

## Original Research Article

**Transfusion Transmitted Infections (TTIs) among blood donors of Punjab****H. S. Lamba<sup>1</sup>, Kulbir Kaur<sup>2</sup>, Parwinder Kaur<sup>3</sup>, Kulwant Kaur<sup>4</sup>, Kamaljeet Kaur Vij<sup>5</sup>, Amarjit Singh Vij<sup>6</sup>**<sup>1</sup>Assistant Professor, Department of Pathology, Punjab Institute of Medical Sciences, Jalandhar.<sup>2</sup>Professor, Department of Pathology, Punjab Institute of Medical Sciences, Jalandhar.<sup>3</sup>Associate Professor, Department of Pathology, Punjab Institute of Medical Sciences, Jalandhar.<sup>4</sup>Tutor, Department of Pathology, Punjab Institute of Medical Sciences, Jalandhar<sup>5</sup>Assistant Professor, Department of Anatomy, Punjab Institute of Medical Sciences, Jalandhar.<sup>6</sup>Professor, Department of Medicine, Punjab Institute of Medical Sciences, Jalandhar**\*Corresponding author**

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**Abstract:** Blood is life and blood transfusion saves millions of lives worldwide each year and reduces morbidity. Blood transfusion is associated with a large number of complications, some of them are trivial and others are potentially life threatening which demand pre-transfusion screening and testing particularly transfusion transmissible infections (TTIs). These TTIs are a major problem associated with blood transfusion practice. The estimate of risk of TTIs is essential for monitoring the safety of blood components available for transfusion and to evaluate the success of screening procedures. A retrospective study of the data of healthy blood donors was conducted at blood bank of Punjab Institute of Medical Sciences, Jalandhar, Punjab. The blood donors who donated blood from January, 2011 till December, 2015 were included in this study. The data was analyzed statistically using SPSS software version 20. Out of total 22,645 healthy blood donors, there were 22,443 (99.1%) male and 202 (0.9%) female; 9,793 (43.2%) voluntary and 12,852 (56.8%) replacement donors. 2.68% blood donors tested positive for TTIs and the incidence of five routinely tested TTIs was HBsAg 0.58%, Anti-HCV 1.05%, Anti-HIV 0.15%, VDRL 0.88% and malaria 0.01%. From year 2011 to year 2015, the trend of anti-HCV and VDRL was up sloping whereas that of HBsAg and anti-HIV down sloping. Malaria was positive only in the year 2012. With the implementation of strict donor criteria, and use of sensitive screening tests, it may be possible to reduce the incidence of TTIs.

**Keywords:** Blood, transfusion, transfusion transmissible infections (TTIs)

**INTRODUCTION**

Blood transfusion is a life-saving intervention that has an essential role in patient management within health care systems but at the same time it has life threatening hazards also [1]. There should be provision of adequate supplies of safe blood and blood products that are accessible to all patients who require transfusion either to save their lives or promote their continuing or improving health. World health organization recommends screening of all whole blood and apheresis donations for transfusion-transmissible infections prior to the release of blood and blood components for clinical or manufacturing use. Screening of all blood donations is mandatory for the following infections: human immunodeficiency virus 1 and 2 (HIV 1 & 2), Hepatitis B virus (HBV), hepatitis c virus (HCV), syphilis (*Treponema pallidum*). Screening of donations for other infections, such as those causing

malaria, chagas disease or HTLV, should be based on local epidemiological evidence [2]. India has a population of more than 1.2 billion with 5.7 million Human Immunodeficiency Virus (HIV) positive, 43 million HBV-positive and 15 million HCV-positive people [3]. The risk of transfusion associated transmission of these viruses may be alarming due to high sero-prevalence of HIV, HCV and HBV (0.5%, 0.4% and 1.4% respectively) among blood donors. As per guidelines of National AIDS Control organization (NACO) of India, it is mandatory to test each and every blood unit for HIV, anti HCV, HBsAg, Syphilis and Malaria [4]. This study was aimed to know the prevalence of transfusion transmissible infections (TTIs) among the blood donors of Punjab.

**MATERIAL AND METHODS**

This retrospective study was done on the record of blood donors who donated blood during five years period (1<sup>st</sup> January, 2011 to 31<sup>st</sup> December, 2015) at blood bank of Punjab Institute of Medical Sciences, Jalandhar. All these blood donors were healthy blood donors screened carefully by trained personnel by answering the donor’s questionnaire and complete physical examination. The donated blood units were tested to detect hepatitis B surface antigen (HBsAg), hepatitis c virus antibodies (Anti-HCV), human immunodeficiency virus antibodies (Anti-HIV 1 & 2)

with enzyme linked immunosorbent assay (ELISA) method, serology for *Treponema pallidum* antibodies by slide flocculation test, venereal disease research laboratory test (VDRL) and looking for presence of malaria parasite (MP) on peripheral blood smear.

**RESULTS**

There were total 22,645 blood donors, 9,793 (43.2%) voluntary and 12,852 (56.8%) replacement donors. There were 22,443 (99.1%) male and 202 (0.9%) female donors. The year wise distribution of blood donors is shown in table 1.

**Table-1: Distribution of voluntary and replacement blood donors**

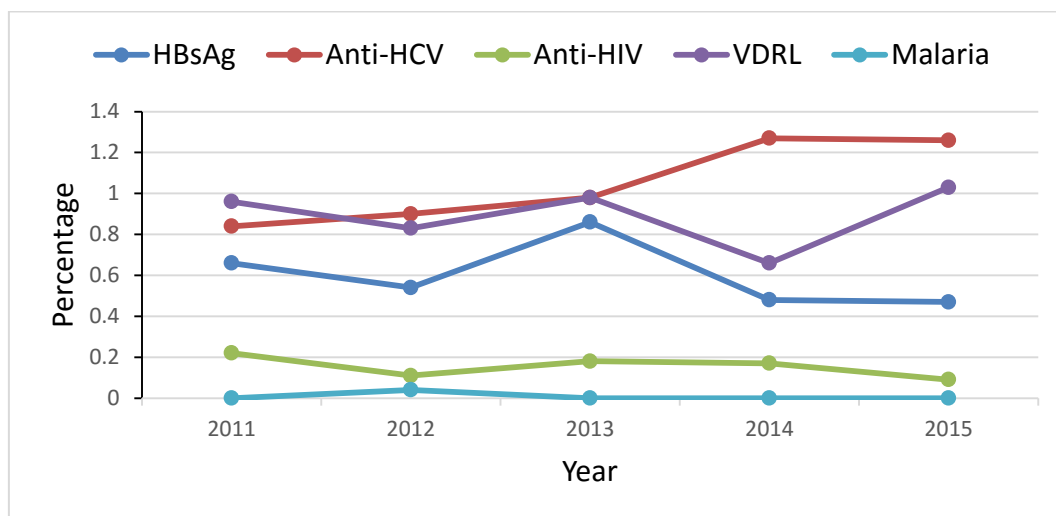
Year	Voluntary (%)	Replacement (%)	Male (%)	Female (%)	Total
2011	1,330 (26.7)	3,648 (73.3)	4,928 (99.0)	50 (1.0)	4,978
2012	798 (15.4)	4,392 (84.6)	5,133 (98.9)	57 (1.1)	5,190
2013	719 (27.1)	1,938 (72.9)	2,630 (98.9)	27 (1.1)	2,657
2014	2,213 (48.5)	2,355 (51.5)	4,521 (98.9)	47 (1.1)	4,568
2015	4,733 (15.4)	519 (84.6)	5,231 (99.6)	21 (0.4)	5,252
Total	9,793 (43.2)	12,852 (56.8)	22,443 (99.1)	202 (0.9)	22,645

Out of all the blood units studied, 608 (2.68%) tested positive for one or the other of the five TTIs. The incidence of five routinely tested TTIs over the five years study was HBsAg (0.58%), anti-HCV (1.05%), anti-HIV (0.15%), VDRL (0.88%) and malaria parasite (0.01%). Out of these five TTIs, majority of the donors were positive for anti-HCV and the minimum incidence

was that of malaria. All the TTI positive blood units belonged to male blood donors except one tested positive for HCV was from a female donor. The incidence of TTIs among the blood donors is shown in table 2 and the trend of their incidence during the study period is shown in figure 1.

**Table-2: Incidence of Transfusion Transmissible Infections (TTIs) among blood donors, n (%)**

Year	Donors	Total TTIs	HBsAg	Anti-HCV	Anti-HIV	VDRL	Malaria
2011	4,978	134 (2.69)	33 (0.66)	42(0.84)	11(0.22)	48(0.96)	0(0.0)
2012	5,190	126 (2.43)	28(0.54)	47(0.9)	6(0.11)	43(0.83)	2(0.04)
2013	2,657	80 (3.01)	23 (0.86)	26 (0.98)	5 (0.18)	26 (0.98)	0 (0.0)
2014	4,568	118 (2.58)	22 (0.48)	58 (1.27)	8 (0.17)	30 (0.66)	0 (0.0)
2015	5,252	150 (2.85)	25 (0.47)	66 (1.26)	5 (0.09)	54 (1.03)	0 (0.0)
Total	22,645	608 (2.68)	131(0.58)	239 (1.05)	35 (0.15)	201(0.88)	2(0.01)



**Fig-1: Trend of Transfusion Transmissible Infections (TTIs) among the blood donors**

Though, the overall maximum incidence is that of anti-HCV, but in the year 2011, the incidence of VDRL positivity was greater than that of anti-HCV (0.96% vs 0.84%). From year 2011 to year 2015, the trend of anti-HCV and VDRL is upsloping whereas, the trend of HBsAg and anti-HIV is down sloping. Malaria was positive only in the year 2012, and that only in two blood donors.

## DISCUSSION

This study was done on the blood donors who donated blood in the blood bank of Punjab Institute of Medical Sciences, Jalandhar. The study period was from January, 2011 to December, 2012. Majority of the donors were male (99.1%), while female donors were only 0.9%. This finding is in accordance with the other studies done in India: Pahuja S. *et al.* [5] and Singh B. *et al* [6] from Delhi, Arora D. *et al.* from Haryana [7], Rao P. *et al.* from Pune [8], Singh K. *et al.* from Karnataka [9]. In this study, the majority of the donors (56.8%) were replacement donors, while voluntary donors were only 43.2%. Singh B *et al.* [10] reported 83.6% replacement and 16.4% voluntary donors. While, Kakkar N. *et al.* [11] have reported 94.7% and 5.3% and Garg S *et al.* [12] have reported 90.1% and 9.0% replacement and voluntary donors respectively. This study documents total prevalence of TTIs 2.68% and the differential prevalence as follows: HBsAg 0.58%, anti-HCV 1.05%, anti-HIV 0.15%, VDRL 0.88% and malaria parasite 0.01%; the maximum prevalence was that of VDRL and minimum that of malaria parasite. Fernandes H *et al.* [1] have reported prevalence of TTI in total donors 0.6%. In their study, prevalence of hepatitis B was highest (0.34%) followed by syphilis (0.11%), HIV&HCV (0.06%) and malaria (0.01%). Pallavi P *et al.* [13] from Mysore report the overall prevalence of HIV, HBsAg, HCV and syphilis as 0.44%, 1.27%, 0.23% and 0.28%, respectively. No blood donor tested showed positivity for malarial parasite in that study. Gupta N *et al.* [14] from Ludhiana have reported the overall prevalence of HIV, HBsAg, HCV and syphilis as 0.084%, 0.66%, 1.09% and 0.85%, respectively in their study. In the study of Pahuja *et al.* [5] from Delhi, the prevalence of TTIs was HIV 0.56%, HBsAg 2.23%, and HCV 0.66%.

## CONCLUSION

Nevertheless, the goal of a safe and affordable blood supply that can meet the growing global demands may be reached by the coordinated optimization of each step in the transfusion chain, including the careful consideration of donor eligibility criteria, adherence to rigorous rules during donation, processing and storage, the optimal implementation of available screening tests, the use of suitable pathogen inactivation methods and finally the vigilance of prudent physicians, who evaluate the necessity of each transfusion. Combined with the development and implementation of sensitive

and affordable detection and inactivation approaches, these measures can make blood transfusion a safer form of therapy even in places where the risks to date have to be considered significant.

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