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Epidemiological Study for Entamoeba Histolytica Infection and their Risk Factors among Children in Pediatric Hospital in, Sulaimani Province-Iraq

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Abstract:
Background: The protozoa parasite Entamoeba histolytica is an essential cause of human morbidity and mortality around the world other than malaria and schistosomiasis. Prevalence of E. histolytica in Sulaimani province, KRG, Iraq has been scantily studied as well as detecting and controlling the risk factors related to the parasite is crucial in Sulaimani city.
Objectives: A cross-sectional study was pointed to supply the primary information on the prevalence and epidemiological risk factors including age, residency, economic status, drinking water source, hand washing and consuming raw vegetable related to E. histolytica infection among children between 1 to 10 years old in Sulaimani city, Iraq.
Methodology: A total of 450 stool samples randomly were collected (during period from September 2021 to February 2022) from children in Sulaimani pediatric hospital in Sulaimani city, KRG, Iraq, and examined by direct smear microscopy in normal saline and iodine smears which is followed by Sulaimani medical laboratories for detection and diagnosis of E. histolytica infection.
Results: The Prevalence of E. histolytica infection in Sulaimani province was (19.3%), and significant association was recorded between the infection and economic status of the child family (p value = 0.005), family who consuming raw vegetable (p value= 0.006) and children's parent education level (p value = 0.05).
Conclusions: Prevalence of E. histolytica among children is low and this parasite may play a minor role in causing morbidity in these populations in Sulaimani city, Iraq. Besides, more studies are necessary to provide information on epidemiological risk factors of E. histolytica to improve health education and environmental sanitary conditions to protect children from the pathogen E. histolytica in Sulaimani city.
Keywords: Epidemiology, Entamoeba histolytica, infection, risk factor, pediatric.

INTRODUCTION

Entamoeba histolytica is one of the anaerobic parasitic amoebozoa, which is a part of genus Entamoeba, and it is a protozoan that causes intestinal amoebiasis and ulceration of the colon as well as extra intestinal manifestations [(1)]. It is a single-celled parasite that is transmitted to humans via contaminated water and food. In spite of the fact that 90 percent of E. histolytica disease are

asymptomatic, about 50 million individuals gotten to be symptomatic, with approximately 100,000 deaths annually [2, 3, 4, and 5]. Amebic infections are more prevalent in countries with lower socioeconomic conditions [6]. Entamoeba histolytica continues to be crucial world health issue which regarded the third leading cause of mortality by the infections.

The protozoa parasite Entamoeba histolytica is a vital cause of morbidity and mortality around the world [7, 8]. Diseases with E. histolytica are common and are one of the major wellbeing issues in developing nations [9, 10]. Human being is the host for the parasite and there are no other known animal reservoirs of this parasite [11]. The clinical spectrum of E. histolytica infections varies from asymptomatic infection to severe colitis and extra intestinal health problems [12]. Most peoples are infected with E. histolytica are carriers [13]. Infection with E. histolytica is responsible from a considerable number of cases of chronic diarrhea among travelers [14]. In addition, infection with the parasite may lead to the development of life-threatening abscess in lungs, liver and brain [9, 15]. Transmission of E. histolytica occurs in areas with poor sanitation by contamination of drinking water or food with human feces [16].

Aims of the Study

A cross-sectional study was pointed to supply the primary information on the prevalence and epidemiological risk factors including age, residency, economic status, drinking water source, hand washing and consuming raw vegetable related to E. histolytica infection among children between 1 to 10 years old in Sulaimani city, Iraq.

METHODOLOGY

A cross-sectional study was conducted on 450 childe of pediatric hospital in Sulaimani province-KRG- Iraq, between September 2021 to February 2022 who entered the hospital for diagnosis and treatment. Through a questionnaire demographic data and risk factors were collected from the patients. Besides, stool specimens were collected and examined microscopically using a direct wet mount method which followed by Sulaimani city medical laboratories to detect E. histolytica cyst.

Statistical data analysis was done using SPSS version (17) for demonstration of the relation between amoebiasis and associated variables. P-value of < 0.05 was regarded statistically significance. Regarding to ethical considerations the study was reviewed and approved by the research ethic committee. An administrative authorization was obtained from the general directorate of health in Sulaimani city and the head of pediatric hospital to facilitate the sampling from patients attending the hospital.

RESULTS:

Table (1) in the current study demonstrates that out of 450 stool samples were collected from children in pediatric hospital in Sulaimani, the prevalence rate was 87 children (%19.3) were infected with Entamoeba histolytica (Fig. 1). Moreover, 72 of infected children with amoebiasis were from urban areas and 15 of them from rural areas.

Significant association was recorded between the infection and economic status of the child family (p value = 0.005), family who consumed raw vegetables (p value= 0.006) and children's parent education level (p value = 0.05) (table 2) . On the other hand, no significant relation was found in the current study between the infection and patient's residency, drinking water source, family size of the patients, indiscriminate defecation, hand washing (table 1).

DISCUSSION

Quantitative, cross sectional study was chosen in order to find out the epidemiology and associated factors that lead to the prevalence of Entamoeba histolytica infection among children admitted to the hospital for diagnosis and treatment between September 2021 to February 2022.

Sulaimani is rapidly developing, this big development has advantages and disadvantages to the people and the environment of the city. The positive change is the development of health care systems. However, the negative changes are the most concerning among the increasing pollution, poor sanitation and using unclean water in agriculture.

The economic situation is the root cause of the lack of clean water and healthy food. Therefore, it is not surprising that, Entamoeba histolytica infection head the list of the most common diseases among hospital admission and mortality rate [17].

Prevalence of E. histolytica in Sulaimani province, KRG, Iraq has been scantily studied and risk factors associated with this parasite are unavailable in Iraq. Therefore this study was conducted in order to assess the epidemiology and factors associated with amoebiasis.

The finding of the study demonstrated that out of 450 stool specimens collected from children in Pediatric Hospital in Sulaimani city, the prevalence rate was 87 children (%19.3) were infected with Entamoeba histolytica. This finding is similar to the study conducted in Al-Furat general hospital / Baghdad, Iraq from 1 October 2017 to 28 February 2018, the prevalence of Entamoeba histolytica was 15.89% among 497 patients [18].

Furthermore, In July 1970-2017 a group of studies were conducted in Iraq using random effect model meta-analyses to find E. histolytica/disbar infection. The result showed that the prevalence of Entamoeba histolytica was at 20.61%. However, the prevalence decreased into 18.46% between 2010 and 2017 [19]. As this rate is almost close to what the current study gained.

The present study found that 72% of infected children with amoebiasis were from urban areas and 15 of them from rural areas. Globally, poor sanitation has more impact on the disease rather than where the patients live [20]. As this has been proven by the finding of this study stated that those who drink tap water are more likely to be infected by E. histolytica compared to those who drink well water.

The current study revealed that there was a slight difference between gender and the positive sample of E. histolytica. In contrast, another study found that females were nearly double at 18.4%. There was no significant association between gender and the prevalence of the disease, as this is consistent with the result of the study done among school children in northern districts of West Bank-Palestine [21].

The current data showed that the majority of affected cases are those who fall into intermediate economic status. This is in lined with the study about risk factors for Entamoeba histolytica infection in an agricultural community in Hanam province, which claims that people from households with an average socio-economic status had a much higher risk of E. histolytica infection (odds ratio [OR] = 4.3, 95% confidence interval CI: (1.3-14.0) compared with those from households with a good socioeconomic status [22]. Furthermore, prevalence of E. histolytica is more common with larger size families, as a significant association was recorded in this study between the infection and economic status of the child family by (p value = 0.005).

Another study also supported this finding and stated that socio-economic status was strongly associated with the E. histolytica infection,

participants who lived in households with an average and poor SES had a 3.8 (95% CI: 1.5-9.8) and 2.4 (95% CI: 0.9-6.4) higher risk of infection with E. histolytica than those living in households with a good status [23].

Indiscriminate defecation, hand washing, close animal contact, has an indirect relationship with the Prevalence of E. histolytica, a significant association was found between infected children and level of parent's education at (p value = 0.05). As the lower their education level, the higher the affected cases. As suggested by a cross-sectional study, public health education programs need to be formulated in schools to raise awareness and teach people about good sanitation and hence reduce infections and morbidity [24].

CONCLUSION

Prevalence rate of the infection amoebiasis among child population is low and the parasite may have a minor role in producing morbidity among pediatric in Sulaimani city, Iraq. Families member size and parents education level of children were significant predictors of this parasite. In addition, more research is necessary in order to provide data on epidemiological risk factors of E. histolytica to promote health status of the community and generate an environmental condition that protects children from the infection in Sulaimani province.

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TABLES and FIGURES

Table (1): Prevalence rate of Entamoeba histolytica among children in pediatric hospital in Sulaimani province.

No.	Variable		Negative Sample	Positive Sample	P-value
1	Gender	Male	212	(46)	0.34
		Female	151	(41)	
2	Resident	Rural	68	(15)	0.74
		Sub rural	2	(0)	
		Urban	293	(72)	
3	Economic state	Good	8	(8)	0.005
		Intermediate	314	(72)	
		Poor	41	(7)	
4	Drinking water source	Mineral	16	(14)	0.09
		Tap	279	(57)	
		Well	68	(16)	
5	Family size	<=4 members(small)	175	36	0.25
		>5 members (large)	188	51	

6	**Parent education level**	Primary school and below	252	51	0.05
		High school and above	111	36	
7	**Room number**	1	192	43	0.08
		2	129	42	
		3	32	2	
		4	10	0	

Table (2): Association between Entamoeba histolytica and another variable.

Case with other infection		**Negative Sample**	**Positive Sample**	**p-value**
	No	338	67	0.22
	Yes	25	20	
Indiscriminate defecation				0.11
	No	269	10	
	Yes	94	**77**	
Hand washing				0.13
	No	264	5	
	Yes	99	82	
Consumes raw vegetables				0.34
	No	174	56	
	Yes	189	31	
Close contact with animal				0.44
	No	327	65	
	Yes	36	22	

Figure (1): Prevalence rate of Entamoeba histolytica among children in pediatric hospital in Sulaimani province.