

Original Research Article

Prevalence of viral (HBV, HCV and HIV) co-infections among apparently healthy blood donors in Ranchi, Jharkhand, India

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ABSTRACT

Background: Apparently healthy blood donors may carry double viral co-infections that might be more fatal than viral mono-infection for the donor himself as well as recipient later on.

Methods: All blood samples were screened for HIV-I and II (4th generation kit), HBV and HCV (3rd generation kit) by using chemiluminescence technique (Manufacturer- Abbott, Model-Architect i 1000SR).

Results: On screening of 41307 blood units, 829 (2.0%) donors were found positive for one of the viral infection (HBV, HCV and HIV). Highest prevalence was for HBV (417 donors- 1.0%) followed by HCV (324 donors- 0.78 %) and HIV (88 donors- 0.21 %).

Conclusions: Apparently healthy blood donors might carry, life threatening, double viral co-infections in their blood. Failure to diagnose and treat co-infection at an early stage results in serious complications and sequelae. For safe blood transfusion all blood units should be tested for compatibility and TTI's with reduction in unnecessary blood transfusion.

Keywords: Hepatitis B virus and hepatitis C virus, Human immunodeficiency virus, Transfusion transmitted viral co-infections

INTRODUCTION

The goal of any transfusion service must be to provide adequate and safe, blood and blood products to the recipients. With every one unit of blood transfusion there is 1% chance of transfusion related complications including Transfusion transmitted infections.¹ Preventing transmission of transfusion transmitted infections through blood transfusion presents one of the greatest challenges of transfusion medicine.² The Drug and Cosmetic Act, 1945 (amended from time to time), all the blood

donations are to be screened against the five major infections namely HIV I and II, HBsAg, HCV, syphilis and malaria.^{3,4} NACO recommended 3rd or 4th generation ELISA HIV I and II test kits which are 100% sensitive should be preferred for use at blood banks for screening of donated blood.⁵ Blood transfusion departments not only screen TTI but also give clue about the prevalence of these infections in healthy populations.⁶ Most of the studies worldwide show majority of the blood donors are associated with viral (HBV, HCV and HIV) mono-infection but few studies also tell the truth of double viral

co-infections among apparently healthy blood donors.⁷ The HIV-HBV or HIV-HCV co-infection has been reported worldwide, and some studies provide evidence that the rate of HBV is higher than that of HCV in HIV infected patients.⁸⁻¹⁰ Conflicting results are reported in some studies.¹¹ The rate of co infection in HIV patients may be different in different geographical area as this is affected by the mode of transmission and load of infection in the population.^{8,12,13} Hepatic diseases are one of the leading causes of morbidity and mortality in co-infected patients.¹⁴ The aim of our present study was to know the prevalence of double viral co-infections among apparently healthy donors in Ranchi, Jharkhand, India. and to heighten the awareness of the infectious complications of blood transfusion.

METHODS

This was a retrospective study done at blood bank, RIMS, Ranchi from 17th July 2015 to 16th January 2017 (18 months study). All blood samples were screened for HIV-I and II Ag/Ab (4th generation kit- Abbott diagnostic), HBSAg and Anti-HCV (3rd generation kit- Abbott

diagnostic) by using chemiluminescence technique (Manufacturer- Abbott, Model-Architect i 1000SR). Test results were taken in relative light units (RLUs). Blood units showing result 1.0 RLU or more than It as well grey zone results (0.90 to 0.99) were considered as positive for corresponding infection.

RESULTS

From 17th July 2015 to 16th January 2017 a total of 41307 blood units were screened in which 829 (2.0%) donors were found positive for one of the viral infections (HBV, HCV and HIV) (Table 1).

Highest prevalence was for HBV (417 donors- 1.0%) followed by HCV (324 donors-0.78 %) and HIV (88 donors- 0.21%). 05 donors showed double viral co-infections with HBV and HCV and 03 donors showed double viral co-infections with HBV and HIV (Table 2). HCV and HIV co-infections were not found in present study. Table 3 and Table 4 showed test results in relative light units (RLUs) of double viral co-infections of HBV and HCV as well as HBV and HIV respectively.

Table 1: Percentage of transfusion transmitted viral mono-infections among blood donors from 17 July 2015 to 16 January 2017.

Time period	Total no. of blood units screened	Total no. of HBV mono-infection	% of Total no. of HBV mono-infection	Total no. of HCV mono-infection	% of Total no of HBV mono-infection	Total no. of HIV mono-infection	% of Total no. of HBV mono-infection
17 July 2015-31 December 2015	12552	122	0.29	88	0.21	33	0.07
01 January 2016-31 December 2016	27790	282	0.68	222	0.53	53	0.12
01 January 2017-16 January 2017	965	13	0.03	14	0.03	02	0.0048
Grand total	41307	417	1.0	324	0.78	88	0.21

Table 2: Percentage of transfusion transmitted viral co-infections among blood donors from 17 July 2015 to 16 January 2017.

Time Period	Total no. of HBS and HCV co-infections	% of total no. of HBS and HCV co-infections	Total no. of HBS and HIV co-infections	% of total no. of HBS and HIV co-infections
17 July 2015-31 December 2015	Zero	Zero	Zero	Zero
01 January 2016-31 December 2016	04	0.0096	03	0.0072
01 January 2017-16 January 2017	01	0.0024	Zero	Zero
Grand Total	05	0.0121	03	0.0072

Table 3: Test results of blood units having double viral co- infections of HBV and HCV in relative light units (RLUs).

Date	Annual bag no.	Age	Sex	Result of HBSAgQ2 in RLUs	Result of Anti-HCV in RLUs
14 May 2016	9343	26	Male	4153.45	0.91
02 July 2016	13506	39	Male	1148.07	1.79
28 August 2016	17997	35	Male	2648.79	2.41
30 December 2016	27709	38	Male	5149.37	9.29
05 January 2017	243	36	Male	5846.20	7.25

Table 4: Test results of blood units having double viral co- infections of HBV and HIV in relative light units (RLUs).

Date	Annual bag no.	Age	Sex	Result of HBS AgQ2 in RLUs	Result of HIV Ag/Ab in RLUs
11 February 2016	2699	37	Male	1096.18	582.18
12 February 2016	2763	29	Male	1.27	3.25
20 February 2016	3207	36	Male	2821.39	451.45

DISCUSSION

Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are the three most common chronic viral infections documented worldwide.^{15,16} It is estimated that more than 33 million people are infected with HIV worldwide.¹⁷ Approximately 20% of HIV-positive patients who acquire acute HBV infection develop chronic HBV infection compared to only 5% of HIV-negative persons.¹⁸ It is observed that, those HIV infected individuals who are co-infected with hepatitis viruses display rapid progression to severe liver disease and have an increased risk of hepatotoxicity associated with antiretroviral therapy.¹⁹ HIV is responsible for about 40 million chronic infections while hepatitis C and hepatitis B cause 130 million and 370 million chronic infections respectively.¹⁵ Failure to diagnose and treat co-infection at an early stage results in serious complications and sequelae.⁷ prevalence of HBV and HCV co-infections in the different geographical area around the world displays great variation.⁷ In US and Europe, HIV and HBV co-infection was reported to be 6 to 14 % while reports for HIV and HCV varied in the range of 25 to 50 % (9, 19). In India the overall rate of infection with HBV and HCV varies from 1-6%.²⁰⁻²² The rate of HBV and HCV co-infection in HIV patients has been reported in few studies in Nepal.^{16,23} Ghimire P et al found the co-prevalence of HBV/HIV in Nepal to be 0.033% which was higher than present study.¹⁶ Karki S et al reported the co-infection rate of 10.8%) for HCV and HIV in the blood donors.²³ No study pertaining to incidence of co-infections with these viruses has been done in Jharkhand till date. The HIV-HCV co-infection was not found in present study whereas this study showed HIV-HBV co-infection rate of (0.0072%). Co-infection with the three viruses increase the risk of acute and chronic liver insufficiency, cirrhosis, hepatic failure and mortalities in comparison to when a person is infected with only one of these viruses.⁷ HBV

co-infections in female patients were more prevalent than in their male counterpart.⁷ But in present study all the HBV co-infected individuals were male and the commonest age group affected was 30 to 40 years of age. People with unsafe sexual relationships and addiction to drugs injection should always be careful as the chances of virus getting transmitted are high among them and the knowledge of co-infection in patients of HIV is vital since these patients, as they live longer on antiretroviral treatment will also need to be managed for their co-infection with HBV or HCV.⁷ The replication of HBV and HCV in HIV patients should be actively monitored while receiving antiviral therapy and this monitoring system should be made a part of clinical care.²⁴ Compared to HIV-mono-infected patients, those with HIV-hepatitis co-infection are at increased hazard of developing liver enzyme elevations on antiretroviral therapy.²⁵ Hepatitis viruses in HIV may lead to faster progression to liver cirrhosis and a higher risk of antiretroviral therapy induced hepatotoxicity.⁷

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