



## Seroprevalence of Common Transfusion Transmitted Infections among Blood Donors in Tertiary Care Rural Hospital of Central India: A Six Years Study

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### Abstract

**Objective:** The aim and objective of the present study was to detect seroprevalence of transfusion transmitted infections (TTIs) among voluntary as well as replacement donors of rural population.

**Materials and Method:** The present study was a retrospective study carried out in the blood bank of tertiary hospital serving mainly rural population of central India From January 2010 to December 2015. All blood bags collected from these blood donors during the study period were screened for TTIs like HIV, HBV, HCV and VDRL from serum of the samples collected at the time of bleeding. The serological tests were performed according to the instructions provided by the manufacturers of the respective kit. All seroreactive blood bags were considered as positive for TTIs and were discarded.

**Result:** During this study period total 39732 donors were donated blood in the blood bank out of which 32918 were voluntary donors and 6814 were replacement donors. Out of these total 39732 donors 0.39%, 1.61%, 0.33 and 0.78% donors were positive for HIV, HBV, HCV and VDRL respectively. We also found the seropositivity was more in voluntary donors as compared to replacement donors.

**Conclusion:** In our study we analyzed that there is no decreased in the trends of HIV, HBV and VDRL seroprevalence as compared to HCV. So there is need to increase awareness programs for donors from the rural population of India about TTIs.

**Keywords:** Seroprevalence, TTIs, Transfusion transmitted infection, Rural India.

### INTRODUCTION

Since 1930 blood transfusion therapy remains the important therapeutic tool in several medical as well surgical interventions. <sup>[1]</sup> There are three types of donors voluntary, replacement and paid. Voluntary donors are a donor who donates his or her blood

without any remuneration whereas replacement donors donate his/her blood on request by the patients or his associates. Paid donors are the illegal practices who donates blood for kind of some remunerations. <sup>[2]</sup> Blood transfusion can save lives when timely given but if the blood transfusion practice will be unsafe these people can be put in

danger due to risk of transfusion transmissible diseases (TTIs).<sup>[3]</sup> Total 81 millions of blood units are donated each year worldwide, out of these 18 millions of blood unit are not screened for TTIs.<sup>[4]</sup> So, an unsafe blood donation practices can costs both human as well as economic point of views and these can results not only morbidity and mortality to patients which can be preventable but also have social effects on their families, communities.<sup>[5,6]</sup> The various procedures to eliminate or at least to reduce the risk of acquiring or transmitting TTIs depends upon strict donor selection criteria, sensitive screening tests and effective inactivation procedures.<sup>[7]</sup>

TTIs can exit as asymptomatic disease in the host hence donors must be screened for high risk behavior. The assessment of the prevalence of TTIs among donors of that particular area can give us an idea of the occurrence of various TTIs in blood donor population and with stringent screening we can move towards safety of the collected blood. It can also give us an idea about the epidemiology of the diseases in that particular community.<sup>[8]</sup>

## MATERIAL AND METHODS

The present study was carried out in the blood bank of tertiary rural hospital located in central India. Over a period of six years from Jan 2010 to Dec 2015 all the voluntary as well as replacement donors were included in the study. Before donation donors were asked to fill the questioner form which included all the information regarding various high risk factors like history of blood transfusion, hospitalization, surgery and other high risk behavior which could give idea about any TTIs. Written consent was obtained from the blood donors before bleeding. Suitable donors were selected and the appropriate amount of blood was collected. At the same time blood samples were collected in a plain test tube to test TTIs and peripheral blood smear was also made to rule out malaria.

During the span of six years period 39732 donors were screened for Human immunodeficiency virus (HIV)( HIV Ab; HIV 3rd generation kit for detection of antibodies to HIV1 and HIV2, J. Mitra

— J. Mitra & Co. Pvt. Ltd, New Delhi, India), Hepatitis B virus(HBV) (Hepalisa, J. Mitra — J. Mitra & Co. Pvt. Ltd, New Delhi, India), Hepatitis V virus (HCV)( HCV Ab; MicroELISA 3rd generation, J. Mitra — J. Mitra & Co. Pvt. Ltd, New Delhi, India) by ELISA, syphilis by RPR(Carbogen kit, Tulip Diagnostics-Tulip diagnostics (P) Ltd, Uttarakhand, India) and Malaria by peripheral smear examination using Field staining. Serum was separated from the blood sample of each donor collected at time of donation. The serological tests were performed as per the manufacturer instructions provided along with the kit.

## RESULT

This was six year retrospective study carried out between January 2010 to December 2015 in blood bank of rural tertiary care centre of central India.. During this period total 39732 donors donated their blood out of which 32918 (82.8 %) were voluntary donors (32145(80.93%) male, and 773(1.94%) were females) and 6814 (17.2%) were replacement donors (6810 (17.13%) male and 04 (0.001%) females) (Table no.1). All these donors were screened for TTIs like HIV, HBV, HCV, syphilis and malaria. In our study overall seroprevalence of HIV was 157 cases (0.39%), HBV was 641 cases (1.61%), HCV was 133 cases (0.33%) and syphilis was 31 cases (0.78%) respectively. (Table no. 2) In our study we did not found any case positive for malarial parasite.

We also evaluated the seropositivity amongst replacement versus voluntary donors in that we found the seropositivity was more in voluntary male donors 812 (84.40%) and as compared to replacement male donors 142(14.76 %). We observed that 8 (0.8 %) voluntary females has seropositivity for TTIs compared to replacement female donors. There were no seropositive donors amongst replacement female donors (Table no. 3).

**Table No. 1:** Distribution of donors from January 2010 to December 2015

Year	Voluntary donors		Replacement donors		Total
	Male (%)	Female (%)	Male (%)	Female (%)	
2010	4967(73.24)	181(2.67)	1614(23.85)	3(0.04)	6765
2011	5225 (78.37)	195(2.92)	1247(18.7)	0(0)	6667
2012	5430(79.49)	112(1.63)	1288(18.85)	1(0.014)	6831
2013	5210(81.11)	123(1.91)	1090(16.97)	0(0)	6423
2014	5464(84.66)	66(1.02)	924(14.31)	0(0)	6454
2015	5849(88.72)	96(1.45)	647(9.81)	0(0)	6592
Total	32145(80.90)	773(1.94)	6810(17.13)	4(0.01)	39732

**Table No 2:** Distribution of seropositive cases from January 2010 to December 2015

Year	Total	HIV		HBsAg		HCV		VDRL	
		Male	Female	Male	Female	Male	Female	Male	Female
2010	6765	34	0	110	2	15	0	5	0
2011	6667	39	0	105	1	17	2	9	0
2012	6831	28	0	142	0	36	0	7	0
2013	6423	17	0	118	1	19	0	4	0
2014	6454	26	0	88	0	18	0	3	0
2015	6592	13	0	73	1	25	1	3	0
Total	39732	157(0.39%)	0	636(1.58%)	5(0.01%)	130(0.31%)	3(0.01%)	31(0.78%)	0

**Table No 3:** Seropositivity against voluntary and replacement donors from Jan 2010 to Dec 2015

	Voluntary donors		Replacement donors		Total
	Male	Female	Male	Female	
HIV	135	0	22	0	157
HBV	542	5	94	0	641
HCV	109	3	21	0	133
VDRL	26	0	5	0	31
Total	812	8	142	0	962

**Table No 4:** Comparison of seroprevalance of various studies among India.

	HIV (%)	HBV(%)	HCV(%)	VDRL (%)
Srikrishna A et al(1999) <sup>[10]</sup>	0.44	1.86	1.02	1.6
Pahuja et al (2007) <sup>[11]</sup>	0.56	2.23	0.66	--
Bhattacharya P et al (2007) <sup>[12]</sup>	0.28	1.46	0.31	0.72
Chandra T et al(2009) <sup>[13]</sup>	0.23	1.96	0.85	0.01
Arora D et al(2010) <sup>[14]</sup>	0.3	1.7	1.0	0.9
Giri P et al(2012) <sup>[15]</sup>	0.07	1.09	0.74	0.07
Alok Kumar et.al. (2014) <sup>[16]</sup>	0.53	1.76	0.20	0.07
Makroo R et al(2015) <sup>[17]</sup>	0.24	1.18	0.43	0.23
Present study	0.39	1.61	0.33	0.78

## DISCUSSION

The transmission rate of HIV, HBV, HCV and syphilis through blood transfusion have been reported around 1 in 2-5 millions, 1 in 0.5 – 1 millions, 1 in 2-4 millions and 1 in 6 million respectively. <sup>[3,9]</sup> But in India this trend is somewhat different and many studies have been carried out to observe seroprevalence amongst donors for TTIs. We compared our study with most of the studies carried out in India and the results were as follows in table no 4.

The seroprevalence for HIV (0.39%) and HBV (1.61%) in present study is close to study carried out by Shrikrishna A et al. <sup>[10]</sup> but the prevalence for HCV and syphilis doesn't match with our study. The results for seroprevalence for HCV carried out by Pahuja S et al. <sup>[11]</sup> were somewhat high but study carried in West Bengal by Bhattacharya P et al. <sup>[12]</sup> were similar to our study findings. The range for syphilis prevalence varied from study to study that is from 0.01 to 1.6 but in our study we found prevalence 0.78 % which is in the range of the various studies. <sup>[10-15]</sup>

In present study in addition we found 820 (2.5 %) voluntary donors seropositive for TTIs out of 32198 voluntary donors and 142 (2.0 %) replacement donors were found seropositive for TTIs out of 6814 replacement donors. So, the seropositivity was more in voluntary donors as compared to replacement donors. Contradictory to this Makroo RN et al. <sup>[17]</sup> and Jamsin Jasani et al. <sup>[18]</sup> found that the seropositivity is more in replacement donors as compared to voluntary donors. They also found that males were more affected as compared to female. When we compared the seropositivity in male and female we found that the seropositivity was more in voluntary males donors 812 (2.46%) in comparison to voluntary female donors. In case of replacement donors no replacement female donors were positive for TTIs but 142 (2.08%) replacement male donors were positive. Similar type of study was carried out in the same institute but it was prospective study of only one and half

year, that study also showed results somewhat matching to present study. <sup>[16]</sup>

## CONCLUSION

In our study we analyzed that there is no decreased in the trends of HIV, HBV and syphilis seroprevalence. The cause behind this can be as there is increased in population as well as these study carried out in rural population of central India. So, the unawareness and illiteracy can be the cause. Compared to HIV and HBV there is decreased in the trend of prevalence of the HCV in our study. So, this study points out us there is need to have well organized and a population based awareness program for donors from the rural population of India about HIV and HBV infections. So, that the patient from rural population can get safe blood transfusion.

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