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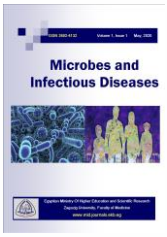

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Original article

Prevalence of *Entamoeba histolytica*, *Giardia lamblia* and *Entamoeba coli* infection associated with risk factors in Khartoum state-Sudan

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ABSTRACT

Background: Intestinal protozoan infections are common among children. **Objectives:** To determine the prevalence of *Entamoeba histolytica*, *Giardia lamblia* and *Entamoeba coli* infection associated with risk factors in Khartoum state. **Methods:** This was cross section study conducted in Khartoum state (Om Elhessin center) included 300 individual form different age groups of both male and females, stool samples were collected and analyzed according to the standard methods. **Results:** The prevalence of *Giardia lamblia* was highest 50% compared with *Entamoeba histolytica* 26% and *Entamoeba coli* 23%, the highest prevalence in age groups 5-15 years i.e., 43%, 15-25 years 32% and above than 25 years 25%, the rate of infection was highest among illiterates 46%, primary education 41% and lowest in secondary education 13%. The results showed that males were 68.4% higher than female which constituted 31.6%. **Conclusion:** The overall prevalence of intestinal protozoa (*Entamoeba histolytica*, *Giardia lamblia* and *Entamoeba coli*) in this study 40%, where the infection it highest among age group 5-15years, males were higher than females and the rate of infection is most frequency among illiterates.

Introduction

Intestinal protozoan infections (IPIs) are common among children resulting in considerable malabsorption syndromes, gastrointestinal morbidity and mortality especially in developing countries [1]. Worldwide, have been recognized as one of the most significant causes of illnesses [2].

It is estimated that IPIs result million illnesses with an average prevalence rate of 50% in developed world, and almost in developing countries [3]. It is estimated that *Entamoeba histolytica* (*E. histolytica)*, the etiological agent of amoebiasis, kills between 40000 and100.000 people per year hence considered one of the deadliest parasitic infections worldwide [4]. *Cryptosporidium* spp. is primarily affecting immunocompromised patients like HIV/AIDS patients [5]. These infections are ubiquitous and highly prevalent among the poor and socioeconomically deprived communities where overcrowding, poor environmental sanitation and hygiene, low level of education and lack of access to safe water are strong risk factors [6].

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Classically, laboratory diagnosis of *Giardia lamblia* (*G. lamblia)* infections is performed by microscopic examination of stool samples. In recent years, direct fluorescent antibody assay and antigen detection by using enzyme-linked immune sorbent assay (ELISA) have been accepted as cost effective alternative diagnostic methods [7]. However PCR-based methods have also showed excellent specificity and sensitivity compared with microscopy as well with antigen detection [2] . *Entamoeba histolytica is* the cause of amoebic colitis, amoebic dysentery, and amoebic liver abscess, resulting in 100,000 deaths annually [8]. In recent year's biochemical, immunological and genetic differences between *E. histolytica* and *E.* dispar, which were previously known as pathogenic and nonpathogenic strains of *E. histolytica*, respectively, have resulted in their description as two separate species [1,2]. As the potentially invasive *E. histolytica* is morphologically indistinguishable from the noninvasive *E. histolytica*, microscopy alone cannot provide a definite answer about the presence of *E.histolytica* cysts and/or trophozoits.

Material and Methods

Study design

It was cross sectional study carried out in Omdurman (Om elhessin center).

Study area

This study conducted in Om Elhessin center which located in North West of Omdurman-Sudan

Inclusion criteria

This study included individual between age 5-40 years attending as out- patient and in-patient to clinic for confirmation of intestinal protozoa infection based on the presence of signs and symptoms.

Exclusion criteria

Patients with history of treatment from intestinal protozoa after one weak.

Collection of stool samples

Stool samples containers were given to participants and then given laboratory number for easy identification and analysis. Prior to sample collection, standard procedures were followed which stated right sample and all laboratory precaution to avoid sample contamination.

Identification of parasite

Stool samples were processed and analyzed after collection by direct smear ,microscopy using normal saline and iodine wet preparation to detect trophozoite and cyst of *E. histolytica*, *Giardia lamblia* and *Entamoeba coli (E. coli)* .

Ethical approval

The ethical approval of the study was obtained from the research committee of Omdurman Islamic university- Faculty of Medical Laboratory Sciences , All experiments were examined and management in Om Elhessin center.

Results

A total of 120 individual (40%) had intestinal protozoa infection from various parasites including *G. lambelia* 50% which had most prevalence while *E. coli* was low rate of infection 23% and 26 % *E. histolytica*, Out of 300 individuals from different age groups of both males and females examined, the results showed that the age 5-15 years had the highest rate of infection i.e., 43% , while 32% among those aged 15- 25years and those above 25 years had lower rate of infection i.e., 25%.

The prevalence of infections were highest among males 68.4% than females 31.6%. The illiterates, 46% were most frequent of getting infection than primary education 41%, and the lowest in secondary education.

Table 1. Shows the prevalence of infection according to different parasites.

Type of parasite	Number of positive	Percentage
Prevalence of *Entamoeba histolytica*, *Giardia lamblia* and *Entamoeba coli*	120	40%
Giardia lamblia	60	50%
Entamoeba histolytica	32	26%
Entamoeba coli	28	23%

Table 2. Shows the prevalence of infection between different genders.

Gender	Number of positive	percentage
Females	38	31.6%
Males	82	68.4%
Total	120	100%

Table 3. Shows the prevalence of infection among different age groups.

Study group	Number of positive	percentage
Age group 5-15	52	43%
Age group 15-25	38	32%
More than 25	30	25%
Total	120	100%

Table 4. Shows the prevalence of infection according to education level of participants.

Education level	Number of positive	Percentage
No informed education	55	46%
Primary education	50	41%
Secondary education	15	13%
Total	120	100%

Discussion

Overall prevalence of *G. lamblia*, *E. histolytica* and *E. coli* among individual aged (5 year to 40 years) in Omdurman (Om Elhessin centre) 40%, which was in agreement with a study done in northwest Nigeria 36% and 35% in Saudia Arabia [9], other studies rreported higher rates of infection, in south Africa 64.8% , Pakistan 52% and Ethiopia 83.8% [8,9].

Our study showed a 50% prevalence of *G. lamblia* infections which was not in agreement with the studies reported in Uganda (12%) and 15.4 in Nigeria, that might be due to difference levels of education , soco- economic status and sanitation [6].

The results showed that the prevalence of *E. histolytica*, 26%, was higher than a study done in Uganda 8% among school children [4], this was due to the more exposure to risk factors and poverty community.

The prevalence of infection among age groups 5-15 years (43%) was the highest rates due to lack of awareness about hygiene and low levels of education.

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The results showed that the prevalence of infection were higher in males (68.4%) versus females (31.6%). On the other hand a study in Malaysia reported in males (22.0%) and females 73.3%.

The finding of this study indicates that the highest infection rate was in individuals who had no informed education 46%, primary education 41% and secondary education 13%.

Conclusion

The overall prevalence of common intestinal protozoan was 40% , *G.lamblia* were 50% in this study. The highest rate of infection was among those aged 5-15 years 43% and those non educated 46%.

Conflict of interest

None to be declared.

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References

1-**Speich B, Marti H, Ame SM, Ali SM, Bogoch II, Utzinger J, Albonico M, Keiser J.** Prevalence of intestinal protozoa infection among school-aged children on Pemba Island, Tanzania, and effect of single-dose albendazole, nitazoxanide and albendazole-nitazoxanide. Parasit Vectors 2013; 4:6:3.

2-**Sah RB, Bhattarai S, Yadav S, Baral R, Jha N, Pokharel PK.** A study of prevalence of intestinal parasites and associated risk factors among the school children of Itahari, Eastern Region of Nepal. Trop Parasitol 2013;3(2):140-4.

3-**World Health Organization (WHO).** Control of Neglected Tropical Diseases. The NTD road map: together towards2030.https://www.who.int/teams/control-of-neglected-tropical diseases/overview.

4-**Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al.** Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012 15;380(9859):2095-128.

5-**Jex AR, Smith HV, Nolan MJ, Campbell BE, Young ND, Cantacessi C, Gasser RB.** Cryptic parasite revealed improved prospects for treatment and control of human cryptosporidiosis through advanced technologies. Adv Parasitol 2011; 77:141-73.

6-**Thompson RC, Hopkins RM, Homan WL.** Nomenclature and genetic groupings of Giardia infecting mammals. Parasitol Today 2000;16(5):210-3.

7-**Ghosh S, Debnath A, Sil A, De S, Chattopadhyay DJ, Das P.** PCR detection of Giardia lamblia in stool: targeting intergenic spacer region of multicopy rRNA gene. Mol Cell Probes 2000;14(3):181-9.

8-**AlAyyar RM, AlAqeel AA, AlAwadhi MS.** Prevalence of Giardiasis and Entamoeba Species in Two of the Six Governorates of Kuwait. J Parasitol Res 2022; 2022:5 972769.

9-**McElligott JT, Naaktgeboren C, Makuma-Massa H, Summer AP, Deal JL.** Prevalence of intestinal protozoa in communities along the Lake Victoria region of Uganda. Int J Infect Dis 2013;17(8): e658-9.

Eltoum NMH, Mubark MEE, Lowba JYL, Mohamed ABS, Idris AAA. Prevalence of *Entamoeba histolytica*, *Giardia lamblia* and *Entamoeba coli* infection associated with risk factors in Khartoum state-Sudan. Microbes Infect Dis 2023; 4(2): 667-670.