

Prevalence of Intestinal Parasitic Infections among Children in Baghdad City

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Summary

Intestinal parasitic infections are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease. This study was conducted in Baghdad city to identify the prevalence of intestinal parasitic infections among patients with an age rang from < 2-18 years, who were outpatients attending clinic of Protecting Hospital for Pediatrics and Al-Zahrawy Hospital. The fecal samples were examined by the direct smear method and the concentration Method.

A total of 730 specimens of feces were examined. Parasites were isolated from 423 specimens. The overall prevalence of infection was 57.9%. The highest prevalence (71.4%) was recorded among the 6-11 years age group with rate of infection in males (59.9%) was higher than in females (56.2%). Overall, protozoa infections (90.1%) were higher than the helminthes infections (17.5%). *Giardia lamblia* (31.0%), *Entamoeba histolytica* (24.3%) and *Entamoeba coli* (18.9%) were the commonest intestinal protozoan identified, *Ascaris lumbricoides* and *Hymenolepis nana* were the most common helminths detected with a prevalence rate of 9.7% and 4.7%, respectively.

The relationship between intestinal parasites and age, sex, date of infection and symptoms were investigated and studied. This study showed that the intestinal parasites among children are still an important public health problem in Baghdad city.

Introduction

Intestinal parasitic infections have long been recognized as an important health problem worldwide. Infection with pathogenic parasites has been associated with significant morbidity and mortality especially in the young, malnourished and immunosuppressed⁽¹⁾. Parasitic infections are regarded as a serious public-health problem, as they cause malnutrition, iron-deficiency anemia, growth retardation in children, and other physical and mental health problems⁽²⁾.

The prevalence of intestinal parasitic infections depends on the socio-economic level of the society, social practice and traditions, poor sanitary and environmental conditions, inadequate personal hygiene, absence of safe drinking

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water supplies and climatic factors⁽³⁾. In developing countries, prevalence rates rang from 30-60%, as compared to < 2% in the developed countries^(4,5).

Intestinal parasites are common in Iraq, varying from one area to another depending on the degree of personal and community hygiene sanitation and climatic factors⁽⁶⁾. In an annual report of communicable disease report control center of Iraq⁽⁷⁾, the rate of infection with intestinal parasites was (1.22%) of (1028640) stool specimens collected from all Iraqi governorates, prevalence of infection was as follows: Basra (59.98%), Sulaimani (26.28%), Najaf (24.89%), Duhok (20.10%), Nassiryah (12.02%) and Anbar (7.08%). Infection rate with *Giardia lamblia* was the highest in Basra (39.28%), and the least in Tikirit (2.95%).

This study was carried out to determine the prevalence of intestinal parasites among children in Baghdad city. The main objectives of the study were to determine the prevalence of intestinal parasites according to the type of parasites and relate such infections with age, sex, clinical symptoms and month.

Such epidemiological surveys on the intestinal parasitic infections among children are important in Baghdad city, since they reflect the sanitary conditions of city and generate data that are essential to formulate strategies for the control of intestinal parasitic infections among children.

Materials and Methods

A total of 730 patients presenting with different symptoms to the Protecting Hospital for Pediatrics and Al -Zahrawy Hospital from January to the end of November 2009. The age ranged from 1 month to 18 years, from various socio-economic status had been examined for intestinal parasites in their stool by using both direct smear and concentration methods. A detailed questionnaire was filled with all necessary information's for each patient.

Stool samples: Samples were collected for each patient in clean universal screw cap battles, one gram of the feces was kept to be ready examined by direct smear method, and a drop of Lugol's iodine solution was mixed with a fleck of the feces (approximately 0.2 gm) and spread by means of an applicator stick on a clean microscopic slide to suitable thickness. A cover slip was put on the smear and examined under low and high objectives lens. Finally, the samples were concentrated using the procedure of zinc-sulphate flotation technique and iodine stained slides were prepared and examined microscopically⁽⁸⁾.

The results were presented in numbers, percentages and by using chi-square as a test of significance.

Results

From 730 specimens investigated, 423 were positive for intestinal parasites, which mean a prevalence of 57.9%. Table (1) shows that the prevalence of intestinal parasites is the highest in 6-11 years age group (71.4%), followed by age group 12-18 years (55.1%), while there is no significant difference in

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prevalence of intestinal parasites between the two sexes groups ($p>0.05$), being 59.9% in males and 56.2 % in females.

Table (2) shows that, the rate of intestinal parasites from single and double infections, for protozoa were (90.1%) significantly more than helminthes with (17.5%). In the term of protozoa, the *G. lamblia* (31.0%), *E. histolytica*(24.3%) and *E. coli* (18.9%) were the most common infections from total number of infected samples. The infection rate with helminthes, including *A. lumbricodies*, which showed the highest rate (9.7%), Only *E. histolytica* and *E. vermicularis* were more frequent in females than males, while the prevalence of other parasites was higher in males than females (with the exception of *B. hominis* and *H. nana* which had a similar frequency in both sexes). The frequency of various intestinal parasites by age is shown in the same table.

Overall, considering single and double infection, the commonest parasite was *G. lamblia*, which was presented in 31.0% of the examined samples, the infection with a single parasite was more common (92.4%) than that with double parasites are shown in table (3). The commonest double infection was between *G. lamblia* and *E. histolytica* (2.8%), followed by *E. histolytica* and *A. lumbricodies* (2.4%).

The most common clinical presentation were abdominal pain (15.6%), fever (10.9%), diarrhea (10.2%), vomiting (8.5%) Perianal pruritus (5%) , and bloody diarrhea(4.5%). Less common clinical feature was rectal prolapsed (0.9%), are shown in table (4).

Table (5) shows monthly prevalence of single and double infections gradually increased from a minimum in April to a maximum between October and November. These differences showed no statistical significance ($p>0.05$).

Table (1):The prevalence of intestinal parasites according to age groups and gender.

	Number examined	Number positive	Percentage of infection (%)
Age group (years)			
<2	72	22	30.6
2-5	213	112	52.6
6-11	269	192	71.4
12-18	176	97	55.1
Gender			
Male	344	206	59.9
Female	386	217	56.2
Total	730	423	57.9

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Table (2): Intestinal parasites isolated from single and double infections according to age and gender.

Parasites	Age group (years)				Gender		Total of parasites
	<2	2-5	6-11	12-18	male	female	
Protozoa:							
<i>Giardia lamblia</i>	7(31.8)	34(30.4)	53(27.6)	37(38.1)	69(33.5)	62(28.6)	131(31.0)
<i>Entamoeba histolytica</i>	4(18.2)	27(24.1)	49(25.5)	23 (23.7)	40(19.4)	63(29.0)	103(24.3)
<i>Entamoeba coli</i>	3(13.6)	21(18.8)	36(18.6)	20(20.6)	42(20.4)	38(17.5)	80(18.9)
<i>Iodomoeba bütschlii</i>	1(4.5)	3(2.7)	18(9.4)	4(4.1)	14(6.8)	12(5.5)	26(6.1)
<i>Endolimax nana</i>	-	5(4.5)	12(6.3)	5(5.2)	12(5.8)	10(4.6)	22(5.2)
<i>Blastocystis hominis</i>	1(4.5)	4(3.6)	12(6.3)	2(2.1)	10(4.9)	9(4.1)	19(4.5)
Total protozoal infection	16(72.7)	94(83.9)	180(93.8)	91(93.8)	187(90.8)	194(89.4)	381(90.1)
Helminths:							
<i>Ascaris lumbricoides</i>	4(18.2)	9(8.0)	23(12.0)	5(5.2)	23(11.2)	18(8.3)	41(9.7)
<i>Hymenolepis nana</i>	2(9.1)	5(4.5)	9(4.7)	4(4.1)	10(4.9)	10(4.6)	20(4.7)
<i>Enterobius vermicularis</i>	-	4(3.6)	3(1.6)	1(1.0)	2(1.0)	6(2.8)	8(1.9)
<i>Taenia spp.</i>	-	2(1.8)	-	3(3.1)	3(1.5)	2(0.9)	5(1.2)
Total helminthes infection	6(27.3)	20 (17.9)	35(18.2)	13(13.4)	38(18.4)	36(16.6)	74(17.5)
Total of infected samples	22(100)	112(100)	192(100)	97(100)	206(100)	217(100)	423(100)

Table (3) : The prevalence of various species of intestinal parasites (single and double) according to type of parasite

Parasites	Number Positive	Percentage %
Single infection		
<i>Giardia lamblia</i>	109	25.8
<i>Entamoeba histolytica</i>	81	19.1
<i>Entamoeba coli</i>	74	17.5
<i>Iodomoeba bütschlii</i>	26	6.1
<i>Endolimax nana</i>	22	5.2
<i>Blastocystis hominis</i>	19	4.5
<i>Ascaris lumbricoides</i>	31	7.3
<i>Hymenolepis nana</i>	20	4.7
<i>Enterobius vermicularis</i>	4	0.9
<i>Taenia spp.</i>	5	1.2
Total	391	92.4
Double infection		
G. lamblia+ E. histolytica	12	2.8
E. histolytica+ A.lumbricoides.	10	2.4
G. lamblia+ E. coli	6	1.4
G. lamblia+ E. vermicularis	4	0.9
Total	32	7.6
Total of infected samples	423	100

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Table (4): Clinical presentations of infected patients.

Clinical presentations	Number of patients	Percentage (%)
Abdominal pain	66	15.6
Fever	46	10.9
Diarrhea	43	10.2
Vomiting	36	8.5
Perianal pruritus	21	5.0
Bloody diarrhea	19	4.5
Rectal prolaps	4	0.9
A symptomatics	176	41.6
*Unknown	12	2.8
Total	423	100

*Unknown= for age group < 2 years

Table (5): Seasonal prevalence of intestinal parasites in stool specimens singly or doubly according to month distribution.

Month	Number examined	Positive cases	Percentage (%)
January	40	23	57.5
February	46	26	56.5
March	75	45	60.0
April	67	36	53.7
May	90	51	56.7
June	85	46	54.1
July	62	37	59.7
August	92	55	59.8
September	50	29	58.0
October	53	32	60.4
November	70	43	61.4
Total	730	423	57.9

Discussion

Intestinal parasitic infections are endemic worldwide and remain a major public health concern in many tropical and subtropical countries⁽⁹⁾.

In the present investigation, 57.9% of the 730 patients attending outpatient clinics of both hospitals were infected with intestinal parasites. Previous reports by Al- Jeboori and Shafiq⁽¹⁰⁾, Kadhim⁽¹¹⁾ and Al-Hamdani⁽¹²⁾ gave overall infection rates of 78%, 53% and 63%, respectively in Baghdad area. The comparison of the present findings with those from neighboring countries such as Lebanon⁽¹³⁾ Yemen⁽¹⁴⁾, Egypt⁽¹⁵⁾, Emirates⁽⁹⁾ and Saudi Arabia⁽¹⁶⁾, showed a considerable differences could be found in the overall prevalence of intestinal

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parasites. These differences can be explained by the influence of environmental conditions, hygiene , level of sanitation and differences in human behavior towards intestinal parasites⁽¹⁷⁾.

The most affected group of patients with intestinal parasites, those with 6-11 years old (71.4%), other wise the group with <2 were the less affected group (30.6%). This finding is in agreement with the results of studies done by Molan and Farag in Arbil⁽¹⁸⁾ and by Kadhim in Baghdad⁽¹¹⁾, who showed high prevalence in intestinal parasites in elementary school children. These results possibly reflect the close contact of children with the contaminated environment. The prevalence of intestinal parasitic infections was slightly higher in males (59.9%) than females(56.2%) but this difference is not statistically significant($p>0.05$). Higher rates of infection among males is justify by that males spend their time in the streets, and playing in sand ⁽¹⁹⁾ but usually females tend to spend most of times in homes. This is in agreement with the result of study done by Saifaddin ⁽²⁰⁾, but it is not in agreement with Kadir et al.⁽²¹⁾, who showed that the infection with the intestinal parasites was higher in females than in males.

Among the intestinal protozoan, *G. lamblia*, exhibited the highest rate of infection (31.0%), followed by *E. histolytica* (24.3%). These rates of infection are consistent with those reported in previous survey in Baghdad ⁽¹¹⁾, but they are more than those reported from Turkey⁽²²⁾. These two protozoan remain the most common intestinal parasitic pathogens ⁽²³⁾. The transmission of these parasites occurs via fecal-oral route, either directly from person to person or indirectly by eating or drinking focally contaminated food and water. The asymptomatic carriers of these pathogens pose a constant risk for transmission in the community⁽⁹⁾. *E. coli* was the commonest non pathogenic protozoa being, detected with a rate of 18.9 % , followed by *I. bütschlii* (6.1%). Their presence in the stool strongly suggests the possibility of patients exposure to environmental conditions that may result in the ingestion of contaminated food or water containing pathogenic parasites ⁽²⁴⁾.

Among the intestinal helminthes, *A. lumbricoides* and *H. nana* were the most common being, detected with a rate of 9.7 % and 4.7%, respectively. In contrast to protozoan infections. The prevalence of helminthes infections in our study was significantly low (17.5%). Similar observations have been made in studies performed in the other countries ^(25,26,27) . The reason for this may be due to unfavorable ecological environment and other prevailing socio- cultural factors that influence parasite survival and transmission⁽⁹⁾.

The main double infections were between *G. lamblia* and *E. histolytic* (2.8%) of the total mixed infections, followed by that between *E. histolytic* and *A. lumbricoides* (2.4%). This is related to the unhygienic habits of children and due to the common environmental factors which may affect their transmission⁽²⁸⁾.

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In the present investigation, 41.6% of parasite infections showed no symptoms. Abu Al-Saud⁽²⁹⁾ found similar figure (48.8%) of the parasitic infestations in his survey. This may lead to spread the infection to other children or even within their homes and may contribute to high epidemic rates in their communities⁽³⁰⁾.

Seasonally factor has no effects on the prevalence of intestinal parasites infection rate in Baghdad city during the present study, but there was increment of infection rate between October and November, which may be depend on the number of individual who visited hospital.

A large number of epidemiological studies carried out in different countries and in our country have shown that the prevalence and epidemiological features of intestinal parasites vary in different parts of the world, even in different regions of the same country. The socio-economic level of the society, geographic, sanitary, cultural and nutritional factors may affect the incidence of intestinal parasites^(31,32).

Conclusion

The findings of the present study showed that the prevalence of intestinal parasites among children in Baghdad city is high and *G. lamblia* is the common parasitic in the region, it has also been determined that the 6-11 year age group had the highest parasitic infection, indicating the lack of education on parasitic infections, along with the deficiency of environmental and sanitary conditions and personal hygiene. Furthermore, high rate of intestinal parasites infestation were found in the absence of intestinal symptoms. Therefore, screening of the children for parasites should be an essential part of health care and Prompt preventive measures should be taken for the eradication of these infections, which should include public health education , clean water supply, promoting personal hygiene and periodic deworming of the children.

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انتشار الإصابات بالطفيليات المعوية بين الأطفال في مدينة بغداد

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الخلاصة:

الإصابة بالطفيليات المعوية من الإصابات المستوطنة حول العالم ووصفت بالسبب العالمي الوحيد الأعظم للاعتلال والمرض. أجريت هذه الدراسة في بغداد لتعيين معدل انتشار الإصابة بالطفيليات المعوية بين المرضى الذين تراوحت أعمارهم ما بين اقل من سنتين حتى 18 سنة، المراجعين للعيادة الاستشارية لمستشفى حماية الأطفال ومستشفى الزهراوي. اتبعت طريقة المسحة المباشرة وطريقة التركيز لفحص العينات.

فحصت 730 عينة غائط : وظهرت الطفيليات المعوية من 423 عينة، أي أن نسبة الإصابة الإجمالية هي 57,9% من المجموع. كانت أعلى نسبة للإصابة (71,4%) لدى الفئة العمرية 6-11 سنة. وكانت نسبة إصابة الذكور (59,9%) أعلى من إصابة الإناث (56,2%).

وجد أن الإصابة بالأوليات (90,1%) كانت أعلى من الإصابة بالديدان (17,5%). حيث كانت الجيارديا اللامبلية، اميبا الزحار واميبا القولون من أكثر الطفيليات المكتشفة وبنسبة انتشار قدرها (31%) وتلتها (24,3%)، ثم (18,9%)، بينما كانت دودة الصفر الخراطيني و الدودة القزمية من أكثر الديدان شيوعا وبنسبة إصابة قدرها 9,7% و 4,7% على التوالي.

درست ونوقشت العلاقة بين الطفيليات المعوية والعمر ، الجنس، تاريخ الإصابة بالعدوى والأعراض. أظهرت هذه الدراسة بأن الطفيليات المعوية بين الأطفال ما زالت مشكلة صحية عامة مهمة في مدينة بغداد.