

SEROPREVALENCE OF COMMON TRANSFUSION TRANSMISSIBLE INFECTIONS AMONG BLOOD DONORS IN WESTERN UTTAR PRADESH, INDIA

Varsha Chaudhary, Vijender K Agrawal, Shashi K Sexena, Deepak Upadhyay, Arun Singh, Shailendra P Singh
Department of Community Medicine, Rohilkhand Medical College & Hospital, Bareilly, Uttar Pradesh, India

Correspondence to: Varsha Chaudhary (mahichaudhary25@gmail.com)

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ABSTRACT

Background: Transfusion transmitted infections (TTIs) are a major problem associated with blood transfusion practices.

Aims & Objectives: The present study was conducted to estimate the prevalence of transfusion transmitted infections among blood donors in one of the blood bank in Bareilly city.

Materials and Methods: In this retrospective study, we reviewed healthy blood donors, over a period of one year (Jan 2013 – Dec 2013), from the records of the blood bank of Indian Medical Association (IMA) at Bareilly for HBsAg, Hepatitis C Virus (HCV), HIV and Syphilis, by using the appropriate enzyme-linked immunosorbent assay. HIV infection was confirmed using a standard immunoblotting technique. Hepatitis B Virus (HBV) was tested for surface antigen (HBsAg) and HCV by the immune chromatographic method. The Venereal Disease Reference Laboratory (VDRL) test was used for estimation of syphilis infection. The study was designed for a duration of four months from April 2012 to July 2012. Medical reports of the donors were accessed from the hospital records and analyzed.

Results: A total of 28,395 blood donors were screened. 60.43% were replacement donors, and 39.57% were voluntary donors. 95.21% were males. The overall seroprevalence of HBV, HCV, HIV and Syphilis were 1.93%, 1.02%, 0.27% and 0.16% respectively.

Conclusion: Strict selection of blood donors with emphasis on getting voluntary donors, and comprehensive screening of donors for TTIs using standard methods are highly recommended to ensure the safety of blood for recipient.

Key Words: Transfusion Transmissible Infections (TTIs); Voluntary Blood Donors; Replacement Blood Donors; Seroprevalence

Introduction

Blood transfusion is a lifesaving intervention, and millions of lives are saved each year globally through this procedure.^[1] However, blood transfusions are associated with certain risks, which can lead to adverse consequences. Unsafe blood remains a major threat for the global spread of transfusion transmissible infections (TTIs). According to WHO, safe blood is a universal right, which means that blood that will not cause any harm to the recipient, and that has been fully screened, and is not contaminated by any blood borne disease – such as HIV, Hepatitis, malaria or syphilis.^[2] WHO recommends that all donated blood should be screened for hepatitis B virus (HBV), Hepatitis C virus (HCV), Human immunodeficiency virus (HIV) and syphilis, at least.^[3] TTIs can exist as asymptomatic diseases in the hosts, so donors must be screened for high risk behaviour related diseases. Evaluation of data on the prevalence of transfusion transmissible infections namely HIV, HBV, HCV and syphilis among blood and plasma donors permits an assessment of the occurrence of infections in the blood donor population, and consequently the safety of the collected donations. It also gives an idea of the epidemiology of these in the community.^[4] An unsafe blood transfusion is very costly, from both human and economic points of view. Morbidity and mortality

resulting from the transfusion of infected blood have far-reaching consequences, not only for the recipients themselves, but also for their families, their communities and the wider society.^[5,6] Since a person can transmit an infection during its asymptomatic phase, transfusion can contribute to an ever-widening pool of infection in the population. The economic costs of the failure to control the transmission of the infection include increased requirement for medical care, higher levels of dependency, and the loss of productive labour force – placing heavy burdens on already overstretched health and social services and on the national economy.^[5,7] Globally, more than 81 million units of blood are donated every year.^[3] More than 18 million units of blood are not screened for TTIs.^[1,8] This study was conducted to assess the sero prevalence of HBV, HCV, HIV and syphilis among blood donors in one of the blood bank in Bareilly city.

Materials and Methods

In this retrospective study, we reviewed healthy blood donors, over a period of one year (Jan 2013 – Dec 2013), from the records of the blood bank of Indian Medical Association (IMA) at Bareilly, to determine the seropositivity of TTIs in blood donors. The replacement donors were family members, friends or relatives of the patients concerned. Donors were selected and screened

thoroughly, as per the guidelines of the Gazette of India.^[9] Professional blood donors, those with previous history of jaundice, pregnant and lactating women were excluded.

Five ml blood was collected from each subject into plain, sterile bottle, following informed consent. Blood samples were centrifuged and the sera were separated and analysed. Two kits were used, based on WHO recommendation of two different testing strategies, involving enzyme linked immunosorbent assay (ELISA), and/or simple or rapid assays for surveillance. Samples were analysed for antibodies to HIV 1/2, HBsAg and HCV by ELISA. Test for syphilis was done by VDRL. Any serum found reactive by the first assay was retested using a second assay based on different antigen preparations, and/or different test principle using the anti-HIV test, HBsAg which is an immunochromatographic sandwich assay and HCV by the anti HCV test.

The data was collected, entered and analysed by using statistical Package for Social Sciences (SPSS). Data was presented in the form table and chi square test was applied as test of significance.

Results

In the present study, out of the total 28,395 blood donors, 17,158 (60.43 %) were replacement donors and 11,237 (39.57%) were voluntary donors. On statistical analysis, the proportion of voluntary donors was found to be significantly low ($p < 0.001$) throughout the year. On sex distribution, males were 95.21% while females were only 4.79% (male: female ratio, 19.9:1) (table 1).

The prevalence of HBsAg, anti HCV, anti HIV and VDRL among study population is shown in table 2. The overall sero-prevalence of HBV and HCV was 1.93% and 1.02% respectively, while the prevalence of VDRL and HIV was 0.16% and 0.27% respectively. The highest prevalence was observed for HBV, followed by HCV, HIV and syphilis in decreasing order. Higher prevalence of HBsAg and HCV in male was found to be statistically significant ($p < 0.05$), while higher prevalence of HIV in female than male was not found to be statistically significant ($p > 0.05$). Difference in prevalence of syphilis among male and female was not found to be statistically significant ($p > 0.05$).

The pattern of seropositivity of HBV showed continuous high trends throughout the year followed by HCV seropositivity (figure 1).

Table-1: Total blood collection and sex distribution of donors

Months	Voluntary	Replacement	Males	Female	Total
Jan - Mar	3284 (45.13%)	3993 (54.87%)	6942 (95.4%)	335 (4.6%)	7277 (100%)
April - June	2994 (36.63%)	5180 (63.37%)	7841 (95.93%)	333 (4.07%)	8174 (100%)
July - Sep	2512 (36.77%)	4320 (63.23%)	6508 (95.26%)	324 (4.74%)	6832 (100%)
Oct - Dec	2447 (40.14%)	3665 (59.96%)	5744 (93.98%)	368 (6.02%)	6112 (100%)
Total	11237 (39.57%)	17158 (60.43%)	27035 (95.21%)	1360 (4.79%)	28395 (100%)

Table-2: Gender distribution of seropositive donor blood samples for HBsAg, HIV, HCV and syphilis

Gender	Number of donors	Prevalence			
		HBsAg Positive	HCV Positive	HIV Positive	VDRL Positive
Male	27035	537 (1.98%)	287 (1.06%)	71 (0.26%)	44 (0.16%)
Female	1360	11 (0.81%)	2 (0.15%)	7 (0.51%)	1 (0.07%)
Total	28395	548 (1.93%)	289 (1.02%)	78 (0.27%)	45 (0.16%)

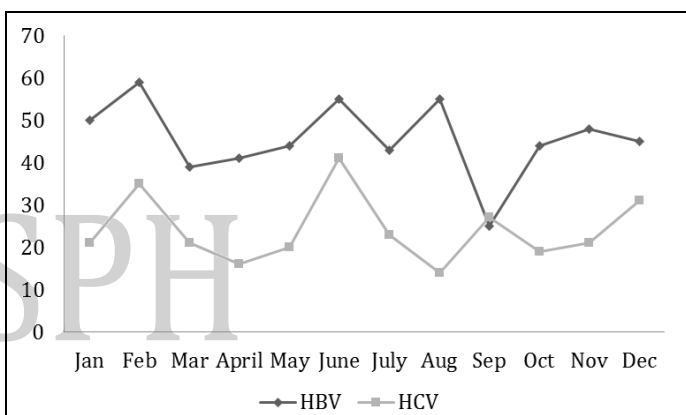


Figure-1: Comparison of Prevalence of HBV & HCV in blood donors

Discussion

In the present study, an analysis of the donor profile, and estimations of the prevalence of HBV, HCV, HIV and syphilis, were attempted. In our study, replacement donors were 60.43% and voluntary donors were 39.57%. Similar findings were reported by various other studies^[10-14] (82.4%, 94.7%, 96.3%, 68.365% and 99.48% voluntary donors respectively). Presence of low prevalence of voluntary blood donors in Indian set-up probably reflects a basic lack of awareness in the general population, the presence of misconceptions and fears associated with donating blood, the lack of health education, and the indifferent attitude of the health sector. In all these studies, percentage of voluntary donors was much less in comparison to our study. This might be because IMA conducts various camps for voluntary blood donation, and they used to donate this blood for children suffering from Thalassemia free of cost. Female made a smaller section of our study

(4.79%). This is in consonance with Bhawani Y et al^[13] (10.52%), Pahuja A et al^[14] (2.76%) and Agrawal VK et al^[15] (8.5%) study.

Our study also estimated the seroprevalence of four major TTIs in our blood donors. Prevalence of HBsAg in our blood donor population was 1.93% which is similar to findings by Kaur et al^[16] (1.7%) in Punjab, Singh B^[17] (1.8%) in northern India, and Agrawal et al in urban area of Bareilly^[15] (1.5%). Variable results of 0.66%^[18], 2.45%^[19], 3.44%^[20] and 5.46%^[21] have also been reported in various other studies. The prevalence of HBV infection is lower in the United States and Western Europe (0.1% - 0.5%), and is reported to be higher (5 - 15%) in Southeast Asia and China.^[22]

The seroprevalence of HCV in our study was 1.02%. Similar findings of 0.95%^[12], 1.09%^[18] and 1.4%^[23] were reported by other studies. Much higher prevalence was reported by Mumtaz S et al^[21] (6.21%) in Rawalpindi, and by Sood G et al^[24] (2.8%) in Delhi. Yet another set of studies reported it to be at lower level of 0.28%^[20], 0.50%^[17] and 0.66%^[14].

For HIV, India is second only to South Africa, in terms of overall number of people living with HIV. The Indian National AIDS Control Organization (NACO) suggested an overall prevalence of 0.91% (2005) in India.^[24] The present study showed an HIV seroprevalence of 0.27%, similar to that reported by Kaur H et al^[16] in Punjab (0.26%) ; whereas much higher prevalences of 0.47%^[20], 0.56%^[14], 1.83%^[25], 3.8%^[26] and 11.7%^[27] were reported by various other studies. Lower prevalences of HIV was also reported by some studies^[28,29] (0.054% and 0.13%). For Syphilis, the seroprevalence was found to be 0.16% in the present study, which was much lower than reported by other studies (0.85%^[18] and 1.25%^[21]). Availability of safe blood for transfusion is must for recipients and the community as well. This can be achieved by vigorous screening of donors and donated bloods. Effective control strategies including a sensitive and stringent screening of all blood donors, public awareness programs, and institution of adequate public health measures are urgently needed.

Conclusion

In our retrospective study of 28,395 healthy blood donors at IMA blood bank in Bareilly, we estimated overall prevalence of HBsAg, HCV, HIV and Syphilis to be

1.93, 1.02, 0.27 and 0.16% respectively. Blood is still one of the main sources of transmission of these diseases. Hence, strict selection of blood donors, with emphasis on getting voluntary donors, and comprehensive screening of donors for TTIs using standard methods, are highly recommended to ensure the safety of blood for recipient.

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