

**Original article**

## **Seropositivity of TTI (Transfusion Transmissible Infections) Among Blood Donors in Blood Bank of a District Hospital in Northern Rajasthan: A 4 year Record Review**

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### **ABSTRACT:**

**Introduction:** Everywhere in the world, transfusion of human blood is an essential therapeutic procedure, as there is no genuine substitution. Advances in infectious diseases testing continue to improve the safety of blood supply. However, viral, bacterial, and parasitic disease can still be transmitted by transfusion and novel agents may appear at any time. Thus, infectious complications of transfusion remain an important area of concern in transfusion medicine. The evaluation of data of the Seropositivity of HIV, HBV, HCV, syphilis and malaria among blood donors permits an assessment of the acquisition of the infections in the blood donor population and consequently the safety of the collected donations. It also gives an idea for the epidemiology of these infections in the community.

**Objective:** To find out prevalence of Seropositivity of TTIs among voluntary and replacement donors.

**Material And Method:** The present study was a retrospective record review and conducted at the Blood Bank of Govt. D.B.Hospital, Churu. Record review was done retrospectively for past 4 years i.e. June 2014 to May 2018. The donors were either voluntary (Camp and first relatives of patients) or replacement donors (relatives other than first relative or friends of patients in the blood bank). The total number of seroreactive cases and their distribution were noted and were identified as co-infection. All statistical analysis was done using Epi-info.

**Results:** Total 38818 blood units were donated at our blood bank during the study period, of which 265 blood units (0.68%) were positive for infectious marker. The seropositivity was 0.57% for Hepatitis B virus, 0.04% for HIV, 0.06% for Hepatitis C virus, 0.008% for syphilis and 0.003 for malaria. There were two cases of co-infection for HIV and Hepatitis B virus. There was single case of co-infection for HIV and Hepatitis C virus. The percentage of seropositivity was 0.68% in males and 1.97% in females. Seropositivity was highest in the age group of 26-40 years. **Conclusion:** Maximum Seropositivity was found for Hepatitis B virus. So, further community based studies are required to look for real prevalence of Hepatitis B in the catering area of the blood bank.

**Keywords:** Transfusion-transmitted infections, blood donors, Seropositivity

## **INTRODUCTION:**

Blood and blood component therapy is an inescapable mode of treatment in a variety of routine and emergency patient management. Most of deaths and disabilities related to blood transfusion are due to transmission of infectious agents. (1) Transfusion transmissible infections (TTI) create a significant burden on health care system. The burden of TTI varies from country to country depending upon the load of TTI in that population from where blood units are sourced. Blood donors are from the general population and seropositivity of blood donors is a reflection of seropositivity for these infection markers in general population of that geographical area. (2) Since a person can transmit infections during the asymptomatic phase (window period); transfusions have the potential to an ever widening pool of infections in the population. WHO recommends that all blood donations should be screened for infections prior to use. Screening for HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria should be mandatory. (3) Blood transfusion (BTS) service is an integral and indispensable part of healthcare system. The main objectives of BTS are to ensure safe, adequate, and accessible blood supply at all health care levels. (4) Blood Transfusion departments screen TTI and give valuable clue about the prevalence of these infections in healthy populations. (5) In spite of technological advancement; it is difficult to detect TTIs during window period. Other things like false negative results, prevalence of asymptomatic carriers, genetic variability in viral strains and technical errors causes error in diagnosis. (6) Hepatitis B is one of the common TTI and occult HBV infection can only be diagnosed by HBc and HBV DNA. (7) Global seroprevalance of HCV among blood donors varies from 0.4-19.2%. (8) Collection of blood during window period is responsible for transmission of HIV via blood and component transfusion. (9) Very few data is available that shows presence of co-infection with more than one TTI. (10,11) In India testing of HIV1 and II, Hepatitis B and C virus, Syphilis and malaria is mandatory. (12)

## **OBJECTIVES:**

- 1.To find out frequency of seropositivity of HIV , HBsAg , HCV, syphilis and malaria in voluntary and replacement donors in Blood Bank of DBH,Churu (Rajasthan).
2. To find out age and sex distribution among seropositive for HIV , HBsAg , HCV, syphilis and malaria among voluntary and replacement donors.

## **MATERIAL AND METHOD:**

The present study was a retrospective record review and conducted at the Blood Bank of Govt. D.B.Hospital , Churu. Record review was done retrospectively for past 4 years i.e. June 2014 to May 2018. 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 3<sup>rd</sup> generation , J.Mitra & SD Lab) and Venereal Disease Research Laboratory (VDRL) reactivity (Carbogen kit, Tulip Diagnostics as well as RPR Span) malaria was screened by Rapid Card Test. Test e performed according to the manufacturer's instructions. All reactive samples repeated in duplicate before labeling them seropositive. The donated blood was discarded whenever the pilot donor sample found positive for any TTIs. External and Internal quality control was maintained by submitting the samples to NACO approved center, Santokba Durlabh Ji Laboratory, Jaipur and plotting Levi Jennings chart respectively.

**RESULTS:**

Out of 38818 blood donors included in this study over a period of four years, 32047(82.56%) voluntary blood donors whereas 6771 (17.44%) were replacement donors (table 1). There were 31847 (82.04%) males, while 6768 (17.44%) were females. All donors were divided in three age groups i.e. 18-25 years, 26-40 years and more than 40 years. It is seen that there were maximum donors from 26-40 years followed by 18-25 years i.e. 54.95%, 36.19% respectively while more than 40 years group had only 15.5% donors (Table 3). Overall, average seropositivity was 0.683%, with 0.041% for HIV, 0.062% for HCV and 0.569% for HBV, 0.008% for syphilis and 0.003% for malaria. On seeing year wise seropositivity it is seen that there is a trend of decrease in seropositivity, it being least (0.505%) in June 2017-May 2018 from 0.828% in June 2015-May 2016. Seropositivity in voluntary donors was 4.2 times more as compared with replacement donors. Out of 265 seropositive donors, only 4 were females (1.5%). Single female was positive for HCV and three females for HBV. All were voluntary donors. 66.4% seropositive donors belonged to 26-40 years, 28.7% to 18-25 years and 4.9% belonged to more than 40 years group (table 5). There was single case of co-infection for Human Immunodeficiency Virus, and Hepatitis C Virus. There were two cases of co-infection for HIV and Hepatitis B virus. All cases of co-infection were males and voluntary donors.

Table 1: Year wise distribution of donors (Voluntary and replacement donors)

Year	Voluntary		Replacement		Total
	Number	%	Number	%	
June 2014-may 2015	6615	82.00	1452	18.00	8067
June 2015-may 2016	8032	81.15	1866	18.85	9898
June 2016-may 2017	9444	83.22	1903	16.78	11347
June 2017-may 2018	7956	83.69	1550	16.31	9506
Total	32047	82.56	6771	17.44	38818

Table 2: Distribution of donors according to sex and type of donor (V-voluntary, R-replacement, T-total)

Year	Male			Female		
	V	R	T	V	R	T
June 2014-may 2015	6594	1451	8045	21	01	22
June 2015-may 2016	8022	1866	9888	10	00	10
June 2016-may 2017	9378	1902	11280	66	01	67

June 2017-may 2018	7853	1549	9402	103	01	104
total	31847	6768	38615	200	03	203
%	82.04	17.44	99.48	0.51	0.01	0.52

Table 3: Distribution of all donors according to age and sex

Age	18-25yr			26-40yr			>40yr			Total
Year	male	female	total	male	female	total	male	female	total	
June 2014-may 2015	3395	08	3403	3780	12	3792	870	02	872	8067
June 2015-may 2016	3402	04	3406	5576	05	5581	910	01	911	9898
June 2016-may 2017	4025	19	4044	6630	45	6675	625	03	628	11347
June 2017-may 2018	3171	26	3197	5210	73	5283	1021	05	1026	9506
Total	13993	57	14050	21196	135	21331	3426	11	3437	38818
%	36.04	0.14	36.19	54.60	0.34	54.95	8.82	0.03	8.85	100

Table 4: Seropositivity for Transfusion Transmissible Infections among all donors

	Donor	June2014-may 2015	June2015-may 2016	June2016-may 2017	June2017-may2018	Total	% TTI
HIV	V	02	02	03	03	10	0.026
	R	03	01	01	01	06	0.015
	Total	05	03	04	04	16	0.041
	%	0.062	0.030	0.035	0.042	0.041	
HBsAg	V	42	61	48	33	184	0.474
	R	09	15	07	06	37	0.095
	Total	51	76	55	39	221	0.569
	%	0.632	0.768	0.485	0.410	0.569	
HCV	V	06	01	10	02	19	0.049
	R	00	01	01	03	05	0.013
	Total	06	02	11	05	24	0.062
	%	0.074	0.010	0.097	0.053	0.062	
Syphilis	V	01	00	01	00	02	0.005

	R	00	01	00	00	01	0.003
	Total	01	01	01	00	03	0.008
	%	0.012	0.020	0.009	00	0.008	
Malaria	V	01	00	00	00	01	0.003
	R	00	00	00	00	00	0.000
	Total	01	00	00	00	01	0.003
	%	0.012	00	00	00	0.003	
Total seropositivity	V	52	64	62	38	216	0.556
	R	12	18	09	10	49	0.126
	Total	64	82	71	48	265	0.683
	%	0.793	0.828	0.626	0.505	0.683	
Total donors		8067	9898	11347	9506	38818	

Table 5: Distribution of seropositive cases according to age group

Age group	18-25 yr		26-40yr		>40yr		Total
Years	TTIs	%	TTIs	%	TTIs	%	
June 2014-may 2015	24	37.5	35	54.7	05	7.8	64
June 2015-may 2016	17	20.7	61	74.4	04	4.9	82
June 2016-may 2017	21	29.6	47	66.2	03	4.2	71
June 2017-may 2018	14	29.2	33	68.7	01	2.1	48
Total	76	28.7	176	66.4	13	4.9	265

#### DISCUSSION:

In our study TTI was most common between 26 to 40 years of age group. Mandal et al also found that height prevalence of TTI in 26 to 35 years of age group. (13) The peaking of TTI in young age group suggests a close relationship of acquisition of infection in sexually active age group and also suggests high risk behaviour population. The rates of seropositivity among males were higher than females in our study. This could be due to the fact that males work outdoors and away from their homes and have more chances to get infections.

Table 6: Comparison of seropositivity of blood donors in different studies

Sr. no.	Author	Area	Year	HBV(%)	HIV(%)	HCV(%)	Syphilis(%)
1.	Kaur et al 16	Chandigarh,india	2001-2005	1.7	0.6	0.8	0.7
2.	Deshpande et al 17	Latur , maharashtra	2007-2011	2.82	0.38	0.22	0.22
3.	Patil et al 15	Mumbai , maharashtra	2008-2014	1.48	0.40	0.37	0.11
4.	Mandal et al 14	West Bengal , india	2010-2012	1.24	0.42	0.62	0.65
5.	Lathamani et al 18	Karnataka ,india	2008-2010	0.53	0.08	0.098	0.09
6.	Our study	Churu ,india	2014- 2018	0.569	0.04	0.062	0.008

Table 6 shows comparison of different studies on TTI and reveals that the seropositivity of HBV was highest followed by HIV among TTI in most of the studies. (13,14,15,16,17) Seropositivity rates of syphilis and malaria were in negligible frequency. This shows that our health system is working with efficacy. The difference in values of seropositivity in different studies may be due to difference in prevalence of TTI in different areas, the effectiveness in donor selection and variable proportion of replacement and voluntary donors. There were only three donors with co-infection found in our study and contrary to that Kaur et al found 23 blood donors with co-infection in their study. (15) The risk of having TTI in the replacement donors was found more among replacement donors as compared to voluntary donors. (13,15) In present study we found seropositivity was more among voluntary donors. This contrary finding can be due to recent change in definition of voluntary donors. Promotion of voluntary donations (blood camps) would further reduce the risk of both single as well as co-infections. Hence, the emphasis should be to maximize voluntary blood donations so as to minimize the risk of TTI in accordance with the National Blood Policy of India. (18)

#### CONCLUSION:

The seropositivity among the blood donors at our blood bank was 0.569% for HBV, 0.041% for HIV, 0.062% for HCV and 0.008% for Syphilis and 0.003% for malaria. The prevalence was highest among the sexually active age group of 26-40 years. Total seropositivity declining over the course of three years. Voluntary blood donation (blood camps) and proper donor selection are important to increase blood safety and avoid transmission of infectious disease through blood transfusion.

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