



A Study on Trends of Infective Seropositivity among Blood Donors at the Blood Bank of a Tertiary Care Centre

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ABSTRACT

Transfusion transmissible infections (TTIs) or seropositivity among blood donors are major problems associated with blood transfusion practices. Safe blood and blood products should be transfused to all patients in need for blood transfusion. All blood donors attending to the Blood bank during the period January 2012 to December 2014 were screened for hepatitis B surface antigen (HBsAg), anti HCV antibody, anti HIV-1, 2 antibodies by using the appropriate enzyme-linked immunosorbent assay (ELISA) method. Malarial antigen and syphilis testing were done by immunochromatographic technique and rapid plasma reagin (RPR) test respectively. Of the 88,084 donors who were screened during the study period, 22,764 (25.84%) were voluntary and 65,320 (74.16%) were replacement donors. Of them, total 1148 (1.3%) were seropositive. Out of 1148 seropositive cases 0.16%, 0.75%, 0.21%, 0.08% and 0.14% were HIV, HBV, HCV, VDRL and MP respectively. Co-infection was seen in 29 (0.03%) donors. A properly conducted donor screening, notification and improving hemovigilance system will help in reducing the chances of transfusion transmitted infections rates.

KEYWORDS

Blood donors, seropositivity, transfusion-transmitted infections

INTRODUCTION

Transfusion of unsafe blood leads millions of people to risk of transfusion transmissible infections (TTIs).¹ TTIs can exist as asymptomatic disease in the hosts, so donors must be screened for high-risk behaviour related diseases. In spite of technological advancements, the problems of 'window period' of infections, false-negative results, genetic variability in viral strains and technical errors to be considered.² Hepatitis B is one of the common TTI. Evaluation of data on the prevalence of TTIs namely human immune deficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), malaria parasite (MP) and syphilis among blood and blood component donors permits an assessment of the occurrence of infections in the blood donor population and consequently the safety of the collected donations. HIV, HBV and HCV co-infection has emerged as a leading cause of morbidity throughout the world in the last two decades.^{3, 4} As per National AIDS Control Organization (NACO), 3.5% of HIV infection is attributed to blood transfusion.⁵ TTIs continue to be problems in many part of the world as well India and the multitransfused patients of Thalassaemia major are particularly at increased risk of TTI.⁶

MATERIALS AND METHODS

A retrospective study was carried out in the Blood bank of Gauhati Medical College & Hospital, Guwahati, North-East India from January 2012 to December 2014. The study was approved by institutional ethical committee. The blood bank of department of pathology, Gauhati Medical College is a state of the art blood bank with average annual collection of 30,000 units of blood from healthy blood donors from in and around Guwahati annually.

Inclusion criteria: Any donor meeting all criteria for eligibility of blood donation as mentioned in SOP, Blood Bank, Gauhati Medical College & Hospital, Guwahati.

Exclusion criteria: Any eligible donor having any kind of reaction during the blood donation procedure was excluded from the study.

The donors were either voluntary (Camp) or replacement donors (relatives or friends of patients in the blood bank). All samples were screened for hepatitis B surface antigen (HBsAg; Hepalisa, J. Mitra ELISA of SPAN), anti-human immunodeficiency virus antibodies

(HIV Ab; HIV 3rd generation kit for detection of antibodies to HIV1 and HIV2, J. Mitra & SD. lab), anti-hepatitis C virus antibodies (HCV Ab; Micro ELISA 3rd generation, J. Mitra & SD Lab), Venereal Diseases Research Laboratory (VDRL) reactivity (Carbogen kit, Tulip Diagnostics as well as RPR Span) and malarial parasite (MP) antigen (pLDH) by immunochromatographic technique (PAN MALARIA CARD, J. Mitra & SD Lab). The validity of the test is assured as per the given criterion and the results were computed. The total number of seroreactive cases and their distribution were noted. Cross checking was done by calling the donors through post or over telephone. The donors with more than one seroreactivity were noted and were identified as co-infection.

RESULTS

Out of total 88,084 units of collected blood, 65,320 (74.16%) from replacement and 22,764 (25.84%) were from voluntary donors which is detailed in Table 1.

Table 1: Year wise collection of Blood (Voluntary & Replacement) for the period 2012-2014

Year	2012	2013	2014	Total
Total collection	29409	29618	29057	88084
Replacement collection	21417	20802	23101	65320 (74.16%)
Voluntary collection	7992	8816	5956	22764 (25.84%)

Of the Voluntary donors 86.40% were male 13.60% were female. Among replacement donors 72.49% were male and 27.51% were female.

In this entire 3 years study, out of total 88,084 blood donors (Voluntary +Replacement), HIV reactivity was seen in 140 (0.16%) of donors. Similarly 660 (0.75%) were positive for HBV infection, 182 (0.21%) were positive for HCV infection, 73 (0.08%) were positive for syphilis infection, 122 (0.14%) were positive for malaria infection which is detailed in Table 2.

Table 2: Year wise seropositivity of donors for the period 2012-2014

Year	2012	2013	2014	Total 3 years	Percentage
Total collection	29409	29618	29057	88084	
HIV	47	32	61	140	0.16%
HBV	184	212	264	660	0.75%

HCV	37	44	101	182	0.21%
VDRL	32	34	7	73	0.08%
MP	65	51	6	122	0.14%

Out of total 88,084 blood donors, co-infection was seen in 29 (0.03%) donors. HIV and HBV co-infection was seen in 6 donors. HIV and syphilis co infection was seen in 9 donors. HBV and HCV co infection was seen in 5 donors. HBV and syphilis co infection was seen in 7 donors. HBV and malaria co infection was seen in 1 donor. HIV, HBV and syphilis co infection was seen in 1 donor. These are detailed in Table 3.

Table 3: Donor category-wise distribution of co-infections

Co-infection	Type of donor		Total
	Voluntary	Replacement	
HIV+HBV	1	5	6
HIV+VDRL	0	9	9
HBV+HCV	1	4	5
HBV+VDRL	0	7	7
HBV+MP	1	0	1
HIV+HBV+VDRL	0	1	1
Total	3	26	29 (0.03%)

Out of total 88,084 collected blood 1148 (1.3%) blood were found to be seropositive, of which 1079 (1.22%) blood were of replacement collection and the remaining 69 (0.08%) blood were of voluntary collection which is detailed in Table 4.

Table 4: Year wise total Seropositivity of Voluntary & Replacement donors

	2012	2013	2014	Total	Percentage
Total Seropositivity of Voluntary collection	21	17	31	69	0.08%
Total Seropositivity of Replacement collection	334	348	397	1079	1.22%
All total Seropositivity	355	365	428	1148	1.3%

DISCUSSION

TTIs continue to be a great threat to safe transfusion practices. With every unit of blood, there is 1% chance of a transfusion related problem including TTIs.² Professional donors and donors with high risk behavior such as drug addict, homosexual, commercial sex workers carry more risk of seropositivity.⁷ Many factors favour co-infection including high degree of epidemiological similarity between their mode of transmission namely through blood and blood products, sharing of needles to inject drugs, and sexual activity resulting in co-infection with the two viruses as a common event.⁸

Majority of donors in the present study were replacement donors (74.16%). The finding is in concordance with Singh B et al², Kaur H et al⁹ and Kochhar AK et al¹⁰.

In the present study the seropositivity (1.3%) and the co infections (0.03%) were higher in replacement donors, which is closely similar to Dorga M et al¹¹, Kaur G study⁷ and Chavan SK et al¹². All these finding is in agreement with World Health Organization suggestion that, commercially remunerated donors and family replacement donors are more likely to transmit TTIs than voluntary donors.¹³

Nucleic acid amplification testing (NAT) for HCV and HIV infection had been successfully introduced to screen donors in many developed countries but the cost- effectiveness to be considered in our country.¹⁴

Based on the results we feel that donor selection and screening procedures must be strictly followed for the blood safety. Voluntary blood donation has to be made a part of healthy lifestyle, proper health education to be given to public about the benefits of voluntary blood donation and proper assurance to be given to all donors regarding the life style.

CONCLUSION

Blood transfusion is a life saving agent but it can be responsible of life threatening infections to the recipient if pre-transfusion screening tests are not done properly. Presently the safety of blood for transfusion is maintained by careful selection of voluntary donors and performing the mandatory screening for transfusion transmissible infections (TTI) as meticulously as possible. Seropositivity and co infections are more common among replacement donors which could be due to concealing of high risk behavior and professional donors posing as relatives. Promotion of voluntary donors and fully functional hospital transfusion committee with refresher trainings to medical and paramedical staff will help in improving hemovigilance system and reducing the incidence of transfusion transmissible infections .

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