Frequency of intestinal parasitic infections among displaced children in Kassala Town

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Abstract

Background: Sudan has the world's largest internally displaced population, estimated at four millions. There are eight main areas of internally displaced people in Kassala (eastern Sudan). The prevalence of intestinal parasitic diseases is more in camps of displaced peoples due to poor sanitation, standard of living and personal habits of cleanliness.

Methods: Nine hundred faecal specimens were collected. 450 from displaced children around Kassala town aged from 6 months to 13 years and 450 stool samples were collected from children inside Kassala town. Microscopical examinations by two techniques were done (wet preparation and concentration technique by simple centrifugation for parasite detection and identification.

Results: Seventeen percent were found to harbor stages of infective parasites. Four species of infective parasites were identified from individuals in all areas (displaced areas). These were: Giardia lamblia (12.3%), Haemophilus. nana (4.9%), Entamba. histolytica (0.4%) and Trichuris. trichiura (0.2%).

In urban Kassala the prevalence of infective parasites was 10%. These were: Giardia. lamblia (08%) and Haemophilus. nana (02%).

Conclusion: The prevalence of intestinal parasitic infections among displaced children was high when compared with the urban area..The stool examination by concentration technique (by simple centrifugation) was superior to stool examination by wet preparation technique.

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Introduction

As a result of insecurity and war with Eritrea a large number of people from the border villages with Kassala were displaced westwards to live in displaced camps on the west and east banks of the Gash River(1). There are eight main areas of internally displaced people in Kassala. These are Fedyeeb, Gulsa, Allafa, Aderman, Amara, Adamir, Fatu and Dabalwet[(1)].

The main intestinal parasites that infect man are; Entamoeba histolytica, Balantidium coli, Giardia lamblia, Isospora belli, Cryptosporidium species, Taenia saginata, Taenia solium, Hymenolepsis nana, Dipyllidium caninum, Diphylobothrium latum, Fasciolapsis buski, Metagonimus yokogawai, Heterophyses spp, Ascaris lumbricoides, Trichuris trichiura, Entrobius vermicularis, Hook worms, Strongyloides stercoralis and Schistosoma mansoni[(2)].

Most infectious diseases are particularly prevalent in areas with warm climates in which man exerts himself least in developing sanitary protection and typically has a low threshold of resistance to invading organisms[(2)].

Not all parasitic infections cause diseases of clinical significance. There are many factors that predispose to disease development, including host and parasite factors. The host factors include age, level of natural immunity at the time of infection, life style , and presence of co-existing disease or a condition which reduces immune responses, e.g. pregnancy , under-nutrition or malnutrition[(3)].

The gold standard test for diagnosing intestinal parasites is stool examination. There are many methods for concentrating intestinal parasites in a stool specimen, an example is formol-ether sedimentation. This method gives a good concentration of parasitic contents. Also there is a simple sedimentation method, where parasitic cysts, eggs and free living parasites can be concentrated[(4)].

The prevalence of intestinal parasitic diseases is an indication of environmental conditions. A high index of intestinal parasitoses points to deficiencies in sanitation, the standard of living and personal habits of cleanliness[(5)].

Although safe and efficacious broad-spectrum antiparasitic drugs have been developed, their availability for use in mass-treatment programs and for individual treatment worldwide can be limited by economic resources, existing manufacturing and distribution networks, and national regulations.

Increasing population density, environmental pollution with human waste products, and global migration patterns will continue to promote transmission. Incompletely treated infected individuals can serve as roving reservoirs of infection for long-lived parasites[3].

Methods

The study population comprises children in five areas of displaced people around Kassala town. These areas are: Fediape, Dabalawate, Fatu, Aderman and Amara and one area from inside of the town which is Wawnour area. Cluster sampling technique was used for the selection of areas while simple random sampling was used for collection of stools. Four hundred and fifty stool samples were collected from these five areas and same sample sizes were collected from Wawnour area, using the sampling formula:

$$n = \frac{Z2\ pq}{d2}$$

Informed consent was taken from parents and care – takers after explanation about the objectives and aims of the study

The faecal samples in this study were examined macroscopically to see worms, worm segments mucus or blood in the stool. Microscopical examination was done by the following two direct methods:

Wet preparation technique

About 2 mg of faeces were mixed with one or two drops of physiological saline (0.9 gm/dl) on a slide and covered with a cover-glass and examined microscopically by 10x objective with condenser iris closed sufficiently to give good contrast and then by 40x objective to identify detected parasitic objects[6] .

Direct method by concentration technique by simple centrifugation

About 1 gram of faeces was added to 14 ml of normal saline (0.9 gram/dl) in a conical tube and the faeces was broken by glass rod and mixed with normal saline. Then the conical tube, was centrifuged at 500 in a centrifuge. The supernatant was discarded (about 3 times) till it was clear. The sediment was then mixed and mounted to a slide and covered with a cover-glass and examined under microscope firstly with 10x and then with 40x[7].

Results

The overall prevalence of infective parasites was 17.8% in all rural areas around Kassala town. Four species of infective parasites were identified from individuals in all rural areas (displaced area). The overall prevalence was 10% in the urban area (Wawnour) inside Kassala town(Giardia Lamblia & Haemophilus Nana), (Tables1 & 2).

Table (1): Frequency of different species of parasites encountered among displaced children in rural areas (n=450)

Parasites	No. infected	%
G. lamblia	55	12.3
H. nana	22	4.9
T. trichiura	01	0.2
E. histolytica	02	0.4
E. coli	17	3.8
C. mesnili	01	0.2
I. beutschii	01	0.4
No parasites	350	77.8

Table (2): Frequency of different species of parasites encountered among children in urban areas (n=450)

Parasites	No. infected	%
G. lamblia	36	08
H. nana	09	02
E. coli	13	2.9
No parasites	392	87.1

Intestinal parasites among males was 18.3%, while it was 16.6% among females, this deference is not statistically significant. Infection rate with intestinal parasites among children under-5years was 17% and it was 18.6% among those above five years old.

There was a significant difference between stool examination by concentration technique and stool examination by wet preparation (direct) in the total samples from children in rural area (p-value <0.05) but not in the urban area .

Discussion

The results showed that the frequency of intestinal parasitic infections among children in rural areas was (22.2%) i.e. higher than the prevalence rate of intestinal parasitic infection among children in an urban area (12.9%).

This high rate of infection might be attributed to poor hygiene standard in areas investigated. Findings indicated that Giardia labmlia seemed to be the most predominant species with the highest frequency .

The high rate of Giardia lamblia is usually attributed to the habit of eating unwashed vegetables. Education of child's parents has an important role in intestinal parasitic infection[9]. Transmission of Giardia lamblia

may result from drinking contaminated water[8]. It is thought that Giardia lamblia is common in most areas particularly in communities and institutional groups[10,11].

Our result of 12.3% frequency of Giardia lamblia is close to those reported in surveys conducted in Khartoum (9.9% for Giardia lamblia)[12], Zaire and Uganda (8%)[13] and also in Iraq (10.5)[14,15]. Social habits, and hygienic conditions may be similar in these countries.

Our result of 22.2% and 12.9% for intestinal parasitic infection in rural and urban areas respectively, is different from the study conducted during a six months period in Yemen (36.7% and 25% for intestinal parasitic infection in rural and urban areas respectively)[16] . and in Suadi Arabia[17]. This may be due to different habits and hygienic conditions.

The survey indicated that the older children were more subjected to infection than younger children. This is comparable to other studies from East Africa[18].

Conclusion

The frequency of intestinal parasitic infections among displaced children was high compared to urban area.

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