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Full Length Research Paper

Sero-prevalence of HIV in under-fives presenting with diarrhoea at the University of Port Harcourt Teaching Hospital, Nigeria

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Abstract

HIV infection is of major public health concern worldwide. Though the prevalence of HIV in Nigeria seems to be stabilizing, a significant number of the population are still unaware of their status. A prospective study was carried out to determine the sero-prevalence of HIV in under-fives presenting to UPTH with diarrhoea. Also to determine the risk factors for HIV transmission in the seropositive patients. From September 2007 to February 2008, a total of 342 under-fives who presented to UPTH with diarrhoea were screened for HIV using the double ELISA test. A structured questionnaire was completed by the investigators to assess the risk factors for infection. Mothers of the seropositive patients were also screened with the same test kits. The majority (89.0%) had acute diarrhoea, 22 (6.0%) had persistent diarrhoea, 16 (5.0%) had chronic diarrhoea while 64 (18.7%) had dysentery. Thirty three of the patients tested positive to HIV antibodies, giving a seroprevalence of 9.6%. Significantly more HIV positive patients 12 (75%) had chronic diarrhoea. The presumed mode of HIV transmission in 30 (90.9%) of the patients was vertical. Since diarrhoea is a common feature of HIV infection, all children with diarrhoea should be screened for HIV. Measures aimed at prevention of mother to child transmission of HIV should be intensified.

Keywords: HIV, seroprevalence, under-fives, diarrhoea, transmission.

INTRODUCTION

The Human Immunodeficiency Virus (HIV) infection is of major public health concern world wide. Acquired Immune Deficiency Syndrome (AIDS) develops in an HIV positive person after months to years of infection as HIV steadily weakens the body's immune system, increasing its vulnerability to diarrhoea, pneumonia, tuberculosis, tumours and opportunistic infections (WHO, About HIV/AIDS. 2005. http://www.who.int/hiv/abouthiv/en/).

There is much more rapid disease progression in HIV infected children compared to adults. The average time from HIV infection to AIDS diagnosis is eight to seventeen months in children compared to eight to eleven years in adults (GENX PHARMA LIMITED. HIV in children. 2002. file://C:\ocuments and settings\Administrator\My Documents\ HIV in Children.htm). Paediatric AIDS kills especially fast in developing countries (UNAIDS World AIDS Day 1997 Material. Children living in a world with AIDS by Health and Welfare Ministry, GBGM, UMC. Children with HIV, a future compromised). The true magnitude and prevalence of paediatric HIV in Nigeria remains largely unknown as a result of under reporting and paucity of reports on its clinical manifestations (Asindi and Ibe, 1992; Emodi and Okafor, 1998; Angyo et al., 1998).

Diarrhoea is among the top three causes of childhood morbidity and mortality, especially in developing countries like Nigeria (WHO Programme for control of diarrhoeal diseases: The pathophysiology of watery diarrhoea, dehydration and rehydration. In: Readings on diarrhoea-students manual. Geneva 1990; 16-28). It is a very

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common problem in people living with HIV, (Carcamo et al., 2005) and is one of the early symptoms of HIV infection (Alison and Kevin, 2001). Diarrhoea is such a common feature of HIV infection that it is among the World Health Organization (WHO)'s major criteria for the case definition of paediatrics AIDS (Eneh et al., 2006). Diarrhoea occurs in 90% of AIDS patients in developing countries (Mukhophadya et al., 1999) and is experienced by over 50% of patients with HIV/AIDS at some time during their illness and can be a major source of morbidity and mortality (Carcamo et al., 2005). HIV infected children can have diarrhoea with pathogens that infect HIV negative children (e.g *Rotavirus or Salmonella*) (Andrew, 2004). Children with symptomatic HIV infection can also have infection with unusual organisms (including *cytomegalovirus, candida* and *Gardia lamblia*) (Andrew, 2004).

Since diarrhoea is one of the commonest and earliest presenting features in HIV infected individuals, screening children with diarrhoea for HIV will facilitate early diagnosis, thereby reducing the impact of the infection on the child and his family. It has been shown that with effective treatment, HIV infected children can have longer and healthier lives (UNAIDS/WHO AIDS Update, December 2004: www.unaids.org/wad2004/report.html). Knowing the HIV status of a child may serve as an entry point for the rest of the family. Since the dominant mode of HIV infection in children is vertical, detecting HIV antibodies in a child's serum in most cases indicates that the infants mother is infected (Lyons, 1990).

The present study therefore sought to determine the HIV status of children below five years presenting to the University of Port Harcourt Teaching Hospital with diarrhoea, a common early feature of HIV infection, thus enabling the infected child and his or her family have access to early care, treatment and support.

Objectives

To determine the seroprevalence of HIV in under fives presenting with the different types of diarrhoea (acute, persistent, chronic or dysentery) with or without other clinical problems. Also to determine the risk factors for transmission of HIV infection in the HIV seropositive subjects.

SUBJECTS AND METHOD

The study was carried out within a six month period between the months of September 2007 to February 2008, in the Diarrhoea Training Unit (DTU) and the Children Emergency Ward (CHEW) of the University of Port Harcourt Teaching Hospital (UPTH).

Ethical clearance was sought and obtained from the Ethics Committee of the University of Port Harcourt Teaching Hospital. Informed consent was also obtained from parents and guardians of the study subjects. A minimum sample size of 342 was obtained using the formula; $n = z^2 (pq) / e^2$.

One millilitre of venous blood was collected into a syringe from children who fulfilled the inclusion criteria. The samples were tested for HIV using the Double Enzyme Linked Immunosorbent Assay (Double ELISA) technique of Immunocomb HIV 1 and 2 kits (Orgenics, Israel), a visually read qualitative and differential immunoassay test for the detection of antibodies to HIV 1 and 2. All initially reactive samples were confirmed using the Genscreen HIV 1 and 2 kits (Bio Rad, France). The mothers of the patients who tested positive for HIV antibodies were also tested for HIV antibodies using the same double ELISA test kits. The HIV seropositive children who had mothers that also tested positive to HIV antibodies were presumed to have been infected vertically.

The data was analyzed using epi-info version 6.04 and SPSS version 15 statistical packages. Test of significance between proportions was assessed using Chi-square. A 95% confidence interval was used and a p value of 0.05 or less was considered significant.

RESULTS

Table 1 shows the age and sex distribution of the patients. There were 201 male and 141 females, giving a male to female ratio of 1.4:1.

As shown in table 2, 260 (76.1%) of the subjects were aged less than 18 months while 82 (23.9%) were between 18 and 59 months.

Type of diarrhoea in the 342 subjects

As shown in figure 1, 304 (89.0%) of the subjects had acute diarrhoea, 22(6.0%) had persistent diarrhoea while 16 (5.0%) had chronic diarrhoea. Sixty four (18.7%) had visible blood in their diarrhoeal stools while 278(81.3%) did not.

HIV Seroprevalence

Among the 342 children recruited for the study, 33 were seropositive for HIV antibodies, giving a seroprevalence rate of 9.6% while 309 (90.4%) were seronegative. Amongst the 33 subjects found to be seropositive for HIV antibodies, there were 21 (63.6%) males and 12 (36.4%) females with a male to female ratio of 1.8:1. Twenty seven (81.8%) of the 33 HIV seropositive subjects were aged less than 18 months. Table 3, shows the age and sex distribution of the 33 HIV seropositive subjects. There was no statistically significant difference in the HIV

Table 1. Age and sex distribution of the 342 subjects

Age range	Male (%)	Female (%)	Frequency (%)
0 – 11 months	120 (35.1)	78 (22.8)	198 (57.9)
12 – 23 months	45 (13.2)	40 (11.7)	85 (24.9)
24 – 35 months	25 (7.3)	16 (4.7)	41 (12.0)
36 – 47 months	9 (2.6)	6 (1.7)	15 (4.3)
48 – 59 months	2 (0.6)	1 (0.3)	3 (0.9)
Total	201 (58.8)	141 (41.2)	342 (100)

Table 2. Age and sex category of the 342 subjects

Age category	Male (%)	Female (%)	Total (%)
< 18 months	152 (44.5)	108 (31.6)	260 (76.1)
18-59 months	49 (14.3)	33 (9.6)	82 (23.9)
Total	201 (58.8)	141 (41.2)	342 (100)

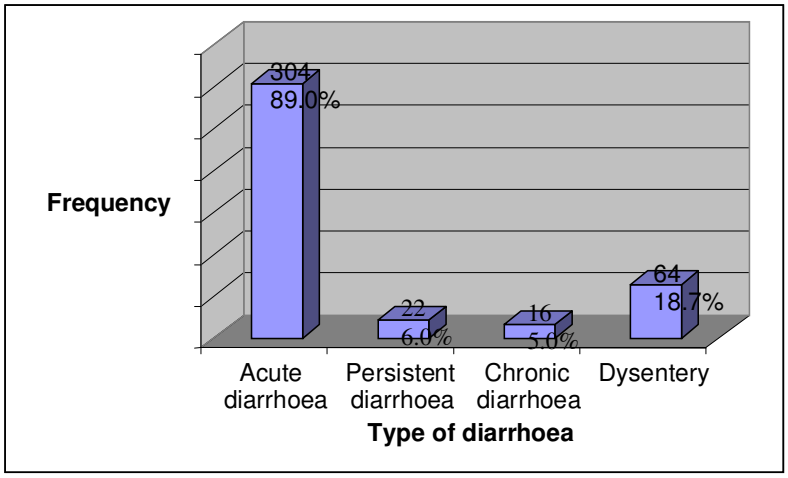

Figure 1. Type of diarrhoea in the 342 subjects

Table 3. Age and sex distribution of the 33 HIV seropositive subjects

Age	Male	Female	Total
< 18 months	19 (57.6)	8 (24.2)	27 (81.8)
18-59 months	2 (6.1)	4 (12.1)	6 (18.2)
Total	21 (63.7)	12 (36.3)	33 (100)

seroprevalence in the different sexes, $\chi^2 = 0.29$, df = 1, p = 0.59. There was also no statistically significant difference in the HIV seroprevalence among the age groups $\chi^2 = 0.67$, df =1, p = 0.412.

Type of diarrhoea in the 33 HIV seropositive subjects

Among the HIV positive subjects, 19 (58.0%) had acute diarrhoea, 2 (6.0%) had persistent diarrhoea, 12 (36.0%) had chronic diarrhoea while 9 (27.3%) had dysentery (figure 2).

Seroprevalence of HIV in the different types of diarrhoea

Of the 304 subjects with acute diarrhoea, 19 (6.3%) were

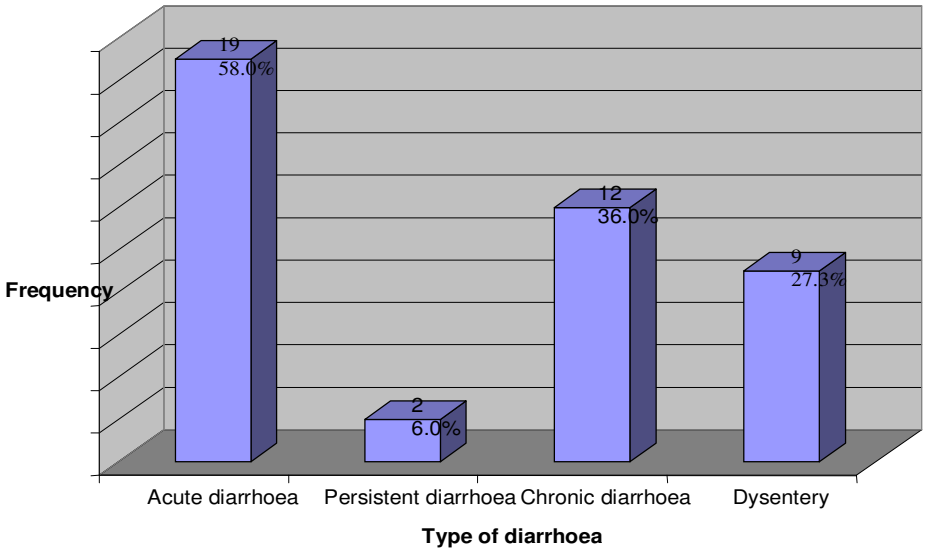

Figure 2. Type of diarrhoea in the 33 HIV seropositive subjects

Table 4. Risk factors for HIV transmission in the 33 seropositive subjects

Risk factor	No of cases (%) n = 33
HIV positive mother	30 (90.9)
Injection from *PMDs	14 (42.4)
Use of unsterilized instruments	5 (15.2)
Sexual abuse	1 (3.0)
Blood transfusion	0 (0.0)
Previous surgery	0 (0.0)
Previous dental procedure	0 (0.0)

*Patent Medicine Dealers

HIV seropositive, 2 (9.1%) of the 22 with persistent diarrhoea were HIV seropositive while 12 (75.0%) of the 16 subjects with chronic diarrhoea were HIV seropositive. This difference was statistically significant (χ^2 = 82.416, df = 2, p = 0.000) with the HIV seropositive subjects being more likely to have chronic diarrhoea. Nine (14.1%) of the 64 subjects with dysentery were HIV seropositive. There was no statistically significant difference between the HIV seroprevalence in the subjects with blood in stools and those without blood in the stools (χ^2 = 1.759, df = 1, p = 0.185).

As shown in table 4, the presumed mode of HIV infection in all 30 (90.9%) seropositive subjects was vertical as their mothers also tested HIV positive.

DISCUSSION

The HIV seroprevalence in under-fives with diarrhoea in this study was 9.6%. This is higher than the 6.5% reported in Kano (Hassan-Hanga, 2005). The reason for this difference is not clear but may be due to the fact that children in the present study were of comparably lower ages and as such some of them may still have maternal antibodies. Chintu et al found a much higher HIV seroprevalence of 24% in a similar study population in Zambia (Chintu et al, 1995). The difference may be because of a higher HIV seroprevalence rate of 17% from antenatal sentinel surveys in Zambia[16] as compared to the 4.4% prevalence in Nigeria (Nigeria: President Obasanjo Notes Decline in HIV Prevalence Rate in Nigeria. Nigeria First (Abuja) May 5, 2006. all Africa .com). Angyo et al., 1998 in Jos found a much higher seroprevalence of 37.7% in children with severe forms of protein energy malnutrition, which like diarrhoea, is a high risk group for HIV infection.

The high HIV seroprevalence of 75% in children with chronic diarrhoea supports the inclusion of chronic diarrhoea as a major criterion in the WHO case definition of Paediatric AIDS. This agrees with reports from other

Nigerian authors (Emodi and Okafor, 1998; Hassan-Hanga, 2005; Ugochukwu, 2006; Nte and Eneh, 2008) who also found chronic diarrhoea to be a major feature of paediatric HIV. Taken together, the HIV seroprevalence in under-fives with persistent and chronic diarrhoea in this study is 36.8%. Other authors (Nte and Eneh, 2008) in the same centre (Nte and Eneh, 2008) and elsewhere (Hassan-Hanga, 2005) also reported high HIV seroprevalence of 44.4%, and 23.1% respectively in children with persistent diarrhoea. There was no significant association between dysentery and HIV infection. This is similar to findings from Kano (Hassan-Hanga, 2005).

Vertical transmission from mother to child was responsible for 90.9% of HIV infection in the present study. Similar reports were given by other Nigerian authors (Hassan-Hanga, 2005; Eneh et al., 2006) who also found high vertical transmission risks of more than 90%. This contrasts with vertical transmission risks of 69.6% and 79.7% reported in Jos (Angyo et al., 1998) and Nnewi (Ugochukwu, 2006) respectively. Authors in New York (Persaud et al., 1992) also reported a lower vertical transmission risk of 69%. While the age range of subjects for this study was 1 month to 5years, children 1 month to 15 years and 3 months to 16 years respectively were used in the Jos (Angyo et al., 1998) and Nnewi (Ugochukwu, 2006) studies. The ages of the subjects in the New York study (Persaud et al., 1992) were 4 to 15 years. The comparably lower ages of the subjects in the present study may explain the higher vertical transmission risk as children with lower ages are less likely to be exposed to other modes of HIV transmission other than vertical. (Emodi and Okafor, 1998) found that in no child above 4 years could HIV infection be related to vertical transmission.

Children below 18 months represented the majority of study subjects as diarrhoea is commoner at this age. Among the HIV seropositive subjects, the majority (81.8%) were less than 18 months. This compares favourably with reports from other Nigerian authors (Emodi and Okafor, 1998; Angyo et al., 1998; Hassan-Hanga, 2005; Nte and Eneh, 2008).

CONCLUSION

The National Provider Initiated HIV Testing and Counselling (PITC) of all children coming in contact with health facilities should be effected. Public enlightenment campaigns on the prevention of HIV infection should be intensified. Now that HIV DNA by Polymerase Chain Reaction (PCR) is available, the children less than 18 months who tested HIV positive should have a confirmatory test.

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