

BRIEF COMMUNICATION**Prevalence of *Cryptosporidium* Infection in Children at the Paediatrics Clinic of Jimma Hospital, Southwest Ethiopia**
Gebru Kibru, B.Sc¹ Girma Mekete, B.Sc²**ABSTRACT**

A cross sectional survey was conducted to determine the magnitude of *Cryptosporidiosis* among under-five children with diarrhoea attending the Paediatric Clinic of Jimma Hospital from 20 September 30 October 1997. One hundred fifty under-five children with diarrhoeal complaints were identified and oocysts of *Cryptosporidium* spp were looked for in the stool samples using the modified Ziehl-Neelsen staining method. Out of one hundred fifty stool specimens five were positive for oocysts of *Cryptosporidium* giving a 3.3 % prevalence rate. The report was submitted to the respective Paediatrician and the patients were treated as *cryptosporidiosis* rather than viral or bacterial diarrhoeal cases. This study has demonstrated the presence of *Cryptosporidium* infection in the region and therefore the parasite must be looked for during laboratory investigation of diarrhoeal stool samples.

INTRODUCTION

Cryptosporidium species, a coccidian protozoon, causes acute, self-limited diarrhoea in children, traveller's diarrhoea and nosocomial infections (1). Infection is caused by ingestion of oocysts containing sporozoite from hands, food or water contaminated with faeces (2).

Cryptosporidiosis in humans was considered rare and zoonotic before the advent of AIDS (3). The severity of *Cryptosporidial* infection is highly associated with immunosuppression and malnutrition (1,4). In immunocompromised individuals, the disease is

prolonged and life threatening frequently ending with death (1,5). Epidemic outbreaks have been reported due to unfiltered municipal water, contact with infected animals and forwarding children in day-care centers (6,7). The outcome of *Cryptosporidium* infection includes prolonged intermittent cholera-like watery mucoid diarrhoea that usually lasts two weeks, persistent gastroenteritis, vomiting, malabsorption and low graded fever (8).

Studies have shown that children are more commonly infected than adults. Diarrhoea is the leading cause of morbidity and mortality in <5 children (2,4,8-10) with a prevalence which is higher in developing (5-10 %) than on the western nations (1-4%) [2,4].

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Screening for *Cryptosporidium* oocysts among children aged under 15 years in different provinces of China showed a prevalence range of 0.7 to 5.0% and the prevalence was higher in under-four children than the others (10). Seasonal peaks were observed in Spring, Summer and early Autumn. A study in China revealed a less than 1% prevalence for the oocysts and 42.3-57.5% rate for the antibody to *Cryptosporidium* on the same subjects (8). A report from Guinea Bissau indicated that the relative mortality for children with Cryptosporidiosis was 2.8% in the first year of life and 3.6% in the second year. The prevalence of the oocyst was 7.4 % during episodes of diarrhoea, 15% among subjects with persistent diarrhoea and 6.1 % among those with acute diarrhoea (12). Studies done on cryptosporidiosis in children with acute diarrhoea in Nepal (10), Gambia, Bangladesh, Costa Rica, Rwanda and Sudan revealed prevalence rates of 6.8, 9, 6.5, 4.3, 4 and 6.1 % respectively (13-17)

In Ethiopia, where 20% of the population is under-five and are moderately to severely malnourished (18) the contribution of *Cryptosporidium* to the episodes of child diarrhoea obviously has its own considerable impact. The first case of cryptosporidiosis was reported relatively recently (19) and thus its epidemiology is not thoroughly studied.

Several staining techniques have been developed to detect *Cryptosporidium* oocysts in faecal smears. Among these Modified Ziel-Neelsen staining, Safranin-methylene blue staining, and Phenol auramine staining techniques are most frequently recommended (2,20).

In order to increase the yield of oocysts, Sheather's concentration method may be used in lighter infections. However,

concentration of the oocysts prior to staining is not necessary because many oocysts are usually excreted in acute infections (2).

MATERIALS AND METHODS

The study population included 150 children with diarrhoea who sought medical care at the Paediatrics Clinic of the Jimma Hospital from September 20 to October 30, 1997.

Sample collection and Procedure:- Fresh faecal specimen was collected with leak-proof clean container and was transported to the laboratory within 1 hour. The magnitude of cryptosporidiosis among under-five children with diarrhoea was determined.

A thin smear from the fresh faecal specimen was prepared, air dried, fixed with absolute methanol and stained by the modified Ziehl-Neelsen staining technique according to the WHO recommendations (20). The stained smear was microscopically examined for oocysts using the high power (40x) or oil immersion objective. *Cryptosporidium* oocysts in a ziehl-neelsen stained smear appears small, rounded to oval pink-red stained bodies, measuring about 5µm in diameter.

To ensure the reliability and validity of the test method two slides from the same sample were prepared and examined by two independent senior laboratory technicians. All positive slides were confirmed by a Parasitologist.

RESULTS

The age distribution of the study population showed preponderance of

infants (32.7 %) followed by those 12 to 24 months (23.3 %).

Out of 150 subjects, 5 were positive for oocysts for *Cryptosporidium* species making a prevalence rate of 3.3%. All positive cases were under the age of 12 months. Their age ranged from 3 to 10 months. They were breast fed, and from urban dwellings.

All the *Cryptosporidium* positive children experienced vomiting and three of them were febrile to touch. The duration of diarrhoea was less than 7 days in four of the positive cases and recurrent in one of the patients. The consistency of the stool was watery muco-diarrhoeic in all positive specimens.

DISCUSSION

The 3.3% prevalence rate recorded in the present study is in accordance with reports from different countries namely, China (0.7-5.0%) [8,11], Costa Rica (4.3%) [15] and Rwanda (4%) [16]. But it is lower than the reports from Guinea Bissau (6.1-15%) [12], Nepal (6.8%) [10], Gambia (9.0%) [13], Bangladesh (6.5%) [14] and Sudan (6.1%) [17]. This might be due to the low yield of the method used (21), the short study period that neglected seasonal effects (8,22), and the target population chosen (12).

There were only 2 reports of cryptosporidiosis from Ethiopia when this study was undertaken. The 3.3% isolation rate is lower than that reported from north-western Ethiopia (9%) [23]. This might be because the latter study considered only those children attending the high risk group, and the study period was longer possibly minimising seasonal effects. Even though the design, target population and method used in this study was similar to

that reported from Addis Ababa, the rate in the present study is slightly lower than the previous report, 5.6% (1). This might be due to the short study period of the present report as compared to one solid year in the previous case.

Unlike other studies that showed high prevalence of cryptosporidiosis among rural residents and bottle fed children (7), all the positive cases in this study were from urban centres and were breast-fed. The zoonotic transmission of the disease and presence of domestic animals and pets in almost all households of the town and the fact that the highest proportion (68.8%) of the examined children were from urban centres may explain the former. Even though their mothers denied that their children were weaned. Inclusion of additional simple foods with the mother's milk, related with poor personal hygiene, could not be completely ignored. If the HIV status of these children were known, immunocompromization might also explain the positivity in breast fed children. However, no association could be drawn from this study because the positive result obtained was very low.

Although the low prevalence rate of the parasite found in this study may underestimate the true prevalence due to the reasons aforementioned, this study gives clue to laboratory workers and physicians of the region that the possibility of infection by *Cryptosporidium* species among children with diarrhoea must not be overlooked. This does not mean that the parasite is the sole aetiology of the disease. A multi-disciplinary investigation is recommended to study the epidemiological aspect of the parasite, its clinical profile and association with other enteric pathogens and a method for its early detection.

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