

## Hepatitis D Virus Infection is Not Associated with HIV Related Opportunistic Infection among HIV/HBV Co-infected Patients at Baseline in Northwestern Nigeria

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### Abstract

**Background:** Individuals with HIV infection are prone to acquiring opportunistic infections when the immune system is weakened and this tends to increase the morbidity and mortality of HIV infected individuals. At this stage, the HIV infected individual is said to progress to AIDS. Viral infections are the major cause of opportunistic infections and a number of viruses were identified as such. This study aimed to determine if hepatitis D virus occurs as an opportunistic infection among HIV/HBV co-infected study participants at baseline.

**Materials and Methods:** The study was cross-sectional and comprises of adult treatment-naïve HIV/HBV co-infected study participants. The study participants were screened for HDV infection. Prevalence of HDV infection was compared among HIV/HBV co-infected study participants with and without AIDS at baseline. SPSS Version 20 was used for data analysis. Fisher's exact test and Yate's chi-squared test were used for statistical tests and P-value of < 0.05 was considered as statistically significant value.

**Results:** The prevalence of HDV infection was not statistically significant among HIV/HBV co-infected study participants who had AIDS at baseline based on symptoms of opportunistic infections or severe immunosuppression or symptoms of opportunistic infections coupled with severe immunosuppression (P= 0.077; 1.000; 0.155 respectively).

**Conclusion:** Hepatitis D virus infection among HIV/HBV co-infected study participants is not associated with HIV related opportunistic infections, it occurs as a primary pathogen.

**Keywords:** AIDS, HDV infection, HIV/HBV co-infection.

### Introduction

Opportunistic infections are infections that infect immunocompromised individuals, and Human Immunodeficiency Virus (HIV) infection is one of the commonest conditions associated with opportunistic infections.<sup>1,2</sup>

Individual infected with HIV is said to progress to Acquired Immune Deficiency Syndrome (AIDS) when has severe immunosuppression (CD4<sup>+</sup> T cell counts < 200/mm<sup>3</sup>) or develop opportunistic infections or have both.<sup>1,3,4,5</sup>

A number of opportunistic infections which may be viral, bacterial, fungal and protozoa are continued to be seen among patients infected with HIV globally.<sup>4,6</sup>

Viral infections, such as human papillomavirus, herpes simplex virus, cytomegalovirus, and varicella-zoster virus, are the major cause of opportunistic infections among HIV infected patients and this can lead to increased morbidity and mortality.<sup>6</sup>

This study aimed to determine whether Hepatitis D virus infection is associated with HIV related opportunistic infections.

## Materials and methods

This was AIDS related opportunistic infections sub-study from previously descriptive cross-sectional study that determine the Sero-Prevalence and risk factors for Hepatitis D virus infection among HIV/HBV co-infected patients in Sokoto North-Western Nigeria.<sup>7</sup>

The study comprises of 37, adult treatment-naïve HIV/HBV co-infected study participants, was conducted from the period of March 2014 to October 2015 at Specialist Hospital Sokoto and Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto. Cross-sectional study design was adopted, and Ethical approval of the study was obtained from the ethics committee of Sokoto State Ministry of health and UDUTH, Sokoto. The study participants provided Informed consent. The study participants were tested for Hepatitis D virus infection by screening for anti HDV with HDV IgG ELISA Assay Kit (Perfemed South San Francisco the United States). Assessment of baseline CD4<sup>+</sup> T-cells count was performed by (Cyflow counter analyzer, PARTEC, Germany).

Symptoms of Opportunistic infections (AIDS-defining illnesses) were assessed among the study participants. A study participant is said to have AIDS when have two of the following: persistent diarrhea, persistent fever, loss of >10 % of body weight, and in addition having either of the following: persistent cough, multiple skin lesions, oral ulcerations). The CD4<sup>+</sup> T cells count were categorized into greater than or equal to 200/mm<sup>3</sup> and less than 200/mm.<sup>3</sup> A study participants is also said to have AIDS when have the CD4<sup>+</sup> T cells count of less than 200/mm,<sup>3</sup> or have both CD4<sup>+</sup> T cells count of less than 200/mm,<sup>3</sup> and symptoms of AIDS-defining illnesses.

The prevalence of HDV infection was compared among HIV/HBV co-infected study participants with and without AIDS at baseline.

Analysis of the data was carried out with the Statistical Package for Social Sciences (SPSS Version 20). Fisher's exact test and Yate's chi-squared test were used for the test of association.  $P < 0.05$  was considered as statistically significant value.

## Results

Four of the HIV/HBV co-infected study participants were positive for anti HDV IgG and

therefore had HDV infection.

No significant difference was observed with regard to the prevalence of HDV infection among HIV/HBV co-infected study participants with AIDS (based on symptoms of opportunistic infections or severe immunosuppression or symptoms of opportunistic infections coupled with severe immunosuppression) and without AIDS at baseline ( $P= 0.077$ ; 1.000; 0.155 respectively). (See Table 1).

**Table 1.** Prevalence of HDV infection among HIV/HBV co-infected patients with and without AIDS at baseline

HIV/HBV co-infected (N-37)	HDV-infection		P-value
	Yes	No	
<b>Symptoms of opportunistic infections</b>			
Yes	0(0.0)	20(100)	0.077
No	4(23.5)	13(76.5)	
<b>Severe immunosuppression (CD4<sup>+</sup> T cell counts &lt; 200 cells/mm<sup>3</sup>)</b>			
Yes	2(9.1)	20(90.9)	1.000
No	2(13.3)	13(86.7)	
<b>Symptoms of opportunistic infections coupled with severe immunosuppression (CD4<sup>+</sup> T cell counts &lt; 200 cells/mm<sup>3</sup>)</b>			
Yes	0(0.0)	17(100)	0.155
No	4(20.)	16(80.0)	

## Discussion

The current study observed that HDV infection is not associated with HIV related opportunistic infection as the prevalence of HDV infection was comparable between HIV/HBV co-infected study participants with and without symptoms of opportunistic infections. The interpretation of these results in the current study is that, HDV infection occurs as a primary pathogen. Primary pathogen is a pathogen that is able to cause disease regardless of the individual's immune status<sup>8</sup>. In a similarly related study, Soriano *et al*, (2011) observed that the incidence of AIDS progression was comparable between study participants with positive and negative HDV infection.<sup>9</sup>

In the current study, HDV infection was observed not to be associated with severe immunosuppression even though numerically higher among HIV/HBV co-infected study participants who do not have severe immunosuppression at baseline. Severe

immunosuppression is the level at which the patient is at greatest risk of contracting opportunistic infections.

## Conclusion

In conclusion, HDV infection is observed to be a primary pathogen rather than opportunistic infection and is not associated with severe immunosuppression among HIV/HBV co-infected study participants.

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