

**Original Research Article****Threats of Transfusion Transmitted Infections: Trends and Seroprevalence among Healthy Blood Donors in Govt. RBM District Hospital Blood Bank: Bharatpur, Rajasthan, India****Avinash Pande<sup>a</sup>, Madhuri Agrawal<sup>b</sup>, Archana Mittal<sup>c</sup>, Sunita Pande<sup>d</sup>, Neeraj Kumar<sup>e</sup>**

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**Abstract**

**Background:** Transfusion-transmissible infections such as hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C virus (HCV) and syphilis are among the greatest threats to blood safety for transfusion recipients thus posing a serious public health problem. This study was done with the aim to study the Seroprevalence of transfusion transmitted infections amongst voluntary and replacement blood donors at Blood Bank and an yearly comparison was made to find out the incidence of HIV, HBV, HCV, Syphilis and Malaria.

**Methods:** In this study, we aimed to access the prevalence and trend of HIV, HBV, HCV and Syphilis over the last 3 years (January 2015 to December 2017) among the blood donors who came to donate Blood at Blood Bank, RBM hospital and associated hospitals as well as in various blood donation camps organized by the same blood bank.

**Results:** From the total of 34628 blood donors, 801 (2.31%) had serological evidence of infection with at least one pathogen, either of HIV, HBV, HCV or Syphilis. These included 23 (0.066%) with HIV, 705 (2.03%) with HBV, 35 (0.10%) with HCV, 47 (0.13%) with Malaria and 27 (0.078%) with Syphilis.

**Conclusion:** From the quantum of blood donors harbouring these infections found in the study, it becomes mandatory to properly select blood donors and perform comprehensive testing of donor's blood using standard methods to ensure the safety of blood recipients

**Keywords:** Seroprevalence; Voluntary; Replacement Blood Donors; HIV; HBV; HCV; Malaria; Syphilis; Transfusion Transmissible Infection (TTI).

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**Introduction**

Blood transfusion service is an integral and indispensable part of health care system. Transfusion of blood and its components save millions of lives worldwide each year and reduce morbidity. Blood transfusion is associated with large number of complications, some of them are only trivial while others are life threatening. Use of unscreened blood transfusion keeps the patient at risk

of acquiring many transfusion transmitted infections like human immune deficiency virus (HIV), Hepatitis B, Hepatitis C, Malaria syphilis, etc. Elaborate pre-transfusion testing and screening of blood has become a necessity for safe transfusions.

Transfusion transmitted infections are a great concern of safety for patients requiring blood transfusion. Till early 1970, blood bank personnel were only concentrating on a few blood borne infections like syphilis and viral hepatitis

despite the constant awareness regarding the presence of multiple infective agents [1]. Blood transfusion departments now-a-days not only screen the blood for HIV, Hepatitis, Malaria and Syphilis, they also give clue regarding the prevalence of these infections in healthy population [3]. The present study has been undertaken to report the seroprevalence of some transfusion transmitted infections over a period of three years from January 2015 to December 2017 in Bharatpur district.

### Materials and Methods

The present study was conducted at Blood Bank RBM Govt. Hospital Bharatpur. Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, Malaria and Syphilis. Data was collected over a period of 3 years from January 2015 to December 2017. In a 3 years period 34628 donors were tested. Donors were selected by the standard criteria for donor fitness. The screening for HIV, HBSAg and anti HCV was done by ELISA (4<sup>th</sup> Generation, J Mitra Diagnostics, India). Test for Syphilis and Malaria was done

by rapid card method. All the reactive samples were repeated in duplicate as recommended by NACO (National AIDS Control Organization). Repeat reactive were labelled as ELISA positive for respective infection and were discarded. The number, type and distribution of co-infections were noted and the findings were analysed.

### Results

A total of 34628 apparently healthy adult donors were screened during the study period. Among them 33246 (96.01%) were males and 1382 (3.99%) were females. 8348 (24.11%) were voluntary donors (VD) while 26280 (75.89%) were replacement donors (RD) (Table 1).

The overall prevalence of HIV, HbsAg, HCV, Malaria and Syphilis were 0.066, 2.03, 0.10, 0.13 and 0.078%, respectively (Table 2). The prevalence of HIV, HbsAg, HCV, Malaria and syphilis among replacement donors were 0.06, 1.86, 0.095, 0.13 and 0.07%, respectively, while in voluntary donors it was 0.006, 0.17, 0.006, 0.002 and 0.01%, respectively (Table 3).

**Table 1:** Total blood collection and sex distribution of donors

Year	Total donors	Voluntary donors	Replacement donors	Males	Females
2015	12056	3193	8863	11658	398
2016	11811	2712	9099	11291	520
2017	10761	2443	8318	10297	464
Total	34628	8348(24.11%)	26280 (75.89%)	33246 (96.01%)	1382(3.99%)

**Table 2:** Incidence of HIV, HBSAg, HCV, Malaria and Syphilis in blood donors

Year	Total donors	HIV	HBSAg	HCV	VDRL reactivity	Malaria
2015	12056	12 (0.099%)	250 (2.07%)	8 (0.06%)	9 (0.07%)	30(0.25%)
2016	11811	06 (0.05%)	119 (1.01%)	6 (0.13%)	9 (0.07%)	12(0.10%)
2017	10761	05 (0.046%)	336 (3.12%)	11 (0.10%)	9 (0.08%)	5(0.04%)
Total	34628	23 (0.066%)	705 (2.03%)	35(0.10%)	27 (0.078%)	47(0.13%)

**Table 3:** Incidence of TTI (%) amongst voluntary (V) and replacement (R) donors during 3 years period (2015–2017)

Year	HIV		HbsAg		HCV		VDRL		Malaria	
	V (%)	R (%)	V (%)	R (%)	V (%)	R (%)	V (%)	R (%)	V (%)	R (%)
2015	0.008	0.09	0.25	1.82	0.008	0.06	0.008	0.06	0.008	0.24
2016	0.008	0.042	0.15	0.85	0.008	0.13	0.017	0.06	00	0.10
2017	00	0.046	0.11	3.01	00	0.10	0.009	0.074	00	0.04
Average	0.006	0.06	0.17	1.86	0.006	0.095	0.01	0.07	0.002	0.13

### Discussion

There is always a risk of TTI's associated with blood transfusion. The risk of TTI has declined dramatically in high income nations over the past two decades, but it is still a major risk in the developing countries. The national policy for blood transfusion services in our country is of recent origin and the transfusion services are hospital

based and fragmented [4]. Voluntary donors (VD) are motivated donors who donate blood at regular interval, replacement donors (RD) are usually one time blood donors who donate blood only when a relative or a friend is in need of blood. The majority of (96.01%) donors in our study were males which is comparable to studies done by Pallavi et al [4] Mysore, Rao and Annapurna et al [5] in Pune, Rose et al [6] in Vellor, Arora D et al [7] in southern

Haryana, Singh K et al [8] in coastal Karnataka, Pahuja et al [9] in Delhi and Singh B et al [10] noting more than 90% of the male donors.

In the present study overall seroprevalence of HIV, HBsAg, HCV, Syphilis and Malaria were 0.066%, 2.03%, 0.10%, 0.078%, 0.13% respectively.

Serosurveys are one of the primary methods to determine the prevalence of TTI. Assessment helps in determining the safety of blood products and also gives an idea of the epidemiology of these diseases in the community [8]. For HIV India is second only to South Africa in terms of overall number of people living with HIV. The Indian National Control Organization (NACO) suggested an overall prevalence of 0.91% in India with 0.25% in Delhi. The prevalence of HIV in various parts of India is different with high rate in Western and Southern parts [10]. The present study showed prevalence of HIV 0.066% which is comparable to study by Gupta N et al [14] at which was 0.084% and in compare of other studies [4,7,9,11,12]. The prevalence of HBsAg was 2.03% in our study which is comparable to study done by Chandra T et al 11 (1.96%) and higher than other studies [4,7,9,13,14,15].

The HCV seroprevalence in our study was 0.10% which is comparable to study done by Shah N et al (0.11%) and lower to other studies [4,7,9,11,13,14].

The VDRL reactivity in our study was 0.078% which is lower than other studies in India [4,7,11,13,14] and higher than Chandra T et al 12 (0.01%)

The prevalence of Malaria was 0.13% in present study. There were only very few studies available on prevalence of malaria as most are not having any malaria positive case in blood donors. So prevalence of Malaria is higher in our study and showing declining trend.

As per our study there is constant difference between seropositivity for HIV, HBsAg, HCV, Syphilis, and Malaria amongst voluntary and replacement donors. The prevalence of HIV, HBsAg, HCV, Syphilis and Malaria among replacement donors were 0.06, 1.86, 0.095, 0.07, 0.13 % respectively, which is much higher than in voluntary donors that is 0.006, 0.17, 0.016, 0.01, 0.002% respectively. Studies [7, 8, 10] have high seropositivity rate in RD compared to VD, a similar finding as we noted in our study.

## Conclusion

As per our study which is comparable to other studies in India voluntary donors have significantly lower rates of prevalence of transfusion transmitted infections compared to replacement blood donors. So awareness of general population about regular blood donation should be created to minimise the chances of spreading TTI. The current practice of selection of voluntary donors over

replacement donors to meet with the need for blood in hospitals coupled with availability of better testing reagents is sure to lower down the threats of transmitting TTIs to patients via transfusion of blood and blood products.

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