



PREVALENCE OF CRYPTOSPORIDIOSIS IN IMMUNOCOMPETENT PATIENTS IN SECONDARY CARE HOSPITAL NORTH EAST REGION

Medicine

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ABSTRACT

Background: Cryptosporidiosis infection caused by group of protozoan parasite with in phylum Apicomplexa. Cryptosporidiosis is more prevalent in patients with immunosuppressed conditions like AIDS and also be seen in immunocompetent patients with asymptomatic or acute or persistent self-limiting diarrhea. **Material And Methods:** Prospective cohort study was conducted March 2019 and April 2020 to estimate prevalence of cryptosporidiosis in immunocompetent patients. **Result:** Out of 230 stool samples collected from 177 adults and 53 children, 47 (20.43%) were positive for *Cryptosporidium*. Out of 53 stool samples from children, 13 (24.52%) were positive and out of 177 adult 34 were positive (19.20%). **Conclusion:** The present study thus highlights the importance of *Cryptosporidium* as a cause of diarrhoea, especially in immunocompetent adults.

KEYWORDS

Immunocompetent, Cryptosporidium, Diarrhea

INTRODUCTION

Cryptosporidiosis infection caused by group of protozoan parasite with in phylum Apicomplexa of genus *Cryptosporidium* and two most common species associated with diarrheal disease *Cryptosporidium hominis* associated with human Cryptosporidiosis and *Cryptosporidium parvum*, which infects bovines and humans (Hunter PR, et al Clin Infect Dis 2004; 39: 504-10., n.d.)

Parasites is found in every region of the world except Antarctica. (Platts-Mills et al., 2015) Cryptosporidiosis is more prevalent in patients with immunosuppressed conditions like AIDS and also be seen in immunocompetent patients with asymptomatic or acute or persistent self-limiting diarrhea in up to 6% of cases. (Chen et al., 2002) Studies has shown that *Cryptosporidium* is an important cause of diarrhea in immunocompetent hosts and main causes of childhood diarrhea in resource-poor countries, and often results in prolonged diarrhea, malnutrition. It is second to rotavirus as a cause of diarrhea in children less than year of age. (Kotloff et al., 2013) *Cryptosporidium* species is now commonly identified in cases of acute, self-limited diarrheal illness in immunocompetent hosts in both developed and developing nations. (Xiao & Feng, 2008) Parasite is transmitted most commonly by from feco-oral route. Oocyst stage being infective form. Oocyst stage can survive in water as it resist disinfection including chlorination. (Reinoso et al., 2008)

The seroprevalence of *Cryptosporidium* among patients suffering with diarrhoea is reported as high as 90% from Brazil and 50% from China. Prevalence reported from India is 1.3% from Northern India, 4.5% from the eastern part of the country (West Bengal), 5.5% from South to West (Mumbai) and 13.1% from South India. (Manocha et al., 2014)

Patients presenting with Diarrhea are often prescribed ciprofloxacin and/or metronidazole empirically. This appears to be a common practice by general physicians throughout the world. (Diniz-Santos et al., 2006)

The purpose of this study was to provide fresh insight into the prevalence of cryptosporidiosis in immunocompetent individual at our secondary care hospital in Shillong city of Meghalaya.

AIM

To determine the Prevalence of cryptosporidiosis in immunocompetent patients in secondary care hospital North East region.

OBJECTIVE

To establish hygienic malpractices and general awareness in the that may predispose to infection.

Inclusion Criteria

1. All immunocompetent with diarrheal illness presented to our centre

Exclusion Criteria

1. All who have been completely treated
2. Old cases of immunosurveillance

MATERIAL AND METHODS

Study Design: Prospective cohort study

Place Of Study: Military hospital Shillong

Duration Of Study: March 2019 and April 2020

Sample Size:

Two hundred thirty (n=230) patients with gastroenteritis diarrhoeal like illness attending our various outpatient departments and indoor facility of our centre.

The study population were divided into two groups children ≤ 18 and adults ≥ 18 years. All of them were initially managed with anti-diarrhoeal antibiotics like Norflox-TZ/ Oflox-OZ on out-patient/ inpatients basis. Despite with the conservative management with oral antibiotics for patients had no response or recurrence of the symptoms. Patients had been re-evaluated again some of them have given the history of recurrent abdominal cramps with diarrhoea following which patients were subjected to stool routine and microscopic examination, we examined 03 consecutive stool samples and looked for *Cryptosporidium* oocysts in faecal smears using formal ether concentration, smears made from the deposits, and stained using the modified Ziehl-Neelsen technique.

Modified Ziehl-Neelsen Technique:

- Slides were exposed to cold carbolfuchsin stain for one hour.
- They were then washed and decolourised with 3% acid alcohol for 15 seconds, washed well in running water
- Counterstained with methylene blue and air-dried at room temperature
- The prolonged treatment with carbolfuchsin was found to be necessary to ensure reliable staining of the oocysts.

Microscopic examination of each smear was done using 100 $\times$ oil immersion, and approximately 200-300 microscopic fields were examined for the presence of *Cryptosporidium* oocysts.

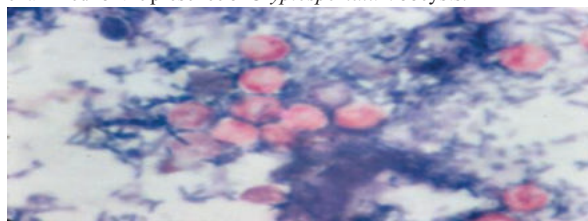


Fig1: Modified acid-fast stain of stool shows red oocysts of

Cryptosporidium parvum against the blue background of coliforms and debris

The *Cryptosporidium* oocyst appeared as a round structure 4-6 μ in diameter and stained dark pink against a green background with acid-fast staining and orange with the safran in-methylene blue technique. (Fig.1)

Quality Control

New slides were used make smears and after the first reader reading the slide, a second reader also read the slide and gave his independent opinion. An agreement of the two readers was taken as the final result.

RESULTS

Out of 230 stool samples collected from 177 adults and 53 children, 47 (20.43%) were positive for *Cryptosporidium* (Table I). Out of 53 stool samples from children, 13 (24.52%) were positive and out of 177 adult 34 were positive (19.20%).

Table 1: Distribution Of *Cryptosporidium*

Parasite	Total patients (n=230)	Adults (n=177)	Children (n=53)
<i>Cryptosporidium</i>	47 (20.43%)	34 (19.20%)	13 (24.52%)

Table 2: Categorisation Of Patients Based On Their Gender

Sex	n= 230 (%)	Positive for cryptosporidium (n= 47)
Male	162 (70%)	37 (78.72%)
Female	68 (30%)	10 (21.27%)

Table 3: Categorisation Of Patients Based On Their Age

Age	N= 230 (□)	Positive for cryptosporidium (n= 47)
≤18 years	53 (23.04%)	13 (24%)
≥18 years	177 (76.95%)	34 (72.34%)

Diarrhoea was the main presenting symptom in our study group which persisted for 8 to 15 days in all patients with 30 patients in whom it persisted for about one month with no other symptoms like significant weight loss and chronic Malabsorption. All patients who were detected for Oocyst of *cryptosporidium* in stool examination were again subjected to HIV testing and 06 patients were tested positive for HIV.

DISCUSSION

Cryptosporidium still remains one of the great public health importance due to its water borne nature and its ability to cause a widespread outbreak of gastrointestinal disease(*Cryptosporidium* in Humans and Animals—a One Health Approach to Prophylaxis - Ryan - 2016). We examined all the stool samples of patients presenting with diarrhoea with no relief after conventional antidiarrheal treatment. Rate of Cryptosporidial diarrheal infection in our study translated to be 20.43% (47 out of 230 who presented during study period). A study carried out in south India indicated an prevalence of 25% (Manocha et al., 2014) .After cumulative data from various parts of India the prevalence rate turns to be between 10- 30%. This is same as the present study.. The high incidence can be attributed to low literacy rate, low socio-economic status, poor water supply system, lack of awareness of disease and not practicing good hygiene and poor sanitation, i.e., hand washing and drinking boiled water, which appears to limit the infection.

The demographic profile of the patient shows the predominance in age group ≥ 18 years unlike other conventional literature mentions that prevalence of *cryptosporidium* are prevalent in participants with ≤ 18 years of age(Chen et al., 2002) . This was possibly because more participants were adults aged ≥ 18 years (n=177) than children (n=53). The gender profile showed male predominance among our study group .In study conducted by Yogendra pratap et al has shown similar result, Among the total patients(643), male patients,383(59.57%) were more common than the females, 260 (40.43%) When analysed statistically, it was noted that there were male predominance in our study with male (n=162) with a female candidate (n=68), and could contribute to the male predominance.

In the present study, out of 230/26 were tested for HIV positive prior to the enrolment of the study and 204 were negative or HIV testing. 47 were tested positive for *cryptosporidium* and were retested for HIV again and 06 were found to be HIV positive.

The present study thus highlights the importance of *Cryptosporidium* as a cause of diarrhoea, especially in immunocompetent adults. Therefore, we suggest that stool specimens should be routinely examined for this particular parasite since the disease is self-limiting in immunocompetent individuals and unnecessary use of antibiotics can be avoided. However, the present data are hospital-based and do not reflect the true prevalence, as there may be a greater number of persons harbouring this parasite who do not report to health clinics. Field studies are needed to assess the true prevalence. The predominance of the infection in men remains unexplained and further studies are warranted to understand the epidemiology of the disease in this region.

SUMMARY AND CONCLUSION

1. Diarrhoea associated with *cryptosporidium* still remains a significant human health problem especially in developing countries.
2. Awareness of the disease with strict hand and food hygiene remains the main stay of the prevention of the disease
3. The predominance of the infection in men remains unexplained and further studies are warranted to understand the epidemiology of the disease in this field.
4. The present study thus highlights the importance of *Cryptosporidium* as a cause of diarrhoea. Therefore, we suggest that stool specimens should be routinely examined for this particular parasite since the disease is self-limiting in immunocompetent individuals and unnecessary use of antibiotics can be avoided. However, the present data are hospital-based and do not reflect the true prevalence, as there may be a greater number of persons harbouring this parasite who do not report to health clinics.
5. Awareness must be spread among the clinicians about the occurrence of these Coccidian parasites not only in immune compromised individuals but also in immunocompetent patients, causing gastrointestinal symptoms.

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