Prevalence of Amoebic Dysentery among Children Attending Al-Battool Teaching Hospital in Diyala Governorate

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ABSTRACT:

BACKGROUND:

This study is carried out throughout the year 2009 to show the prevalence of amoebic dysentery among the children affected with diarrhea in Diyala who were referred from the primary health centers to the pediatric clinic in Al-Battool teaching hospital.

OBJECTIVE:

This study puts the light on the extent of distribution of amoebic dysentery as a cause of diarrhea among children in our community and for thorough recognition of this social problem and its important drawbacks on the general health.

PATIENTSANDMETHODS:

Children affected with diarrhea who were referred from the primary health centers to the pediatric clinic in Al-Battool teaching hospital, the center of Diyala province. Examination of a freshly passed stool within 30minutes was done and more than two samples for every case examined carefully by an expert laboratory personnels.

RESULTS:

The study includes (18450)patients who did visit the pediatric clinic during 2009 , their age is ranging from early days of life up to 15years old , the number of patients affected with diarrhea of different causes was 7752 and the patients complaining from amoebic dysentery were 2640 according to stool examination i.e.the prevalence in our community is 14.3% .

1. A total of 1563 (20.1%) of patients were affected by *Entamoeba histolytica* cyst and 1077 (13.9%) were affected by *Entamoeba histolytica* trophozoite . 2. It is more common among male (1490) than female(1150), male to female ratio is 1.3 :1

3. The infection is present throughout the year but it is more common during hot months from around the beginning of April to the end of September .

4. It is accompanied occasionally by complications; intestinal, extra-intestinal, relapses, and even death .

CONCLUSION:

1. Among children in the study there is no age immune to *E. histolytica* infection. It is more common among age group from two months up to five years old.
2. Infection is more common among male than female.
3. *Entamoeba histolytica* infection is widely spread among our children and it is more common in sectors in the periphery (Baladrouz and Mukdadia) than the center of the governorate mostly explained by the bad sanitation and water pollution .

KEY WORDS : diarrhea , *entamoeba histolytica*, infection.

INTRODUCTION:

Entamoeba histolytica infects hundred of millions of people worldwide; endemic foci are particularly common in the tropics, especially in areas with low socioeconomic and sanitary standards. In most infected individuals *Entamoeba histolytica* parasitizes the lumen of the gastrointestinal tract and causes few or no symptoms or sequelae. The two most common forms of disease caused by *Entamoeba histolytica* are amoebic colitis with parasitic invasion of the intestinal mucosa, and amoebic liver abscess with dissemination of the parasite to the liver. Amoebiasis is highly endemic in Africa, Latin America, India, and Southeast Asia. [1]

Food or drink contaminated with *Entamoeba* cysts and direct fecal-oral contact are the most common means of infection. Direct contact with infected feces also may be responsible for person-to-person transmission . [2]

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Two morphologically identical but genetically distinct species commonly infect humans. *Entamoeba Dispar* the more prevalent species, is associated only with an asymptomatic carrier state .*Entamoeba histolytica* the pathogenic species *Entamoeba*, can become invasive, causing symptomatic disease . Many patients previously described as asymptomatic carriers of *E. histolytica* based on microscopy findings were probably infected with *E. dispar*. [3]

Infection is established by ingestion of parasite cysts, which measure 10–18 mm in diameter and contain 4 nuclei. Cysts are resistant to environmental conditions such as low temperature and the concentrations of chlorine commonly used in water purification but can be killed by heating to 55°C. After ingestion, the cyst, which is resistant to gastric acidity and digestive enzymes, excysts in the small intestine to form 8 trophozoites. [4] These large, actively motile organisms colonize the lumen of the large intestine and may invade the mucosal lining. Once *E. histolytica* trophozoites invade the intestinal mucosa, the organisms multiply and spread laterally underneath the intestinal epithelium to produce characteristic flask-shaped ulcers. [5]

Amoebiasis is the 3rd leading parasitic cause of death worldwide. Prospective studies have demonstrated that 4–10% of individuals infected with *E. histolytica* develop amoebic colitis, and <1% of individuals develop disseminated disease, such as amoebic liver abscess .[6]

Amebic colitis may occur within 2 wk of infection or be delayed for months. The onset is usually gradual with colicky abdominal pains and frequent bowel movements (6–8/day). Diarrhea is frequently associated with tenesmus. Stools are blood stained and contain a fair amount of mucus with few leukocytes. Generalized constitutional symptoms and signs are characteristically absent, with fever documented in only ⅓ of patients. Amoebic colitis affects all age groups, but its incidence is strikingly high in children (1–5) year ofage.[7]

Severe amoebic colitis in infants and young children tends to be rapidly progressive with frequent extra-intestinal involvement and high mortality rates, particularly in tropical countries. Occasionally, amoebic dysentery is associated with sudden onset of fever, chills, and severe diarrhea, which may result in dehydration and electrolyte disturbances .

Laboratory examination findings are often unremarkable in uncomplicated amoebic colitis, although mild anemia may be seen .[8]

PATIENTS AND METHODS:

This study was conducted in Baquba city Diyala province during 2009. Diyala Governorate is located in the middle of Iraq about 65 kilometers to the north-east of Baghdad , Baquba city is the center of Diyala, situated around Diyala river which is the source of water for this city. The area of Baquba is an agricultural area, it is 580 kilmeters and it's population 557178 urban population, in addition to 48000 rural population, children under one year of age 22287 and 94719 are children under 5years of age [9].

There are two main hospitals in Baquba (Baquba general teaching hospital and Al-Battool Maternity and Pediatric teaching hospital), with two reference consultation clinics in these hospitals, regarding the Primary Health Care (PHC) system Baquba consists of one PHC District, that include six main Primary health care centers, Al-Tackya, Al-Tahrier, Al-Saray, Al-Katon, Shifta and Buhriz. Other centers are distributed through rural regions of the district, inaddition patients from other sectors Khalis, Mukdadia, Baladrouz and Bani-saad are refered to consultation pediatric clinic in Al-Battool teaching hospital too.

A total patients suffering from acute diarrhea who were referred from the Primary health care centers to the reference consultation clinic in Al-Battool Maternity and Pediatric teaching hospital throughout 2009, their age is ranging from early days of life up to 15years old, of patients affected with diarrhea of different causes were estimated and the patients complaining from amoebic dysentery, according to freshly passed stool within 30minutes, general stool examination done for more than two samples for every case carefully by an expert laboratory personnels , for detecting Entamoebaphagocytosed erythrocytes, , in addition to the finding mucus and pus cells and occasionally cysts, which regarded in the study positive trophozoite sample, while other samples which were not containing this trophozoite criteria but only cysts were considered positive for cysts .

RESULTS:

The study reveals:

Forty-two percent (42%) of the total number of patients who visit the pediatric clinic during 2009 were complaining from diarrhea (7752 from 18450) .

Thirty-four percent (34%) of those patients with diarrhea were infected by *Entamoeba histolytica*(2640 from 7752) which it constitutes 14.3% of the total number of patients visiting the pediatric clinic.

Among children in the study there is no age immune to *Entamoeba histolytica* infection as it is shown in table (1) it is more among age group 2mo-5year.

It is found that the percentage of patients with *Entamoeba histolytica* cysts 20.1% which is more than patients with *Entamoeba histolytica* trophzoite 13.9% as it is shown in table (2).

It is more among male (19.2%) than female (14.8%) as it is shown in table (3), thus male to female rato is 1.3 :1.

Entamoeba histolytica infection is more in sectors in the periphery (Baladrouz and Mukdadia) than in the center of the governorate. as it is shown in table (4).

The infection is present throughout the year but it is more common on hot months from beginning of April till around the end of September as it is shown in table (5).

It is accompanied occasionally by complications, intestinal and extra-intestinal as it is shown in table (6)

Relapses which constitutes (22.8%) of patients infected with *Entamoeba histolytica* and even death due to it's complications which forms (4.37%) of patients infected with *Entamoeba histolytica* as it is shown in table (7).

Table 1: Distribution of patients with diarrhea according to age

Age	No. of patients with diarrhea	%	No. of patients with +v e *E.H.*	%	% of patients with *E.H.* to total No. of patients with diarrhea (7752)	% of patients with *E.H.* to total No. of patients visiting the pediatric clinic (18450)
0-2 months	606	7.8	62	2.4	0.7	0.3
2mo -5y	5588	72.1	2338	88.5	30.1	12.7
6y -15y	1558	20.1	240	9.1	3.2	1.3
Total	7752	100	2640	100	34	14.3

Table 2: Distribution of patients with diarrhea +*E.H*. cyst and troph. according to age.

age	No. of patients with +v e *EH* cyst	No. of patients with +v e *EH* trophozoite .	% of pt. with cyst to total number of pt. with diarrhea(7752)	% of pt. with trophozoite to total number of patients with diarrhea(7752)
0-2months	38	24	0.4	0.3
2mo -5y	1479	859	18.1	11.1
6y -15y	46	194	0.6	2.5
Total	1563	1077	20.1	13.9

Table 3: Distribution of patients with +ve *E.H*. according to sex

Sex	No. of patients with diarrhea	No. of patients with +v e *E.H.*	%of +v e *E.H.* patients to total number of patients with diarrhea (7752)	% of patients +v e *E.H.* to total number of patients visiting the pediatric clinic(18450)
Male	4160	1490	19.2	8.1
Female	3592	1150	14.8	6.2
Total	7752	2640	34	14.3

Table 4: Distribution of patients +v e *E.H.* according to residency.

Sector	No. of patients with diarrhea	No. of patients +v e *E.H.*	% of patients +v e *E.H.* to total number of patients with diarrhea visiting the pediatric clinic(7752)	%of patients +v e *E.H.* to total number of patients visiting the pediatric linic(18450)
Baquba	1735	304	3.9	1.6
khalis	1102	404	5.2	2.7
Mukdadia	1756	756	9.8	4.1
Baladrouz	2344	894	11.5	4.6
Bani-saad	815	282	3.6	1.3
Total	7752	2640	34	14.3

Table 5: Distribution of patients +v e *E.H.* according to season.

Season	No. of patients with diarrhea	No. of patients +v e *E.H.*	%of patients +v e *E.H.* to total number of patients with diarrhea (7752)	%of patients +v e *E.H.* to total number of patients visiting the pediatric clinic (18450)
Winter (Jan,Feb&Mar).	1460	454	5.6	2.3
Spring (Apr.May.&June).	2522	918	11.9	5.2
Summer (July,Aug.&Sept.)	2480	910	11.8	5.1
Autum (Oct.Nov.&Dec.)	1290	328	4.7	1.7
Total	7752	2640	34	14.3

Table 6: Distribution of patients +v e *E.H.* according to complication and age

Age	No. of patients with + v e *E.H.*	Intestinal complications	% of intestinal complications to number of patients +v e *E.H.*	Extra-intestinal complications	% of extra-intestinal complications to number of patients + ve *E.H.*
0-2mo	62	0	0	2 sepsis	3.2
2mo-5y	2338	3 intussusception	0.25	2 hemolytic-uremic syn. 2 convulsion	0.37
6y-15y	240	0	0	0	0
Total	2640	3	0.25	6	3.57

Table 7 :Distribution of patients +v e *E.H.* according to relapse, deaths and age

Age	No. of patient. +v e *E.H.*	No. of patients with relapse	%of relapse to number of patients with +v e *E.H.*	No. and Causes of death	%of death to number of patients +v e *E.H.*
0-2mo	62	2	3.2	2 sepsis	3.2
2mo-5y		188	16.4	2 first one ; hemolytic-uremic syndrome second one; sepsis following operation for intussusception 1 hemolytic-uremic syndrome	1.17
6y-15y	240	5	3.2	0	0
Total	2640	195	22.8	5	4.37

DISSCUSION:

This study implies that the prevalence of amebic dysentery among hospital attendance represent one third of total cases of diarrhea, and it is 14.3% in our community, so that *Entamoeba histolytica* infects a large number of children among the age group (2mo-5y) and it infects even neonate and still it infects children more than 5y old but to less extent and the disease occur throughout the year although it is more predominated during hot months thus it is endemic in our country , in this study the number of infected patients with *Entamoeba histolytica* is more encountered among sectors away from the center of the governorate especially Baladrouz and Mukdadia.

In addition to that *Entamoeba histolytica* infects male more than females.

Entamoeba histolytica infections cause plenty complications , in this study cases are registered with high fever and even convulsions , dehydration and cases of clinical sepsis especially among neonate, hemolytic-uremic syndrome, other cases reported in this study *Entamoeba histolytica* infection associated with intussusception , occasionally death occurs either among cases of septicemia or hemolytic- uremic syndrome .Other complication mentioned in the books not reported among children in this study is hepatic involvement, amebic liver abscess. Relapses occur and probably represent re-infection or failure to eradicate amoebea from bowel because of inadequate dosage or duration of therapy, the number of relapses in this study evidently is large number and it is especially more among age group 2mo-5year.

Our finding is consistent and coincide with other studies in some respects in other parts of the world e.g. Africa, Southeast Asia, India and Latin America, especially in areas with low socioeconomic and low sanitary standards and water pollution[10]

Study in Ilesa, Nigeria, over a period of nine months (2008) were prospectively studied. A total under-five children (Neonates were excluded) with diarrhea. This puts the prevalence of dysentery at 13.7%. male to female ratio of 1.1: 1. The ages ranged between 2 months and 5years.[11], here in this study the prevalence is less than that in my study which is 14.3%, and there is little difference in male to female ratio as it is 1.3:1 in my study and trophozoites were identified more than in my study[11].

Another study about the prevalence of *E.histolytica* in the venda region, limopo, South Africa, (2003) children aged 2-5 year , the prevalence of dysentery was 12.6% trophozoites of *Entamoeba histolytica* were identified in (78.1%) with male to female ratio 1, here the result in prevalence is less and trophozoites were identified more but here there was no gender difference[11].

Another study in Kumast Ghana,the study involved 284 children aged 2months-5 years with diarrhea, prevalence of dysentery was (15.3%), trophozoite of *Entamoeba histolytica* were identified in (65.2%) , with no gender difference[11].

Prevalence of Intestinal Amoebiasis in Infant and Junior School Children in Degema General Hospital and Environs (2008). Children within the age category of 6-10 yrs had the highest rate of infection. Females (12.3%) were more infected

than males (8.8%) proportionately. In conclusion, the prevalence rates of intestinal amoebiasis among these patients were 11%.

A ten year (1999-2009) retrospective study of amebic dysentery in University Malaya Medical Center (UMMC), Kuala Lumpur, Malayssia.

Farhana F (2008), University of Malaya, Malaysia. The prevalence of amebic dysentery found in this study to be 35% majority of cases occurred among Malaysians (85%) the others were Chinese and Indian patients, the identification of trophozoite is (42%) and male to female ratio is 1.2:1, so the finding here is higher than my study [12].

Recommendations:

As there is no prophylactic drug or vaccine available for amoebiasis , it is recommended to prevent dissemination of this disease by identifying the source, by investigation of diarrheal episodes and regular examination of food handlers and prompt treatment of the diagnosed cases, as well as by improving the water supply and public sanitation and enhancing personal education programs through all available means. It is a treatable disease, the affected cases should be promptly treated as early as possible to prevent its complications.

Acknowledgment:

Acknowledgment and thanks goes to Professor (Dr. Mahjoob N.AL-Naddawi) Head of pediatric Department , Medical College, Baghdad University , who encouraged me and for his very valuable advices for this study.

CONCLUSION:

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REFERENCES :

1. ChandyC.J. and RobertA.S. .Amebiasis :In Nelson Text Book Of Pediatrics, NewYork , Judith Fletcher .17th Ed. 2007:ch 257:1123-25.

2. Haque R, Duggal P, Ali IM, et al: Innate and acquired resistance to amebiasis in Bangladeshi children. *J Infect Dis* 2002; 186:547-52.

3. Haque R, Huston CD, Hughes M, et al: Amebiasis. *N Engl J Med* 2009; 348:1565-73.

4. Huston CD, Boettner DR, Miller-Sims V, et al: Apoptotic killing and phagocytosis of host cells by the parasite *Entamoeba histolytica*. *Infect Immun* 2008; 71:964-72

5. Petri Jr WA, Haque R, Mann BJ: The bittersweet interface of parasite and host: Lectin-carbohydrate interactions during human invasion by the parasite *Entamoeba histolytica*. *Annu Rev Microbiol* 2002; 56:39-64.

6. Stanley Jr SL: Amoebiasis. *Lancet* 2003; 361:1025-34.

7. Stauffer W, Ravdin JI: *Entamoeba histolytica*: An update. *Curr Opin Infect Dis* 2009; 16:479-85.

8. Tanyuksel M, Petri Jr WA: Laboratory diagnosis of amebiasis. *Clin Microbiol Rev* 2003; 16:713-29.

9. Salwa S Ababdul-Wahid. Seroconversion rate after measles vaccine in a selected sample of children under two year of age in Baquba City. PhD thesis, College of Medicine, Al-Mustansiriya University, Community Medicine Dept., Baghdad, 2008

10. Blessmann J, Tannich E: Treatment of asymptomatic intestinal *Entamoeba histolytica* infection. *N Engl J Med* 2006; 347:1384.

11. Stau Park K. Amoebiasis. In: Park K. (ed.) Park's Textbook of Preventive and Social Medicine. 18th Edition. M/s Banarsidas Publishers, Jabalpur,; 2008: 184-5.

12. Jansen, A.; Stark, K.; Kunkel, J.; Schreier, E.; Ignatius, R.; *et al*. Aetiology of community-acquired acute gastroenteritis BMC Infect. Dis. 2009; 8: 143.