

Prevalence of Transfusion Transmitted Infections from Eastern Part of India: A 5-Year Experience

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ABSTRACT

Background: Blood transfusion saves millions of lives everyday across the world. However, transmission of infections along with blood transfusion though can be minimized but cannot be completely avoided. The chance of transmitting infections is higher in underdeveloped laboratories with limited resources. Transfusion transmitted infections (TTI's) can cause significant morbidity and mortality as well.

Methods: A retrospective data analysis was carried out in SMIMS, Gangtok, in the far eastern part of India to estimate the incidence of transfusion transmitted infections (TTI's) in the last five years, from January, 2013 to December, 2017. 5 ml of venous blood was collected from each donor and blood was screened for HBsAg, HIV, HCV, Syphilis and Malaria using card tests. The reactive cases were confirmed with third generation ELISA, TrueLISATM.

Result: A total of 10,011 blood donors were screened from January, 2013 to December, 2017. Male voluntary donors were more compared to female donors. Among the 135 seropositive cases 92 donors (0.91%) were positive for HBsAg, 23 donors (0.22%) were positive for anti HCV, 16 donors (0.15%) were positive for HIV while 4 donors (0.04%) were positive for syphilis. No case of malaria was noted in our study. The overall prevalence of HBsAg, HCV, HIV and syphilis was 0.91%, 0.15%, 0.22%, and 0.04% respectively.

Conclusion: The goal of routine blood transfusion should be to decrease the seroprevalance of TTI's. Strict blood donor selection and proper screening methods along with nucleic acid detection can help in reducing the seroprevalance of TTI's.

Keywords: Transfusion Transmitted Infections, Blood Transfusion, Blood Donors, ELISA

Introduction

Millions of lives are saved everyday across the world by transfusion of blood and blood products. Healthy blood donors are a reserve of safe blood supply. However, blood donors can donate blood during asymptomatic period of infection which can increase the chances of transmission transmitted infections (TTI's). Although pre-transfusion testing and screening is carried out almost in every centre, there is a 1% chance of transfusion associated problems including transfusion transmitted diseases with every unit of blood.(1) The incidence could be higher in developing countries and in remote areas where required resources and manpower are lacking. Unsafe blood transfusion can cause significant morbidity and chronic life-threatening diseases. The possible reasons could be due to prolonged asymptomatic period following infection or silent stage of the disease. Further inadequate resources and unavoidable technical errors in the laboratory can add to the problem. Accurate estimates of risk of TTIs are essential for monitoring the safety of blood supply and evaluating the efficacy of currently employed screening procedures.(2)

The present study has been undertaken to estimate the prevalence of transfusion transmitted infections in a tertiary centre in Gangtok, far eastern part of India.

Materials And Methods

The present study was a retrospective study conducted in the blood bank of Sikkim Manipal Institute of Medical Sciences, Gangtok. The records of blood donors who reported to blood bank from January 2013 to December 2017 were analyzed. The blood donors were requested to fill the donor card. After complete history and physical examination by blood bank medical officer around 5 ml of venous blood was collected in plain vacutainer from all eligible donors. The blood so obtained for serological testing was kept at room temperature and the serum was separated after centrifugation of the vacutainer at 2000 rpm for 5 mins. The venous blood so collected was tested for HBsAg, HIV, HCV, Syphilis and Malaria. The screening test for Hepatitis B surface antigen (HBsAg) was done by Virucheck [Tulip Diagnostics (P). Ltd], Human Immuno deficiency by Retroquic [Tulip Diagnostics(P). Ltd], HCV by SD HCV [AleretTM Medical Pvt. Ltd]. The blood was screened for malaria by BeneSpheraTM (Avantor Performance Materials India Ltd) and syphilis by Rapid Plasma Reagin, Carbogen (Tulip Diagnostics (P). Ltd). The reactive cases of HBsAg, HCV, HIV were further confirmed by third generation ELISA, TrueLISATM [AleretTM Medical Pvt. Ltd]. For each reagent lot used for

serological testing positive and negative controls were performed. The permission from Institutional Ethics Committee was obtained. The data were analyzed by using Microsoft Excel 2007.

Result

A total of 10,011 blood donors were screened from January 2013 to December 2017. Out of the total 7,667(76.6%) were voluntary donors and 2,344(23.4%) were replacement donors.(Figure 1) Among the donors, 8582 (85.7%) were males and 1429(14.2%) were females.(Figure 2) The total

number of seropositive cases that were detected in the study period was 135 of which 92 donors (0.91%) were positive for HBsAg, 23 donors (0.22%) were positive for anti HCV, 16 donors (0.15%) were positive for HIV while 4 donors(0.04%) were positive for syphilis. No single case of malaria was detected in our study.(Table 1) The overall prevalence of HBsAg, HCV, HIV and syphilis was 0.91%, 0.15%, 0.22%, and 0.04% respectively.(Figure 3) The distribution of transfusion transmitted infections among voluntary and replacement donors is shown in Table 2&Figure 4.

Table 1: Total numbers of reactive donors in the study period.

	2013	2014	2015	2016	2017	TOTAL
HIV	6(0.38%)	7(0.34%)	1(0.05%)	1(0.05%)	1(0.05%)	16(0.16%)
HBsAg	15(0.95%)	10(0.49%)	16(0.72%)	33(1.5%)	18(0.9%)	92(0.91%)
HCV	4(0.25%)	11(0.54%)	5(0.22%)	2(0.09%)	1(0.05%)	23(0.23%)
Syphilis	1(0.06%)	2(0.1%)	0	1(0.05%)	0	4(0.04%)
Malaria	0	0	0	0	0	0

Table 2: Incidence of TTI in voluntary(V) and replacement(R) donors during study period.

YEAR	HIV		HBsAg		HCV		Syphilis	
	V	R	V	R	V	R	V	R
2013	4	2	12	3	3	1	0	1
2014	6	1	8	2	6	5	1	1
2015	1	0	15	1	1	4	0	0
2016	0	1	27	6	2	0	0	1
2017	1	0	17	1	1	0	0	0
Total	12(75%)	4(25%)	79(85.8%)	13(14.1%)	13(56.5%)	10(43.4%)	1(25%)	3(75%)

Table 3: Comparison of transfusion transmitted infections prevalence rate with other studies.

Studies	HIV %	HBsAg %	HCV %	Syphilis %
Srikrishna et al. (1999), Bangalore, India	0.44	1.86	1.02	1.6
Pallavi et al. (2011), Mysore, India	0.44	1.27	0.23	0.28
Anjali et al. (2012), Kerala, India	0.6	1.5	0.4	0.1
Pahuja et al. (2007), Delhi, India	0.56	2.23	0.66	-
Arora et al. (2010), Southern Haryana, India	0.3	1.2	1	0.9
Bhattacharya et al. (2007), West Bengal, India	0.28	1.46	0.31	0.72
Adhikari et al. (2010), Sikkim, India	0.32	0.78	0.27	0.27
Present study	0.16	0.91	0.23	0.04

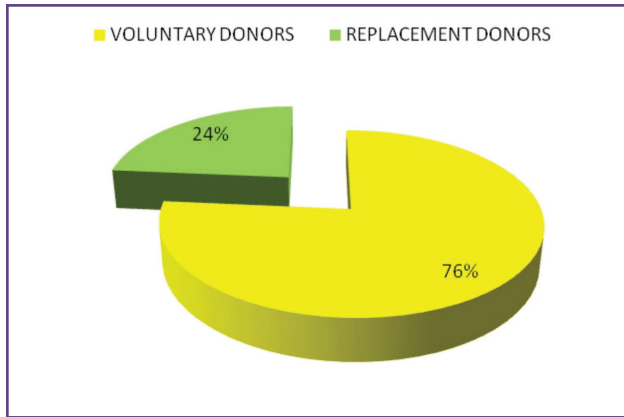


Fig. 1: Total voluntary and replacement donors during 5 years period.

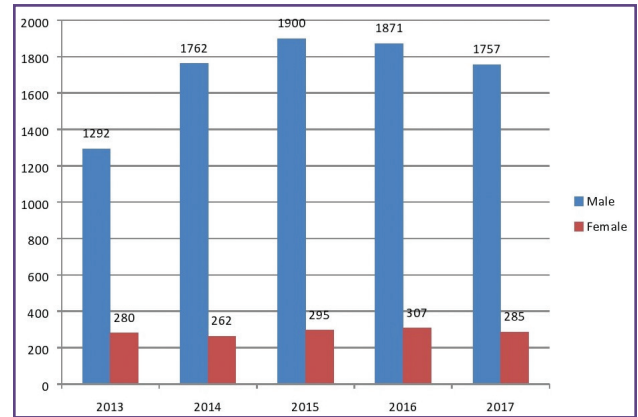


Fig. 2: Number of male and female donors year wise during the study period .

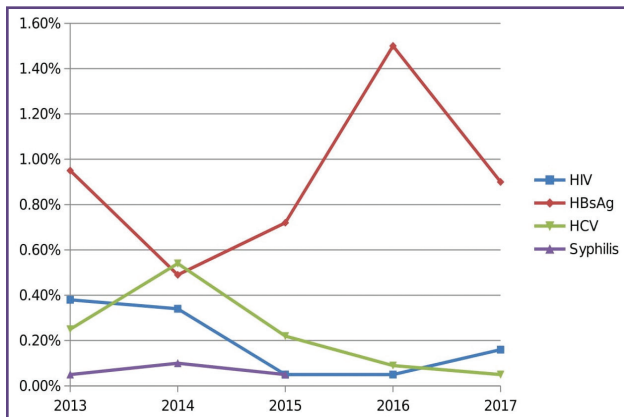


Fig. 3: Total Number of reactive cases among the donors in 5 years period.

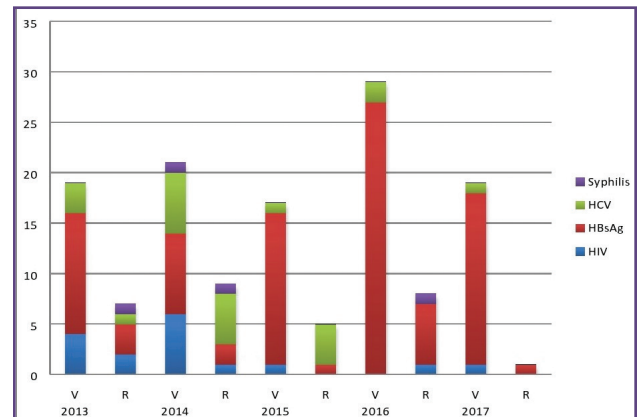


Fig. 4: Prevalance of TTI's in voluntary (V) and replacement (R) donors during study period

Discussion

The aim of this study was to determine the seroprevalence of HIV, HBsAg, HCV, Syphilis and Malaria among healthy blood donors. The majority of the donors were male 8582 (85.7%) aged between 18 and 60 years. This result is comparable with other studies of Pailoor K *et al.*[3], Fernandes *et al.*[4] and Pallavi *et al.*[5]. Seropositivity rate was high among male donors. (88.9%)

Voluntary donors (VD) are motivated blood donors who donates blood at regular intervals and replacement donors (RD) are usually one-time blood donors who donates blood only when a relative is in need of blood.[6] In our study, voluntary donors constituted 7,667(76.4%) of the total donors. These voluntary donations were mainly college students, unrelated healthy persons from the society and outdoor blood donation camps. The increase in voluntary donation could be because of the increase awareness among the public and involvement of government bodies like NACO (National AIDS control organisation) who actively propagate voluntary donation in our country.

[4] Many of the Indian studies show prevalence rates for HIV—0.51–3.87%, HCV 0.12–4%, HBV (HBsAg) 1.2–3.5%, and Syphilis 0.3–0.82%.[7-14] However, in our study the seroprevalence of HIV, HBV, HCV, and syphilis were 0.16%, 0.91%, 0.23%, and 0.04%, respectively which is comparable with other studies such as Srikrishna *et al.*[9] Pallavi *et al.*[5], Anjali *et al.*[15], Pahuja *et al.*[16], Arora *et al.*[17], Bhattacharya *et al.*[18].(Table 4) In comparison to the study done by Adhikari *et al.*[19], overall a decreasing trend in TTI's could be seen in our study. The reason for the decrease in prevalence of TTI compared to that in previous report could be attributed to increased awareness among the blood donors in the society and proper donor counselling.

According to the WHO report, viral dose in HIV transmission through blood is so large that one HIV-positive transfusion leads to death on an average after 2 years in children and 3–5 years in adults.[5] In case of HIV, transmission during window period is possible even if each unit is tested for HIV antibodies. The possibility

of window period transmission would be minimized if blood is collected from low risk targeted general public. [20] HBV positivity indicates a carrier state or an active infection. These seropositive donors may progress to develop chronic hepatitis, cirrhosis, and even progress to hepatocellular carcinomas[21,22]. Sexually transmitted infections constitute a major public health problem and are widespread in developing countries. Syphilis has also acquired a new potential for morbidity and mortality through association with increased risk of HIV infection, thus making safe blood more difficult to get. The residual transmission risk of HBV infection through a transfusion is higher due to a long window period between initial HBV infection and the detection of HBsAg during which the virus is transmissible.[2]Nucleic acid testing (NAT) are very useful in this situation which has considerably shortened the window period. However, the cost of this assay is high which makes it unaffordable for many centers.[23]

Conclusion

The goal of routine blood transfusion should be to decrease the seroprevalance of TTI's. This can be achieved by strict donor selection with effective counselling of donors, encouraging non-remunerated voluntary blood donation including outdoor blood donation camps and autologous donation. Further, proper screening methods along with like nucleic acid detection can help in reducing the seroprevalance of TTI's.

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