

# Childhood Dysentery In Ilesa, Nigeria: The Unusual Role Of *Entamoeba Histolytica*

T Ogunlesi, J Okeniyi, O Oyedeji, S Oseni, O Oyelami, O Njokanma

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## Abstract

Background: *Shigella* species are the usual aetiologies of dysentery in the developing world while *Entamoeba histolytica* is regarded as uncommon in young children.

Objective: To determine the prevalence of *Entamoeba histolytica* in childhood dysentery in Ilesa, Nigeria.

Method: A cross-sectional survey of consecutive under-five children with bloody diarrhoeic stools. Fresh stool specimens were examined microscopically and also cultured on Desoxycholate Citrate Agar (DCA) and MacConkey Agar.

Results: A total of 300 under-five children with diarrhoea were recruited out of which 41 had dysentery giving a prevalence of 13.7%. Trophozoites of *Entamoeba histolytica* were identified in 33 (80.5%) cases while *Trichuris trichiura* and *Shigella* species were isolated in 1 (2.4%) and 4 (9.8%) cases respectively. No pathogens were identified in 2 (4.9%) cases.

Conclusion:

*Entamoeba histolytica* is a prominent aetiology of childhood dysentery in Ilesa, Nigeria.

## INTRODUCTION

Diarrhoea is estimated to cause up to 19% of the annual 10 million under-five deaths in the developing world.<sup>1</sup>

Dysentery, otherwise known as bloody diarrhoea, accounts for about 10% of the diarrhoeal episodes and 15% of the diarrhoeal deaths.<sup>1</sup> *Shigella* species had been described as the most common and most important causes of dysentery while the other pathogens like *Entamoeba histolytica*, *Salmonella* species, *Campylobacter jejuni*, *Yersinia enterocolitica* and *Trichuris trichiura* are reportedly uncommon.<sup>2</sup> Amoebiasis is acknowledged to have a world wide distribution although the exact prevalence of its dysentery form in the tropics and subtropics where it is reportedly endemic is largely unknown.<sup>3</sup>

In Ilesa, Nigeria, there has been no previous documentation of the prevalence of childhood dysentery. The major source of water in Ilesa, a semi-urban community, is well from which water is manually drawn. Only very few families use mechanized devices to pump water from the wells into pipes in their homes. Treated pipe-borne water is not available. Sewage disposal within the community is mainly by pit-latrines and the water cistern methods whereas, in the poorly developed outskirts where majority of the people live, human waste is usually indiscriminately disposed of in the bushes where farming is also done.

In the light of the aforementioned clinical and public health importance of dysentery, this study was done to determine the prevalence of amoebic dysentery among under-five children seen at the hospital. This study was conducted at the Wesley Guild Hospital, Ilesa, Nigeria. This is the main hospital offering both primary and tertiary paediatric services in this semi-urban community.

## METHODOLOGY

All under-five children seen at the General Out-Patient Paediatric Clinic, the Diarrhoeal Training Unit and the Children Emergency Room of the Wesley Guild Hospital, Ilesa over a period of nine months (November 1, 2002 and July 31, 2003) were prospectively studied. Inclusion criterion was the presence of visibly bloody diarrhoeic stools. Neonates were excluded. Information was obtained and analysed on demographic characteristics, the details of pre-presentation drug use and their source of water. Anthropometry and classification of nutritional status were by the Modified Wellcome system.<sup>4</sup>

Fresh stool specimens were collected into sterile universal bottles and examined within 30 minutes of collection.<sup>5</sup> Portions of stool containing mucus and blood were suspended in saline, smeared on warm slides and were examined for motile red blood cells-containing trophozoites

of *Entamoeba histolytica*. Stool samples were inoculated into Selenite-f broth and sub-cultured on Desoxycholate Citrate Agar (DCA) and Mac-Conkey Agar. <sup>6</sup> Bacterial colonies were analysed using the appropriate biochemical and serological methods.

Data analysis was done using the Computer package for epidemiologists (PEPI). <sup>7</sup>

## RESULTS

Out of the 300 under-five children recruited, 41 (13.7%) had bloody diarrhoea while the remaining 259 (86.3%) had watery non-bloody diarrhoea. This puts the prevalence of dysentery at 13.7%. There were 21 males and 19 females with male to female ratio of 1.1: 1. The ages ranged between 2 months and 59 months with the mean (SD) age of 18.9 (11.9) months Twelve (29.2%) children were infants while 22 (53.6%) were in the second year of life. In the third, fourth and fifth years of life were 4 (9.7%), 1 (2.4%) and 2 (4.8%) children respectively.

The mean weight for the group was 8.8 (2.1) kg. Using the Modified Wellcome classification of malnutrition, 18 (43.9%) were normal while 23 (56.1%) had varying degrees of malnutrition with underweight being the commonest form (21/ 41; 51.3%).

The source of water for domestic use was mainly manually dug well (33; 80.5%) while tank and stream (4; 9.7% each) were less common. None of these children used pipe-borne water. Twenty six children (63.4%) took various antibiotics including Co-trimoxazole, Ampicillin, Amoxycillin and Tetracycline prior to presentation.

Pathogens were identified among 39/ 41 (95.1%) subjects. Erythrophageous trophozoites of *Entamoeba histolytica* were found in 33 (80.5%) stools. None of these had additional bacterial isolates on culture. *Shigella* species were isolated in 4 (9.8%) stool specimens. One stool specimen contained Enteropathogenic *Escherichia coli* (EPEC) and ova of *Ascaris* while *Trichuris trichiura* was found in another specimen. No pathogens were identified in 2 (4.9%) specimens. None of the 15 (36.6%) children who did not take antibiotics had *Shigella* in their stools whereas the 4 (9.8%) children from whom *Shigella* were isolated had various antibiotics including Co-trimoxazole prior to presentation. The two children from whom no pathogen was identified did not take antibiotics prior to stool examination.

Twenty seven (81.8%) subjects with amoebic dysentery

were aged 24 months and less. Ten (30.3%) children were infants out of whom two were younger than 6 months (aged 2 and 4 months respectively). The age group most affected by amoebic dysentery was the 13 to 24 months group with 17 (51.5%) cases.

## DISCUSSION

The prevalence of dysentery in this study was slightly higher than 10% cited by the World Health Organization (WHO) in the developing world. <sup>2</sup> However, it was also higher than 6.3% reported in Calabar <sup>8</sup> but much lower than 21.6% reported from Enugu <sup>9</sup> in the south-eastern part of the country. The reason for this disparity is unclear but it may be attributable to differences in study designs, patient selection and differing environmental conditions in the various study centres.

By our results, the distribution of pathogens causing dysentery was significantly different from the pattern described by the WHO which put amoebic infection as constituting less than 3% of all cases of dysentery while *Shigella* was said to be responsible for about 60% of dysentery cases. <sup>2</sup> It is noteworthy that there was no epidemic of dysentery in Ilesa at the time of this study. However, the high rate of antibiotic use, particularly co-trimoxazole which is the cheapest antibiotic agent around, may readily explain the unusually low isolation rate of *Shigella* but not the high prevalence of *Entamoeba*. Although, we lacked facilities with which to differentiate between *E. histolytica* and *E. dispar*, this is not expected to alter our conclusions significantly since this paper focuses on a disease entity and *E. dispar* is not known to be pathogenic.

Thus, we infer that amoebic dysentery appears more common in Ilesa than earlier reported from other parts of the developing world. The faeco-oral transmission of the parasite may explain its distribution which had been reported to be related to sanitary conditions rather than climatic conditions. A detailed description of the sanitary condition of the subjects' homes was not included in the study but poor sanitation is expected in a semi-urban community where water supply is poor and waste disposal is largely indiscriminate.

The manually dug wells which are easily contaminated may be a potentially rich reservoir of the parasite. On the other hand, good hand washing practices which ordinarily should interrupt the transmission of the parasites <sup>10</sup> is expectedly inadequate in situations where water supply takes a lot of

manual efforts and the tendency is to use water sparingly. Poor hand washing practices creates a large pool of carriers of the parasite. This results in further transmission by direct and indirect contacts since the infectious dose of the parasite is rather small ( $<10^2$ ) compared to  $10^4$  for *Shigella* species and  $10^6$  for *Salmonella* species.<sup>11</sup> Thus, the high prevalence of amoebic dysentery in Ilesa may be attributable principally to the poor water supply in the community.

The high rate of antibiotic use could have masked the prevalence of *Shigella* in these cases since there can be co-infection with both *Shigella* and *E. histolytica*.<sup>12</sup> Therefore, it is difficult to conclusively declare *Shigella* as uncommon in Ilesa. However, the fact that the children still presented at the hospital with bloody diarrhoea despite the use of antibiotics at home ordinarily suggested possible in-vivo resistance of *Shigella* to the drugs. Thus, bacterial growth in stools was ordinarily expected. The absence of that may suggest that *Shigella* diarrhoea, for yet unknown reasons may not be as common in Ilesa. This was earlier suggested by a study in the neighbouring community of Ile - Ife.<sup>13</sup>

Provision of water in large quantities appears most ideal in interrupting the transmission of this parasite. This is presently impossible in Ilesa. Thus, with health education, there would be improved personal and public hygiene, particularly adequate hand washing practices. Additionally, boiling of water for domestic purposes should be emphasised in this community since chemical methods of water purification (chlorination) are reportedly ineffective against the cysts of the parasite.<sup>14</sup> Empirical treatment of childhood dysentery pending the availability of bacteriological laboratory reports particularly in this community, may include metronidazole, the anti-parasitic drug recommended for Amoebiasis by WHO.<sup>2</sup>

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## CORRESPONDENCE TO

Dr. TA Ogunlesi. Address: Wesley Guild Hospital, Ilesa, Nigeria. E-mail: tinuade\_ogunlesi@yahoo.co.uk Telephone: +2348055622987

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**Author Information**

**T.A. Ogunlesi**

Consultant Paediatrician, Federal Medical Centre

**J.A.O. Okeniyi**

Lecturer, Department of Paediatrics and Child Health, Obafemi Awolowo University (OAU)

**O.A. Oyedeji**

Consultant Paediatrician, State Specialist Hospital

**S.B.A. Oseni**

Lecturer, Department of Paediatrics and Child Health, Obafemi Awolowo University (OAU)

**O.A. Oyelami**

Professor of Paediatrics, Department of Paediatrics and Child Health, Obafemi Awolowo University (OAU)

**O.F. Njokanma**

Consultant Paediatrician, Havana Specialist Hospital