

# Hepatitis B and Hepatitis C Virus Co-infection among Human Immunodeficiency Virus Infected Patients of Tripura

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## Abstract

**Background:** India has the third largest number of individuals with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome after South Africa and Nigeria. Co-infection of HIV with the hepatitis B virus (HBV) and the hepatitis C viruses (HCV) is a common event due to the similar routes of transmission. The study is designed to evaluate the status of co-infection by HBV, HCV virus among HIV infected patients of Tripura.

**Materials and Methods:** In this cross-sectional prospective study, serological status for HBV and HCV was performed on 453 HIV-positive individuals.

**Results:** Out of 453 HIV-positive patients 17 patients were positive for hepatitis B surface antigen, i.e., 3.75% and there was male preponderance male being 88.23% and female 11.76%. Two patients (0.44%) were positive for the anti-HCV antibody and both of them were male. There was no dual infected patient found, and the route of transmission was heterosexual.

**Conclusion:** This may be related to the high heterosexual mode of transmission. The reduced co-infection decreases the possibility of complication among HIV infected patients of Tripura.

**Key words:** Co-infection, Hepatitis B, Hepatitis C, Human immunodeficiency virus

## INTRODUCTION

India now has the third largest number of individuals with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) after South Africa and Nigeria.<sup>1</sup> Co-infection of HIV with the hepatitis B virus (HBV) and the hepatitis C virus (HCV) is a common event due to the similar routes of transmission.<sup>2</sup> The national HIV prevalence is 0.8% and there are certain areas such as Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Manipur, and Nagaland that account for over 80% of all the reported AIDS cases in the country.<sup>3</sup>

HIV, HBV, and HCV are the three most common chronic viral infections documented worldwide.<sup>4,5</sup> These viruses have similar routes of transmission, namely through blood and blood products, sharing of needles to inject drugs and sexual activity, enabling co-infection with these viruses a common event.<sup>6-8</sup>

HBV and HCV co-infections in HIV-positive individuals is of utmost importance due to the underlying consequences such as the hepatological problems associated with these viruses, which have been shown to decrease the life expectancy in the HIV infected patients,<sup>9</sup> and it may further complicate the treatment of HIV-infected patient.

The co-infection pattern of these viruses showed that 10.0% of the HIV infected population estimated to have chronic HBV infection and around a third estimated to have chronic HCV infection worldwide.<sup>9,5</sup> However, studies reported,<sup>10-13</sup> that the rates of co-infection of HIV with

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www.ijss-sn.com

**Month of Submission :** 07-2015  
**Month of Peer Review :** 08-2015  
**Month of Acceptance :** 08-2015  
**Month of Publishing :** 09-2015

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either HCV or HBV vary from region to region, study population, and risk factors for HIV acquisition.

Despite the effective decline of the mortality and morbidity rate from HIV/AIDS as the result of highly active antiretroviral therapy (HAART), liver diseases due to chronic HBV and HCV infections may become a leading cause of death. The complex interactions between HIV-HBV/HCV co-infection and HAART are increasingly apparent in HIV disease progression.<sup>14</sup>

In HIV-HBV co-infections, HIV infection causes increased rates of persistent HBV infection, increased cirrhosis and liver-related mortality, and increased the risk of hepatocellular carcinoma at lower CD4T cell counts.<sup>15</sup> Similarly in HIV-HCV co-infections, there is a more rapid progress to cirrhosis, end-stage liver disease and hepatocellular carcinoma.<sup>16</sup>

The impact of HBV and HCV could not be limited in causing liver hepatotoxicity but also results in failure in immunological recovery in HIV-positive patients. A study in Tanzania reported slow rate of immunologic recovery after initiation of HAART treatment and higher risk of hepatotoxicity among HIV/HBV and HIV/HCV co-infected patients.<sup>17</sup>

Thus, the management of HBV and HCV in HIV infection is complicated and bring high burden in particular where HIV is rampant. As the result, globally HIV, HBV, and HCV become the major public health concerns.<sup>18,19</sup> In some countries, screening of HIV infected individuals for HBV and HCV is highly recommended before initiation of antiviral treatment.<sup>8</sup>

So, in this study, we have screened all the HIV infected patients attended the Anandalok Community Care Center, Agartala, Tripura.

**Aim**

To evaluate the status of co-infection by HBV and HCV virus among HIV infected patients of Tripura.

**Objectives**

1. To know the prevalence of HBV and HCV co-infection among HIV- positive patient
2. To identify the route of transmission among co-infected patient.

**MATERIALS AND METHODS**

After Ethical Clearance from Ethical Committee of Agartala Government Medical College and a valid written consent from all patients was taken. It was cross-sectional

prospective study and the study period was October 2008-March 2013. All patients who attended the Anandalok Community Care Center, Agartala, Tripura during the period were evaluated by close ended questionnaire, clinically and along with all relevant investigation.

**Inclusion Criteria**

1. All HIV-positive patients attended the Anandalok Community Care Center since October 2008-March 2013
2. Who has given consent for this study?

**Exclusion Criteria**

1. Who has not given consent for this study?

All patients had undergone hepatitis B surface antigen (HbsAg) and anti-HCV blood test for evaluation of their HBV and HCV status. Further evaluation was also done for planning of treatment.

All the patients are initially tested for the HbsAg and anti-HCV antibody by the enzyme-linked immune-sorbent assay (ELISA). The positive sera were confirmed by a repeat ELISA. The cut-off value for reporting the positive results was calculated as per the manufacturer’s direction.

**Data Analysis**

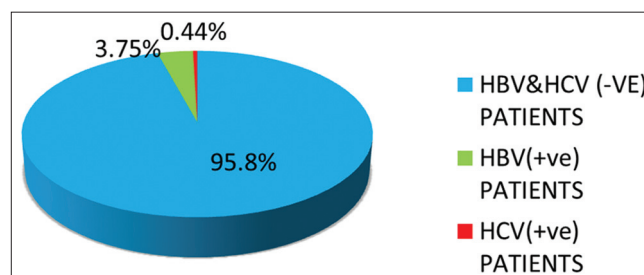
Data was analyzed by frequency distribution.

**RESULTS**

During the study period since October 2008-March 2013 total 453 HIV-positive patients attended the center. Out of which 311 were male and 142 were female, male tendency ratio being 68.65%.

Out of 453 HIV-positive individual 17 were positive for HbsAg, i.e., 3.75%. The prevalence of HCV among HIV infected patients was only 0.44% (Figure 1).

Among the HBV positive patients, there was a male preponderance male being 88.23% (15) and the female was 11.76% (2) (Figure 2).



**Figure 1: Proportion of co-infection**

As per as age is concern 16 positive patients, i.e., 84.21% were in between 20 and 40 years of age and three patients, i.e., 15.78% were above 40 years of age. No positive patient found below 20 years (Figure 3).

The source of HBV infection in all the patients were heterosexual mode and majority of them infected from female sex worker (FSW) through unprotected sex.

Central government employee mainly paramilitary forces were HBV co-infected more (47%) than the others and the source was from FSW.

Maximum (47%) HBV-positive patients from the North district followed by (29%) from Dhalai district.

Both HCV-positive patients were infected from FSW. There was no significance cause of HIV, HBV, and HCV co-infection in the study group. There was no dual positive (HBV and HCV) patient found (Figures 4 and 5; Table 1).

The detail about our results is summarized in Table 2.

## DISCUSSION

Blood borne viruses HIV, HBV, and HCV have the similar route of transmission and hence the possibility of co-infection is very high. Within India HBV and HCV co-infection among HIV infected patients has been variable from region to region.<sup>20-22</sup>

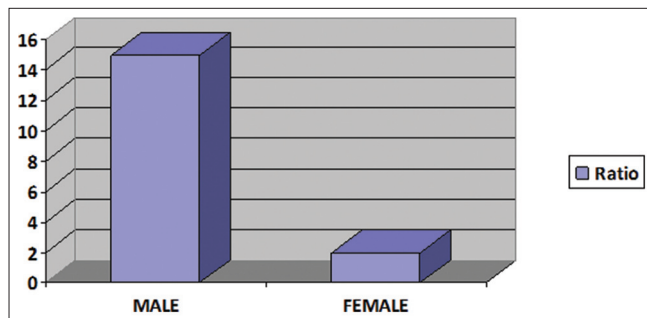


Figure 2: Sex distribution of HBV positive HIV Patients.

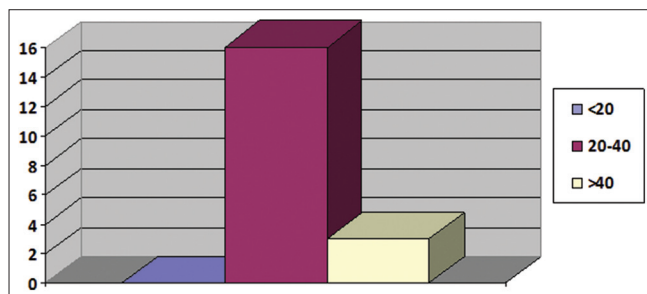


Figure 3: Age distribution of HBV positive HIV Patients.

Hooja *et al.* in tertiary care hospital in northwest India found that HBV and HCV co-infection among HIV infected patients were 10.5% and 1%, respectively.<sup>20</sup>

Tripathi *et al.* in northern India found that HBV and HCV co-infection among HIV infected patients were 2.25% and 1.61%, respectively.<sup>21</sup>

HIV-HBV co-infection among individuals attending the ICTC of a Tertiary Care Hospital in West Bengal, India done by Sarkar *et al.* was 8.3%.<sup>22</sup>

However, we have found HBV prevalence among HIV infected patients in Tripura is 3.75% which is almost similar to HBV prevalence (3.8%) among the general population of Tripura. Heterosexual mode of transmission has been the common mode in our state.

Whereas HCV positivity (0.44%) is further very low probably due to low intravenous (IV) drug use by sharing needle in our state. HCV co-infection is also probably through the heterosexual route.

The co-infection is usually complicated the clinical situation, treatment modality, and the prognosis of patients.

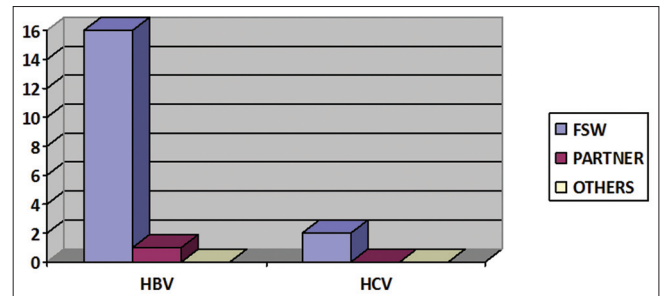


Figure 4: Source of hepatitis B virus and hepatitis C virus infection

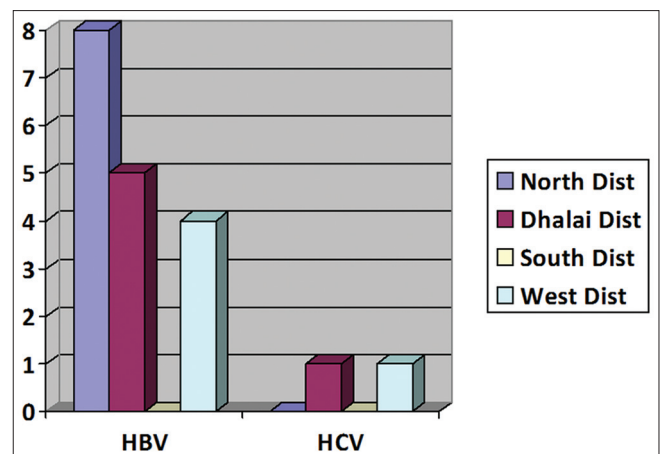


Figure 5: Number of case distribution according to district

**Table 1: Socio demographic distribution of cases**

Demographic	HBV	HCV
Age		
<20		
20-40	14	2
>40	3	
Sex		
Male	15	2
Female	2	
Religion		
Hindu	13	2
Muslim	1	
Christian	2	
Others	1	
Area		
North district	8	
Dhalai district	5	1
South district		
West district	4	1
Occupation		
Central government	8	
State government	4	2
Others	5	
Source		
FSW	16	2
Partner	1	
IV drug user		
Blood transfusion		

IV: Intravenous, HBV: Hepatitis B virus, HCV: Hepatitis C virus

**Table 2: Summary of present study**

Groups	Total	Age (years)	Male	Female	Frequency (%)
HIV alone	434	36.44	294	140	95.8
HIV+HBV	17	35.35	15	2	3.75
HIV+HCV	2	37	2		0.44
HIV+HBV+HCV					

HBV: Hepatitis B virus, HCV: Hepatitis C virus, HIV: Human immunodeficiency virus

The source of HBV and HCV co-infection among HIV infected patients is through sexual route. As the IV drug use in Tripura is very low, so HCV co-infection is very low in our state because HBV and HCV mainly transmitted by blood born route further, sexual transmission of HCV is uncommon.<sup>23</sup>

## CONCLUSION

HIV, HBV, and HCV are transmitted through the similar route but in Tripura HIV, HBV, and HCV co-infection is less, which is probably due to the mainly heterosexual mode of transmission. The reduced co-infection decreases the possibility of hepatic complication among HIV infected patients of Tripura.

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**How to cite this article:** Bhaumik P, Bhattacharjee P, Sil SK. Hepatitis B and Hepatitis C Virus Co-infection among Human Immunodeficiency Virus Infected Patients of Tripura. *Int J Sci Stud* 2015;3(6):77-80.

**Source of Support:** Nil, **Conflict of Interest:** None declared.