

HIV and Hepatitis B Co-infection among Volunteer Blood Donors

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Abstract

Introduction	Co-infection with hepatitis virus (HBV) and Human Immunodeficiency Virus (HIV) is common, because of shared modes of transmission.
Objectives	Our aim was to determine the coprevalence of HBV and HIV among blood donors.
Methods	We screened 11,995 units of blood from both volunteer and replacement blood donors of Kathmandu by standard ELISA method. The statistical significance of the coprevalence of infections was obtained by using Chi square (χ^2) test.
Results	The coprevalence of HBV/HIV was 0.033 percent (4/11,995) among total blood donors. 4 individuals (3 males and 1 female) were found to be coinfecting with HBV/HIV. The infection rate of HIV was 3.8 percent among the hepatitis B infected blood donors. The association of HBV and HIV infection was tested and found statistically significant ($P < 0.05$).
Conclusion	HIV co-infection in HBsAg positive cases among healthy looking individuals was 3.8 %, an alarming situation. Routine screening of all these parameters may be useful in preventing transmission of disease through transfusion.
Key words	HIV, HBsAg, Co-infection, ELISA, Screening, Blood donors

Introduction

The modes of transmission of HBV and HIV are similar being transmitted overtly by blood transfusions and covertly by per-cutaneous routes. The Course of hepatitis B virus infection is modified by the presence of HIV. In most of the cases with HIV and HBV coinfection, it is impossible to determine the relative timing of the two viral exposures¹.

Safe blood in adequate quantity has become more important due to increasing dangers of transmissible infections including HBsAg².

Hepatitis B virus (HBV) is one of the most important infectious agents causing acute and chronic morbidity worldwide. It is estimated that between 350 and 400 million people are chronic HBsAg carriers³. Regions of the high endemicity include South East Asia, Africa, China, and the Arctic Rim etc, have high prevalence of 8-20 percent. Areas of intermediate endemicity have a prevalence of 2-7 percent and include Eastern Europe and the Middle East.

Low endemic areas such as Northern Europe, USA and Australia have prevalence below 2 percent⁴.

According to World Health Report 2000, about 31000 deaths occur annually in South East Asia⁵.

HIV/AIDS has become pandemic. WHO estimation- In Asia - about 1 in 250 adults is infected with virus. Mandatory screening of all donors for such infections have significantly reduced the problem; but not completely eliminated such risk because the donor may be at the window period or lack sufficient response so that our tool can detect the response. The risk of such infection is clearly higher in recipients of blood obtained from commercial source compared to blood from volunteer donors⁶.

Therefore the need for testing for HIV infection has become crucial for prevention, surveillance, and screening of donated blood. The hepatitis virus is 7 times more prevalent than HIV⁷. Co-infection with hepatitis virus (HBV) and Human Immunodeficiency Virus (HIV) is common, because of shared modes of transmission.

This study has been carried out with the aim to determine the co-prevalence of HBV and HIV among blood donors.

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Materials and Methods

This study was a part of M. Sc Microbiology Thesis of Tribhuvan University. During the study period (March 2001-May 2002), one of the investigator was directly involved in bench work, while others were involved in supervisory level. A total of 11,995 units of blood were collected at Nepal Red Cross Society, Central Blood Transfusion Service, Kathmandu, as part of NRCS routine activity of collection, screening, storage and transfusion services. The study population comprised of both Volunteer and replacement blood donors who donated blood at this blood bank or at mobile sessions. The selection of potential blood donors were strictly regulated and based on "Policy on Blood Transfusion Service and working procedures mandated by His Majesty's Government of Nepal".

Anonymous testing of blood bag was done, as the primary objective is to ensure safe blood transfusion. A Serological test performed on all the units collected includes ELISA testing for HBsAg and HIV.

Anti-HIV antibodies were detected using the commercial assay for screening by ELISA (HIV- Enzygnost® anti-HIV 1/2, Dade Behring, Germany). HBsAg was detected in subject's serum using Enzygnost® HBsAg 5.0 ELISA, Dade Behring, Germany. ELISA performed as per the instructions of the manufacturer and result was interpreted as reactive or non-reactive.

Results

The total number of donors included in this study was 11,995. Out of these, male donors constituted 10,815 (90.16%) and the remaining 1,180 (9.84%) were female donors, with male to female ratio 10:1. The donors' age ranged from 18-60 years with an average age group of 25-35 years. 10,461 (87.2%) were volunteer blood donors and rest of the donors were replacement 1,534 (12.8%). The sero-positivity for HBsAg in total blood donors was 0.87 percent and 0.41 percent were anti-HIV positive. (Table -1)

Table 1: Co-prevalence of Hepatitis B and HIV

S. N.	Sample Tested	HIV		P-value
		Positive	Negative Total	
1	HBsAg Positive	4	100	104
2	HBsAg Negative	45	11846	11891
Total		49	11946	11995

One hundred and forty nine (1.24%) blood donors reacted to one or more markers. Of them, HBV/HIV coinfection was recorded only in 4 individuals forming coprevalence of 0.033 percent of the total blood donors. Out of 49 HIV infected blood donors, 4 (8.1%) donors were also HBsAg positive. The association of HBV and HIV infection was found statistically significant ($P < 0.05$).

Among the total sero-positive individuals co-infection of HBV/HIV was found in 2.6 percent.

Discussions

A total of 11,995 blood donors were tested for presence of HBV antigen and anti-HIV antibody using ELISA BEP III Processor. Among them, 4 (0.033%) blood donors (3 males and 1 female) were found coinfecting with HBV/HIV. The coprevalence rate of 0.033 percent, found in this study was found

similar to the study findings of Sharma *et al* during 2002 as 0.038 percent (1/2625) among blood donors, at Tribhuvan University Teaching Hospital, Kathmandu.

The prevalence rate of HBsAg in HIV positive and HIV negative healthy blood donors were compared. Out of the total 49 HIV positive donors, 4 donors were also HBsAg positive where as HBsAg prevalence among total blood donors was 0.87 percent (104/11995). Thus, prevalence of hepatitis B surface antigen in both HIV Positive and negative groups were found almost similar. Similar findings were also noted in similar other studies by Kapur & Mittal, Carmo, Denis and Saillour, estimated that around 7 percent of HIV infected individuals carried hepatitis B surface antigen. This finding is similar to the present study.

Out of 4 co-infected individuals, all of them were volunteer donors and three of them were repeat donors. They were of young age group 21-30 years.

This is an alarming situation requiring early attention for counseling of all blood donors.

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