاول 2023, كان عدد المفحوصين في مستشفى بابل 796 وعدد المصابين 384 (48.49%). اعلى نسبة اصابة بالطفيليات كان ب بالانتاميبا كولاي (85% ز47) و يليه طفيلي الزحار الاميبي – الانتاميبا هستولاتاكا (63.44%) وبعدها الديدان السوطية ترايكيورس تراكيورا (45.9%), اما بقية الطفيليات فكانت كالاتي, الجيارديا اللمبلية (39.09%), الانتروبيس فيرميكلارس (34.73%), جالومستك مسيليني (31.5%), الشريطية القزمة (18.48%), والديدان المعوية الكبيرة الاسكارس – الصفر الخراطيني (11.22%). بينما كانت نتائج فحص 520 من المراجعين لمستشفى العلوية للاطفال, وجدت اصابة 179 (34.4%). ايضا اظهر طفيلي الانتاميبا كولاي الاعلى نسبة اصابة من غيره, اذ سجل (69.3%) و يليه طفيلي الزحار الاميبي (58.6%) و يليه الديدان اسوطية ((45.9%), الجيارديا اللمبلية (25.84%), الديدان الديوسية (21.83%), دودة الصفر الخراطيني (18.36%) والشريطية القزمة (15.71%) واطهرت النتائج بان الاناث كانت الاكثر اصابة (52%) من الذكور في بابل كذلك كانت الاعلى (38%) في بغداد, وبينت الدراسة بان الاعمار 1-10 سنة الاعلى اصابة (56.81%) مقارنة ببقية الاعمار في بابل وبغداد ((51%). بينت النتائج بان الاصابات المعوية في بابل اكثر مما هو في بغداد

الكلمات المفتاحية: طفيلي الزحار الاميبي، الجيارديا الليمبية، الاوالي المعوية و الديدان الدبوسية.



Introduction

Parasitic diseases are of great importance all over the world, as a result of its high prevalence and potential pathological effects, which sometimes reach the point of death mainly in tropical areas, such as parts of Africa, where the population suffers from malnutrition, overcrowding, and deterioration of the public health infrastructures and poor personal health situation, especially in rural areas (Garcia and Brucker, 1993). Parasites have caused the revenge and misfortunes of the human race for centuries (Bilharzia, recognized before 2000 ago) and continue to cause a lot of death and suffering in the world, especially in developing countries' (Ichpujani and Bhatia, 1994). According to the World Health Organization (2020) Estimated, the infections were, 800–1000 million *A lumbricoides*, 700–900 million Hookworm infections, 500 million *T trichiura*, 200 million *Giardia lamblia*, and 500 million *Entamoeba histolytica/dispar* cases globally. Regardless of recent efforts to control intestinal parasite infections, the diseases are still the main causes of mortality and morbidity in the world. In Iraq, gastro-intestinal parasitic infections caused a series of public health issues such as malnutrition, anemia, and growth retardation [AL-Sadoon, 1996, AL-Saqur, *et al.*, 2015 AL-Saqur, 2016, Mehdi, 2022]. Also, overall prevalence rate was about 22% with varying prevalence rates for individual parasites. It is acknowledged that gastro-intestinal parasites are of considerable public health importance in Iraq and throughout less developed Asia [AL-Taie, 2009]. But the geographical distribution and regional burden remain to be determined and updated regularly. However, most reports were based on single samples from a variety of patient groups and controls, and the community prevalence or occurrence has not been documented in details. The present study reports a detailed analysis



of the occurrence of potentially pathogenic intestinal parasites in Iraq. Infections with gastro-intestinal parasites are associated with poor sanitation, unsafe human waste disposal, inadequate of safe drinking water, low socioeconomic status, and demographic factors and spatial. The aims of this survey was to compare the presence of parasites which prevail in Babylon Hospital patients attended to its lab and compared it with AL-Alwiyah Children Hospital patients, during the year starting from the beginning g of January 2003 till the end of December 2023, taking in consideration, age, gender, month of the year. This study is retrospective depending on data received from both Hospitals, for comparing the infection in people who attended, Babylon Hospital and Al-Alwiyah Children's Hospital in Baghdad.

Materials and Methods

This current study depends on data received from Babylon hospital and AL-Alwiyah Children Hospital. Parasite infection was arranged according to gender of patients, age, seasonal variation from the beginning of January 2023 to the end of December, 2023. Data for each parasite were arranged according to the age distribution with groups as follow: Group 1: less than 10 year age, Group 2: more the 10 year to less than 20year ,group 3 more than 20.(in case of AL-Alwiyah ,children, group one was 10 year and the second group above 10 year Alawiyah Children's Hospital. 796 stool samples were collected from Babylon Hospital and (520) stool samples from Al-Alwiyah Children's Hospital

A survey study was conducted to investigate intestinal parasites for patient's attendance to both hospitals. Babylon Teaching Hospital and AL-Alwiyah Children hospital laboratories.



Sample collection: Samples were collected in dry, clean, sterilized, wide-opening plastic containers, taking care not to be contaminated with urine. For detection of pin worm, Scotch Tap Technique was used especially when itching or irritation of the anal regions according to (Gun and Pitt, 2021).

Macroscopic examination: Fecal samples were examined macroscopically before being detected by microscope. The description includes the quantity, forms, color, odor and density of the stool in terms of texture. It may be soft, watery, solid, semi-solid or diarrhea, as it is considered evidence of the type of parasite present in it, taking into account the examination of soft samples in 30 minutes. Trophozoite phases were found in the soft sample; while cyst is appears in solid samples. It is also necessary to contain the sample to contain blood or mucus, as in some cases parasitic worms such as round worm, like pin worm, tape worm can be seen by necked eye.

Microscopic examination: A sample of feces was taken by means of a wooden stick and divided into two parts and placed on both ends of the glass chip, then a drop of normal solution at a concentration of 0.9% is added to one end to detect trophozoite, cyst, red blood cells and white blood cells. The second end is added a drop of iodine solution to dye Glycogen in dark brown color and the nucleus in red and the cytoplasm in light yellowish brown, and examined according to (Riaz, *et al.*, 2020). In some cases, concentration methods were used in case of presence of small amount of feces present in the fecal sample.

Results

Current study revealed high infection 384/796 (48.42%) occurred in patients attended to Babylon hospital lab than those who arrived to Al-alwiyah Hospital-Baghdad, 179/520(34.4%) as showed in Table (1)



Table (1) Number of examined people in Babylon and Al-alwiyah children's Hospitals laboratories and their percentage of infection

Name hospital	Total number of examined	Number of infected	%INFECTION
Babylon hospital	796	384	48.42
Al-Alwiyah children's Hospital	520	179	34.49

According to gender ,female was more infected in Babylon118(54.12%) than male 265(45.84%) while in in Al-alwiyah children's Hospital, the opposite occurred ,Male infection was higher 256(70.32%) than those of female 65(45.18%) respectively ,Tables (2 and 3)

Table (2) Number and percentage of infection of female and male in Babylon hospital

Sex	Samples examined	Infected samples	% Infection
Male	578	265	45.84
Female	218	118	54.12
Total	796	384	48.24

Table (3) Number and percentage of infection of female and male in AL-Alwiyah Children's Hospital

Sex	Number of examined	Number of infected	% of infection
Male	364	256	70.32
Female	166	65	45.18
Total	520	179	63.6

According the relationship of age and infection, the age group (1-10 year) was high infected than other groups ,whether in Babylon 194(83.98%) or in AL-alwiyah Children's Hospital 163(36.8%) comparing to other groups .The percentage of infection in female was higher 118(54.12%) than male



266(46.2%(53.47) in Babylon hospital, also the age group. In Baghdad hospital in less than 10 year old ,was higher169(51.19%) than others group. On the other hand the male in later (hospital showed high infection 91(37.7%) than female 32(36.0%) as in the Tables (4 and 5)

In general ,the total infection in Babylon was 554(69.59%),the highest infected group was, the less than 10 years old 254(71.75%).Male registered high infection 73% than female 66%.While in Al-alwiyah, the total of infection was less 179(48%) and the female infected was higher 150(50%) than male 129(35%) as in Tables (4 and 5)

Table (4) Relationship between age groups and gender in Babylon hospital

Age of group years	Male			Female		
	Total number of examined	Exam. Number of infected	%infection	Number of examined	Number of infected	% total of infection
1-10	231	143	62.17	88	51(57.9%)	83.98
Above 10 years	232	80	34.44	90	49(54.4%)	55.6
Above 20 years	261	43	16.47	40	18	45
Total	578	266	46.2	218	118	54.12

Table (5) Relationship between age group and gender in Al-alwiyah children hospital.

Age of group Years	Male			Female		
	Number of examined	Number of infected	% of infection	Number of examined	Number&% of infected	%total of infection
1-10	317	131	41.31	93	32-34.4	163-51.19
Above 10 years	191	48	25.13	61	18-29.5	66-21.57
Total	366	129	35.24	154	50	169-19.23



The distribution of the recovered parasite in patients examined and its relationship with male and female in Babylon hospital listed in Table (6), which indicated ,that most prevalent protozoa were *E.coli*, *E. histolytica / dispar* and *C.meseline*,77(69.3%,61(58.6) and 47(64.2%0 respectively. While the most discovered helminthes were *T. tirchura* and *E. vermicularis*, which found in 45(44.1%) and 39(43.8%) respectively. In general, the male was more affected than female. On the other side the results Baghdad hospital was clarified in Table (7) Regarding percentage of distribution of parasites in patients in and its relationship with male and female hospital whether in male or female. Which indicated that the most prevalent parasites recovered were *E.coli* 66(56.8%),followed by *E. histolytica / dispar* 51(46.7%),while the lowest 11(15.7%) In case of helminthes, the *E.vermicularis* recovered in n19((21.83%) then *H. nana* in 11(15.71%).The distribution of the parasites in infected patient was nearly the same in male and female, but the rate of infection of parasites Al-Alwiah Children Hospital was lower than in Babylon Table (6 and 7)

Table (6) Examined and infected with parasitic infection for both males and females in Babylon hospital

Parasite infection	Samples examined	Samples infected %	Male examined	Male infected	%	Female examined	Female infected	%
<i>E.histolytica/dispar</i>	104	61(58.6)	76	41	42.63	28	20	20.8
<i>E.vermicularis</i>	89	39(43.8)	73	27	24.03	16	12	10.68
<i>A.lumbericoides</i>	82	21(25.6)	67	12	9.84	15	9	7.38
<i>G.lambliia</i>	93	42(45.1)	68	27	25.11	25	15	13.95
<i>E.coli</i>	111	77 (69.3)	72	51	56.61	39	26	28.86
<i>H.nane</i>	77	24(31.3)	5.1	17	13.09	26	7	5.39
<i>Ancylostoma duodenale</i>	68	28(41.1)	49	21	14.28	19	7	4.76
<i>Trichuris trichiura</i>	102	45(44.1)	78	34	34.68	24	11	11.22
<i>Chilomastix mesnili</i>	70	47(64.2)	44	36	25.2	26	11	7.7



Table (7) Examined and infected with parasitic infection for both males and females in AL-Alwiyah hospital.

Parasite of infection	Sample of examined	Infected sample	%	Male of examined	male of infected	%	Female of examined	Female of infected	%
<i>E.coli</i>	116	66	56.89	81	42	51.85	35	24	68.57
<i>E.histolytica/ dispar</i>	109	51	46.78	77	39	50.64	32	12	37.5
<i>G.lamblia</i>	89	23	25.84	61	17	27.86	28	6	21.42
<i>E.vermicularis</i>	87	19	21.83	63	14	22.22	24	5	20.83
<i>H.nana</i>	70	11	15.71	52	9	17.30	18	2	11.11
<i>A.lumbeicoides</i>	49	9	18.36	32	5	15.62	17	4	23.52
	520	30.57	366/126	34.42	154	43/27			33.8

The most spread parasites, during the year of study in Babylon Hospital, were *E. coli*(77),*E. histolytica / dispar* (61),beside equal spread of *G.lambelia*(42) and *G.meslinnaein* (47),while the spread of helminthes ,was *E. vermicularis*(39) and *H. nana*(24).On the other hand, the most discovered ,parasites ,during months of studying ,was 60 cases ,during May, and 73 case in November as showed in Table(8)

Table (8) Parasitic infection according to the months of the year in Babylon hospital.

Months	E.coli	E.histolytica	G.lamblia	E.vermicularis	A.lumbericoides	H.nana	Ancylostma	Trichuris	chillomastix
Jan.	15	11	5	2	0	0	0	5	9
Feb.	0	3	7	0	4	0	1	0	0
Mar.	19	6	0	6	0	3	5	0	12
Apr.	0	7	5	3	3	2	1	10	5
May	12	5	16	11	4	0	0	9	3
Jun.	4	10	3	0	2	7	5	0	2
Jul.	8	9	2	2	2	5	1	6	0
Aug.	9	7	3	8	5	3	9	3	11
Sep.	6	3	0	0	0	4	6	8	0
Oct.	4	0	1	7	1	0	0	4	5
	77	61	42	39	17	24	28	45	47



In general, the infection in the year of study, was 168 (32.3%), the percentage of infection of the male 123 (36.39) was nearly the same 69 (37.91%) in female, high % of infection recorded in October 27 (65.85%) followed in August, 33 (63.82%), the lowest was registered in April 6 (12.5%) as mentioned in Table (9).

Table (9) Parasitic infection according to the months of the year in AL-Alawiyah children's hospital.

Months	Sample of examined	Sample of infected	%	Male of examined	Male of infected	%	Female of examined	Female of infected	%
Jan.	46	15	32.6	26	11	29.72	20	4	20
Feb.	49	7	14.28	37	5	14.07	12	2	13.33
Mar.	45	11	24.44	25	6	18.18	20	5	20
Apr.	48	6	12.5	32	4	10.25	16	2	12.5
May	46	15	33.33	31	11	34.37	15	4	26.66
Jun.	38	15	39.47	25	10	40	13	5	38.46
Jul.	47	30	32.6	28	16	42.10	19	11	57.89
Aug.	59	33	63.82	38	17	40.47	21	10	47.61
Sep.	69	34	49.27	45	18	38.29	24	11	45.83
Oct.	41	27	65.85	26	19	61.29	15	11	73.33
Nov.	32	10	31.25	25	6	23.07	7	4	57.14
Total	520	168	32.3	338	123	36.39	182	69	37.91

Generally, according to protozoa and metazoan spread in Babylon hospital, the protozoa was more prevalent 224 (58.5%) than metazoan 157 (37.55%). Accordance of, the species of protozoa most spread, *E. coli*, *C. meselinae*, and *E. histolytica/ dispar*, in 77 (69.3%), 44 (62.8%) and 61 (58.6%) respectively. While in metazoan, *E. vermicularis* registered high infection, 49 (55%), then *T. trichura* 45 (44.1%)



Table (10) Examined samples, number, percentage of protozoa and metazoan which registered in (Babylon hospital)

Parasite protozoa	Examined of samples	Infected of samples %
<i>E.histolytica</i>	104	61 58.6
<i>G.lambliia</i>	93	42 45.1
<i>E.coli</i>	111	77 69.3
<i>Chilomastix mesnili</i>	70	44 62.8

Parasite metazoan	Examined of samples	Infected of samples %
<i>E.vermicularis</i>	89	49 55
<i>A.lumbericoides</i>	82	21 25.6
<i>H.nana</i>	77	24 31.3
<i>Anclyostoma duodenale</i>	68	28 41.1
<i>Trichuris trichiura</i>	102	45 44.1
Total	418	157 37.5

Regarding total infection of parasites during the months of the year in AL-Alwiyah Children hospital and with gender. Highest infection recorded during October 28(57%) and the lowest observed in June 6(10.9%). High infection 19 (61%) registered in male during October, while high infection in female 4(80%) was pointed in November as mentioned in Table (10).

On the other hand, the same as in Babylon hospital, percentage of discovered protozoa was higher 140(44.58%) than the metazoan 39(18.93). In case of protozoa ,also ,*E.coli* was in the high rank,66(56.89),then followed by *E. histolytica/ dispar* 51(46.78%),while in the metazon,*E.vermicularis* noticed in high percentage 19(21.83%) then followed by *A.lumriciodes* 9(18.36%), as mentioned in Table (11)



Table (11) Protozoa, and metazoan ,which observed in Al-Alwiyah children hospital with number and percentage of recovery

Parasite protozoa	Examined of samples	Infected of samples/ %of infection
<i>E. coli</i>	116	66/56.89
<i>E.histolytica</i>	109	51/46.78
<i>G.lambliia</i>	89	23/25.84
Total	314	44.5/140

Parasite metazoan	Examined of samples	Infected of samples/ % of infection
<i>E.vermicularis</i>	87	19/21.83
<i>H.nana</i>	70	11/15.71
<i>A.lumbeicoides</i>	49	9/18.36
Total	206	18.9/39

Discussion

There were many differences in outcome of this study between people attended Babylon hospital and AL-Alwiyah Children hospital, which may be due to ,socioeconomy, overcrowding, health education and the age of people who attended the above institute. This study indicated high occurrence of gastro-intestinal parasites in Babylon hospital and AL-Alwiyah Children Hospital and was high in the former (48.42%) than the later (34.49%). The most common protozoa infections in the survey of Babylon Hospital were *E. coli* 66/56%, *E. histolytica/ dispar* 51/46% and *G.lambelia* 23/25%, while the metazoan ,*E.vermicularis*49/55%,*A.duodenale* 28/41 and *A. lumbricodes* 21/25%. While the result of the study in Al-alwiyah Children hospital is nearly the same with parasites outcome, *E. coli*,66/56, *E. histolytica/ dispar* 51/46% and *G.lambelia* 23/25% while the metazoan , it recovered ,*E. vermicularis* 19/21% and *A. lumbercoids* 9/18%.These parasites



are cosmopolitan in distribution, more common in warm climates (Bahir Dar, Amhara,2019). So infections with these parasites were expected to be high in this survey. This can be attributed to the easy routes of transmission and the nature of direct fecal-oral contamination particularly through drinking water, food or reinfection for pin worm. Increasing of travel and immigration, due to bad circumstances, from region to other has been recently reported very frequently in Iraq which is most likely related with the high number of cases diagnosed. These findings were in consistent with others who showed that these three parasites are the top parasites in Iraq (Mahdi, 2022). Naqid (2023) found less total of infection(18.65%) whether in Babylon or Al-alwiyah Children Hospital ,but discovered high infection percentage of *E.histolytica* (68.61%),on the other hand ,found higher infection with *G. lambelia*(25.31%) comparing with AL-Alwia hospital, and less what was discovered in Babylon Hospital (45%), also the same author, declared ,the most infection occurred in the age group more 15 year ,comparing with others, this current study, registered ,high infection in age less than 10 years ,in both hospital. According to percentage of infection in Sulimania governorate registered the highest (70.6% with *E. histolytica* and 28.7% with *G.lambelia*, then followed by Salah-Aldine , Qadesia ,62.1% ,37.9% and 37.9%,28.5% respectively *G.lambelia* ,flowed registered high infection , Also , the same authors, recorded high infection with *E. vermiculais* (35.8%)Which was higher than noticed in Baghdad (21.8%) and less than in Babylon Hospital(55%),also found in female than male ,which may be due to social behavior and anatomy of geneto-Urinary system. In comparison with age, found more infection in age over 10 years, than other groups. (Mehdi, 2022).

Which is in contrast of current study, also their study found infection in male was higher than in female with in paroral of the study in Babylon, with



contrast to the study in Baghdad, which observed ,that the male was more infected than female. With exception of *E. coli*, which showed high recovery whether in Bagdad or Babylon, others parasitic infection discovered, like, *T. tichura*, *Ancylostoma duodenal*, *Ascaris lu,mbriciodes* ,*Chiolomestic meselinae*, *H. nana*.

The high infection in Babylon than Baghdad, may be due to, several reasons,health education, patient logged in rural or urban, No facilities to get clean water, number of sample taken, expert of examiner ,equipment used beside others(Östan, *et al.*, 2017).

The routes of infection can also reflect the age-specific occurrence especially for *G. lamblia* and *E.histolytica/dispar* (Abdel Kareem, *et al.*, 2019), . They are generally transmitted by the fecal-oral route and are most common in children, while the lower occurrence in adults suggesting acquired immunity after repeated infections (Al-Qadhi, 2011). Most of the parasites included in this survey were reported as having high occurrence in male individuals. This result was similar to the previous findings (Todd, 2023). The gender difference may be due to male-specific behavioral factors (Hamza, 2009) such as taking risks with their work or during outdoor activity. While high occurrence of *E.vermicularis* was seen in female individuals this is agreed with findings of others (Al-Sadoon,. and Ali, 1993 and AL-Warid et al,2022). Some cities showed high occurrence of parasites, < 10000 cases for each. Some of these cities are big cities (Baghdad and Basra) and they are more urbanized. Finally our findings from the current survey revealed high occurrences of *E. histolytica/dispar*, pin worm and *G.lamblia*, and in the surveyed population especially among big cities and warrants long-term control strategies to improve sanitary and some living conditions, including



treatment of infected individuals, with clean supply of water and food, (Todd, 2023). The impact of these strategies would be further enhanced via organized health education programs, which may encourage healthy attitude and lead to a declining of gastro-intestinal parasite infections.

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