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RESEARCH ARTICLE

Frequency of intestinal parasitic infection among children under 5 years of age in Baghdad province

Mohammed J. Shakir[1] and Areej A. Hussein[2]
(B.Sc.; M.Sc.) , (M.Sc, Ph.D. Post Doc.)
1, 2 Department of Microbiology, College of Medicine, Diyala University

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Corresponding Author

Mohammed J. Shakir

Abstract

Background: Diarrheal diseases are one of the leading causes of childhood morbidity and mortality in many tropical and subtropical countries especially with poor sanitation and unsafe water also responsible for most cases of childhood.

Objectives: To determine the prevalence of parasitic infection among children under 5 years of age and study the relation with different socio-demographic.

Materials and methods: Two hundred fourty stool samples collected from children attending to the central teaching hospital for pediatric in Baghdad city - Iraq, during the period from March 2010 till March 2011**.** All stool samples were laboratory diagnosed by direct stool examination.

Results: We examined 240 children with diarrhea, 202 cases were found to be positive for intestinal parasites with infection rate was (84.16%). The infection in males (54.58%) was higher than in female (45.42%). Most common parasite was *Entamoeba histolytica* (41.25%) fallowed by *Giardia lambila* (34.17%) and *Cryptosporidium parvum* (8.75%). Also low percentage record within children with breast feeding and urban area.

Conclusion: intestinal infection is common among children in Baghdad city and *Entamoeba histilytica* is the main parasite that causes infection. So we suggest that the city administrators need to pay more attention in the prevenetion of parasitic infections along with the improvement in educational environmental and sanitary conditions.

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Introduction

Diarrheal disease remains one of the largest health problems in many parts of the world. The disease is often mild and self-limiting but, particularly in the elderly and young children, the symptoms may be very severe [1]. An estimated 1,000 million episodes occur each year in children under 5 years of age. Diarrhea causes an estimated 5 million deaths in children fewer than 5 years of age per year [2]. About 80% of these deaths occur in children in the first 2 years of life. Approximately one third of deaths among children fewer than five are caused by diarrhea [3].

The incidence of pathogens causing diarrhea varies between developed and developing world setting. In developed countries about 70% of diarrheal cases are of viral (40% rotavirus), 10% - 20% of bacterial and <10% of protozoa origin [4, 5].

Entamoeba histolytica, *Giardia lamblia* and *Cryptosporidium* spp are the most common diarrhea causing parasitic protozoa [6]. Which still remains a leading cause of morbidity and mortality among infants in low- and

middle-income countries [7]. As infections with parasites, particularly *G. lamblia* and *Cryptosporidium* spp., are the most likely causes of persistent diarrhea (>14 days) [8].

Diagnosis of these parasites is usually performed by microscopy. However, microscopy lacks sensitivity and specifity, recently replacing microscopy with more sensitive and specific nucleic acid based methods is hampered by the higher costs, in particular in developing countries. Multiplexing the detection of more than one parasite in a single test by real-time polymerase chain reaction (PCR) has been found to be very effective and would decrease the cost of the test [9].

Breast-feeding provides significant protection against many diseases including diarrhea in infancy [10]. This is attributable to a complex of acquired and innate factors unique to human milk including immunoglobulins [11, 12], oligosaccharides, glycoconjugates, lactoferrin, antimicrobial compounds [13], leukocytes, cytokines, and other agents [14,15].

Thus, the present study was designed to investigate the prevalence of intestinal parasite among children under 5 years of age and study the relation with different socio- demographic such as age, gender; also study role of breast-feeding in protection against intestinal parasite infection (IPI) by comparing breast-fed with non-breast-fed infants with persistent diarrhea.

Subjects and methods

Sample collection: A total of 240 children presenting with diarrhea to the central teaching hospital for pediatric in Baghdad city - Iraq, during the period from March 2010 till March 2011.

Parasitological examination: The stool samples were collected in plastic containers from all participants and examined by direct wet smear in normal saline and Lugol's iodine for the presence of intestinal parasite cysts and trophozoites. Microscopically examined initially under low power (10X10 magnifications) bright field then under high power (40X40 magnification) bright field.

Data sheet: Was used to record variables such as age, gender, demographic, occupation of parent, immune state, personal hygienic habits of the children, breast feeding and parasite identified. A questionnaire was administered by the same observer to parents or legal guardians of each child and latest were compared with the parasitological result in order to estimate the sensitivity, specificity and positive predictive value.

Statistical analysis: Data were analyzed using Statistical Analysis System- SAS (2010) and differences were evaluated using the Chi-Square test. All tests were two-sided with differences considered significant at $P<0.05$ [16].

Results

The results showed in table (1) which demonstrated that among 240 cases, 202 were positive for parasitic infection. The laboratory diagnosis revealed those 99 cases with *E. histolytica*, 82 cases *with G. lamblia*, and 21 cases C. *parvum*

Table (1). Intestinal parasitic infections in the study population

Parasite infection	Number	Percentage	Comparison of Significance	
			Chi2-value	Sig.
E. histolytica	99	41.25	6.99	Sig. $P\leq0.01$
G lamblia	82	34.17	11.32	
C. parvum	21	8.75	13.89	
Total	202	100%		

* Significant

The results of current study demonstrated that percentage of parasitic infection within males 131(54.58%) was more than females 109 (45.42%) and statistical analysis show significant differences at P<0.05.

Table (2): Distribution of Intestinal parasitic infections according to gender

Gender	Number	Percentage	Comparison of Significance	
			Chi^2-value	Sig.
Males	131	54.58%	4.371	Sig.
Females	109	45.42%		(P≤0.05)
Total	240	100%		

* Significant

As shown in table 3, majority of aged between 1 month to 5 years, it was found that 113 (47.08 %) of patients was occur in the age group (2-3 years), while the age group <= 2years constitute the lower percentage. Statistically significant difference was found between intestinal parasite and age (P≤0.01).

Table (3): Distribution of Intestinal parasitic infections according to age

Age stratum	Number	Percentage	Comparison of Significance	
			Chi^2-value	Sig.
<= 2years	24	10.00%	10.509	Highly Sig.
2-3 years	113	47.08%		(P≤0.01)
More than 3	103	42.92%		
Total	240	100%		

* Significant

Significant differences noticed between breast feeding and non-breast feeding. Most infected cases occur in children with no breast-fed group and constituted the higher percentage 59.17%, while children with breast fed group constituted the lower percentage 40.83%%.

Table (4): Distribution of Intestinal parasitic infections according to breast feeding

Feeding	Number	Percentage	Comparison of Significance	
			Chi^2-value	Sig.
Breast-fed group	98	40.83%	7.024	Sig.
Non-breast-fed group	142	59.17%		(P≤0.01)
Total	240	100%		

** Significant

Highest prevalence 57.50% (138/240) of parasitic infection was found in the children at urban area followed by 42.50% (102/240) in the rural area as shown in table (5).

Table (5): Distribution of Intestinal parasitic infections according to living area

Area	Number	Percentage	Comparison of Significance	
			Chi^2-value	Sig.

Urban	138	57.50%	6.512	Sig. (P≤0.01)
Rural	102	42.50%		
Total	240	100%		

* Significant

Discussion

Diarrhea, including that of parasitic origin, remains one of the most common illnesses among children and, as reported by the World Health Organization, is one of the major causes of infant and childhood mortality in developing countries [17]. Intestinal opportunistic parasitic infections are important causes of diarrhea which is a serious health problem in tropical regions. Giardia spp. and Cryptosporidium spp. are common parasitic causes of human diarrhea with the prevalence rate of 1% - 3% in the industrialized world and 4% - 17% in developing countries [18].

We found that the prevalence of intestinal parasitic infection is around 84.16% and most of these infections are due to protozoan such as *Entamoeba histilytica* and *Giardia lamblia*, these two protozoan remain the most common intestinal parasitic pathogen, Similar results has been reported from Goni *et al*.,(2012) during examination one hundred sixty stool sample by using microscopic examination [19]. This may be related with worldwide distribution of this parasite comparing with other and the transmission of these parasites occurs via fecal-oral route, either directly from person to person or indirectly by eating or drinking fecally contaminated food and water. Also this may be related to the poor living conditions and like of sanitation in studied area.

There was high prevalence of intestinal parasitic infection in the present study and lower rates of infection have been reported from neighboring countries such as Turkey and Iran [20, 21].

According to the gender distribution, the percent work revealed that the prevalence of intestinal parasitic infections was slightly higher in males than females, which is comparable with study done by Sherchand *et al*., (2009) in children Hospital at Nepal [22]. Higher prevalence of diarrhea in male was also reported to be Moyo *et al*.,(2011) in Tanzania [23].

In this study, more than half of the patients infected with intestinal parasitic infections within age group (2-3 years), these result agree with finding of [24, 25]

Breast-fed infants have a lower prevalence of gastrointestinal infections including IPI than formula-fed infants this result similar to result of Abdel-Hafeez *et al*., (2013). Who investigated the effect of breast-feeding in protection against protozoan infection in infants with persistent diarrhea [26]. Also agreement with other studies [14, 15]. However, there are little conflicting opinions concerning breast-milk and anti-infective functions [27, 28].

Higher frequency of diarrhea was seen in children at urban area 57.50% comparing with rural area 42.50%. This result disagreement with Escobedo *et al*., in 2008, who performed the study in children between 5-15 years of age in Cuba [29] And also with Ak *et al*., (2006) who study the distribution of intestinal parasitic disease in Anatolian region of Turkey [20]. This may be related with limited sample size or parents of Children at urban area directly visit the doctor at hospital or may be large size of family of living in relatively crowded conditions. The level of sanitation and socioeconomic status and poor personal health habits all of these show that risk factors for infection in children.

In conclusion. The findings of the present study showed the 2-3 years age group had the highest parasitic infection, and *Entamoeba histilytica* is the main parasite that causes infection in children. So we suggest that the

city administrators need to pay more attention in the prevenetion of parasitic infections along with the improvement in educational environmental and sanitary conditions

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