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Research Article

# SEROPREVALENCE OF TRANSFUSION TRANSMISSIBLE INFECTIONS IN BLOOD DONORS IN RURAL AREA IN WESTERN UTTAR PRADESH- AN INSTITUTIONAL RETROSPECTIVE STUDY

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## ABSTRACT

**Background:** Blood transfusion service is an essential and vital part of the healthcare system with most important objective is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels.

**Material & Method:** This retrospective study was carried out to evaluate the seroprevalence of transfusion transmissible infections among the replacement or voluntary healthy blood donors at a tertiary health care hospital in the rural belt of Western Uttar Pradesh. A total of 2776 blood donors were screened over a three years period. All donors were screened for HIV, Hepatitis B, Hepatitis C, syphilis and malaria.

**Results:** 96.04% (2666/2776) were replacement and 3.96% (110/2776) were voluntary donors. Male: female ratio was 26:1. Out of the 2776 screened donors, 75 (2.7%) were seroreactive cases. The seroprevalence of HBsAg, anti HCV, Syphilis, Malaria and HIV was found to be 1.37%, 0.94%, 0.25% & 0.18% & 0.07% respectively. 3 cases had co-infection i.e. > 1 TTI (HIV+HCV, VDRL+MP and HBsAg+ HCV).

**Conclusion:** There is continues need of program for awareness and encouragement of voluntary blood donation in the rural parts of India to avoid risk of TTI and all donors should be screened by proper history, physical examination and proper screening of blood for TTI by highly sensitive and specific kits.

**Keywords:** Transfusion transmissible diseases, Seroprevalence, Hepatitis B Virus, Hepatitis C Virus, Human Immunodeficiency Virus, Syphilis, Malaria

## INTRODUCTION

Blood Transfusion (BT) is a globally practiced intervention which saves millions of lives however is also associated with certain life threatening adverse effects which can be acute or delayed and also threat for spread of transfusion transmissible infections (TTI) such as HIV, Hepatitis B and C, Syphilis or Malaria<sup>1</sup>. Blood transfusion service is an essential and vital part of the healthcare system with most important objective is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels<sup>2</sup>. Despite strict and precise donor screening by more sensitive methods to detect TTI's` markers, the window period, prevalence of asymptomatic carriers, false negative results, genetic variability in viral strains and

technical errors are still the problems<sup>3</sup>. All donors must be screened for high risk behavior related to TTI as these infections can exist as asymptomatic diseases<sup>4</sup>. The purpose of the present study is to determine the prevalence rate of transfusion transmissible diseases among replacement or voluntary blood donors coming to the blood bank at a medical college in the rural belt of western Uttar Pradesh.

## MATERIALS AND METHODS

The present study was carried out at Saraswathi Institute of Medical Sciences, Hapur over a period of three years from Jan 1<sup>st</sup> 2010 to Dec 31<sup>st</sup> 2012. Blood donors, replacement or voluntary were selected after taking proper medical history and undergoing physical examination. All blood donors were

screened for Hepatitis B antigen (HBsAg), Anti Hepatitis C virus antibodies (Anti HCV), Anti Human Immunodeficiency Virus antibodies 1 and 2 (Anti HIV 1 & 2), Venereal Disease Research Laboratory reactivity (VDRL) and Malarial antigen (MP) by highly sensitive & specific NACO approved commercial rapid test kits. All reactive samples were tested again by a commercial kit of higher specificity before being labeled seroreactive and respective donors were deferred. Amongst seroreactive groups, cases with combination of 2 or more TTI were labeled as co-infection. Finally, their number, type, age, sex and distribution of seroprevalence in terms of percentage findings were analyzed.

## RESULTS

A total of 2776 blood donors were screened over a three years period. Of these, 96.04% (2666/2776) were replacement and 3.96% (110/2776) were voluntary donors. Male: female ratio was 26:1. Majority of screened donors belonged to 18-35 years age group (Table-1). Out of the 2776 screened donors, 75 (2.7%) were seroreactive cases. In seroreactive donors, 38 (1.37%) cases were reactive for HBsAg, 26 (0.93%) cases for Anti HCV, 07 (0.25 %) cases for syphilis, 5 (0.18%) cases for MP antigen and 02 (0.07 %) cases for HIV (TABLE-2). 3 cases had co-infection i.e. > 1 TTI (HIV+HCV, VDRL+MP and HBsAg+ HCV). All except one seropositive case were from voluntary donors and only one female was seroreactive (TABLE 3).

## DISCUSSION

The prevention of TTI through blood transfusion in developing countries like India is difficult even when effective policies and strategies are present and this is due to limitation of the tests to detect the disease in the window or pre-seroconversion phase, nonseroconverting chronic or immune-silent carriers, immunologically variant viruses, high cost of screening, a lack of funds and trained personnel<sup>5</sup>. The among blood donors, risk of transfusion transmission of HIV, Hepatitis B and Hepatitis C may be worrying due to high seroprevalence of HIV, anti-HCV, and HBsAg (0.5%, 0.4%, and 1.4%, respectively)<sup>6</sup>. In present study, male donors were outnumbered the female donors (26:1) similar to other studies<sup>2,5,6</sup>. We thought that in developing country like India, this could be due to the facts of social and religious cultural custom and large number of females of reproductive age-group are anaemic, hence are unfit for blood donation.

In most studies, predominantly donors are voluntary donors<sup>2,5,6</sup> however Kaur *et al*<sup>3</sup> observed replacement donors (55%) are more in number than voluntary donors (45%) and Gupta *et al*<sup>7</sup> observed 39.71% donors are voluntary and 60.29% are replacement donors but in present study voluntary donors were only 3.96% (110/2776) and replacement donors were 96.04% (2666/2776). This could be due to social and cultural unawareness of healthy adults for blood donation and its importance in medical health especially in rural areas. In present study, we encountered a steady decline in voluntary donors from 47 (6.8 %) in 2010 to 23 (2.3 %) in 2012 however replacement donors number in 2010, 2011 and 2012 was 644 (93.2%), 1042 (96.3%), 1023 (97.7%) respectively. This could

be due to variable number of requirement in hospital. Among the Indian blood donors prevalence rate of TTIs in 2008 was reported to be ranged as follows; HBV – 0.66% to 12%, HCV – 0.5% to 1.5%, HIV – 0.084% to 3.87%, and syphilis – 0.85% to 3%<sup>6</sup>. Similar to present study, Kaur *et al*<sup>3</sup> and Sharma *et al*<sup>8</sup> observed that replacement donors have higher seroreactivity rate than voluntary donors which could be due to high risk behavior and paid donors presenting as relatives however in present study this could also be due to small number voluntary donors. The promotion of voluntary donors may reduce the risk of TTI in accordance with National Blood Policy.<sup>3</sup> Pallavi *et al*<sup>2</sup> observed in their study that seropositivity of HIV has decreased both in voluntary and replacement donors from 0.55 to 0.15% and 0.63 to 0.49% respectively. The prevalence of Hepatitis B and seropositivity for anti-HCV is decreased in voluntary donors from 1.3 to 0.69% and 0.19% to 0.05% respectively but a slight increasing trend is noted replacement donor (1.04 to 1.55% and 0.07% to 0.31% respectively)<sup>2</sup>. The VDRL reactivity shows increasing trends amongst both voluntary and replacement donors<sup>2</sup>. Sabharwal *et al* also observed the increasing trend in prevalence of HIV, HBV, HCV and syphilis<sup>9</sup>. Present study also observed the increasing trend in prevalence of HIV, HBV, HCV, Syphilis and malaria between 2010 to 2012. In present study, majority of cases were in the age group of 18-35 years and only one case of anti HCV positive donors was of age group >35 years. The increase in seropositivity in HBsAg and MP antigen reflects either an absolute increase in number of cases or outcome of higher detection rates following the use of more sensitive kits/techniques. Most studies show prevalence of HBV in blood donors is most common followed by HCV followed by either HIV or Syphilis<sup>3,5,7,9</sup>. Present study also show similar findings.

## CONCLUSION

It can be concluded that there is continues need of program for awareness and encouragement of voluntary blood donation in the rural parts of India to avoid risk of TTI and all donors should be screened by proper history, physical examination and proper screening of blood for TTI by highly sensitive and specific kits. This can be carried out by a well coordinated blood transfusion unit with maintenance of quality control at all levels.

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**Table 1: Age and gender wise yearly distribution of voluntary & replacement blood donors**

VOLUNTARY						
	MALE			FEMALE		
	18-35yrs	>35yrs	TOTAL	18-35yrs	>35yrs	TOTAL
<b>2010</b>	37	08	45	02	00	02
<b>2011</b>	30	06	36	04	00	04
<b>2012</b>	10	09	19	04	00	04
<b>TOTAL</b>	77	23	100	10	00	10
REPLACEMENT						
	MALE			FEMALE		
	18-35yrs	>35yrs	TOTAL	18-35yrs	>35yrs	TOTAL
<b>2010</b>	495	128	623	21	00	21
<b>2011</b>	796	197	993	40	09	49
<b>2012</b>	819	137	956	18	06	24
<b>TOTAL</b>	2110	462	2572	79	15	94

**Table 2: Yearly distribution of seropositivity: 2010-2012**

SEROPOSITIVITY 2010-2012							
	2010		2011		2012		TOTAL
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	
<b>HIV</b>	01	00	00	00	01	00	02
<b>HBsAg</b>	07	00	08	00	23	00	38
<b>Anti HCV</b>	04	00	04	00	17	01	26
<b>Syphilis</b>	01	00	00	00	06	00	07
<b>MP antigen</b>	01	00	01	00	03	00	05
<b>TOTAL</b>	14	00	13	00	50	01	78

3 Cases had co-infection of TTI (HIV+HCV, VDRL+MP, HBsAg+ HCV)

**Table 3: Age wise distribution of seropositivity**

AGE WISE DISTRIBUTION OF SEROPOSITIVITY					
	MALE		FEMALE		TOTAL
	18-35yrs	>35yrs	18-35yrs	>35yrs	
<b>HIV</b>	02	00	00	00	2
<b>HBsAg</b>	32	06	00	00	38
<b>Anti HCV</b>	24	01	01	00	26
<b>Syphilis</b>	07	00	00	00	07
<b>MP antigen</b>	05	00	00	00	05
<b>TOTAL</b>	70	7	1	00	78

3 Cases had co-infection of TTI (HIV+HCV, VDRL+MP, HBsAg+ HCV)

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