



## SEROPREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS AMONG BLOOD DONORS IN A TERTIARY CARE TEACHING HOSPITAL IN CENTRAL INDIA

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### ABSTRACT

Transfusion of blood and blood components forms an important and specialized modality of patient management. Transmission of infections like Hepatitis and AIDS during transfusion is the most serious and undesirable among adverse transfusion reactions. Seroprevalence of these infections in blood donors is an indication of disease prevalence in healthy population and a potential risk for transmission of these transfusion transmitted infections (TTIs). This study was undertaken to know the trend of seropositivity of common transmissible infections among donors at blood bank of a Tertiary Care Teaching Hospital, that has attached Regional Hemoglobinopathy Detection and Management Centre. Analysis of data over the past three and half years revealed highest seropositivity for Hepatitis B Virus (HBV). Increasing positivity for HBV and Human Immunodeficiency (HIV) was noticed. Unwarranted transfusions and unsafe transfusion practices expose patients to the risk of transfusion-transmissible infections. Judicial use of blood and blood components and more vigilant donor screening by blood bank personnel appears to be immediate remedies.

**KEYWORDS :** Seropositivity, TTI, blood donors

### Introduction:

Infections that may prove fatal, can be transmitted during transfusion. 5–10% of HIV transmission in Africa is quoted to be the result of contaminated blood transfusions (1). With rapid increase in number of people with transfusion transmissible infections (TTI's) globally, the field of transfusion medicine is facing a huge problem in providing safe blood and blood products. There is an urgent need to improve testing for transfusion transmissible diseases and the selection of blood donors (2).

### MATERIAL AND METHODS:

The present study was carried out in a Blood bank of Central India that forms the major transfusion service of a Tertiary Care Hospital and attached Regional Hemoglobinopathy Detection and Management Centre, during January 2013 to June 2016. For analysis of the data all the donations during study period were divided into two groups. Group A comprised of all the blood units collected during voluntary blood donation camps organized by the Blood Bank, within 50km area. Group B included blood units collected in the Blood bank and donated by relatives of ailing recipients as well as the staff members, students and employees of the hospital.

A total of 19088 serum samples were tested for prevalence of mandatory markers of five TTIs viz HIV, HBV, HCV, syphilis and malaria. Donor selection was based on detailed history of present and past illness, personal history and clinical examination. A detailed pre donation questionnaire was included in donor registration form. Information regarding risk factors like history of surgery, previous illness, hospitalization, blood transfusion, occupation, high risk behavior and tattoo marks was obtained for every prospective donor to eliminate professional donors. Written consent was obtained from all the donors and ethical clearance was obtained from the Institutional Ethical Committee.

All testings were done with NACO approved commercially available kits. Hepatitis B, HIV and HCV were tested by 3rd generation ELISA kits, screening for syphilis was done by Rapid plasma Reagin (RPR) method and malaria was tested by Rapid Malaria kit. All the reactive samples were repeat tested before labeling them seropositive. Seropositive blood units were discarded as per the standard protocol.

### Observations:

Retrospective review of reports is compiled. The time frame covers from January 2013 to June 2016. The annual blood donation with types of blood donors classified into Group A comprising of voluntary camp donors and Group B comprising of Blood bank donors including voluntary as well as replacement donors. Consecutive test results on

transfusion transmittable infection markers were included in the data. During this period a total of 19088 units of blood were collected from donors. Data collection and analysis was achieved by compiling the data on excel Microsoft 2003 computing programme. Simple statistical application was used to describe the results as shown in Table 1, 2 and 3.

**Table 1: Year & Gender wise distribution of Blood Donors**

Year	Total Donors	Camp Donors (Group A)	Blood Bank Donors (Group B)	Male	Female
2013	4803	2478	2325	4561	242
2014	5304	2385	2919	5108	196
2015	5940	2719	3221	5741	199
2016 (June end)	3041	1681	1360	2873	168
Total	19088	9263	9825	18283	805

Out of 19,088 donors, 95.78% were males and 4.22% were females.

**Table 2: Year-wise Seroprevalence of various infectious markers in blood donors**

Year	Number of Donations Tested	HIV N (%)	HBsAg N (%)	HCV N (%)	VDRL N (%)	MP N (%)	Total N (%)
2013	4803	13(0.27)	46(0.95)	8(0.16)	2(0.04)	0(0)	69(1.43)
2014	5304	12(0.22)	66(1.24)	12(0.22)	0(0)	0(0)	90(1.69)
2015	5940	35(0.58)	87(1.46)	25(0.42)	0(0)	1(0.01)	148(2.49)
2016 (June)	3041	27(0.88)	44(1.44)	17(0.55)	1(0.03)	3(0.09)	92(3.02)
Total	19088	87(0.45)	243(1.27)	62(0.32)	3(0.01)	4(0.02)	399(2.09)

HIV-Human Immunodeficiency Virus, HBsAg-Hepatitis B Surface Antigen, HCV-Hepatitis C Virus, MP-Malarial parasite

As revealed by Table 2, the overall seroprevalence of HIV, HBsAg, HCV, Syphilis and Malaria was 0.45%, 1.27%, 0.32%, 0.01% and 0.02% respectively. There was an increase in HIV positivity and almost parallel increase in HCV positivity over the study period. HBsAg positivity also showed an increasing trend from 2013 to 2016.

Distribution of Seropositive cases amongst Group A and Group B is depicted in Table 3.

**Table 3: Distribution of Seropositive cases**

Infections	Camp Donors (Group A) (Total 9263)	Blood Bank Donors(GroupB) (Total 9825)	Total (Total no.19088)
HIV	28(0.30%)	59(0.60%)	87(0.45%)
HBsAg	80(0.86%)	163(1.65%)	243(1.27%)
HCV	19(0.20%)	43(0.43%)	62(0.32%)
Syphilis (RPR)	0	3(0.03%)	03(0.01%)
MP	0	4(0.04%)	04(0.02%)
Total	127(1.37%)	272(2.76%)	399(2.09%)

HIV-Human Immunodeficiency Virus, HBsAg-Hepatitis B Surface Antigen, HCV-Hepatitis C Virus, MP-Malarial parasite On comparison of Group A donors and Group B donors, for seroprevalence of the infectious markers it was observed that HIV, HBV, HCV Syphilis and Malaria were significantly higher in Group B i.e blood bank donors.

#### Discussion:

Transfusion of blood and blood components, as a specialized modality of patient management saves millions of lives worldwide each year and reduce morbidity. With every unit of blood transfusion, there is a 1% chance of occurrence of transfusion associated problems including transfusion transmitted diseases (3). Blood transfusion is entering a new era due to the challenges posed by the increasing diversity of TTIs. Upward trend of seropositivity may reflect high prevalence of subclinical infections in the healthy (asymptomatic) population in particular geographic area.

In our study, males (95.78%) outnumbered females (4.22%). This is similar to other studies done in India (4,5,6,) comprising more than 90% of the male donors. Less female contribution was because of higher incidence of anemia, low weight or lack of awareness and enthusiasm among female blood donors

In our study, seroreactive cases were 2.09%, which is similar to studies done by Sahil S et al.,(4) and Nigam JS et al.,(7) with 2.18% and 2.25% seroreactive cases respectively.

National adult HIV prevalence is estimated at 0.26% in 2015(8). The seroprevalence of HIV in the present study was 0.45%. Similar findings were noted by Mondal R et al.,(9) Pallavi P et al.,(5). Increasing positivity for HIV noted which reflects changing lifestyle of young urban population that form majority of blood donors within or outside blood bank.

World Health Organization has placed India in the intermediate zone (2-7% prevalence rate) of prevalence of hepatitis B(10). Seroprevalence of HBsAg in our blood donors was 1.27% which is similar to findings by Pallavi et al.,(5), Makroo R et al.,(11). A study conducted by Sachdeva A et al.,(12) reported a lower prevalence of 0.45%.

This study showed lower (0.32%) prevalence of HCV, in comparison to national prevalence of 1.8% - 2.5% in India (13). A study conducted by Pailoor et al.,(14) has reported a lower prevalence level (0.06%) a higher prevalence of 1.09% by Gupta N et al., (15) and 1.02% by Sri Krishna et al.,(16) were noted.

Sexually transmitted infections constitute a major public health problem. The VDRL reactivity in our study was 0.01% which is significantly lower as compared to 0.51% and 0.85% noted by Sabharwal ER et al.,(17) and Gupta N et al., (15) respectively.

In our study the seroprevalence of malaria was found to be 0.02%, that is similar with the study by Suresh Babu et al., of 0.02%(18). As apparently healthy individuals are selected for blood donation, malarial parasites density is usually very low and may be missed easily.

In our study, HBV showed the highest seropositivity. Higher prevalence of HBsAg observed may be due to high prevalence of HBV infection in that population. Fernandes H et al showed similar finding.(19)

In the present study, increasing trend for all the markers was observed. A decreasing trend for all the markers were noted by Suresh

Babu et al.,(18) and Sachdeva et al.,(12).

Prevention of TTI is difficult, due to nonavailability of required resources in many blood banks. Transmission of diseases during transfusions occurs, primarily because of the inability of the test to detect the disease in the pre-seroconversion or 'window' phase of their infection, high cost of screening, lack of funds and trained personnel. Immunologically variant viruses, non-seroconverting chronic immuno silent carriers and inadvertent laboratory testing errors are the additional causes(19). Reputed centers of the country have included NAAT (Nucleic Acid Amplification Test) testing for all important viral infections, with a view to bring down the window period of these infections.

The National Blood Transfusion Council since 2005, advocates the disclosure of results of TTI to blood donor(20). The positive donors were referred to Integrated Testing and Counselling Centre (ICTC) except for malaria. Monthly data regarding seroprevalence of various infections is submitted to Maharashtra Aids Control Society and State Blood Transfusion Council, Mumbai.

Rationalization of use of whole blood and increased use of blood components will prove to be an important step towards good and safe blood bank practices.

**Conclusion:** Regular analysis of region wise data about seroprevalence of various TTIs can give an idea about need for strategic change in approach for control and prevention of these infections.

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