

Prevalence Rate of Intestinal Parasites in Mayo Area, Khartoum State, Sudan

TAYSEER ELAMIN MOHAMED ELFAKI¹

Department of Parasitology and Medical Entomology

College of Medical Laboratory Science

Sudan University of Science and Technology, Khartoum, Sudan

SAFA ABD-ELRAHMAN OSMAN

Al Masaodia Health Centre, Gezira State, Sudan

AHMED BAKHEET ABD ALLA

Department of Parasitology and Medical Entomology

College of Medical Laboratory Science

Sudan University of Science and Technology, Khartoum, Sudan

Abstract:

This study was conducted to study the prevalence rate of intestinal parasites in Mayo Area, Khartoum State-Sudan by using wet preparation technique and formal ether concentration technique (FECT). For this purpose, a cross-sectional study was carried out during the period from March 2013 to June 2013. Participants in this study included one hundred and fifty subjects (age between 2-42 years old with mean age was 22 year) from them, 56 were patients and 94 were food handlers. Out of 150 studied populations, 109 (73%) were males and 41 (23%) were females. Faecal samples were collected from all subjects. Parasitological data were obtained and recorded. The faecal samples were examined to detect the prevalence of intestinal parasites in the study area by using wet preparation technique and FECT. Out of 150, 88 (59%) and 36 (24%) were found to be positive for intestinal parasites when using FECT and wet preparation respectively. The present study showed that the prevalence were 38

¹ *Corresponding author: talfaki@yahoo.com

(25%), 25 (17%), 22 (15%) and 3 (2%) of *E.histolytica*, *G.lamblia*, *E.coli* and *H.nana* when using FECT respectively. This study showed that there is association between the prevalence of intestinal parasitic infection and presence of blood and mucus in the faecal samples. In addition to, the present study showed that there is association between the prevalence of intestinal parasitic infection and gender and age groups. FECT was used to determine the intensity of infection. Out of 88, 10 (11%) were presented as mild infection, 40 (46%) were presented as moderate infection and 38 (43%) were presented as severe infection. This study concludes that the prevalence rate of intestinal parasites was high in the Mayo area; infection rates are almost different among age groups and FECT more efficient than wet preparation for detection of intestinal parasites.

Key words: Prevalence, Intestinal parasites, Mayo area, Formal ether concentration technique.

INTRODUCTION:

Intestinal parasites are parasites that populate the gastrointestinal tract in humans and other animals. They can live throughout the body, but most prefer the intestinal wall. Means of exposure include: ingestion of undercooked meat, drinking infected water, and skin absorption. The two main types of intestinal parasites are protozoa and helminthes. An intestinal parasite can damage or sicken its host ⁽¹⁾. The major groups of parasites include protozoan (organisms having only one cell) and parasitic worms (helminthes). Parasites can get into the intestine by going through the mouth from uncooked or unwashed food, contaminated water or hands, or by skin contact with larva infected soil, they can also be transferred by the sexual act of anilingus in some cases. When the organisms are swallowed, they move into the intestine, where they can reproduce and cause symptoms. Children are particularly susceptible if they are not thoroughly cleaned after coming into

contact with infected soil that is present in environments that they may frequently visit such as sandboxes and school playgrounds. People in developing countries are also at particular risk due to drinking water from sources that may be contaminated with parasites that colonize the gastro-intestinal tract ⁽²⁾. The parasitic infections are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease ⁽³⁾. These infections are associated with poor sanitary habits, lack of access to safe water and improper hygiene, thereby occurring wherever there is poverty ⁽⁴⁾. The main objectives of this study were to study the prevalence of intestinal parasites in Mayo area, Khartoum State, Sudan, to detect the intensity of infection by using FECT, to determine the relationship between the prevalence rate of intestinal parasitic infections and age groups and to compare between wet preparation method and FECT in detecting the infection in the study area.

MATERIALS AND METHODS:

Study design:

This was cross-sectional study conducted to determine the prevalence rate of intestinal parasites among patients who attended Bashiar Hospital in Mayo area, Khartoum State, Sudan.

Study area:

This study was carried out in Mayo area, Khartoum State, Sudan, during the period from March 2013 to June 2013.

Study subjects:

The studied populations included in this study were categorized according to gender into males and females who were come to Bashiar Hospital in Mayo area, Khartoum State, those

participants with different education levels with the age ranging from 2 to 42 years old and the mean age was 22 years old. Random samples were collected from them after their agreed to participate in this study. The age of study subjects included in the present study was divided into 3 groups: less than 10, 10-20 and more than 20 years old.

Sampling:

A total of 150 questionnaires were administered. A total of 150 faecal samples were collected, from those filled the questionnaire.

Design of questionnaire:

Self-administrated per-coded questionnaire which was specifically designed to obtain information that helped in this study. The designs of questionnaire include gender, age, observation of blood and mucus in the faecal samples.

METHODS:

1. Wet preparation:

A drop of normal saline was placed on the middle of the slide by using Pasteur pipette. With wooden stick, small portion of faecal sample was emulsified in the saline drop, then covered with cover glass and examined under microscope by using 10x objective for detection and 40x objective for identification.

2. Formal ether concentration technique (FECT):

About 1 gram of faecal sample (half tea spoonful) was estimated and emulsified in 10 ml of 10% formal saline in screw cap centrifuge tube, further 10 ml of 10% formal saline was added, mixed and shaken manually then sieved in a beaker. The suspension was transferred to conical tube and equal volume of ether was added, mixed and centrifuged at 5000rpm for 3

minutes. By using wooden stick the layer of faecal debris was loosened from the site of the tube and rapidly the tube was inverted to discharge the supernatant. The sediment was left, the tube was retained to upright position; the fluid from the side of the tube was allowed to drain to bottom of the tube, the sediment was mixed by using Pasteur pipette and all the sediments were transferred to 1 or more slides, then covered with cover glass and examined by using microscope, 10x objective for detection and 40x objective for identification. The intensity of infection was obtained by counting the number of intestinal parasite stage per gram (spg) of faecal sample. Results were expressed as (≤ 50 spg) presented as mild infection, (50-100 spg) as moderate infection, (>100 spg) as severe infection.

Statistical analysis:

Data were analyzed using Statistical Package for Social Sciences (SPSS) under windows, version 15.0. Frequencies, mean, Chi square test statistical analysis were performed and the *p* values of less than 0.05 were considered statistically significant. Data were presented in tables after analysis using SPSS.

Ethical clearance:

Ethical clearance for this study was obtained from College of Medical Laboratory Science- Sudan University of Science and Technology and an informed consent was obtained from all subjects included in this study.

RESULTS:

The studied populations included in this study were males (109 (73%)) and females (41 (23%)), among those 150 subjects, 68 were patients and 82 were food handlers who were come to

Bashiar Hospital in Mayo area, Khartoum State, those participants with different education levels and age ranging from 2 to 42 years old with the mean age of 22 years old. The age of study subjects included in the present study was divided into 3 groups: less than 10, 10-20 and more than 20 years old. A total of 150 faeces samples were examined for intestinal parasites. Out of these, 36 (24%) were found to be positive for intestinal parasites when detected by using wet preparation method and 88 (59%) when using FECT. From the 88 positive cases, 53 (60%) were males and 35 (40%) were females and from the 36 positive cases, 27 (75%) were males and 9 (25%) were females in table (1). The differences in prevalence rate according to gender was found to be statistically significant ($p=0.000$). The positive cases within each age group were 10 (7%), 2 (1%) and 24 (16%) respectively when using wet preparation and were 27 (18%), 17 (11%) and 44 (29%) respectively when using FECT in table (2). The differences in prevalence rate according to age groups was highly significant ($p=0.000$). For detection of intestinal parasites when using FECT, the results showed that the frequency of *E.histolytica* was 38 (25%), *G.lambliia* was 25 (16.7%), *E.coli* was 22 (14.3%) and *H.nana* was 3 (2%) in table (3). The intensity of infection by FECT was obtained by counting the number of stage per 1 gram of faeces, (less than 50 stages per 1 gram of faeces) presented as mild infection, (50-100 stages per 1 gram of faeces) as moderate infection and (more than 100 stages per 1 gram of faeces) as sever infection in table (4). Out of 150 studied population, 20 (13%) had blood in their faecal samples, all of them were positive for intestinal parasites and among 130 (87%) who had no blood in their faecal samples, 68 (45%) were found to be positive and 62 (41%) were negative ($p=0.000$) in table (5). Out of 150 studied population, 48 (32%) had mucus in their faecal samples, 36 (24%) were positive for intestinal parasites and 12 (8%) were negative, and among 102 (68%) who had no mucus in

their faecal samples, 40 (27%) were found to be positive and 62 (41%) were negative ($p=0.000$) in table (6). The results showed that among the 88 positive cases, 58 (39%) were patients while 30 (20%) were food handlers, in table (7). Chi-square test was used to compare between wet preparation and FECT for detection of intestinal parasites, wet preparation method was detected 36 positive cases while FECT was detected 88 positive cases ($p=0.000$) in table (8).

Table (1): Overall prevalence of intestinal parasitic infections using wet preparation and FECT according to gender

Intestinal parasites	Gender		Total
	Male	Female	
Direct wet mount	27	09	36
FECT	53	35	88

$p=0.000$

Table (2): Overall prevalence of intestinal parasitic infections using wet preparation and FECT according to age groups

Age groups (years)	Intestinal parasites	
	Wet preparation	FECT
Less than 10	10	27
10-20	2	17
More than 20	24	44
Total	36	88

$p=0.000$

Table (3): Frequency of intestinal parasites by using FECT

Intestinal parasites	Positive	Negative	Prevalence (%)
<i>E.histolytica</i>	38	112	25.0
<i>G.lambliia</i>	25	125	16.7
<i>E.coli</i>	22	128	14.3
<i>H.nana</i>	3	147	2.0

Table (4): Frequency of intensity of intestinal parasitic infection by FECT

Intestinal parasites	Intensity of infection			Total
	Mild	Moderate	Sever	
<i>E.histolytica</i>	6	10	22	38
<i>G.lambliia</i>	4	6	15	25
<i>E.coli</i>	0	22	0	22
<i>H.nana</i>	0	2	1	3

Table (5): Prevalence of intestinal parasites among studied population with blood in their faecal samples

Intestinal parasites	Blood in the faecal samples		Total
	No	Yes	
Positive	68	20	88
Negative	62	0	62
Total	130	20	150

p=0.000

Table (6): Prevalence of intestinal parasites among studied population with mucus in their faecal samples

Intestinal parasites	Mucus in the faecal samples		Total
	No	Yes	
Positive	40	36	76
Negative	62	12	74
Total	102	48	150

p=0.000

Table (7): Overall prevalence of intestinal parasites among food handlers and patients in the study area

Intestinal parasites	Studied population		Total
	Patients	Food handlers	
Positive	58	30	88
Negative	10	52	86
Total	68	82	150

Table (8): Comparison between wet preparation and FECT

Wet preparation	FECT		Total
	Positive	Negative	
Positive	36	0	36
Negative	52	62	114
Total	88	62	150

p=0.000

DISCUSSION:

Intestinal parasitic infections of humans are important threats to healthy living in developing countries ⁽⁵⁾. The environment and the socio-cultural habits of the people could be attributable for the high prevalence of intestinal parasitic infections in the developing countries ⁽⁶⁾. Intestinal parasitic infections are among the major diseases of public health problems in sub-Saharan Africa. Apart from causing mortality and morbidity, infection with intestinal parasites has been associated with stunting of linear growth, physical weakness and low educational achievement in school children ⁽⁷⁾. Chronic intestinal parasitic infections have become the subject of speculation and investigation in relation to the spreading and severity of other infectious diseases of viral origin, tuberculosis and malaria. However, the study on the prevalence of various intestinal parasitic infections is a prerequisite not only for formulation of appropriate control strategies but also to predict risk for communities under consideration ⁽⁸⁾. So, this study was conducted to study the prevalence rate of intestinal parasites in Mayo area, Khartoum State. For these purposes, a total of 150 faecal samples were examined for intestinal parasites. In this study statistical tests were used, the p value is (0.05), less than 0.05 is significant and more than 0.05 is insignificant. So all p value get from results compared with 0.05. The study showed that the prevalence rate of intestinal parasitic infection in Mayo area was 36 (24%) and 88 (59%) when using wet

preparation and FECT respectively. This reveals that several factors could be responsible for the transmission of the disease in this area. Among these factors: the social behavior, non hygienic community practices, improper disposal of human waste and lack of health care and education. This result was similar to result obtained by Halim *et al.* ⁽⁹⁾ in Kenya. From the 88 positive cases, 55 (60%) were males and 35 (40%) were females and from the 36 positive cases, 27 (75%) were males and 9 (25%) were females. The differences in prevalence rate according to gender was found to be statistically significant ($p=0.000$). These findings were disagreeing with study conducted in Turkey by Okya *et al.* ⁽¹⁰⁾. The study showed that the higher prevalence was found in the age group more than 20 year old and the differences in prevalence rate according to age groups was highly significant ($p=0.000$). The results showed that the higher prevalence of intestinal parasites was presented with *E.histolytica* (25%) followed by *G.lambliia* (16.7%), *E.coli* (14.3%) and *H.nana* (2%). Because these parasites can be transmitted orally by drinking infected water and these parasites are environmental contaminants of the water supply. The water supply is really an important risk factor for the giardiasis and amoebiasis and several large outbreaks of giardiasis have resulted from the contamination of municipal water supplies with human waste ⁽¹¹⁾. The ingestion of contaminated water is a common problem for transmitted the diseases. In addition to, the study showed that the most intensity of infection was severing infection which was presented with *E.histolytica* and *G.lambliia*. The present study revealed that there is difference significant in the prevalence of intestinal parasites according to the presence of blood and mucus in the faecal samples, because these macroscopically appearance related to invasive with parasitic elements. The food handlers especially in rural community were played the major role in transmission of parasitic infection, so, the present

study done among the patients and the food handlers so as to reflect this result. The current study was carried out to determine the sensitivity and compare between direct wet preparation and FECT that can be used for diagnosis of intestinal parasites. The results proved that FECT gave the highest relative sensitivity when using Chi-square statistical test to compare between wet preparation and FECT for detection of intestinal parasites, wet preparation method was detected 36 positive cases while FECT was detected 88 positive cases ($p=0.000$).

CONCLUSION:

This study concluded that the prevalence rate of intestinal parasites was high in the Mayo area, Khartoum State, Sudan; infection rates were almost different among age groups and FECT more efficient than wet preparation for detection of intestinal parasites.

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