

*Research Article***Prevalence of *Cryptosporidium* species in human faecal specimens in Minia Governorate, Egypt.****Nabil S. Gabr, Azza K. Ahmad, Usama S. Belal, Ekhlas H. Abdel-Hafeez, and Reham A. M. Abd Rabou****Department of Parasitology, Faculty of Medicine, Minia University, Minia, 61519, Egypt.****Abstract**

For evaluation of the prevalence of *Cryptosporidium* spp. infection in diarrheic humans in Egypt, fecal specimens from diarrheic (n = 300) were collected and examined for the presence of *Cryptosporidium* spp. oocysts. The presence of *Cryptosporidium* spp. oocysts was determined by Ziehl-Neelsen acid-fast staining. The results showed that the overall prevalence of infection in all 300 samples was 44.7%. *Cryptosporidium* oocysts were detected either alone (37.3%) or mixed with other parasitic infection (7.3%) with the use of Modified Zeil-Neelsen stain. results indicate that *Cryptosporidium* spp. infection is prevalent in diarrheic humans in Egypt.

Key Words: *Cryptosporidium* spp, Modified Zeil-Neelsen stain, diarrhia

Introduction

Cryptosporidium species is one of the infectious zoonotic protozoan parasites that has been recognized as a human pathogen since 1976 (Fayer and Ungar, 1986). *Cryptosporidium* spp. is the cause diarrhea in a wide range of mammalian spp. (Priest *et al.*, 2006). The disease can affect both immunocompetent and immunocompromised individuals causing a wide spectrum of diseases ranging from asymptomatic carrier state to severe diarrhea. Infection with this parasite results in severe but selflimiting diarrhea in immunocompetent and often lethal diarrhea in immunocompromised individuals (Chen *et al.*, 2002). *Cryptosporidium* spp. is a primary pathogen causing acute diarrhea and the most evident symptom of cryptosporidiosis is diarrhea. Non-specific signs, such as dehydration, fever, anorexia, weakness, and progressive loss of conditions may be accompanied. There are a variety of methods, including microscopy, immunological and molecular techniques, for the detection of *Cryptosporidium* oocysts. Microscopic methods include concentration techniques and staining of fecal smears. There are difficulties in distinguishing *Cryptosporidium* oocysts from other small particles, such as yeasts,

moulds, algae, and plant debris by routine fecal examination techniques in fecal and environmental specimens (Fayer *et al.*, 2000). The modified acid-fast staining technique is useful and the oocysts appear as pink to red, spherical to ovoid, bodies on a blue or purple background. The stained smears are permanent and can be stored for a long time before examination when the samples are high numbers (Sevinc *et al.*, 2003). The purpose of this study was to determine the prevalence of *Cryptosporidium* spp. infection in different age groups of diarrheic humans in Egypt by the conventional microscopy method using the modified acid-fast staining.

Materials and methods**Subjects and fecal examination**

Diarrheic fecal samples (300 in total number) were collected in sterile plastic containers from inpatient and outpatient clinics of University Hospitals and Tropical hospital, Minia District, Egypt, who presented with diarrhea associated with nausea, vomiting, abdominal pain and fever during the period from June 2016 to May 2017. All participants provided verbal approval before participation in the study. Information on potential risk factors for infections was gathered by using structured

questionnaires. These factors included source of water, presence of animals (dogs, chicken, ducks, guinea pigs, rabbits, parrots, and sheep).

Samples were subjected to:-

Macroscopic examination to identify color and odor, blood and mucus, round worms, thread worms, or tapeworm proglottids, and consistency.

Microscopic by: a- Saline wet mount smear (Melvin and Brooke, 1982): to detect worm eggs or larvae protozoan trophozoites, and cysts, and the presence of RBCs and WBCs, b- Iodine wet mount (Garcia et al, 1983) for glycogen and nuclei of protozoan cysts. c- Water-ether technique (Smith, 2007) and d- stained with Modified Acid Fast (Casemore et al, 1985).

Results

The results are shown in tables (1 &2).

Table 1: Intestinal parasitic infections identified by microscopic examination of stool samples

Parasites	No.	Percentage
<i>Cryptosporidium</i> spp. oocysts	134	44.7%
<i>Blastocystis hominis</i>	60	20%
<i>Entamoeba histolytica</i> cysts	44	14.7%
<i>Giardia lamblia</i> cysts	20	6.7%
<i>Entamoeba coli</i> cysts	16	5.3 %
<i>Hymenolepis nana</i> egg	12	4%
<i>Cyclospora cayetanensis</i> oocysts	12	4%
<i>Isospora belli</i> oocysts	4	1.3%

Table 2: Results of single and mixed parasitic infection

	No	Percentage
<i>Cryptosporidium</i> spp. only	112	37.3%
<i>Cryptosporidium</i> spp. with other parasites	22	7.3%
Parasites other than <i>Cryptosporidium</i> spp.	106	35.3%
No parasite	60	20%
Total	300	100.0%

Discussion

The objective of this study was to determine the prevalence of *Cryptosporidium* spp. infection in diarrheic humans in Minia governorate, Egypt. In this study the prevalence of *Cryptosporidium* spp. in all specimens was (44.7%). This comes in accordance with Gabr and others who reported a prevalence rate 61% in Minia city (Gabr et al., 2014). where, Abdel-Hafeez et al., (2012) reported a rate of 42.2%, 60.2% in immunocompetent and immunosuppressed individuals respectively (Abdel-Hafeez et al., 2012)

There are discrepancies in the prevalence between different surveys, which were done

on human cryptosporidiosis. In Egypt the prevalence of cryptosporidiosis varied according to the localities. For example, Hassan et al., (2002) reported the incidence of *Cryptosporidium* spp. was 37.7% and 91% in immunodeficient children and adult patients, respectively. Moreover, Antonios et al., (2010), Shoukry et al., (2009), Helmy et al., (2013) and Mousa et al., (2010) reported 33.3%, 33.3%, 49.1% and 31.1% positive rates of human cryptosporidiosis, respectively. The prevalence rates were 15% in chronic renal failure patients in Zagazig, Egypt (Ali et al., 2000), 23.5% in Abo El-Resh Hospital (Naser et al., 2017) and 19.5% in Benha (Abdel-Maboud et al., 2000).

Countries other than Egypt with high prevalence rate of *Cryptosporidium* spp. infection (34.6%) was Indonesia (Kurniawan et al., 2009a). Furthermore, a study in India stated that the prevalence rate in AIDS was 77.5% (Uppal et al., 2014)

Low prevalence rates were reported in Kenya and Isfahan, Iran as the prevalence rate of cryptosporidiosis in children was 4% (Gatei et al., 2006, Saneian et al., 2010). The discrepancy in infection rates is expected due to many causes such as immune state of patients, patients' age, environmental habitats or seasonal variation, sample size, virulence of different isolates of the parasite (El-Badry et al., 2015). The intermittent excretion of the parasite oocyst in stool may be another factor (Adamu et al., 2006).

In the present study the *Cryptosporidium* oocysts were detected either alone (37.3%) or mixed with other parasitic infection (7.3%) with the use of Modified Zeil-Neelsen stain. This agreed the detection of mixed infections of 21.7% (5/23) in positive patients (Abd El Kader et al, 2012). No doubt, *Cryptosporidium* is a common pathogen present in cases with mixed infections. This agreed with Phillips et al., (1992) in London (Phillips et al., 1992), but in Jakarta and Ethiopia mixed infection occurred in 7% and 2.6% respectively (Kurniawan et al., 2009b; Wegayehu et al., 2011).

Mixed parasitic infection detected by Modified Zeil-Neelsen stain (7.3%) (*Cryptosporidium* spp. with other parasites) may be explained by the fact that an already established parasite within the host may create an environment suitable for flourishing of other parasites. Furthermore, over crowdedness, poor hygienic conditions, bad habits and contaminated water supply may be other causes (MacKenzie et al., 1995).

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