

**ORIGINAL ARTICLE**

## **Cryptosporidiosis among Patient with and without Lymphohematopoietic Malignancy in Baghdad**

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### **ABSTRACT**

*Patients with malignant disease are frequently affected by parasitic diseases such as cryptosporidiosis. Cryptosporidium is a parasite causing self-limited diarrhea and enteritis in healthy individuals. The prevalence and intensity of Cryptosporidium infection was studied in two groups including 30 subjects with lymphohematopoietic malignancy undergo chemotherapy and 146 non malignant subjects. Stool specimen was obtained from each case. The specimens were concentrated by the formalin-ether method and smear was prepared from each. The smears were stained by modified Ziehl-Neelsen method and were observed under a light microscope. 23 (76.66%) malignant and 22(15.06%) non-malignant patients were positive for Cryptosporidium infection. The results showed a statistically significant difference between malignant and non- malignant groups ( $P<0.05$ ). The results also showed that the intensity of Cryptosporidium infection in malignant patients was significant( $P<0.05$ ) much (higher than non-malignant patients. and this could be due to immunosuppressive therapy in these malignant patients.*

**Key words :** Cryptosporidiosis , malignant disease , prevalence , intensity

### **INTRODUCTION**

Cryptosporidiosis is a zoonotic and anthroponotic disease which caused by protozoan parasites genus *Cryptosporidium*, it has a worldwide distribution and in the most surveys it is considered to be among the four major pathogens causing diarrheal diseases in children [1]. Humans can acquire *Cryptosporidium* infections through several transmission routes, such as direct contact with infected persons or animals, and ingestion of contaminated food and water [2]. *Cryptosporidium* infection can persist for a long time and can lead to serious complications in patients with AIDS, renal transplant or cancer patients [3, 4, 5], while in patients with an intact immune system, this organism leads to a self limited infection [6]. Reports of Cryptosporidiosis prevalence are sparse from Arab countries [7] and until now there is a little reports from the Arab Gulf region [8], including Iraq [9,10] especially that deal with malignant disease patients [11]. Therefore the current study was done to verify the prevalence of cryptosporidiosis in a group of Iraqi malignant patients and to compare the results with a group of non- malignant individuals.

### **MATERIALS AND METHODS**

#### **Sampling**

This study was conducted from April 2009 to March 2010 at AL-Noor primary health care center, AL-Noor General Hospital and AL-Khadimya Teaching Hospital in Baghdad, Iraq. Two groups of people were included in the study, first group was composed of 30 individuals clinically confirmed with lymphohematopoietic malignant disease (11 female, 19 male) between the ages of 18 and 76 years (mean age 42.24 years, SD=18.79). 10 patients had acute lymphoblastic leukemia (ALL) , 7 had acute myelogenous leukemia (AML) , 3 had chronic lymphoblastic leukemia (CLL) , 3 had multiple myeloma (MM) , 2 had Hodgkin's lymphoma(HL) and 5 had non- Hodgkin's lymphoma (NHL). The second group included 147 individuals clinically confirmed without malignant disease (84 female, 63 male) between the ages of 18 and 80 years (mean age 34.86 years, SD=12.43). For every individual, one fresh fecal specimen from early morning discharge was collected and prepared for examinations.

**Examination of specimens**

Every specimen was collected in 10% buffered formalin in a clean wide-mouthed plastic container and was subjected to concentration by a formalin-ethyl acetate concentration technique and stained with modified Ziehl-Neelsen for identification of *Cryptosporidium* (oocysts) [12].

**Intensity of Infection**

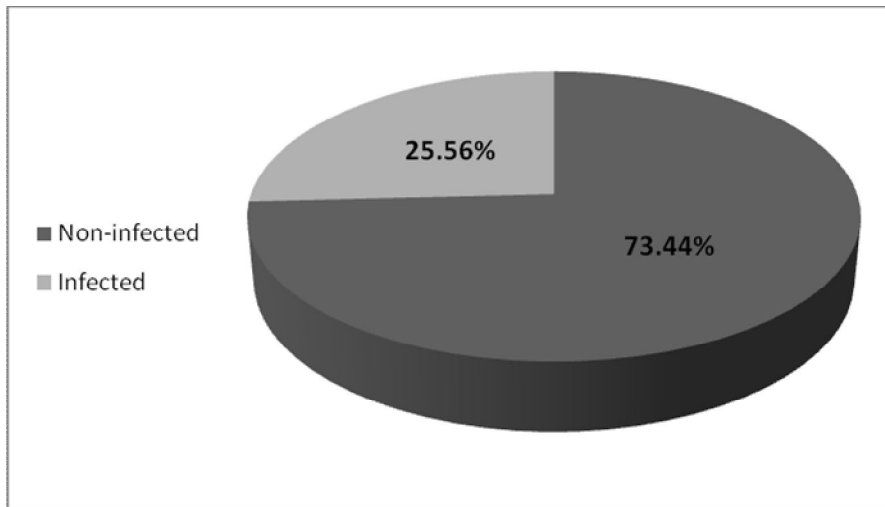
The intensity of infection was quantified by the number of oocysts counted in a 20 l volume of concentrated stool specimen: 1+ (1-50 oocysts), 2+ (51-150 oocysts), and 3+ (>150 oocysts) [13].

**Statistical Analyses**

Statistical analyses were performed with Chi square tests. The data were analyzed using SPSS statistical software (10<sup>th</sup> version). Statistical significance was set at p<0.05.

**RESULTS AND DISCUSSION**

The results showed that the total infectivity rate of *Cryptosporidium* in this study was 25.56% (Figure 1).



**Figure 1.** Percentage of infected and non infected persons with *Cryptosporidium*

**Table 1:** Infectivity rate of cryptosporidium in subjects with and without malignancy

Group	Infected Number (%)
Subjects with lymphohematopoietic malignant disease (n=30)	23 (76.66%)
Subjects without malignant disease (n=146)	22(15.06%)
Total =176	45

**Table 2 :** Infectivity rate of cryptosporidium in subjects different lymphohematopoietic malignancy

Subjects with lymphohematopoietic malignant disease (n=30)	Infected Number (%)
ALL (n=10)	7(70)
AML (n=7)	5(71.42)
CLL (n=3)	3(100)
MM (n=3)	3(100)
HL (n=2)	0(0)
NHL (n=5)	4(80)

**Table 3** : Intensity of infection with cryptosporidium in subjects with and without malignancy

Infected subjects (n=45)	Intensity of infection		
	+1 Number (%)	+2 Number (%)	+3 Number (%)
Subjects with lymphohematopoietic malignant disease (n=23)	3(13.04)	5(21.73)	15(65.21)
Subjects without malignant disease n=(22)	7(31.81)	9(40.90)	6(27.27)

The number of positive samples was 45 out of 176 patients, this percentage was higher than other studies done in Iraq [14, 15]. The differences in infectivity rate may due to the following factors: number of patients samples in screening study , differences in nature of the areas , age of patients , diagnostic method used, living conditions, socio-economic criteria , nutritional status , immunological status , personal hygiene and the variation of temperature from year to another [10 ,14 ,15].

These 176 patients was divided into, 30 patients with lymphohematopoietic malignant disease undergoing chemotherapy (Group I) and 147 individuals without malignant disease (Group II) were examined for *Cryptosporidium* infections. The prevalence of infectivity with *Cryptosporidium*, in each group, is summarized in Table 1. According to this table, the overall prevalence of infection in group I was 76.66% and in group II, 15.06%, statistical analysis showed highly significant relation between the immunological status and infection with *Cryptosporidium* ( $p < 0.05$ ).

The present study showed higher prevalence of cryptosporidiosis among patients with malignancy compared to the non- malignant (Immuno-competent) group and was in concordance with previous studies [11,13,16,17,18]. This observation may agree with several reports stating that intestinal parasitic infections in immuno-compromised patients depend largely on the prevalence of intestinal parasitism in the local community [19], as well as all these patient may stay for long time in hospitals and may contact with other patients or with their medical staff member and be source of infection. Transmission of *Cryptosporidium* within the hospital environment has been reported by Squier *et al.* [20] and can be a problem in units that deal with immunocompromised patients [21]. The prevalence of infection in patients with malignant disease 76.66% which showed in the current study was higher than other study , for example, Tanyuksel *et al.* [22] reported on a study, done in Turkey, of 106 fecal samples from patients with diarrhea and various cancers. *Cryptosporidium* oocysts were detected in 18 (17.0%), of these 106 patients. The authors found no oocysts in samples from 60 cancer patients without diarrhea. A similar study of 560 patients with cancer and diarrhea in India found oocysts in 7 patients (1.3%) of these seven patients, five had hematological cancers [23].

Results of the current study showed that *Cryptosporidium* infection was detected in 7 out of 10 (70%) patient with ALL , 5 out of 7 (71.42%) with AML , 3 out of 3(100%) with CLL , 3 out of 3 (100%) with MM , 0 out of 2 (0%) with HL and 4 out of 5 (80%) with NHL. Table 2. Our results differ from the results of Aksoy *et al.* who reported that thirty-eight (76.0%) of the 50 patients had lymphoma or leukemia and were considered immunosuppressed. *Cryptosporidium* was detected in 2 patients with a diagnosis of ALL and NHL [24]. This differences may be related to several factors: the type of malignancy, immunocompromising effect of the chemotherapy for malignant disease, the diagnostic method used for identification of the parasite [5] and age of patients [25].

Results also showed that out of 45 infected individuals with *Cryptosporidium*, 23 had lymphohematopoietic malignancy and 22 without malignancy . Intensity of infection was distributed as following in patients with lymphohematopoietic malignancy : 13.04% , 21.73% and 65.21% for +1 (1-50 oocysts), 2+ (51-150 oocysts), and 3+ (>150 oocysts) respectively , while the non malignant group showed 31.81% , 40.90 % and 27.27 % for +1 (1-50 oocysts), 2+ (51-150 oocysts), and 3+ (>150 oocysts) intensity of infection respectively (Table 3). Statistical analysis showed that there was significant relation ( $p < 0.05$ ) between intensity of infection and malignancy. This result agreed with Certad *et al.* who found highly significant correlation between intensity of cryptosporidiosis and severity of neoplastic lesions [26].

In conclusion we found high prevalence of *Cryptosporidium* infection with high intensity among patients with lymphohematopoietic malignancies as well as high scale prevalence and seroprevalence study are recommended.

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