



Original Article

Seroprevalence of HIV, HBV, HCV and Syphilis among Blood donors at a tertiary care hospital

Bindu Madhavi R^{1*}, Hanumanthappa A R², Vishwanath G²

1. Assistant Professor, Department of Microbiology, Sri Devaraj Urs Medical college, Sri Devaraj Urs Academy of Higher Education and Research, Kolar.
2. Professor, Department of Microbiology, JJ Medical College, Davangere.

Abstract

Introduction: Blood transfusion is a lifesaving essential therapeutic procedure in many medical and surgical instances, as there is no genuine substitution. Even though it can save many human lives, in some instances it can transmit infectious diseases which are fatal. Amongst the undesirable complications due to blood transfusion, transmission of certain Transfusion Transmissible Infections (TTIs) like HIV, HBV, HCV and Syphilis are the most significant long term detrimental side effects. Hence meticulous pre transfusion testing and screening particularly for TTIs is the need of the hour.

Objectives: To determine the prevalence and trend of HIV, HBV, HCV and Syphilis among the blood donors.

Materials and Methods: The study was done at Blood bank, Chigateri District Hospital, attached to J J M Medical College, Davangere. Data was collected for a period of 5 years, from January 2010 to December 2014. All the blood samples were screened for HIV, HBV and HCV by ELISA and Syphilis by Rapid Plasma Reagin test (RPR).

Results: A total of 27, 300 blood donors were screened during the study period, out of which 85.5% were voluntary donors and 14.5 % were replacement donors. Among the blood donors screened, seroprevalence of HIV, HBV, HCV and Syphilis was 0.25 %, 1.99 %, 0.02 % and 0.004 % respectively.

Conclusion: Blood transfusion should be strictly done only during an absolute need. To give utmost importance to continue screening donated blood, with highly sensitive and specific tests and to counsel positive donors for any above infections.

Keywords : Transfusion Transmitted infections , Human immunodeficiency virus , Hepatitis B virus , Hepatitis C virus , Syphilis , Blood donors.

Introduction

Million people lives are saved each year through blood transfusion. Safe blood is always a critical component of health care to prevent the spread of blood borne infectious diseases.¹

Blood transfusion not only saves lives but also improves health of many patients. Requirement for blood transfusion may arise at any time both in rural as well as urban areas, but they may not always have

access to safe blood whenever required. Many a time unavailability of blood has even led to deaths. An adequate and reliable supply of safe blood can be assured by regular, voluntary and unpaid blood donors. They are also the safest group of blood donors as the prevalence of blood borne infections is low among this donors.²

It is well known fact that blood transfusion is associated with many complications, some are only trivial where as some others are life threatening, because of which it demands meticulous pre-transfusion testing and screening.³

Of the total blood donations occurring globally, 42 % are collected from high income countries, which homes less than 16 % of the World's population. Hence every country needs to ensure that supply of blood and blood products are sufficient and also free from TTIs.²

Transfusion departments always play a important role in screening, monitoring and control of infections

*Corresponding Author

Dr. Bindu Madhavi R

Assistant Professor , Department of Microbiology,
Sri Devaraj Urs Medical College, Sri Devaraj Urs
Academy of Higher Education and Research,
Tamaka, Kolar-563101, Karnataka, India.

Mobile No : 8971977645

E-mail : bindum450@gmail.com

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transmitted by blood transfusion. They also give clue about the prevalence of TTIs in healthy population.⁴ Voluntary donors are the main source of blood for transfusion in India, followed by replacement donors. In India, main source of blood for transfusion are voluntary donors followed by replacement donors. The prevalence of HIV, Hepatitis viruses and other blood borne infections is usually low among voluntary donors and high among replacement donors.⁵ The present study was done to determine the prevalence of Transfusion Transmitted Infections (TTIs) among the blood donors, which may further help in selecting the blood donors from the population.

Materials and Methods

The present retrospective cross sectional study was conducted at Blood bank Chigateri District Hospital, attached to JJM Medical College, Davangere. Data of blood donation was collected for a period of 5 years, from January 2010 to December 2014. Blood

donors were either voluntary or replacement donors. The objective of the study was to determine the prevalence and trend of HIV, HBV, HCV and Syphilis among blood donors.

Clinically healthy individuals of 18-65 years of age with body weight of more than 45 Kgs and Hb of more than 12.5 g % qualified for donation were included for the study. Donors with history of any pre- existing illness in recent past, weight loss, uncontrolled diarrhea, recent history of jaundice, liver disease, cardiovascular and pulmonary disease, malignancy, epilepsy, malaria, bleeding disease were excluded. The blood samples were screened for HIV (1 and 2) by 3rd and 4th generation ELISA, HBV was tested by 3rd generation ELISA , HCV was tested by 3rd generation ELISA test, using NACO approved commercially available kits and screening of Syphilis was done by Rapid Plasma Reagin test (Span diagnostics).⁶

Table 1 : Total Number of Voluntary and Replacement Donors

YEAR	VOLUNTARY DONORS (VD)			REPLACEMENT DONORS (RD)			TOTAL (VD+RD)
	MALE	FEMALE	M+F	MALE	FEMALE	M+F	
2010	2854	180	3034	689	22	711	3745
2011	3219	219	3438	445	13	458	3896
2012	3893	133	4026	545	21	566	4592
2013	4653	211	4864	1058	37	1095	5959
2014	7617	377	7994	1083	31	1114	9108
TOTAL NUMBER OF DONORS IN 5 YEARS							27300
M- Male, F- Female, VD- Voluntary donors, RD- Replacement donors							

Figure 1 : Distribution of Donors Based on Sex

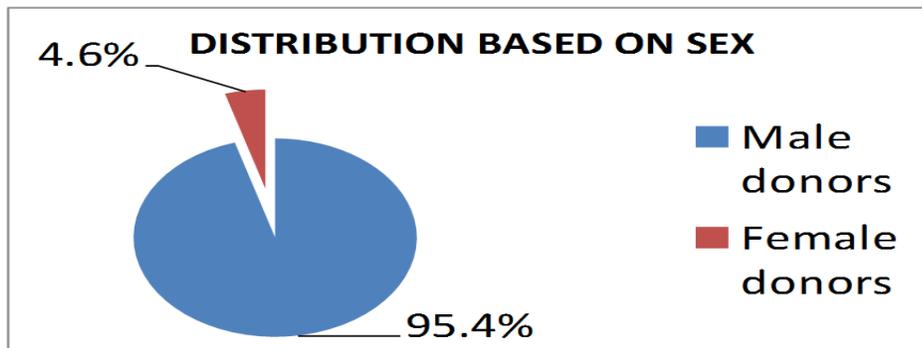


Table 2 :Sex Distribution of Seropositive Cases Among Blood Donors

TTIs		HIV	HBV	HCV	SYPHILIS	TOTAL (%)
GENDER	MALE	68	533	06	01	607 (2.2)
	FEMALE	01	10	00	00	11 (0.04)
TOTAL		69 (0.25%)	543 (1.99%)	06 (0.02%)	01 (0.04%)	618 (2.3)

TTIs- Transfusion Transmitted Infections

Figure 2: Trend of Prevalence of TTI's Among Voluntary and Replacement Donors

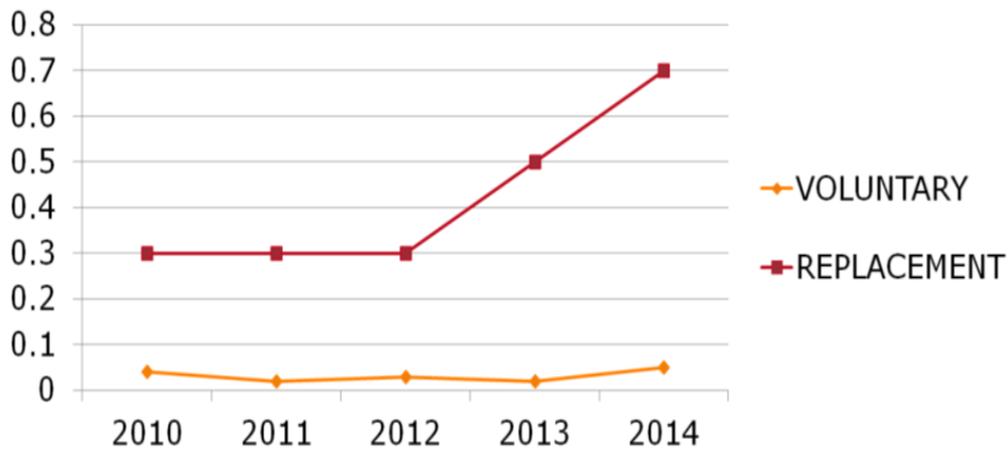


Table 3: Distribution of Seropositive Cases Among Voluntary and Replacement Blood Donors

TTIs		HIV	HBV	HCV	SYPHILIS	TOTAL (%)
TYPE OF DONATION	VOLUNTARY	05	37	00	00	42 (0.15)
	REPLACEMENT	64	506	06	01	577(2.1)
TOTAL (%)		69 (0.25)	543 (1.99)	6 (0.02)	1 (0.04)	619 (2.3)

Table 4 :Comparison of Seroprevalence of HBV, HIV, HCV and Syphilis in Different Places of India

YEAR	PLACE	HBV (%)	HIV (%)	HCV (%)	SYPHILIS (%)
2005-2009	Davangere ¹	2.12	-	0.1	-
2005-2011	Maharashtra ³	1.6	0.53	0.03	-
2006-2013	Ahmedabad ¹⁷	0.162	0.977	0.108	0.234
2005-2013	Tripura ¹⁸	1.2	0.093	0.109	-
2008-2014	Delhi ²⁰	1.61	0.32	0.73	1.62
2013-2016	Port Blair ⁵	0.066	1.056	0.124	0.247
2010-2014	Present study	1.99	0.25	0.02	0.004

Results

During the study period a total of 27, 300 blood donors were screened for blood donation, out of which 26, 056 (95.4 %) were male donors and 1, 244 (4.6 %) were female donors (Figure 1). Total number of donors in the year 2010, 2011, 2012, 2013 and 2014 was 3745, 3896, 4592, 5959 and respectively. Majority of donors were voluntary donors accounting to 23, 356 (85.5 %) whereas 3,944 (14.5 %) were replacement donors. Out of total 27,300 blood donors, 618 (2.3 %) were seropositive cases. Among the blood donors, seroprevalence of HIV, HBV, HCV and Syphilis was 0.25 %, 1.99 %, 0.02 % and 0.04 % respectively (Table 1). Overall prevalence of HBV was found to be highest followed by HIV, HCV and Syphilis. Trends of prevalence of TTIs increased among the replacement donors compared to voluntary donors (Figure 2).

Discussion

Blood transfusion is always a necessary component of health care which potentially saves many lives every year. Every healthcare setup needs to meet its requirement for blood and blood products and ensure that, they are free from Transfusion Transmitted Infections like HIV, HBV, HCV and other life threatening infections. WHO recommends, all blood products received for transfusion should be screened minimum for HIV, HBV, HCV and Syphilis. Blood safety is integral to the WHO HIV/AIDS plan, to combat the spread of

HIV infection and for the achievement of the health related Millennium Development Goals to reduce child mortality, improve maternal health, combat HIV and develop global partnership for development.⁷

WHO promotes voluntary donation over replacement blood donation. In our study, 85.5% were voluntary donors and 14.5 % were replacement donors. In a study done by Patel et al, from western Ahmedabad 95.56 % were voluntary blood donors ⁸, but a study from Karnataka and from Haryana reported it as 58 % and 31.4 % respectively.^{9,10} Public should be encouraged to become voluntary blood donors for which more and more blood camps should be done.

In our study among the blood donors, males (95.4 %) outnumbered females (4.6 %); seroprevalence of TTIs was also higher among males (Table 2). This is similar to other studies done in India by Pallavi P et al¹¹, in which 97.84 % were males ;a study by Patel et al⁸ had 85% male donors. Other studies done by Arora D et al¹⁰ in Southern Haryana, by Singh K et al¹² in coastal Karnataka, by Pahuja et al¹³, and Singh B et al¹⁴ in Delhi had more than 90 % of male donors.

In our study, the prevalence of HIV, HBV, HCV and Syphilis was 0.25%, 1.99 %, 0.02% and 0.04 % respectively. The WHO fact sheet showed prevalence of Hepatitis B virus as 0.02 % (0.008 % - 0.08 %) in high income countries, 2.27 % (0.80 %- 4.87 %) in lower middle income countries and 3.64 % (2.55 %- 8.59 %) in low income countries. The fact sheet

showed prevalence of Hepatitis C virus as 0.02 % (0.005 %-0.11%) in high income countries, 2.27 % (0.8 %- 4.87 %) in lower middle income countries and 0.93 % (0.50% - 1.95 %)in low income countries. The fact sheet showed prevalence of HIV virus as 0.02 % (0.004%-0.02 %) in high income countries, 0.14 % (0.03-0.69%) in lower middle income countries and 0.86 % (0.39%-2.4%) in low income countries. The factsheet showed prevalence of Syphilis as 0.02 % (0.006-0.14 %) in high income countries 0.44 % (0.12 %- 1.09 %) in lower income countries and 0.6 % (0.3 %- 1.63 %)in low income countries.¹⁵

Mondal R et al in their study observed seroprevalence of HIV, HBV, HCV and Syphilis as 0.42 %, 1.24 %, 0.62 % and 0.65 % respectively in a rural tertiary care center in Darjeeling, India.¹⁶Motayo B O et al in Nigeria, in their study found high prevalence rates of 6.2 %, 10 % and 1.5 % for HIV, HBV and HCV respectively and 0 % seroprevalence of Syphilis was observed among the blood donors.¹⁷Seroprevalence of TTIs from various studies done in India is shown in Table 4, among which most of the studies showed high prevalence of HBV compared to HIV, HCV and Syphilis.

In the present study number of donors gradually increased from 3,745 in the year 2010, to 9108 in 2014. Among the donors voluntary donors were highest compared to replacement donors. Seroprevalence of TTIs was more among the replacement donors than the voluntary donors, which indicates that blood from voluntary donors is always safe (Table 3). HBV was the most prevalent TTI followed by HIV, Syphilis and HCV. Prevalence of TTIs was more among replacement donors than the voluntary donors. Trend of TTIs rate had a drastic increase among the replacement donors than the voluntary donors. Efforts must be made to encourage and increase the number of voluntary donors, by organizing more number of blood camps possible.

Conclusion

In the present study, higher and increasing incidence of TTIs has been observed among replacement donors compared to voluntary donors. Hence there is a need to increase public awareness and efforts to be made to encourage voluntary donors. The cost and time involved in screening blood can be reduced by an effective education of donors and selection program that promotes self-exclusion by donors at risk.

To give utmost importance to continue screening donated blood, with highly sensitive and specific tests and to counsel positive donors for any above infections. Blood transfusion should be strictly done only during an absolute need. Better screening

methods to detect TTIs even during window period should be carried out with improved sensitivities.

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Conflict of interest : none

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