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INTESTINALPARASITES IN PATIENTS WITH CHRONIC ABDOMINAL PAIN

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Abstract

Information about intestinal parasites in Sohag (Upper Egypt) in patients with chronic abdominal pain is scarce. This study determined the intestinal parasites symptoms in 130 patients with chronic abdominal pain and cross-matched 20 healthy persons. Parasitic infection was confirmed by stool analysis.The most commonest clinical data with stool analysis was as following: 1- *Entamoeba histolytica* associated with nausea 20 (37.74%) followed by anorexia 19 (35.85%), 2- *Entamoeba coli* associated with diarrhea 3 (100%) followed by nausea 2 (66.67%) and vomiting 2 (66.67%), 3- *Enetrobius vermicularis* associated with nausea 2 (66.67%), diarrhea 2 (66.67%) followed by flatulence 1(33.33%), 4- *Giardia lamblia* associated with anorexia 3 (42.86%), vomiting 3 (42.86%) followed by diarrhea 2 (28.57%)., 6- *Hymenolepis nana* associated with anorexia 10 (40.00%) followed by flatulence 9 (36.00%), 7- *Taenia saginata* associated with dyspepsia 3 (60.00%) followed by flatulence 2 (40.00%), and 8- *Ancylostoma duodenal* associated with anorexia 2 (66.67%) and diarrhea 2 (66.67%).

Key words: Upper Egypt, Chronic abdominal pain, parasitic infections.

Introduction

Chronic or recurrent abdominal pain is the commonest gastroenterological complaint the physician is confronted with in his outpatient clinic (Bhaskar and Sumathi, 2011). Parasitic diseases are highly endemic but patchily distributed among the 20 countries and almost 400 million people of the Middle East and North Africa (MENA) region (Hotez *et al,* 2012). Intestinal parasitic infections are among the most common infections in the world and are responsible for considerable morbidity and mortality (Kongs *et al,* 2001).The epidemiology of intestinal parasitic infections shows that these parasites are found in every age group and in both sexes. However, the incidence is high in some areas and in some age groups. Human intestinal parasitic infections have a worldwide distribution, with the greatest incidence and intensity occurring in developing countries (Naish *et al,* 2004). Intestinal symptoms with parasitic infections are frequent and include abdominal pain and acute or chronic diarrhea and/or constipation, but systemic manifestations (fatigue, anemia, weight loss, rash, etc) are by no means uncommon. Most intestinal parasites are transmitted by the fecal-oral route as a result of the ingestion of water, vegetables, and/or soil contaminated with ova, cysts or oocysts; in other cases (i.e. *Ancylostoma duodenale*) transmission occurs via the skin through direct penetration by larvae living in the soil (Masucci *et al,* 2011). The common intestinal parasites that may give rise to chronic digestive disorders as persistent diarrhea, chronic abdominal pain and/or blood in the stool are protozoa as *Blastocystis hominis, Cryptosporidium* spp*., Cyclospora cayetanensis, Entamoeba histolytica, Giardia intestinalis* (syn.: *G. lamblia*and *G. duodenalis), Dientamoeba fragilis, Isospora belli,and Balantidium coli* or helminthes as *Ascaris lumbricoides, Hymenolepis spp.,Capillaria philippinensis, Diphyllobo-thrium* spp*.,* hookworm (*Ancylostoma duodenale and Necator americanus*), *Taenia*spp*., Trichuristrichiura*, intestinal flukes (Becker *et al,* 2013). The three main techniques for the diagnosis of human intestinal protozoan infections include (i) light microscopy; (ii) antigen detection (EIAs); and (iii) PCR assays. Since the first description of parasitic intestinal protozoa in human stools, documented by the Dutch microscopist Antony van Leeuwen-

hoek in 1681(Dobell, 1920), microscopic detection of protozoan cysts and trophozoites has been the most widely used diagnostic approach. Identification of helminthes eggs on microscopic stool examination is the reference test for most intestinal helminthes species. In hospitals and microbiological laboratories, stool examination after prior concentration (e.g. by formalin-ether concentration technique) is most commonly employed, while the Kato-Katz thick smear technique is widely used in epidemiological studies and anti-helminthes drug efficacy evaluations in endemic regions (Booth *et al,* 2003; Speich *et al,* 2010).

The present study aimed to define the correlation between parasitosis and chronic abdominal pain in Upper Egyptian patients.

Patients, Materials and Methods

Cross-sectional study included patients (12-90 years old) with chronic abdominal pain with or without other GIT symptoms as nausea, vomiting, dyspepsia, diarrhea, constipation and/or flatulence. Besides, cross-matched twenty healthy adults were recruited as controls. All participants were informed by the study and signed a written consent then.

All patients and controls were subjected to: A- Full clinical examination (General: looking for signs of anemia and/or malabsorption and clinical examinations of chest, heart and abdomen. B- Laboratory investigations (Aseptic venous blood samples for CBC and liver, and kidney function tests). Patient was considered anemic if hemoglobin values <13.5 g/dl in males and <12 g/dl in females and eosinophilia was diagnosed if counted >0.4x10^9/L.

Stool analysis: morning fresh samples were collected and examined by: a- Direct smears stained with Giemsa stain as well as modified Ziehl-Neelsen stain when indicated to detect *Cryptosporidium* .B- Concentration methods (El Naggar *et al*, 2006).

Abdominal ultrasonography was performed to exclude organic or local cause of chronic abdominal pain. Examination of liver concentrated on size, surface, echo-pattern, any focal lesion and portal and hepatic veins diameters. Examination of spleen concentrated on size, diameter, splenic vein diameter, and any collateral abnormality. Examination of kidneys and urinary bladder concentrated on any abnormality; also, scanning of the gall bladder and biliary channels for any obstruction, ascites was reported.

Results

Patients were categorized into 2 groups: 1st group (G1) included 130 patients with chronic abdominal pain and the 2nd group (G2) included 20 healthy volunteers to serve as controls, Stool analysis in G1; 99 patients (76.15%) had positive findings. These were *Entamaeba histolytica* cyst in 53 (40.77%), *Hymenolepis nana* egg in 25(19.23%) followed by *Giardia lamblia* cyst in 7(5.38%). In G2; 12 (60%) had positive findings. These were *E. histolytica* in 9 (45%) followed by *G. lamblia* cyst in 3 (15%).

Clinical data: In G1, the commonest associated symptoms were anorexia48 (36.92%), flatulence 41 (31.54%) followed by diarrhea 40 (30.77%). Among 99 patients with positive stool analysis, the commonest symptoms were anorexia in 35 (35.35%), nausea in 33 (33.33%) followed by flatulence in 30 (30.3%) and diarrhea in 30 (30.3%). The eosinophilia was significantly higher in G1 with positive stool analysis for parasites, but without significant difference between the groups as regard presence of anemia. Among the G1, the commonest findings associated with anemia were *G. lamblia* in 6 (60%) and *E. histolytica* in 25 (40.32%), and the commonest findings associated with eosinophilia were *Entamaeba coli* in 3 (100%) and *Taenia saginata* in 5 (100%) followed by *Enterobius vermicularis* in 2 (66.67%) and *Ancylostoma duodenale* in 2 (66.67%).

Abdominal ultrasonography showed normal except for 23 cases; liver was mildly to moderately enlarge with bright mildly to echo pattern (fatty liver).

All details are given in tables (1 & 2) and figures (1, 2, 3, 4, 5 & 6).

Table 1: Distribution of symptoms in G1.

Symptoms	Cases(n=130)
Anorexia	48 (36.92%)
Flatulence	41 (31.54%)
Diarrhea	40 (30.77%)
Nausea	38 (29.23%)
Vomiting	38 (29.23%)
Dyspepsia	32 (24.62%)
Constipation	28 (21.54%)
Malaise	1 (0.77%)
Pallor	21 (14.00%)
Underweight	18 (12.00%)

Table 2: Distribution of symptoms by type of intestinal parasites in G1.

Symptoms	Negative (n=31)	Positive (n=99)	*E.histolytica* cyst (n=53)	*E. coli* (n=3)	*Enterobius* (n=3)	*Giardia* cyst (n=7)	*H. nana egg* (n=25)	*Taenia* egg (n=5)	*Ancylostoma* egg(n=3)
Anorexia	13 (41.94%)	35 (35.35%)	19 (35.85%)	1 (33.33%)	0 (0.0%)	3 (42.86%)	10 (40.0%)	0 (0.0%)	2 (66.67%)
Flatulence	11 (35.48%)	30 (30.30%)	16 (30.19%)	0 (0.0%)	1 (33.33%)	2 (28.57%)	9 (36.0%)	2 (40.0%)	0 (0.0%)
Diarrhea	10 (32.26%)	30 (30.30%)	14 (26.42%)	3 (100%)	2 (66.67%)	2 (28.57%)	6 (24.0%)	1 (20.0%)	2 (66.67%)
Nausea	5 (16.13%)	33 (33.33%)	20 (37.74%)	2 (66.67%)	2 (66.67%)	2 (28.57%)	6 (24.0%)	0 (0.0%)	1 (33.33%)
Vomiting	12 (38.71%)	26 (26.26%)	13 (24.53%)	2 (66.67%)	0 (0.0%)	3 (42.86%)	7 (28.0%)	0 (0.0%)	1 (33.33%)
Dyspepsia	6 (19.35%)	26 (26.26%)	16 (30.19%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (28.0%)	3 (60.0%)	0 (0.0%)
Constipation	7 (22.58%)	21 (21.21%)	12 (22.64%)	0 (0.0%)	0 (0.0%)	1 (14.29%)	8 (32.0%)	0 (0.0%)	0 (0.0%)
Malaise	0 (0.0%)	1 (1.01%)	1 (1.89%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Pallor	5 (16.13%)	16 (16.16%)	8 (15.09%)	0 (0.0%)	0 (0.0%)	2 (28.57%)	6 (24.0%)	0 (0.0%)	0 (0.00%)
Underweight	2 (6.45%)	16 (16.16%)	6 (11.32%)	1 (33.33%)	0 (0.0%)	1 (14.29%)	6 (24.0%)	1 (20.0%)	1 (33.33%)

Fig. 1: Distribution of studied groups according to stool analysis.

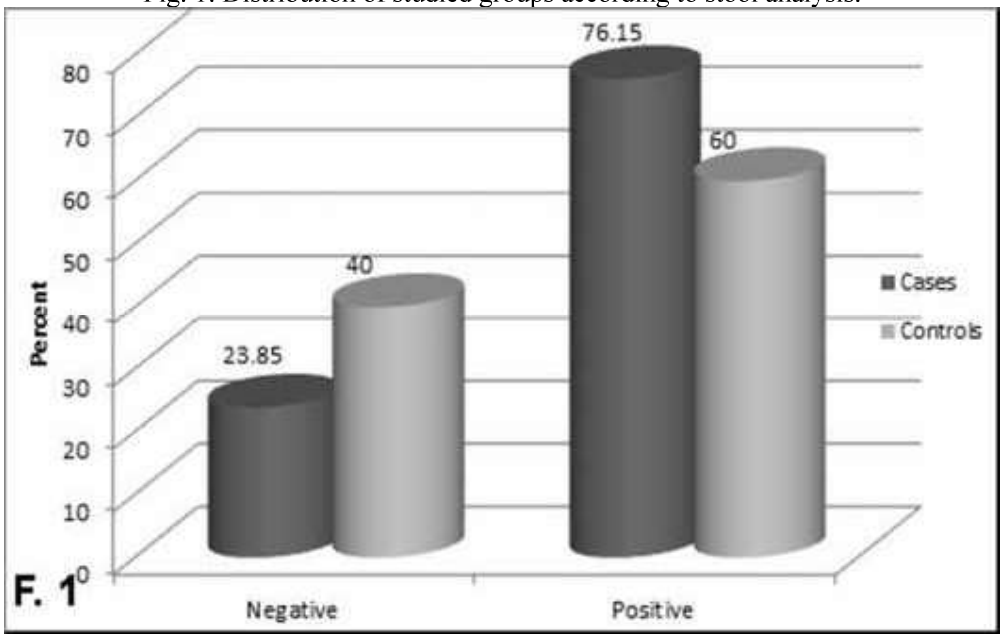


Fig. 2: Distribution of intestinal parasites in groups.

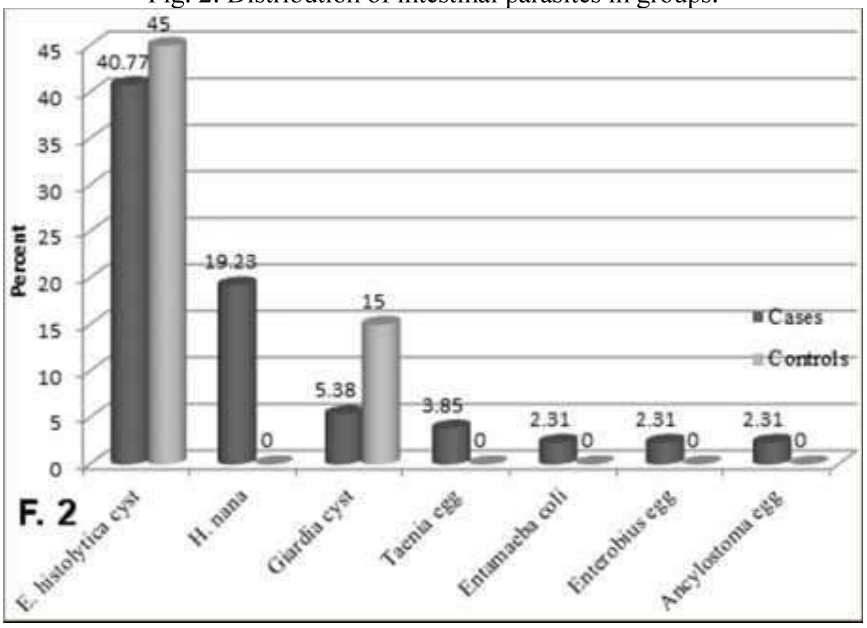


Fig. 3: Distribution of anemia in groups according to stool analysis.

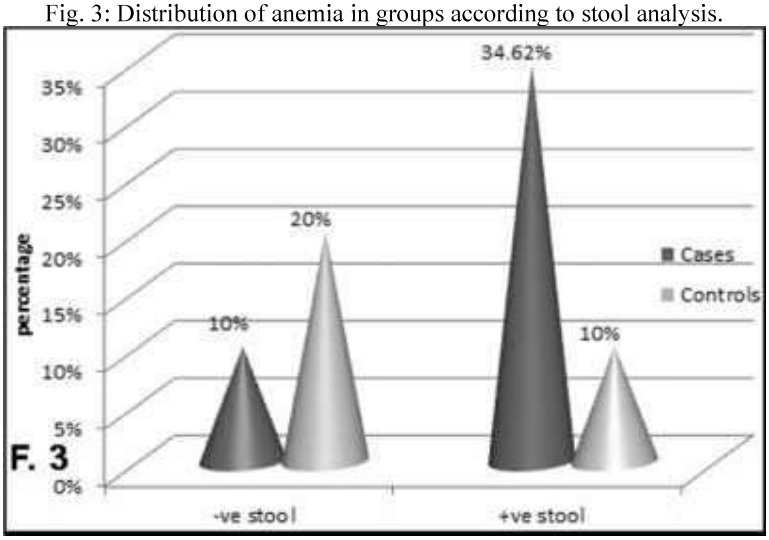


Fig. 4: Distribution of eosinophilia in groups according to stool analysis.

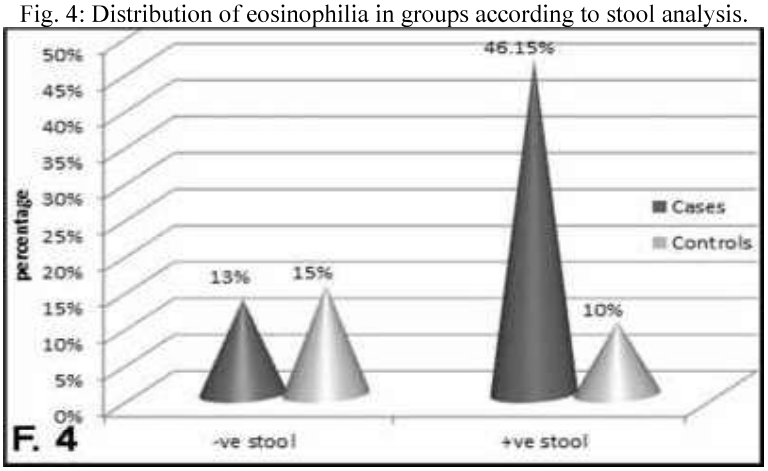


Fig. 5: Distribution of anemia by type of intestinal parasites in G1.

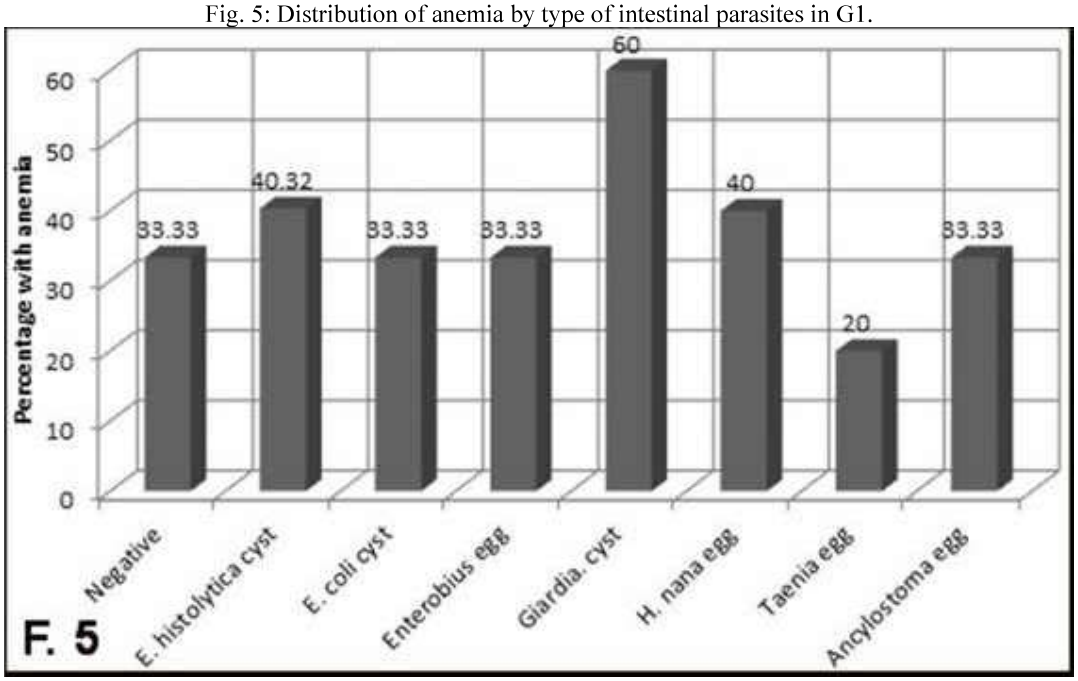
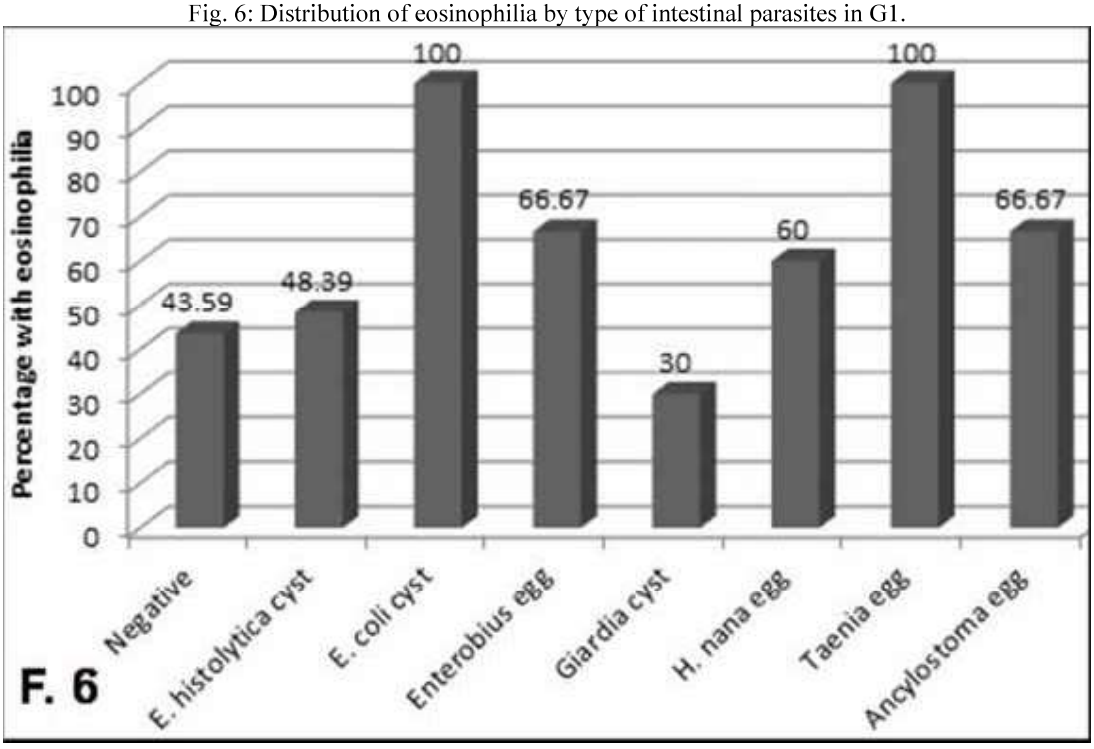


Fig. 6: Distribution of eosinophilia by type of intestinal parasites in G1.



Discussion

Chronic or recurrent abdominal pain is the commonest gastroenterological complaint the physician is confronted with in his out-patient clinic (Bhaskar and Sumathi, 2011). Intestinal parasitic infections are among the most common infections in the world and are responsible for considerable morbidity and mortality. The intensity of infection is a major determinant of morbidity (Kongs *et al,* 2001). In the present work, parasitic infection was detected in 74%of the studied

population. This is higher than many studies conducted in Egypt to figure out the epidemiology of parasitic infections as Hassan (1994) when assessed parasitic infections in Giza governorate, reported an overall prevalence of 56.5%. El Masry *et al.* (2002) found that the prevalence of parasitic infections among children in two low socioeconomic areas in Alexandria; El Madabegh and Tobgeya was 66.7% and 43.8% respectively. Also, Crompton (1999) and El Badawy *et al.* (2001) stated that the prevalence of parasitic infections were widely varied from place to place, time to time and person to person even in endemic areas according to two main factors; the intensity of exposure to the parasites on one hand and the combating control measures on the other. Both these factors interact together to bring out the incidence and prevalence of parasitic infections. In the current study the most prevalent pathogenic parasitic infections were *Entamoeba histolytica* cyst (40.77%), *Hymenolepis nana* (19.23%), *Gardia lamblia* (5.38%), *Taenia* (3.85%), *Enterobius vermicularis* (2.31%), *Anclystoma* (2.31%), *Entamaeba coli* (2.31%) and this agreed with Bakr *et al.* (2009) in Menoufia Governorate, Egypt. They found that the most prevalent pathogenic parasitic infections were *Entamoeba histolytica* (20%), *Entamoeba coli* (10%), *Giardia lamblia* (10%), *Ascaris lumbricoides* (7.31%). However, none had *Cryptosporidium* spp., which might be due to the fact that all patients were from urban areas within Sohag City, capital of Sohag Governorate. Shalaby and Shalaby (2015) in rural area reported a significant relation between cryptosporidiosis, low socio-economic level and animal contact.

Regarding clinical data in stool positive cases, anorexia was reported in (35.35%), nausea in (33.33%), diarrhea in (30.3%), flatulence in (30.30%), vomiting in (26.26%), dyspepsia in (26.26%), constipation in (21.21%), pallor in (16.16%), underweight in (16.16%) and malaise in (1.01%). These figures are higher than in stool negative cases of chronic abdominal pain. Intestinal invasion may be asymptomatic (small number) or presented by various symptoms as abdominal pain (usually vague), abdominal cramps/colic, diarrhea, rarely vomiting and occasionally constipation (Hökelek and Lutwick, 2006). Most of the parasitic infections cause acute or chronic diarrhea with malabsorption (Mahmoud, 1983; Alberton *et al,* 1995). The most frequent associated symptoms were diarrhea and distension (Mahmoud, 1983; Current and Garcia, 1991). However, chronic symptoms such as dyspepsia, epigastric pain, nausea and anorexia may be present (Addis *et al,* 1992; Fayad *et al,* 1992). El-Hawy *et al*. (1992) and Markel *et al*. (1999) cleared that, through effect on the intestinal flora, children infected with enteric parasites may suffer from colitis that lead to vague, non-specific abdominal symptoms. So, they usually lose their food interest to prevent these symptoms. *Entamoeba histolytica* may be asymptomatic or may cause dysentery or extra intestinal disease. Patients with amebic colitis typically present with a several-week history of cramping abdominal pain, weight loss, and watery or bloody diarrhea. The insidious onset and variable signs and symptoms, with fever and grossly bloody stool are absent in most cases (Aristizabal *et al.,* 1991). In our study, the most common symptoms associated with *Entamoeba histolytica* were nausea (37.74%), anorexia (35.85%), flatulence (30.19%), dyspepsia (30.19%) and diarrhea (26.42%). Intestinal invasion by *Entrobius vermicularis* may be asymptomatic (small number) or presented by various symptoms as vague abdominal pain, abdominal colic, diarrhea, vomiting and constipation. However, the most common symptom in pin worm infection is nocturnal perianal pruritus (Hökelek and Lutwick, 2006). In our study, the most common symptoms associated with *Entrobius vermicularis* were nausea (66.67%), diarrhea (66.67%) and flatulence (33.33%). *Giardia Lamblia* generally causes a self-limited ill-

ness characterized by diarrhea, abdominal cramps, bloating, weight loss, and malabsorption. However, asymptomatic infections are frequent, especially in developing countries (Thompson, 2000). In the present study, the most common symptoms were anorexia (42.86%), vomiting (42.86%), nausea (28.57%), diarrhea (28.57%) and flatulence (28.57%). The symptoms of *H. nana* infection in our study included anorexia (40%), flatulence (36%), constipation (32%), vomiting (28%), pallor (24%) and underweight (24%). This agreed with Romero (2007) who reported abdominal pain, meteorism, nausea, vomiting, and diarrhea, loss of appetite (anorexia), itching, irritability, sleeplessness and enuresis. In severe infections, diarrhea is more frequent, associated with malabsorption syndrome which results in weight loss. Mohammad and Hegazi (2007) reported that the presence of *H. nana* reduced the intestinal absorption of vitamin B12 and folic acid which resulted in the development of anemia. The effects of *Ancylostoma duodenale* infection include growth delay, especially in children, and anemia (Ndyomugyenyi *et al*, 2008). In the present study, the most common symptoms were dyspepsia (60.0%), flatulence (40.0%), diarrhea (20.0%) and underweight (20.0%). In the present study reported association between anemia and parasitic infection among the studied population most commonly with *Giardia* followed by *Entamaeba histolytica*. Nesheim and Crompton (2002) reported that parasitic infections were usually associated with anemia as a subsequent event, due to either malnutrition e.g. *Ascaris* or chronic blood loss e.g. ancylostomiasis and schistosomiasis. The present study denoted that cases with eosinophilia were concomitant with parasitic infections commonly with *Entamaeba coli* and *Taenia* followed by *Enetrobius* and *Ancylostoma*. This was confirmed by Silva and Pereira, (2000) who illustrated that 81% of eosinophilia was due to parasitic infections. Parasitic infections of the gut, though are relatively uncommon in the United Kingdom, should always be considered when eosinophils are a conspicuous feature of an inflammatory reaction. Parasites, which are sometimes associated with dense eosinophilia in the lamina propria of the jejunum, are *Giardia lamblia* and hookworms. Hookworms are most often indicated in sections by erosions or circular channels where the worm was lying in the densest aggregates of eosinophils in these sections (Morson and Dawson, 1979).

Conclusion

It is known that infections caused by gastro-intestinal parasites affect over 3.5 million people worldwide. The outcome data showed intestinal parasitic infections in both cross-matched healthy subjects and patients with chronic abdominal pain and that there was marked associated symptoms with gastro-intestinal parasites.

No doubt, proper diagnosis and specific treatment of the gastero-intestinal infected patients is a must.

References

Addis, DC, Davis, JP, Roberts, JM, Masty, MM, 1992: Epidemiology of Giardiasis in Wisconsin: Increasing incidence of reported cases and unexplained seasonal trends. Am. J. Trop. Med. Hyg. 47:13-9.

Alberton, F, Newman, CP, Casemore, DP, 1995: An outbreak of waterborne cryptosporidiosis associated with public water supply in UK. Epidemiol. Infect. 115:123-31.

Aristizabal, H, Acevedo, J, Botero, M, 1991: Fulminant amebic colitis. Wld. J. Surg. 15: 216-21.

Bakr, IM, Arafa, NA, Ahmed, MA, Mostafa, MH, Mohamed, MK, 2009: Prevalence of intestinal parasitosis in a rural population in Egypt, and its relation to socio-demographic characteristics. J. Egypt. Soc. Parasitol. 39:371-81.

Becker, SL, Vogt, J, Knopp, S, 2013: Persistent digestive disorders in the tropics: causative infectious pathogens and reference diagnostic tests: BMC Infect. Dis. 13:37-42.

Bhaskar, RB, Sumathi, B, 2011: Chronic abdominal pain. Indian J. Pract. Pediat. 13:171-84.

Booth, M, Vounatsou, P, N'Goran, EK, Tanner, M, Utzinger, J, 2003: The influence of sampling effort and the performance of the

Kato-Katz technique in diagnosing *Schistosoma mansoni* and hookworm co-infections in rural Côte d'Ivoire. Parasitol. 127:525-31.

Crompton, DW, 1999: How much human helminthiasis is there in the world? J. Parasitol. 85: 397-403.

Current, WL, Garcia, LS, 1991: Cryptosporidiosis. Clin. Microbiol. Rev. 3:325-58.

Dobell, C, 1920: The discovery of the intestinal protozoa of man. Proc. R. Soc. Med. 13:1-15.

El Badawy, AA, Hassan, AA, El Naggar, SA, El Gohary, SS,Raafat, A, 2001: Identification of factors and groups at risk of infection with *Schistosoma mansoni* in urban Sharkia Governorate. J. Egypt. Soc. Parasitol. 31:491-500.

El-Hawy, AM, Abdel-Rahman, MM, Rozeik, MS, Rageb, KH, Pypers, M, 1992**:** Study of physical fitness in adult bilharzial *mansoni* patient versus athletes. Menoufia. Med. J. 4:63-7.

El Masry, MA, El Sahn, AA, Mahmoud, MH, Eissa, SM, 2002: Impacts of environmental conditions on incidence of intestinal parasitic infections in two low socioeconomic areas in Alexandria, Egypt. Bull. High Inst. Pub. Hlth. 32:157-70.

El-Naggar, SM, el-Bahy, MM, Abd Elaziz, J, el-Dardiry, MA, 2006: Detection of protozoal parasites in the stools of diarrhoeic patients using different techniques. J. Egypt. Soc. Parasitol. 36, 2:487-516.

Fayad, ME, El-Khattib, AH, Abd-Elkader, S, Sabry, H, 1992: Parasitic infections among children attending the gastroentrology clinic in King Faisal Hospital, Holy Mecca, Saudi Arabia. Sci. Med. J. Cai. Synd. 4:63-70.

Hassan, SI, 1994: Parasitic infections in primary and secondary schools in Giza Governorate, Egypt. J. Egypt. Soc. Parasitol. 24, 2:597-601.

Hökelek, M, Lutwick, LI, 2006: Nematode infections: Nematode infections.htm, eMedicine Specialties>Medicine, Ob/Gyn, Psychiatry, and Surgery> Infectious Diseases.

Hotez, PJ, Savioli, L, Fenwick, A, 2012: Neglected Tropical Diseases of the Middle East and North Africa: Review of Their Prevalence, Distribution, and Opportunities for Control. PLoS. Negl. Trop. Dis. 6:1475-82.

Kongs, A, Marks, G, Verle, P, Van Der, F, Stuyft, P, 2001: The unreliability of the Kato-Katz technique limits its usefulness for evaluating *S. mansoni* infections. Trop. Med. Int. Hlth. 6:163-9**.**

Mahmoud, AF, 1983: Parasitic infections. In: Nelson Textbook of Pediatrics. WB Saunders Company, Philadelphia.

Markell, EK, John, DT, Krotoski, WA, 1999: Medical parasitology book. WB Saunders Company, Philadelphia.

Masucci, L, Graffeo, R, Bani, S, Bugli, F, Boccia, S, *et al*, 2011: Intestinal parasites isolated in a large teaching hospital, Italy, Euro. Surveill. 16:1-7.

Mohammad, MA, Hegazi, MA, 2007: Intestinal permeability in *Hymenolepis nana* as reflected by non-invasive lactulosa/manitol dual permeability test and its impaction on nutritional parameters of patients. J. Egypt. Soc. Parasitol. 37:877-91.

Morson, BC, Dawson, IMP, 1979: Gastrointestinal pathology. 2nd ed. Oxford: Blackwell Scientific Publications.

Naish, S, McCarthy, J, Williams, GM, 2004: Prevalence, intensity and risk factors for soil-transmitted helminth infections in a South Indian Fishing Village. Acta. Trop. 91:177-187.

Ndyomugyenyi, R, Kabatereine, N, Olsen, A, Magnussen, P, 2008: Malaria and hookworm infections in relation to haemoglobin and serum ferritin levels in pregnancy in Masindi district, western Uganda.Trans. R. Soc. Trop. Med. Hyg. 102:130-6.

Nesheim, MC, Crompton, DW, 2002: Nutritional impact of intestinal helminthiasis during the human life cycle. Ann. Rev. Nutr. 22:35-59.

Romero, CR, 2007: Microbiologia Y Parasitologia Humana. 3rd edition; Mexico, Editorial Medica. Pan American.

Shalaby, NM, Shalaby, NM, 2015: Cryptosporidium parvum infection among Egyptian school children. J. Egypt. Soc. Parasitol. 45, 1:125-31.

Silva, MF, Pereira, FE, 2000: Intestinal nematodes, Toxocara infection and pyogenic liver abscess in children: a possible association. J. Trop. Pediatr. 46:167-72.

Speich, B, Knopp, S, Mohammed, KA, Khamis, IS, Rinaldi, L, *et al*, 2010: Comparative cost assessment of the Kato-Katz and FLOTAC techniques for soil-transmitted helminthes diagnosis in epidemiological surveys. Parasit. Vectors 3:71-8.

Thompson, RC, 2000: Giardiasis as a re-emerging infectious disease and its zoonotic potential. Int. J. Parasitol. 30:1259-67.