



Original Research Article

Seroprevalence of transfusion transmissible viral infections in blood donors of tertiary health care hospital in Karnataka

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ABSTRACT

Background: Blood transfusion and its components are significant in saving millions of lives around the worldwide every year. Few, but serious complications are associated with Blood transfusion such as exposure to transfusion -transmissible infections (TTI), in particular: Human immunodeficiency virus(HIV)Hepatitis B Virus(HBV), Hepatitis C virus (HCV). Therefore, methodical pre transfusion testing of blood units for transfusion transmissible diseases is compulsory as per National Aids Control Organization (NACO) guidelines.

Objective: To evaluate the prevalence of transfusion transmissible viral infections among blood donors in our tertiary health care hospital in Bangalore, Karnataka.

Materials and Methods: The study comprised of retrospective analysis of blood donor's records covering from January 2015 to December 2018 (4 years) in the department of Blood bank, Sanjay Gandhi institute of trauma and orthopedics, Bangalore.

Results: A total of 8728 blood donors were screened for TTIs between 2015 to 2018.

Conclusion: Although there were a smaller number of transfusion transmissible viral infection among blood donors, methodical and comprehensive screening of donor's blood for HIV, HBV and HCV using standard methods are essential to ensure the safety of blood to the recipients.

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1. Introduction

Blood transfusion is a key element of modern health care. The aim of blood transfusion is to provide safe and effective blood and blood products.¹ Transfusion transmitted infections such as human immunodeficiency virus (HIV), and hepatitis B virus (HBV), and hepatitis C virus (HCV) are among the greatest threat to blood safety for the recipient and pose a serious public health problem.² Morbidity and mortality infected blood transfusion have far reaching consequences, not only for the recipients, but also for their families and wider society.^{3,4}

Increasing prevalence of HIV, HBV, HCV among the humans have raised the problems of blood safety. Hence, continuous monitoring of the magnitude of transfusion transmissible infections in blood donors is important for

estimating the risk of transfusion transmitted infections and optimizing donor recruitment strategies to minimize infectious diseases transmission.² Continuous improvement and application of donor selection criteria and sensitive screening tests reduce the risk of TTIs.⁵

Hence, the present study was carried out with the aim of determining sero-prevalence of TTIs among blood donors in our tertiary care hospital.

2. Materials and Methods

2.1. Study

Study was conducted at Sanjay Gandhi institute of trauma and orthopedics, Bangalore from January 2015 to December 2018 (four years).

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2.2. Type

Retrospective, cross sectional descriptive study.

2.3. Data collection

Data was collected about blood donor's age, sex, serological results of HCV, HBsAg, HIV, at the Time of Blood collection. This was done by using a structured questionnaire. Blood was collected from apparently healthy individuals of age 18-60 years with weight > 45 kg and hemoglobin concentration > 12.5gm%. All blood Donor samples were screened for hepatitis B surface antigen (HBs Ag), HCV and HIV. HIV, HBsAg, HCV were done by enzyme-linked immuno adsorbent assay(ELISA) procedure using third generation kits.

2.4. Laboratory Testing

From each blood donor bag, five milliliters of blood was collected in sterile test tube. Centralization at a speed of 3500 revolutions per minute(rpm) for 5 minutes was done to separate the serum. 2ml of collected from each sample in sterile hepatitis c vials. Each donor was tested for HBsAg, anti-HCV and HIV. HIV was screened by using 3rd- generation ELISA technique (HIV 1/2: HIV merilisa). Blood samples tested by using serological assays for HIV infection were screened by ID NAT testing. Hepatitis B virus was screened by using 3rd generation immuno assay ELISA (HBsAg merilisa) and ID NAT testing hepatitis C virus by using the human anti-HCV 3rd-generation ELISA, (HCV merilisa) and ID NAT testing.

2.5. Inclusion criteria

All blood donors who donated blood during the study period.

2.6. Exclusion criteria

All prospective donors who did not satisfy donor selection criteria of NACO guidelines.

2.7. Data management

Descriptive statistics was used to summarize the data where frequency tables and cross tabulations were used while describing the data in numbers and percentages.

2.8. Quality Assurance

Standard operational procedures were strictly followed and QC materials were used for all serological tests. Laboratory quality was assured by well trained professionals, training and supervision during sample collection and testing.

2.9. Ethical consideration

Consent of the donor was taken. Ethical clearance was obtained from the institute.

3. Results

Donor characteristics: Total donors comprised of 8728: of which 7474 (85.63%) were males and 1254(14.36%) were females in the ratio of 5.9:1 in four years. (Table 1).

Prevalence of blood borne pathogens: Blood borne pathogens were detected among 73(0.83%) of donors and 8655(99.16%) of the donors were free from the three viral infections. Donors with positive result for HIV were 3/8728(0.03%), HBV 69/8728(0.79%), HCV 1/8728(0.01%). The hepatitis B infection was the predominant infection among TTIs constituting 69(94.52%) of all the TTIs. Multiple infections were not seen in present study. Prevalence of all the three infections were more common in 20-29-year age group constituting 37/73(50.68%). (Table 2).

Sero prevalence rates of TTIs in voluntary and replacement donors in four years shows that TTIs are common among voluntary donors consisting of 43/73(58.90%) as in Table 3.

Sero-prevalence of TTIs among males and females shows that males are affected more than females 64/73(87.67%).

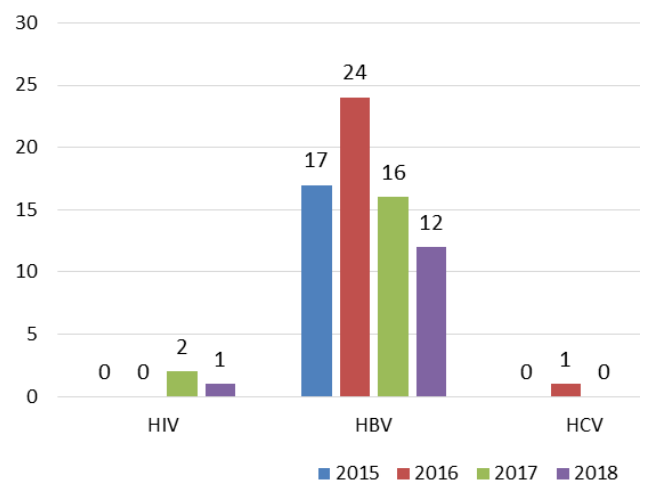


Fig. 1: Trend of TTIs year wise (2015-2018)

4. Discussion

WHO and NACO's aim is to achieve safe and appropriate blood supply by obtaining blood from healthy, voluntary, non-remunerated donors who have lower risk of TTIs compared to commercial and family replacement donors.

The aim of our study was to determine the seroprevalence of transfusion transmissible viral infection among blood

Table 1: Frequency of blood donors by gender and year wise

Year	Male (%)	Female (%)	Total number
2015	1642 (81.52)	372 (18.47)	2014
2016	1817 (84.62)	330 (15.37)	2147
2017	1980(87.10)	293 (12.89)	2273
2018	2035 (88.70)	259 (11.29)	2294
Total	7474 (85.63)	1254 (14.36)	8728

Table 2: Age wise distribution of TTIs

Age in years	HIV	HBS Ag	HCV	Total
< 20	0	08	0	08
20-29	02	34	01	37
30-39	01	16	00	17
40-49	0	10	0	10
50-60	0	01	0	01
Total	03	69	01	73

Table 3: seroprevalence rates of TTIs: voluntary vs replacement donors.

Disease	Voluntary Number (%)	Replacement Number (%)	Total Number (%)
HIV	01(1.36%)	02(2.73%)	03(4.10%)
Hepatitis B	41(56.16%)	28(38.35%)	69(94.52%)
HCV	01(1.36%)	00	01(1.36%)
Total	43 (58.90%)	30(41.09%)	73

Table 4: Gender distribution of TTIs.

Disease	Male	Female	Total number
HIV	01	02	03
Hepatitis B	62	07	69
HCV	01	00	01
Total	64(87.67%)	09 (12.32%)	73

donors. Most of the donors in our study were males 7474(85.63%) aged between 18 and 60 years. This is similar to the studies of Buseri et al,⁶ Anjali et al,⁷ Pallavi et al,⁸ Tessema et al.² High deferral rates due to anemia, low body weight might be the reason for lower percentage of female donors.

In the present study, seroprevalence of transfusion transmissible infections(TTIs) was 73 (0.83%) which is similar to study by SriKrishna et al,⁹ Anjali et al,⁷ Pallavi et al.⁸

The seroprevalence of HIV, HBV, HCV were 0.03%, 0.79%,0.01%, respectively. This is similar to studies by SriKrishna et al,⁹ Anjali et al,⁷ Pallavi et al.⁸ The reason for lower prevalence of TTIs compared to other studies could be due to our efforts in creating the awareness among donors about TTIs before donation.

Higher HIV prevalence rates were observed in the age group of 20-29 (0.02%), followed by 30-39(0.01%). Prevalence of HIV detected in 20-29 years age group was higher compared to other age groups. This may be due to the high-risk behavior in younger generation such as multiple sex partners, unprotected sex and intravenous drug abuse.

The prevalence was more among females and replacement donors. This finding, in deviation to other studies may be random finding.

The prevalence of HBV, 0.79% is similar to studies by Adhikari et al,¹⁰ Sushma et al.¹¹ Higher HBV prevalence rates were observed in the age group of 20-29 (0.38%), followed by 30-39(0.18%). Prevalence of HIV detected in 20-29 years age group was higher compared to other age groups. This may be due to the high-risk behavior in this age group. HBV infection by gender distribution showed that the prevalence of HBV among males was higher than females. A higher seroprevalence rate among male donors than female donors might be due to risk behavior of males, such as outside socialization, multiple sex relationships etc. Higher prevalence rate was observed among voluntary donors compared to replacement donors. This may be due to the asymptomatic, carrier state nature of the disease. Many donors were not aware of the presence of infection.

The prevalence of HCV was seen in 0.01% of blood donors. It was seen in 20-29-year age group which is similar to study by Tigabu et al.¹² This might be due to high risk behavior in younger generation.

HCV infection by gender distribution showed that male had higher prevalence rate than females. This is similar to study by Tigabu et al.¹²

The trends in TTIs in blood donors tend to decrease in this study. HIV, HBV and HCV went from nil, 0.19%, nil, in 2015, nil, 0.27%, 0.01 % in 2016, 0.02%, 0.18%, nil in 2017, 0.01%, 0.13%, nil 2018 respectively, similar to other studies. The lower prevalence and decreasing trend TTIs in this study might be due to the awareness on the disease, modes of spread and prevention and our attempts in creating awareness among donors before blood donation.

5. Conclusion

The study reflects the sero prevalence of TTIs in general population in our area. Donor selection using standard methods and use of effective and sensitive screening tests like NAT assay would reduce the risk of TTIs.

6. Source of Funding

None.

7. Conflict of Interest

None.

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