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## HIV Infection in hospitalized under-5 children with acute watery diarrhoea in Calabar, Nigeria

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**Abstract:** *Background:* The signs and symptoms of HIV/AIDS in children are not quite distinct because of similarities in clinical presentation between HIV infection and endemic tropical diseases. Diarrhoea, one of the cardinal symptoms of HIV/AIDS, is a common childhood disease.

*Objective:* This study was conducted to find the prevalence of HIV infection among children admitted with acute watery diarrhoea in our diarrhoea treatment and training unit.

*Method:* Consecutive children aged below 5 years admitted into the unit with diarrhoea were recruited. The children were examined. The parents were counseled before blood was taken for HIV screening. In addition, parents of children who were sero-positive for HIV were also screened.

*Results:* One hundred and fifty-two who made the inclusion criteria were studied. Eight (5.3%) were sero-positive for HIV, five of them being males. None of these mothers had antenatal care and they were all delivered at either home or traditional attendants' homes. All were under weight and six of them presented with severe dehydration. These factors reached statistical significant differences between children who were sero-positive and those who were not. None of these eight patients died from acute watery diarrhoea but two of them eventually died from complications of persistent diarrhoea.

*Conclusion:* Children with HIV may present with acute watery diarrhoea. Children with diarrhoea that are underweight with severe dehydration whose sero-status are not known should be screened for HIV.

### Introduction

Diarrhoea is a leading cause of morbidity and mortality among children in developing countries<sup>1,2</sup>. It is also a leading cause of morbidity and mortality among HIV infected children<sup>3-6</sup>. Diarrhoea incidence, duration and severity are higher in HIV infected children. For instance acute and persistent diarrhoea are four times more common in HIV-infected than uninfected children<sup>3</sup>.

Paediatric HIV infection in Nigeria is increasingly becoming a problem because a lot of infected children are not identified early due to similarities in clinical presentation between HIV infection and endemic diseases<sup>6,7</sup>. Furthermore, financial constraints and limited or lack of confirmatory testing facilities are also contributory<sup>7,8</sup>.

Selective screening based on clinical suspicion has been advocated for developing countries<sup>7,9</sup>. It could be especially useful in the presence of a larger load of patients with several morbidities that may be HIV-related, in the face of limited resources for diagnosis and treatment.

Diarrhoea Training/Treatment Unit which admits acute watery diarrhoea cases offers this opportunity.

Few studies have examined the issue of co-morbidity of HIV with acute watery diarrhea as a clinical manifestation.<sup>5,6,9,10</sup> This study therefore attempts to find out the prevalence of HIV among children admitted into the Diarrhoea Treatment and Training Unit of the University of Calabar Teaching Hospital, Calabar, Nigeria. This study will help in identifying children admitted with acute watery diarrhoea who in addition also have HIV infection. The children identified could eventually be enrolled into the treatment programme to expand the intervention.

### Subjects and Methods

This prospective study was conducted in the Diarrhoea Treatment/Training Unit (DTU) of the University of

Calabar Teaching Hospital in the Southern tip of Nigeria. The unit earlier described by Ochigbo et al<sup>11</sup> is a sub-unit of the Children's Emergency Room of the Hospital and it admits an average of 30-40 patients per month with acute watery diarrhoea.

Ethical approval for the study was obtained from the Ethical Committee of the University of Calabar Teaching Hospital. In addition, a written consent was obtained from the individual parent/guardian.

Consecutive under-5 admissions with acute watery diarrhea, clinically defined as passage of three or more watery stools in a day were recruited. As a departmental policy, children less than six weeks old, malnourished children with diarrhoea and those with persistent diarrhoea are admitted into other wards of the department and were thus excluded from this study. Also excluded in the study were children whose HIV sero-status were known. All recruited patients' parents/guardians were given pre- and post-counseling. Parents whose children were sero-positive for HIV were subsequently screened.

A proforma data was opened for each child and mother stating the age, sex, frequency and duration of diarrhea, vomiting, fever and other symptoms. Feeding options for infants were noted. Each child was fully examined and degree of dehydration noted. Anthropometry was done according to standard procedures. Social status was assessed based on suggested classification by Olusanya et al<sup>12</sup>.

Two screening tests were done using CHEMBIO STAT-PAK Assay (CHEMBIO diagnostic systems, INC, USA) and the Determine (Inverness Medical, Japan) to screen for HIV 1 and 2 antibodies. The test kits were used in strict compliance with the manufacturer's instructions.

These tests were done by the investigators (after receiving training) and there were cross-checked by a scientist from the President Emergency Plan for Aids Relief (PEPFAR) Laboratory. In addition, children who were 18 months and below that were sero-positive had blood taken for polymerase chain reaction analysis through the PEPFAR clinic. Those with confirmed infection status were recruited into the Paediatric HIV/AIDS treatment protocol. There was no facility to screen these diarrhea admissions for rota virus. Stool cultures were done and urea, electrolyte and creatinine levels were done for severely dehydrated children. Children who had fever were screened for malaria and septicemia.

Each child received appropriate treatment for the level of dehydration ranging from oral rehydration salts to intravenous fluid therapy. In addition, all received zinc oxide which is routinely practised in the unit. Each patient was followed up till discharged or transferred to the main paediatric ward when complications set in or the diarrhea became persistent. The study spanned nine months, from April 1st 2008 to October 30, 2008.

The data were analysed using Microsoft excel. Chi-square was calculated for contiguous variables and P was significant at p-value  $\leq 0.05$ .

## Result

A total of 152 patients were recruited out of a total of 246 patients admitted during the period. There were 88 males and 64 females giving a male: female ratio of 1.4:1. Eight were sero-positive for HIV, five of them being males. This gives a prevalence of 5.3% among diarrhea admissions. The youngest was three months while the oldest was 48 months. All the mothers of our patients were sero-positive for HIV.

The age distribution of infected children is shown in Table 1.

**Table 1:** Age distribution of 152 children and frequency of HIV among the age groups

Age in months	Number	Number sero-positive	Percent
< 6	25	1	0.66
7 – 12	47	3	1.97
13 – 24	38	2	1.32
25-36	19	1	0.66
37-48	13	1	0.66
49-<60	10	0	0.00
<b>Total</b>	<b>152</b>	<b>8</b>	<b>5.3</b>

## Socio -economic states

Three children were from the middle class and five from the lower socio-economic class.

All the eight children with HIV were underweight. Correspondingly, 62 (43%) out of the 144 that were sero-negative were underweight. There was a statistically significant difference between these two groups,  $X^2 = 4.38$ ,  $P=0.036$ .

Stool frequency ranged from five to six per day, and two had dysentery. Three progressed to persistent diarrhea. Escherichia coli was the commonest organism isolated in three of the patients while one culture grew Staphylococcus aureus. The rest did not grow any pathogen.

## Nutrition History

Only one of the eight sero - positive children was exclusively breast fed, others were mixed-fed from infancy.

## Place of Delivery

None of the parents had antenatal care and therefore none was screened. All of them were delivered at home,

churches and traditional birth attendant places. Parity ranged from one to three.

#### *Duration of Diarrhoea*

Five of them presented within 48 hours of diarrhoea .

#### *Associated illness*

Three had malaria while two had acute respiratory infection in addition to acute diarrhoea.

#### *Past Medical History*

Two had been admitted earlier for febrile illness but no previous history of blood transfusion. None had a chronic illness.

#### *Degree of Dehydration*

Six (75%) of the eight had severe dehydration while the remaining two had moderate dehydration. Comparatively only 35 of the 144 were severely dehydrated. This difference between the two groups was statistically significant.  $\chi^2=7.48$ ,  $P=0.005$ .

#### *Outcome*

The five who were younger than 18 months had PCR done and were confirmed positive.

Three of these acute diarrhoea cases were complicated with persistent diarrhoea and were subsequently transferred to the main paediatric ward where two later died. All the other surviving patients were recruited for ARV treatment.

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## **Discussion**

The prevalence of HIV infection among acute diarrhoea admissions was 5.3%. This shows that some patients with acute diarrhoea may also have HIV infection. This prevalence is similar to the 5% HIV seroprevalence in a Lagos hospital among children outpatients<sup>13</sup>.

It is, however, higher than the 4.1% national sentinel sero prevalence rate but lower than the overall HIV prevalence of 7.1% reported for Cross River State during the National sentinel survey for 2010<sup>14</sup>. This sentinel survey is derived from antenatal visits which is not representative of the population since most mothers do not book for antenatal care and even those that book delivered at home as reported by Etuk and Etuk<sup>15</sup>.

The national estimates of person living with HIV/AIDS in 2010 are 3.1 million with children constituting 321,580<sup>14</sup>. This is a sizeable number that will increase the abysmally high childhood mortalities in Nigeria. All our patients had vertical transmission from their mothers. Efforts must be geared towards reduction of HIV/AIDS in Nigeria.

Our prevalence could have been higher if subjects with severe malnutrition with diarrhoea were screened prevalence rates as high as 10-30% have been recorded in several studies in Nigeria<sup>3,7,9,16,17</sup> and up to 50% in Kenya<sup>6,18</sup>. Most of these studies involved other morbidities other than acute watery diarrhoea as in our study<sup>3,6,7,16,17,18</sup>. In a Zambian study that assessed children 5 years and below with diarrhoea and HIV only 25% had acute diarrhoea, the remaining being chronic diarrhoea<sup>9</sup>. It shows that a lot of children may be missed if not screened. For instant, in a recent analysis of blood samples of children in Kogi a prevalence of 10% was recorded, higher above the national average<sup>16</sup>.

Our youngest patient was aged three months and at this age it is difficult to diagnose HIV because the seropositive test could have come from maternal antibodies. Also at this age most are asymptomatic. In this era that our women preferred unorthodox places for deliveries selected screening is necessary when these categories of patients present themselves at health facilities.

All our patients with HIV belonged to the middle and lower social classes.

This is not surprising because these social classes do not often avail themselves with antenatal facilities<sup>12,15</sup>. None of our parents received antenatal care and so none of them was screened. Since most of our women are not screened it should now be the responsibility of practitioners to adopt the provider initiated screening of HIV as recommended by the World Health Organization in Nigeria to pick up those that were not screened during antenatal care<sup>19</sup>.

All infected children were underweight and this was statistically significant. This cannot be solely attributable to HIV at this age because most of the patients were of low socio-economic status. In addition, nutrition was also not optimal as most of them were mixed-fed from infancy. One of our selection criteria was to exclude severely malnourished children who are readily screened for HIV and are not usually admitted in DTU. It would be expedient from this study to recommend screening of underweight patients with diarrhoea for HIV so as not to miss them.<sup>2-4</sup>

Most of the children were severely dehydrated at presentation. This agrees with the fact that diarrhoea incidence, duration and severity are higher in HIV infected children<sup>3</sup>. That most of them were severely dehydrated at presentation could have been contributed by the decrease immunity accompanying HIV infection.

This may predispose to severity of diarrhoea and vomiting and therefore the severe dehydration. The presence of co-morbid conditions in some of these children may support the assertion that immunity decreases with HIV infection even before HIV becomes symptomatic. It was thus not surprising that malaria and acute respiratory tract infections were common among these patients and two had previous hospitalization.

All the children were delivered at home or traditional birth attendants' places. The question that arises is whether these parents knew their sero-status before such deliveries took place. This history, however, was not volunteered by the mothers. If screening is made more accessible to mothers, the prevention of transmission from mother- to -child could be enhanced<sup>20</sup>. Stake holders need to work out modalities to reach the un-reached.

## Conclusion

Children with acute watery diarrhoea may in addition, also have HIV infection. High index of suspicion is necessary as there were no pathognomonic symptoms and signs of children with both conditions. We recommend that children with acute watery diarrhoea that are underweight and severely dehydrated should be screened for HIV.

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