

# The Prevalence of Transfusion Transmitted Infections in Blood Donors and Possible Correlation of Transfusion Transmitted Infections with ABO and Rh Blood Groups Blood Donors in, Tertiary Care Center of SMS Hospital, Jaipur

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## 1. Introduction

The distribution of ABO and Rh varies in different population groups and an understanding of their distribution helps in an efficient delivery of transfusion services [1].

As every blood transfusion carries the risk of transmission of infection to the recipient, hence screening of the donated unit is a mandatory procedure carried out in all the blood center.

Blood borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and syphilis can be transmitted with each unit of blood transfused. [2]

The risk of transmission of transfusion transmitted diseases (TTD) is 1% per transfusion. [3] It has been previously been found that ABO blood group antigen bears some association with certain infections and malignancies such as gastric cancers, epithelial ovarian cancer, and pancreatic cancers. [4]

It is seen that genetically determined ABO group antigens present in blood may block binding of possible TTD causative organisms to cell wall polysaccharides.

However, the non-secretors lacking in their antigen are at a risk of a variety of TTD. [5] The prevalence of TTDs varies from area to area from where the donor population comes. It also reflects the prevalence of asymptomatic carriers in the society. The detection of these asymptomatic carriers is very essential as blood donated in the window period of viral infections plays a major role in transmitting these infections to the recipients. Hence, this study was undertaken to determine the seroreactivity of TTD among blood donors and to elicit any association of TTDs with blood group antigens. Further, this study also addresses the need of properly detailed history taking of the donors and the need to encourage only voluntary blood Donation.

## 2. Aim

To find out seroprevalence of hepatitis B, hepatitis C, HIV, syphilis, and malaria infections in healthy blood donors and to determine any association between different blood groups and seroreactivity, in the SMS hospital blood center, Department of IHTM at SMS Medical College & Hospital, Jaipur during the period from 1 Jan 2019 to 31 DEC 2020.

## 3. Material and Method

This retrospective study was Carried out over a period of 24 months from 1Jan 2019 to 31 Dec 2020 in the SMS hospital blood center, Department of IHTM at SMS Medical College & Hospital, Jaipur. During this period of total 91089 donors had donated blood in the blood center, out of which 89814 were (98.6%) male, and 1275 (1.4%) were females. All the donated blood bags were screened for transfusion transmitted infection.

Serum sample were screened for HbsAg by 4th Gen ELISA kit. For HIV I and HIV II detection, 4th Gen HIV Ag and antibody kit were used. Anti HCV antibody were detected by 3rd generation HCV ELISA kit. For malaria Rapid visual Malaria Antigen card and for Syphilis One step Rapid card test was used. Blood group was determined by forward and reverse grouping of donor sample using tube method.

## 4. Results

Out Of total 91089 donors, male donors were 89814 (98.6%), and female donors were 1275 (1.4%). The most common blood group was B positive (33.63%) while the least common was AB negative (0.65%) (Table 1) The prevalence of Rh positive blood group was 94.3% were as Rh negative blood group was only 5.7% (Table 2). Out of the total seroreactive cases, 93.75% (85397 cases) had Rh positive blood group and remaining 6.25% (5692 cases) had Rh negative blood group (Table 2). Among the seroreactive donors, 937 (1.03%) cases were reactive for HBsAg, 68 cases (0.075%) for HIV, 182cases (0.20%) for anti HCV,

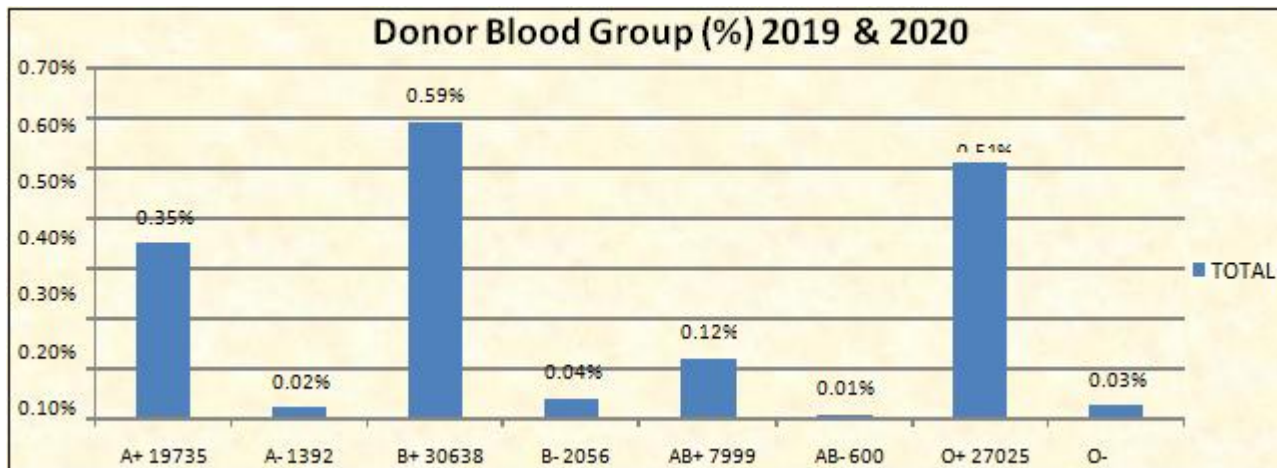
337 cases (0.37%) for Syphilis and 9 cases (0.001%) for Malarial antigen (Table 3). Overall maximum seroreactivity was seen blood group B positive (0.54%) followed by O positive (0.50%) and then A positive (0.37%). The prevalence of TTI in relation to ABO blood group including Rh is shown in Table 3.

In Groupwise seroreactivity it was found that the highest percentage of HBsAg and HCV reactivity was found in B positive donors and highest percentage of HIV reactivity was found in O-positive donors. highest percentage of syphilis reactivity was found in A positive donor and highest

percentage of malaria reactivity was found in B negative donors.

**Table 1:** Prevalence of different blood group in 2019 and 2020

Blood group	2019	2020	total	% of total
A+	12132	7603	19735	21.66%
A-	885	507	1392	1.52%
B+	18986	11652	30638	33.63%
B-	1329	727	2056	2.25%
AB+	4987	3012	7999	8.78%
AB-	399	201	600	0.65%
O+	16972	10053	27025	29.66%
O-	996	648	1644	1.80%

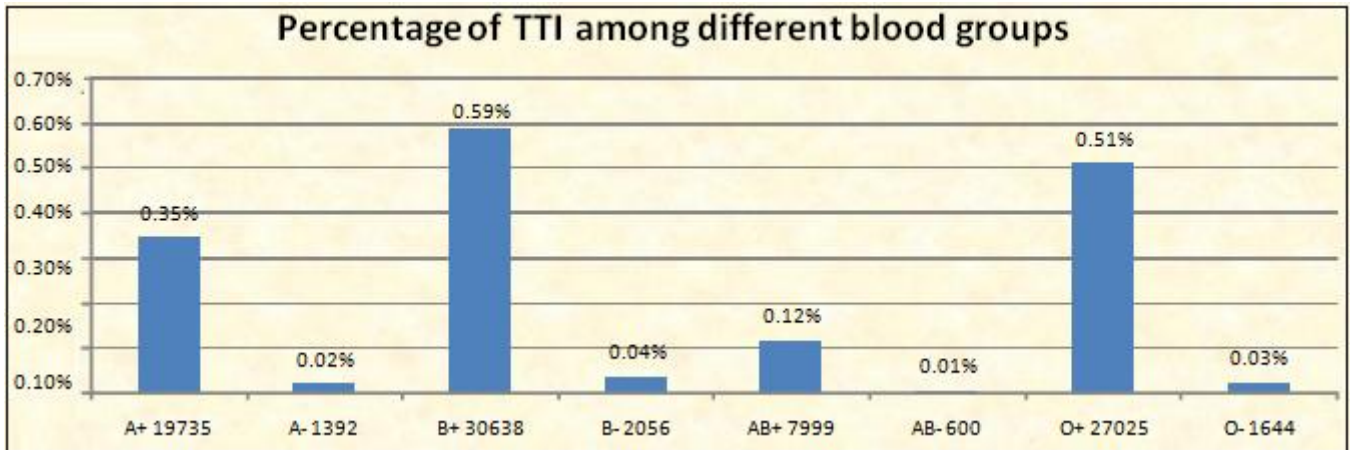


**Table 2:** Prevalence of TTI among Rh positive and Rh negative blood groups

	Total	HBsAg (%)	HIV (%)	HCV (%)	VDRL (%)	Malaria (%)	Total (%)
RH+	85397 (93.75%)	884 (0.97%)	63 (.069%)	172 (.19%)	320 (.35%)	7 (.008%)	1446 (94.3%)
RH-	5692 (6.25%)	53 (.058%)	5 (.006%)	10 (.01%)	17 (.019%)	2 (.002%)	87 (5.7%)
TOTAL	91089	937 (1.03%)	68 (.075%)	182 (0.20%)	337 (0.37%)	9 (.001%)	1533 (1.68%)

**Table 3:** Prevalence of TTI among different blood groups

Blood group	HBsAg (%)	HIV (%)	HCV (%)	VDRL (%)	Malaria (%)	Total (%)
A+ 19735	182 (0.92%)	14 (0.070%)	40 (.20%)	85 (0.43%)	1(.005%)	322 (.35%)
A-1392	13 (0.93%)	1 (0.071%)	2 (.14%)	5 (0.35%)	0	21 (.023%)
B+ 30638	343 (1.11%)	21 (0.068%)	72 (.21%)	104 (0.34%)	2(.006%)	542 (.59%)
B-2056	21 (1.02%)	3 (0.14%)	4 (.19%)	6 (0.29%)	2(.097%)	36 (.039%)
AB+ 7999	72 (0.90%)	4 (0.05%)	6 (.075%)	28 (0.35%)	1(.012%)	111 (.12%)
AB-600	4 (0.66%)	0	1 (0.16%)	2 (0.33%)	0	7 (.007%)
O+ 27025	287 (1.06%)	24 (0.088%)	54 (0.19%)	103 (0.38%)	2(.007%)	470 (.51%)
O-1644	15 (0.91%)	1 (0.060%)	3 (0.18%)	4 (0.24%)	1 (.060)	24 (.026%)
TOTAL	937 (1.03%)	68 (0.075%)	182 (0.20%)	337 (0.37%)	9 (0.001%)	1533 (1.68%)



## 5. Discussion

The most common blood group in our study was B positive (33.63%), similar to the observation made by Anumanthan et al., Nigam et al. and Tyagi et al. [6-8]. However, the studies done by Talib, et al., Bashwari et al. and Abdullah found blood group O to be the most common [9-11]. The prevalence of Rh negative blood group in our study was 5.7%. The least common blood group in our study was AB negative (0.65%) which was similar to the study by Ngassaki-Yoka et al. [12]. Overall maximum seroreactivity was seen with blood group B positive (0.59%), similar to the observation made by Sinha et al. followed by O positive (0.51%) and then A positive (0.35%) [13].

## 6. Conclusion

This study reflects seroprevalence of Transfusion transmitted infection. Further, it also reflects co relation between blood group antigens and the Transfusion transmitted infection. However, comprehensive large scale studies are needed to further evaluate his association and categorize particular blood groups as high-risk donors. This study also further reflects the importance of voluntary non-remunerated blood donors in blood donation.

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