

Short Communication

Asymptomatic Cryptosporidiosis in a Periurban Slum Setting in Kolkata, India - a Pilot Study

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SUMMARY: We report the results of a prospective study conducted among asymptomatic children of slum dwellers in Kolkata, eastern India, to assess the prevalence of *Cryptosporidium parvum* during the period of October 2002 to July 2003. Of the 609 fecal samples examined, *C. parvum* was detected in 14 (2.3%). The study indicated that poor sanitary conditions may be cofactors for the cryptosporidial disease burden among slum dwellers. The implications of asymptomatic infections have been discussed.

Cryptosporidium parvum, an intestinal protozoan parasite, has been detected as one of the major diarrheagenic pathogens in humans throughout the world (1,2). There are reports of several hospital-based studies from India and other countries on the prevalence of *Cryptosporidium* in children with diarrhea. But little information is available on asymptomatic carriage of *Cryptosporidium* in an apparently healthy population (3), and community-based studies carried out in depth are scanty in the case of developing countries. In view of the foregoing, we undertook a prospective study among nondiarrheic apparently healthy children in a selected focus area in Kolkata, India, to evaluate the magnitude of cryptosporidiosis as an impending public health problem in a periurban slum dwelling community and to explore hitherto unknown disease burden among Indians especially where the prevalence of malnutrition is presumed to be high.

The study was conducted in the Tiljala slum area, a periurban locality of an eastern suburb of Kolkata, India. All children between 1 - 12 years old were identified and enrolled for sample collection.

During the period from October 2002 to July 2003 (10 months), a total of 609 non-diarrheal stool samples were collected. Stool samples were collected in sterile McCartney's bottles and examined within 4 h of collection. The fecal smears, after fixation by methanol and drying, were stained by modified Kinyon's acid fast staining (4) and microscopically examined for *Cryptosporidium* oocysts.

In this study of asymptomatic carriage of *C. parvum* in a Kolkata slum area over a period of 10 months, cryptosporidiosis prevalence was found to be 2.3% (14/609) in a preselected focus group. Age-wise prevalence is depicted in Table 1. The highest risk group for cryptosporidial infections was found to be children below 1 year of age. The mean age of isolation was 1.2 ± 1.0 years.

The worldwide prevalence of *Cryptosporidium* among asymptomatic children (carriers) is less than 0.5% (5) when several exceptional localities with high prevalences, which probably have a local explanation, are excluded from the

Table 1. Age-wise distribution of *Cryptosporidium parvum* in periurban slum of Kolkata, India

Age group (years)	No. of stool samples	No. of samples positive (%)
0-<1	166	7 (4.2)
1-<2	148	4 (2.7)
2-<3	123	2 (1.6)
3-<4	71	1 (1.4)
4-<5	36	0
5-<12	65	0
Total	609	14 (2.3)

Mean (age of isolation) \pm S.D. = 1.2 ± 1.0 years.

calculations. Compared to these findings, our detection rate in this community-based study is much higher (2.3%). In a similar study in the United States, cryptosporidiosis was detected in 6.4% of asymptomatic cases (3).

Our findings suggest that there is a sustained prevalence of *Cryptosporidium* in this population, and therefore there is the probability that with the onset of acute diarrhea the carriage vis-à-vis detection rate will increase, possibly due to a "wash out" phenomenon. It has been predicted that the proportion of asymptomatic carriers of important diarrheagenic pathogens like *Cryptosporidium* sp. may be high in areas of low socio-economic status in developing countries (6), which is very much evident in the present study. This is attributed to the unsanitary living conditions in slum areas - viz., paucity of clean drinking water supplies, mixed dwelling habits (i.e., domestic/pet animals are kept near or inside the houses), improper sewage or waste disposal facilities, intake of contaminated food, etc. However, overcrowding and previously unnoticed diarrhea in the family may also become positive factors, as found in a study in Mexico (7).

Our results confirm the fact that in Kolkata, eastern India, an area known for cryptosporidial endemicity for over a decade now (8), even symptomless individuals in the community can have been colonised by *Cryptosporidium*, maybe very early in life, as has also been reported from a study in southern India (9). This fact may be more alarming because it has already been shown (10) that even "asymptomatic" cryptosporidial infections are associated with significant

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growth shortfalls in children in developing countries (e.g., Peru). In Guinea-Bissau, West Africa, cryptosporidial diarrhea in the first year of life was associated with diminished linear growth and weight at 2 years of age, suggesting a permanent effect with blunting of catch-up growth in young children (11). Thus, cryptosporidial infection even without overt diarrhea may be an emerging cause of malnutrition in the developing world.

Emergence of *C. parvum* as one of the major causes of prolonged and life-threatening diarrhea in immunocompromised patients and particularly in patients suffering from AIDS is now an established fact (12). Therefore, the disease burden may become higher, subject to the spread of this hitherto unknown asymptomatic infection in the immunocompromised and malnourished pediatric population in a community, especially in a country like India, where 53% of children under 5 years of age suffer from moderate to severe malnutrition (13).

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