ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 07, Issue, 12, pp.17868-17871, December, 2017

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

PREVALENCE OF GASTRO INTESTINAL PARASITE AMONG PRIMARY SCHOOL SUDANESE CHILDREN IN BANAT & ALHALANGA VILLAGES IN KASSALA SUDAN

[1]Mohamed Hassan Ahmed, [1]Amna Mustafa Mohammed, [1]Rasha Yasein Terkawy, [1]Aisha Hashim anglo, [1]Dalal Abdolaziz Ismail, [1]Aaisha Hussain Mohammed, [1]Tafawl Ibrahim Karrar, [2]Abdelrahman Mohamed Sid Ahmed and [*,3]Khadega Suleiman Mohammed Zarroug

[1]Department of Parasitology and Medical Entomology, Medical Laboratory Science program Faculty of Medicine and Health Science Kassala University, Sudan
[2]Department of Clinical Chemistry, Medical Laboratory Science program, Faculty of Medicine and Health science Kassala University, Sudan
[3]Department of Microbiology and Parasitology, Faculty of Medicine and Health Science, Kassala University, Sudan

ARTICLE INFO

Article History:
Received 08th September, 2017
Received in revised form
18th October, 2017
Accepted 16th November, 2017
Published online 30th December, 2017

Key Words:
Intestinal parasite,
Kassala,
Alhalanga villages,
Primary school
and Intestinal protozoa.

ABSTRACT

Background: In order to identify the prevalence rate of intestinal parasitic infections among primary school children, this cross sectional study conducted in Banat and Alhalanga areas in Kassala State. The study involved one hundred stool samples collected from children aged under 13 years. By using direct wet preparation, flotation technique and formal ether concentration technique to process the samples, the results showed that, 45 children about (45 %) were harboring different gastrointestinal parasites. the study revealed that protozoa was seen in 29 children about (64.4%), while helminthes and co infection of protozoa and helminthes were seen in 11 children about (24.5%) and 5 children about (11.1%) respectively. Out of 45 positive cases, single parasite infections were found among 35 children about (77.8 %), were as 10 children about (22.2 %) were found to be infected with multiple parasitic infections. The result also showed the highest prevalence rate of single parasite infection was *G.lamblia* 22 children about (48.9%) followed by *H.nana* 10 children about (22.2%), *E.histolytica* 2 children about (4.4%) and E.vermicularis 1 child about (2.2%) and the highest prevalence rate of multiple parasitic infection (co-infection) was *G.lamblia* + *E.histolytica* 5 children about (11.1%) followed by *G.lamblia* + *H.nana* 3 children about (6.7%), *E.histolytica* + *H.nana* 1 child about (2.2%) and *G.lamblia* + *E.vermicularis* 1 child about (2.2%). When using different techniques for all samples of study population, formal ether concentration technique proved to detect higher rates of different parasites encountered. The highest rate reported was for *Girdia lamblia* (22.0%), followed by *Hymenolepis nana* (10.0%), *Entamoeba histolytica* (2.0%) and *Enterobius vermicularis* (1.0%). The result also showed that using floatation technique could not recover a single case of *Entamoeba histolytica*. Although there is differences in detection of different parasites by different techniques unfortunately these differences in rates were found to be statistically in significant with (p. value= 0.848).

Citation: Mohamed Hassan Ahmed, Amna Mustafa Mohammed, Rasha Yasein Terkawy *et al.* 2017. "Prevalence of gastro intestinal parasite among primary school Sudanese children in Banat & Alhalanga villages in Kassala Sudan", *International Journal of Development Research*, 7, (12), 17868-17871.

INTRODUCTION

Parasitic infections of gastro intestinal caused by intestinal helminthes and protozoan parasites, are the most prevalent infections in humans in developing countries (Savioli and Albonico, 2004). About one third of the world (more than two billion people) is infected with intestinal parasites (Chan, 1997). Poverty, illiteracy, poor hygiene, lack of access to potable water, and a hot and humid tropical climate are some of the common factors attributed to intestinal parasitic infections (IPI). About 39 million disability adjusted life years (DALYs) are attributed to IPI and thus, represents a substantial economic burden due to these infections (Stephenson *et al.*, 2000). Intestinal parasites are parasites that populate the gastrointestinal tract. The term is not merely a collective term but it can include a group of diverse parasites that vary greatly in many aspects e.g: biology, pathology and epidemiology

***Corresponding author:* Khadega Suleiman Mohammed Zarroug,**
[3]Department of Microbiology and Parasitology, Faculty of Medicine and Health Science, Kassala University, Sudan.

(WHO, 1985). Taxonomically, the intestinal parasites are composed of two major subgroups: Protozoa: it includes *Giardia lamblia, Entamoeba histolytica, Balantidum coli and Cryptosporidium parvum*. & Helminthes: the intestinal helminthes are represented by both flat worms and nematodes (WHO, 1985). Intestinal nematodes constitute by far the most common parasitic infection in human. It includes *Ascaris lumbricoides, Enterobious vermicularis, Strongyloides stercolaris* and *Trichuris trichiura.* In the other branch, it includes flat worms (trematodes and cestodes). They include *Hymenolepis nana* and *Taenia species* (WHO, 1985). Many of the infections of the gastrointestinal tract (GI) are caused by parasites that are cosmopolitan in distribution. Protozoa can be directly infectious for man when they are passed in the feces into the environment, but helminths require a period of maturation while in the soil, where they become infectious. Others such as *Taenia saginata* require the involvement of an intermediate host during their life cycle. Infections of the GI tract account for a high proportion of deaths in infants where the standards of hygiene and nutrition are low. Fecal-oral transmission of the pathogens is the most common mode of GI infections, whereby water, food and hands become contaminated with fecal material which then come in contact with the mouth (Garcia and Bruckner, 1997).

MATERIALS AND METHODS

Study design

Cross sectional study was collected from different schools in Kassala state-Sudan (Banat and Alhalanga), during the period from April to October 2017, Samples involved in this study were taken from 100 school child and their age under 13 years, the collected stool sample obtained Convenient sampling technique was used to collect samples, Data collection tools and variables questioner sheets were used to record all patients and sample data, age, presenting symptom, and residence.

Sample processing

Each selected primary school children was provided with a labeled container which is transparent, clean and wide for fecal sample collection.

Methodology

The Direct smear examination, formal ether concentration technique and the 33% zinc sulphate floatation technique were used for the detection of different gastrointestinal parasites.

Ethical consideration

The study was approved by the local ethics committee of Kassala University. All participants were informed by the aim of study after signed written informed consent. Sample and clinical information were used anonymously.

Direct smear examination

Wet preparation was made by mixing small portion of stool taken with an applicator wooden stick with a drop of normal saline on slide and covered with cover slip and examined systematically under microscope using 10X and the high magnification 40X for observation of more details.

Triple wet preparation

Direct smear examination done three times. Formal ether concentration technique approximately, one gram of feces was collected from different parts of the specimen and emulsified in 5 ml of formal saline in glass beaker. Further 5 ml from same solution was added and mixed. The resulting suspension was strained through the sieve. The filtered sample was poured back into a centrifuge tube and then equal volume of ether was added. The tube was mixed for one minute and then centrifuged for 5 minutes at 2000 rpm. All upper 3 layers were discarded and the sediment was transferred into slide which was covered with cover slip and examined under microscope using 10X and 40X magnifications. 33% Zinc sulphate floatation technique approximately, half gram of feces was collected from different parts of the specimen and emulsified in long glass tube half filled with 33% Zinc sulphate solution and then the tube was filled with the same solution until convex shape was formed. Carefully, a cover glass was put and air bubbles were avoided. 30 to 45 minutes after, a cover glass was taken and put on clean and dry slide and examined under microscope using 10X and 40X magnifications.

RESULTS

The results showed that out of the 100 primary school children, 45 were found infected with gastrointestinal parasites. This constituted an overall infection rate of 45% (Figure 1). The over-all prevalence of gastrointestinal parasite among study population by using different techniques, almost 31 child were found by wet preparation (31.0%), near 33 child by triple preparation (33.0%), nearly 43 child by zinc sulphate (43.0%) and 45 by formal ether concentration technique (45.0%) (Table 1). The result revealed that protozoa was seen in 29 (64.4%), while helminthes and co infection of protozoa and helminthes were seen in 11 (24.4%) and 5 (11.1%) respectively (Table 2). In comparison between single parasitic infection and co- infection the result showed that high prevalence rate of single infection 35 (77.8%) and low prevalence rate of co-infection 10 (22.2%) (Table 3). The result also showed the highest prevalence rate of single parasite infection was *G.lamblia* (48.9%) followed by *H.nana* (22.2%), *E.histolytica* (4.4%) and E.vermicularis (2.2%) (Table 4), and the highest prevalence rate of multiple parasitic infection (co-infection) was *G.lamblia* + *E.histolytica* (11.1%) followed by *G.lamblia* + *H.nana* (6.7%), *E.histolytica* + *H.nana* (2.2%) and *G.lamblia* + *E.vermicularis* (2.2%) (Table 4 and 5).

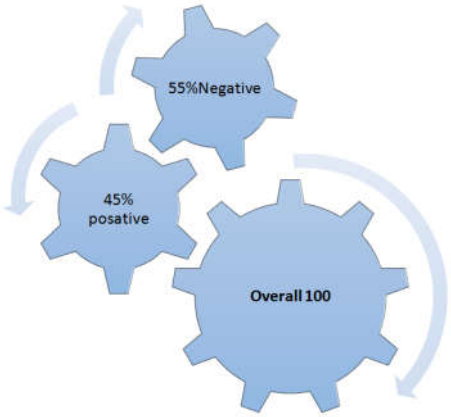

Fig.1. The overall prevalence of gastrointestinal parasite among school children

When using different techniques for all samples of study population, formal ether concentration technique proved to detect higher rates of different parasites encountered (table 6). The highest rate reported was for *Girdia lamblia* (22.0%), followed by *Hymenolepis nana* (10.0%), *Entamoeba histolytica* (2.0%) and *Enterobius vermicularis* (1.0%). The table also showed that using floatation technique could not recover a single case of *Entamoeba histolyticap.*

Table 1. The overall prevalence of gastrointestinal parasite by different techniques

Type of method	No examined	No positive	Prevalence
Wet preparation	100	31	31%
Triple preparation	100	33	33%
Zinc sulphate	100	43	43%
FECT	100	45	45%

Table 2. The overall prevalence of protozoa & helminthes infection

Type of infection	No examined	No positive	Prevalence
Protozoa	100	29	64.4%
Helminthes	100	11	24.5%
protozoa-Helminthes	100	5	11.1%

Table 3. The overall prevalence of single & co-infection of gastrointestinal tract among school children

Type of infection	No examined	No positive	Prevalence
Single	100	35	77.8%
Co infection	100	10	22.2%

Table 4. Prevalence of single parasite infection

Parasite	No examined	No positive	Prevalence
E.histolytica	100	2	4.4%
G.lamblia	100	22	48.9%
H.nana	100	10	22.2%
E.vermicularis	100	1	2.2%

Table 5. Prevalence of multiple parasites infection (co-infection)

Parasites	No examined	No positive	Prevalence
G.lamblia + E.histolytica	100	5	11.1%
G.lamblia + H.nana	100	3	6.7%
E.histolytica + H.nana	100	1	2.2%
G.lamblia + E.vermicularis	100	1	2.2%

Table 6. Comparison between different techniques in detection of each parasites

GIT parasite	No examined	No of positive (prevlance) by wet.p	No of positive (prevlance) by triple.p	No of positive (prevlance) by Zinc	No of positive (prevlance) by FECT
E.histolytica	100	1 (1.0%)	1 (1.0%)	0 (0%)	2 (2.0%)
G.lamblia	100	17 (17.0%)	19 (19.0%)	22 (22.0%)	22 (22.0%)
H.nana	100	10 (10.0%)	10 (10.0%)	10 (10.0%)	10 (10.0%)
E.vermecularis	100	0 (0%)	0 (0%)	1 (1.0%)	1 (1.0%)

p.value = 0.848

DISCUSSION

From the results, it is obvious that the overall prevalence rate of gastrointestinal parasites among primary school children was 45.0% which is high prevalence rate and may attributed to the primitive environmental condition of the area in addition to poor quality of life and behavior. This rate was found to be near to the rate reported by Sehgal *et al*. (2010) in Chandigarh North India (42.8%) and (Teklu *et al.,* 2013) in Ethiopia (39.9%). On the other hand, our rate was lower than the rate reported by (Ikram *et al*., 2009) in rural Peshawar (66%). In a study carried out in primary school children in Bareilly District, the prevalence rate of gastro intestinal parasites was lower than the rate of our study (22.81%) (Rashid *et al*., 2011). These and other studies give the evidence of spread of intestinal parasites among school children in different regions. Among the parasitic infections detected, overall prevalence of helminthes was (24.4%) and of protozoan was (64.4%) this result is disagree with study done by Sharma and colleagues (Sharma *et al.,* 2004) were found higher helminthes prevalence rate. The multiple parasitic infection rates (co infection) in this study were (22.2 %) which lower than other study done by (Bisht *et al.,* 2011; Wani *et al.,* 2010) in India quote were found a higher prevalence rate with double parasites (30-40%). The findings of this study indicated that the common intestinal parasites in primary school children were *Giardia lamblia*, *Hymenolepis nana*, *Entrobius vermicularis*, and *Entamoebia histolytica*, also Gashaw *et al*. (2008) found *Giardia lamblia* was more frequent (33.4%) than other intestinal parasites. while (Rashid *et al.*, 2011) reported the most prevalent intestinal parasites were *Ascaris lumbricoides*, *Giardia lamblia* and *Entamoeba histolytica*. These variable results in the prevalence of parasites (helminthes, protozoa, single infection and even co infection) were reflection of the local endemicity, sanitary standard, environmental conditions, timing and seasonal differences in the design of the survey work and personal hygiene (Chiaozie *et al.,* 2007). Different prevalence rates among all study population were reported by different techniques, although there is differences in detection of different parasites unfortunately these differences in rates were found to be statistically in significant with (p. value= 0.848).

Conclusions

- Gastrointestinal parasites are highly prevalent among primary school children (45.2%) in Kassala state.
- The prevalence rate of intestinal protozoa is higher than intestinal helminthes.
- Also the prevalence rate of single infection is higher than co-infection.
- *Giardia lamblia* is the most common parasites that detected in the study population.
- Formal ether concentration technique proved to have high sensitivity rate of detection of different gastrointestinal parasites.

REFERENCES

Abhay, R., Gary, L., Peter, J. and Moriya, T. 2009. Medical parasitology. Landes Bioscience, 1002 West Avenue, Austin, Texas 78701, USA. 282-300.

Aribodor, D. N., Anidebe, A. O., Eneanya, A. O. and Emelummadu, O. F. (2012). *Entamoeba histolytica* Infection in Children Aged 0-12 Years in Rural Communities in Anambra State, Nigeria. *Niger. J. Parasitol*., 33(2):129-132.

Assafa, D., Kibru, E., Nagesh, S., Gebreselassie, S., Deribe, F. and Ali, J. 2004. Medical parasitology. *Ethiopia Public Health Training Initiative*, 116-122.

Beaver, P. C; Jung, R. C. and Cupp, E. W. 1984. Clinical Parasitology. 9th ed. Philadelphia: *Lea & Febiger*, Family *Taeniidae*; 512-538.

Bisht, D; Verma, A. K. and Bharadwaj, H. D. 2011. Intestinal parasitic infestation among children in a semi-urban Indian population. *Trop Parasitolo,* 1; P 104-7.

Burkhart, C. N. and Burkhart, C. G. 2005. Assessment of frequency, transmission, and genitourinary complications of enterobiasis (pinworms). *Int. J. Dermatol.,* 44, 837-840.

Carvalho, E. M; Da Fonseca and Porto, A. 2004. Epidemiological and clinical interaction between HTLV-1 and *Strongyloides stercoralis*. *Parasite. Immunol*., 11-12:487-97.

Chiaozie, J. U; Kelvin, O.E; Patrick, G.O; Nelson, C. A. and Emmanuel, A. 2007. Soil-transmitted helminthes infection in school children in South-Eastern Nigeria: The public health implication. Internet children of Gurez valley of Jammu and Kashmir state, India. Journal of *Global Infectious Diseases,* 2 91-4

Cooper, E. S. 1999. Trichuriasis. In Guerrant RL, Walker DH, Weller PJ, editors: Tropical Infectious Diseases, Principles, Pathogens & Practice, Volume 2. New York: Churchill Livingstone. 955-958.

Davis, A. N; Haque, R. and Petri, W. A. 2002. Update on protozoan parasites of the intestine. *Curr. Opin. Gastroentrol*., 18:10

de Silva, N. R; Brooker, S; Hotez, P. Z; Montresor, A; Engles, D. and Savioli, L. 2003. Soil-transmitted helminthes infections: updating the global picture. *Trends. Parasitol*., 19: 547-51.

Drake, L. J., Jukes, M. C., Sternberg, R. J. and Bunday, D. A. 2000. Geohelminth infections (Ascariasis, Trichiuriasis, and Hookworm): Cognitive and development impacts. *Sem. Paediatr. Infect. Dis*., 11:245-51.

Fayer, R. and Ungar, B. L. 1986. *Cryptosporidium* and cryptosporidiosis. *Microbiol. Rev*., 50: 458-483.

Fraser, D. 1994. Epidemiology of *Giardia lamblia* and *Cryptosporidium* infections in childhood. *Isr. J. Med. Sci*., 30, 356-361.

Gabbad, A. A and Elawad, M. A. 2014. Prevalence of intestinal parasite infection in primary school children in Elengaz area, Khartoum Sudan. *Academic Research International*, 5 (2):86-90.

Garcia, L. S. and Bruckner. D. A. 1997. Diagnostic medical parasitology, Washington, DC: ASM Press. 205.

Gashaw, A; Afework, K; Feleke, M; Moges, T. and Kahsay, H. 2008. Prevalence of Bacteria and Intestinal Parasites among Food-handlers in Gondar Town,Northwest Ethiopia. *J Health Popul Nutr.,* 26(4), 451-455

Genta, R. M. 1989. Global prevalence of strongyloidiasis: critical review with epidemiologic insights into the prevention of disseminated disease. *Rev. Infect. Dis*., 11(5): 755-67.

Herwaldt, B. L. 2000. *Cyclospora cayetanensis*: review, focusing on the outbreaks of cyclosporiasis in the 1990s. *Clin. Infect. Dis*., 31:1040-57.

Ismail, M. 2005. Creative climate and learning organization factors; their contribution toward innovation. *Leadership and Orgi Devop Jurnal.,* Vol.26, Issue 8, pp.639-654.

World Health Organization, 1985. Presentation and control of intestinal parasitic infection, report of WHO. Geneva.

****