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Prevalence and risk factors of hepatitis b infection in HIV infected children seen at national hospital Abuja

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Abstract: *Background:* Human immunodeficiency virus infection remains a global pandemic. Co infection with hepatitis B virus leads to rapid progression to AIDS if not diagnosed and promptly treated or better still prevented. The study aims at determining the prevalence and risk factors of hepatitis B infection in HIV infected children being followed up at the Paediatric HIV clinic.

Patients and methods: A cross-sectional study of 261 HIV infected children aged eight months to fourteen years to determine the prevalence of Hepatitis B infection and pattern of hepatitis B vaccination was carried out between July and October 2012 at the Paediatric HIV clinic of National Hospital Abuja. Ethical approval was obtained from Ethical Committee of the hospital. Vaccination and transfusion history were obtained from the parents and guardians of the subjects using a proforma after signed in-

formed consent.

Blood samples were collected for Hepatitis B surface antigen screening and Hepatitis Be screening in those with HBsAg positive blood samples.

Results: Only 3 (1.15%) of the 261 HIV infected children had Hepatitis B infection. All the children less than 5 years old in this cohort received hepatitis B vaccination and none of them had Hepatitis B infection. The HIV/HBV co infected children were older than ten years ($p = 0.047$) and history of blood transfusion ($p = 0.003$) was also significant. However, scarification ($p = 0.996$), local circumcision ($p = 0.928$); uvulectomy ($p = 0.898$) were not significant risk factors in this cohort.

Conclusion: There is need to intensify routine hepatitis B vaccination and routine screening of blood before necessary transfusion. This would further lead to a low prevalence of Hepatitis B in HIV infected children and the general populace at large.

Introduction

Human immunodeficiency virus infection and the resulting acquired immunodeficiency syndrome remains a global pandemic.¹ In Sub-Saharan Africa, there is a high prevalence of HIV/ AIDS and Nigeria has the largest population of children living with HIV/ AIDS.² Other viruses such as Hepatitis B virus have attained high public health significance.³

HIV/ HBV co- infection leads to rapid progression to AIDS, antiretroviral treatment failure and hepatic failure if not properly treated with effective antiretroviral drugs.⁴ The risk factors for hepatitis B infection include local group circumcision, uvulectomy by local barbers, sexual promiscuity.⁵ Other important risk factors are scarification marks with unsterilized instruments, transfusion with unscreened blood and blood products.⁶ In countries of high endemicity in Africa and Asia, vertical perinatal transmission from mother to child and childhood horizontal transmissions are important modes of

transmission of HBV infection.⁶ Strict blood screening, vaccination and improved sanitation should lead to decline in prevalence of HBV infection in regions of high endemicity.⁶

The prevalence of HIV/ HBV co- infection in a USA study of 974 children aged between two months to eighteen years was 4.7%.⁷ In South Africa, HIV/ HBV co- infection prevalence in children ranges between 5-17%, with the higher percentages occurring in the industrialized towns where mining activity in association with increased sexual promiscuity takes place.⁸ At Muhibili National Hospital, Tanzania the prevalence of HIV/ HBV co- infection in children was 1.2%.⁹

In Nigeria, the prevalence of HBV infection in HIV infected children vary across the six geo- political regions of the country; 5.8% in Owerri¹⁰, 7.7% in Benin¹¹, 7.8% in Makurdi¹², 10% in Ilorin¹³, 11.9% in Ibadan¹⁴, and 19% in Maiduguri¹⁵ with higher percentages in Northern Nigeria attributed to the high prevalence of

high risk behavior in the northern part of Nigeria.⁵ This study was carried out to determine the prevalence of hepatitis B infection in HIV infected children being followed up at the paediatric HIV clinic and the risk factors associated HIV/ HBV co- infection in this cohort.

Patients and Methods

The study was carried out at National Hospital Abuja between July and October 2012. The patients were consecutive 261 already diagnosed HIV infected children aged between eight months and fourteen years attending the Paediatric HIV [PEPFAR] clinic whose parents/ guardians gave informed consent and children older 10 years also gave verbal assent.

A structured proforma was used to collect data. The information obtained from the parents, guardians and older children include age, sex, hepatitis B immunization status (their immunization cards were viewed were available), history of previous blood transfusion; and some other risk factors for hepatitis B infection such as local circumcision and uvulectomy.

Blood samples were collected for Hepatitis B surface antigen screening The blood samples were collected for hepatitis B surface antigen as a point of care test by the investigator using ACON hepatitis B rapid test strips (Qualitative immunoassay method).¹⁶ The test for each patient was completed within twenty minutes. The presence of two burgundy coloured lines on the test strip was interpreted as a positive result while the presence of a single burgundy coloured line in the control region was taken as a negative result. The hepatitis B surface antigen positive samples were also tested for HBeAg as a point of care test using In Teche hepatitis Be test cassettes.¹⁷ Immediately after, the blood samples were taken to the laboratory for HBsAg and HBeAg confirmatory tests.

Data analysis was done using SPSS version 20. The level of significance was at 95% confidence level and p value of < 0.05 was taken as significant

Results

There were 261 HIV infected children aged 8 months to 14 years in the study cohort. One hundred and sixty one (61.7%) were males and 100 (38.3%) were females with a male to female ratio of 1.6: 1. Three (1.15%) of the 261 children in this cohort have HIV/ HBV co- infection, two males and one female. All the 3 children with HIV/ HBV co- infection were older than 10 years in age. Forty one (15.7%) of the children were less than 5 years old, 125 (47.9%) were aged 5 years to 10 years; and 95 (36.4%) were older than 10 years.

The mean age of the female subjects (9.11 ± 0.33yrs) was comparable with that of the male children (8.40

±0.28yrs), p = 0.296. HIV/ HBV co- infection was significantly related to age (Table 1) but not significantly related to sex (p = 0.291).

Table 1 shows the age of the children in relation to hepatitis B antigenaemia; only 3.2% of the children older than 10yrs had HIV/HBV co- infection in this cohort. HIV/ HBV co- infection was significantly related to age (p = 0.047)

Table 1: Hepatitis B antigenaemia according to age of study population

Age	HIV infection n = 258 (%)	HIV/HBV Co- infection n = 3 (%)	Total (n)
0 – 5yrs	41 (100)	0	41
6 – 10yrs	125 (100)	0	125
11 – 15yrs	92 (96.8)	3 (3.2)	95
Total	258 (98.85)	3 (3.15)	261

$\chi^2 = 5.30, p = 0.047$

Table 2 shows the Hepatitis B vaccination status of 261 children in the cohort. All the 41 children less than 5 years old had received 3 doses of hepatitis B vaccine and none of them had hepatitis B infection.

Table 2: Hepatitis B vaccination status according to age of study population

Hepatitis B vaccine	Age 0-<5yrs	5-<10yrs	10-<15yrs	Total (n)	Percentage
No	0	4	54	58	22.2%
Yes	41	108	29	178	68.2%
Not sure	0	13	12	25	9.6%

One hundred and seventy seven (68.6%) of the 258 HIV mono-infected children had received three doses of hepatitis B vaccine. Only one (33.3%) out of the three children with HIV/ HBV co-infection had received three doses of hepatitis B vaccine. This difference was statistically significant ($\chi^2 = 3.529, p= 0.047$)

Ten (3.9%) of the 258 HIV mono- infected children had previous blood transfusion, while two (66.7%) of the HIV/ HBV co- infected children have history of blood transfusion; Table 3 and the difference was statistically significant. There were no significant difference between HIV mono-infection and HIV/ HBV co- infection with respect to local circumcision (p= 0.928), scarification marks (p= 0.996) and uvulectomy (p= 0.898).

Table 3: Some risk factors for HIV/ HBV co- infection in the study population

Risk factors for HIV/ HBV co- infection	HIV mono- infection n= 258	HIV/ HBV co- infection n= 3	2	p
<i>Blood transfusion</i>				
Yes	10	2		
No	248	1	8.806	0.003
<i>Local circumcision</i>				
Yes	2	0		
No	256	3	0.008	0.928
<i>Scarification</i>				
Yes	1	0		
No	257	3	0.0001	0.996
<i>Uvulectomy</i>				
Yes	2	0		
No	256	3	0.016	0.898

Discussion

The overall prevalence of hepatitis B antigenaemia in HIV infected children in this study is 1.5%. The prevalence of 1.5% of HIV/ HBV co- infection in this study is much lower than the previous prevalence report of 5.8% in Owerri¹⁰, 7.7% in Benin¹¹, 7.8% in Makurdi¹², 10% in Ilorin¹³, 11.9% in Ibadan¹⁴, and 19% in Maiduguri¹⁵, but comparable to the 1.2% among Tanzanian HIV infected children.⁹ This may be as a result of regional differences in risk factors for HIV/ HBV co- infection over varying time periods.

The study carried out in Port Harcourt by Alikor *et al*, noticed a declining trend in the prevalence of hepatitis B surface antigenaemia between 1999 & 2004; this was attributed to increased level of education and improved standard of living.¹⁸ Adewole *et al* in 2008, reported a prevalence of 11.5% of Hepatitis B infection among

HIV infected adults at National Hospital Abuja.¹⁹ A prevalence of 5.1 % hepatitis B infection was reported by Landrum *et al* in 1997 among hepatitis B vaccinated HIV infected adults (Hep B Ab > 10IU/L) followed up for a period of 10years but none of them had chronic hepatitis B infection.²⁰

Factors that might have contributed to the low prevalence of HIV/ HBV co- infection among HIV infected children seen at National Hospital include high vaccination coverage of 100% in children less than five years old in this cohort who received three doses of Hepatitis B vaccine.

History of blood transfusion, an important risk factor for the transmission of Hepatitis B infection⁵, was reported in only 10% of the HIV mono- infected children and 66.7% in the HIV/ HBV co- infected children. History of blood transfusion was a significant risk factor in this cohort. This contrast to the findings of other studies in Nigerian children with HIV infection where blood transfusion was not significantly associated with risk of risk of HIV/ HBV co- infection.^{5,11}

Other risk factors such as local circumcision, uvulectomy and scarification marks were not present in any of the HIV/ HBV co- infected children and were not significantly associated with HIV/ HBV co- infection in this study. This is similar to the Benin study reported by Sadoh *et al*.¹¹

Conclusion

Strict adherence to proper screening of blood and blood products; hepatitis B vaccination at birth and according to NPI schedule and environmental sanitation can among HIV infected children and the general populace at large.⁶

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