

SEROPREVALENCE AND TREND OF TRANSFUSION TRANSMISSIBLE INFECTIONS IN BLOOD DONORS: A STUDY FROM TERTIARY CARE HOSPITAL IN PUNJAB

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Abstract

Background: Blood transfusion is associated with risk of transfusion transmissible infections (TTIs). This study was conducted to access the seroprevalence and trend of major TTIs in blood donors. **Material and Methods:** A retrospective study was conducted at Patel Hospital, India in which 13035 blood units were collected from 2015-2019 which were tested for TTIs (HIV/HBV/HCV) using a fully automated VitrosECi immunodiagnostic system. **Result:** Over a five-year period, out of 13035 blood units, 366 were seropositive for TTIs with seroprevalence rate of 2.81%. The prevalence was higher in males donors (2.85%) as compared to female donors (1%) and highest in the 18-30 age group. Between 2015 and 2019, HIV and HBV rates nearly doubled, while HCV showed a similar trend. **Conclusion:** The study highlights the need for promotion of non-remunerated and repeat voluntary blood donation and followup of TTI positive donors in addition to NAT testing to reduce risk of TTIs.

INTRODUCTION

Transmission of transfusion transmissible infections (TTIs) is one of the major adverse events which is associated with blood transfusion. National AIDS Control Organization (NACO) has made it mandatory to test all the donor samples for Human Immunodeficiency virus (HIV) 1 and 2, Hepatitis B, Hepatitis C, Syphilis and Malaria before releasing the blood for the patients.^[1] Among these TTIs; HIV, Hepatitis B and Hepatitis C pose a major threat for the patients because of asymptomatic course of these infections and tendency to escape detection during window period in blood donors in initial stages.

The magnitude of TTI among the donors varies between the countries and between different regions of same country. The knowledge of seroprevalence and trend of TTI in blood donors provides an estimate regarding the safety of blood transfusion and health practices of population in general. Thus, this study was conducted to access the seroprevalence and trend of major TTIs i.e. HIV,

HBV, HCV in blood donors by testing the blood units in accordance with NACO guidelines.^[1]

MATERIALS AND METHODS

The present study was a retrospective study conducted in the Department of Transfusion Medicine at Patel Hospital, Jalandhar, India a Tertiary level Hospital. The donors included in the study were apparently healthy and belonged to the age group of 18 to 65 years. All blood donors satisfied the criteria for blood donation as per Drugs and Cosmetic Act 1940 (and rules there under) and NACO guidelines.^[1]

Data was collected over a period of 5 years from January 2015 to December 2019 during which a total 13035 blood units were collected and tested for TTIs. Blood was screened for HIV, HBV, and HCV by using fully automated VitrosECi immunodiagnostic system based on enhanced chemiluminescence assay. All tests were performed as per manufacturer instructions and standard operating procedures of the department.

RESULTS

A total of 13035 blood units were collected over a period of 5 years by Department of Transfusion Medicine at Patel Hospital, Jalandhar, out of which 12736 (97.7%) were donated by males and 299 (2.29 %) by females. [Table 1]

Out of 13035 blood units screened, total 366 units were found to be seropositive for TTIs (HIV, HBV and HCV) with seroprevalence rate of 2.81% (366/13035). Year wise distribution of different TTI among males and females is shown in Table 2. Out of 366 reactive blood donors; 363 donors were males and 3 donors were females. Total 34 donors were reactive for HIV, 133 for HBV and 199 for HCV (n=366) as shown in [Table 2].

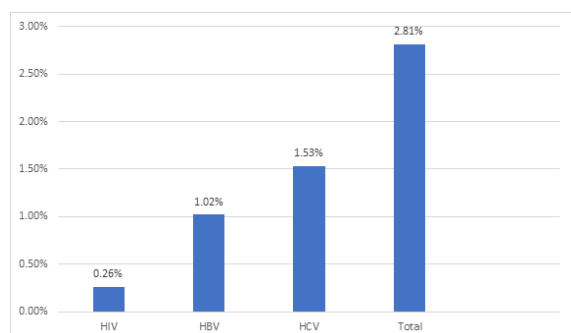


Figure 1: Prevalence of HIV, HBV, HCV in blood donors, n=13035

The seroprevalence for HIV was 0.26 % (34/13035), 1.02% for HBV (133/13035) and 1.53% for HCV (199/13035) with overall seroprevalence rate of 2.81%; (n=13035). [Figure 1]

The prevalence of TTI was found to be more in males (363 donors out of 12736=2.85%) as compared to female donors (3 donors out of 299 females =1.0%) as shown in [Figure 2].

Age wise distribution of different TTIs is shown in [Table 3]. Maximum prevalence of TTI was seen in 18-30 age group (1.83%) followed by age group of 31-50 years (0.97%) and least in age group of 51-65 years (0.01%). [Table 3]

From 2015 to 2019, HIV (0.17 to 0.34%) and HBV (0.69 to 1.54%) shows a rising trend and both infections have almost doubled in these 5 years whereas HCV almost showed a similar trend over these five years. [Figure 3]

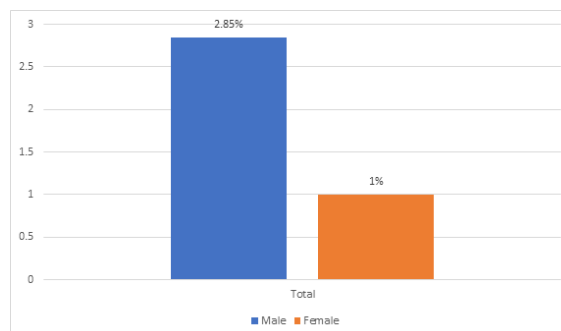


Figure 2: Prevalence of TTI in Male and Female donors, n=13035

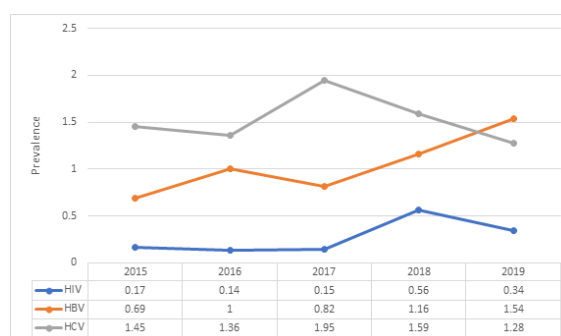


Figure 3: Year wise seroprevalence and trend of HIV, HBV, HCV in blood donors over 5 years

Table 1: Sex distribution of blood donors over 5 years, n=13035

Year	Males	Females	Total
2019	2266	72	2338
2018	2280	48	2328
2017	2626	45	2671
2016	2676	122	2798
2015	2888	12	2900
Total	12736 (97.7%)	299 (2.29 %)	13035

Table 2: Year wise distribution of reactive blood donors among males and females, n=366

Year	Total reactive	HIV			HBV			HCV		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
2019	74	8	0	8	36	0	36	30	0	30
2018	77	12	1	13	26	1	27	37	0	37
2017	78	3	1	4	22	0	22	52	0	52
2016	70	4	0	4	28	0	28	38	0	38
2015	67	5	0	5	20	0	20	42	0	42
Total	366	32	2	34	132	1	133	199	0	199

Table 3: Year wise distribution of reactive blood donors among different age groups and their prevalence, n=13035

Age group	18-30	31-50	51-65
	No. Of reactive donors	No. of reactive donors	No. of reactive donors
2019	47	27	0

2018	49	28	0
2017	51	26	1
2016	45	25	0
2015	46	21	0
Total	238 (1.83 %)	127 (0.97%)	1 (0.01%)

Table 4: The comparison of our study with other studies from North India.

Study	Region	Study period	Seroprevalence of HBV	Seroprevalence of HCV	Seroprevalence of HIV	Total Seroprevalence
Present study	Jalandhar	2015-2019	1.02	1.53	0.26	2.81
Kaur et al. ^[2]	Ludhiana	2004-2009	1	1.4	0.2	2.6
Kumar et al. ^[4]	Ludhiana	2008-2013	1.03	1.53	0.26	2.82
Koshy et al. ^[5]	Ludhiana	2008-2010	1.11	1.53	0.27	2.91
Arora et al. ^[6]	South Haryana	2002-2006	1.7	1.0	0.3	3
Makroo et al. ^[7]	Delhi	2005-2013	1.18	0.43	0.24	1.85
Rawat et al. ^[8]	Delhi	2008-2014	1.61	0.73	0.32	2.66

DISCUSSION

Despite the most stringent donor screening and testing practices, safe blood free from all TTIs remains a difficult goal to achieve. Despite technological advancements in TTI testing, there are various challenges like 'window period, false negative results, prevalence of asymptomatic carriers, genetic variability in viral strains and technical errors which can lead to transmission of TTIs to recipient.^[2] An integrated strategy by blood transfusion services is required for reduction of TTI transmission to patients. The main component of an integrated strategy includes collection of blood only from voluntary, non-remunerated blood donors, screening for all TTIs and reduction of unnecessary transfusions.^[3]

In our study, out of 13035 blood units collected in 5 years, majority was donated by male donors 12736 (97.71 %) as compared to female donors 299 (2.29%) which is comparable with other studies from North India. 2, 4-8 This difference could be due to high incidence of anaemia, household pressures, lack of motivation and fear about procedure in females compared to males.

Among apparently healthy 13035 blood donors, 366 donors (2.81%) were found to sero-reactive which included 34 donors reactive for HIV (0.26 %), 133 (1.02 %) for HBV and 199 (1.53%) for HCV.

The comparison of our study with other studies from North India is shown in [Table 4]. In our study, the prevalence of HIV, HCV and HBV is comparable with other studies from Ludhiana, Punjab from North India.^[2,4,5] Other studies from North including Haryana and Delhi shows higher prevalence of HBV and lower prevalence of HCV and comparable prevalence of HIV as compared to our study. 6,7,8. These differences could be due to difference in the study period, the donor population and screening methods used in the study.

CONCLUSION

The prevalence of TTIs in our study correlate well with prevalence rates from some of the other studies on blood donors in India. Therefore, non-remunerated and repeat voluntary blood donor services are needed and should be encouraged particularly amongst women. Along with use of NAT, confidential donor screening, enhanced public awareness, vigilance of donors, strengthening health facilities can help in decreasing TTIs. A system of regular follow up of positive TTIs donors should be strengthened so that they may be counselled, treated and prevent their re-entry in donor pool.

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