

Seroprevalence of Transfusion Transmitted Infections among Healthy Blood Donors: A 5-Year Tertiary Care Hospital Experience

Anupriya A^{1*}, Priya Banthavi S², Vasudevan³, Pramila⁴, Uma A⁵

¹Asst Prof Microbiology, Trichy SRM Medical College Hospital & Reserach Centre, Tamil Nadu, India

²Assoc Prof Pathology, Trichy SRM Medical College Hospital & Reserach Centre, Tamil Nadu, India

³Tutor in Pathology, Trichy SRM Medical College Hospital & Reserach Centre, Tamil Nadu, India

⁴Professor of Pathology, Trichy SRM Medical College Hospital & Reserach Centre, Tamil Nadu, India

⁵Professor of Microbiology, Trichy SRM Medical College Hospital & Reserach Centre, Tamil Nadu, India

Original Research Article

*Corresponding author

Anupriya A

Article History

Received: 14.02.2018

Accepted: 21.02.2018

Published: 30.03.2018

DOI:

10.21276/sjams.2018.6.3.83



Abstract: Transfusion-transmitted infections (TTIs) hamper blood safety and cause a serious public health problem. Aim of the present study is to estimate the seroprevalence of transfusion transmitted infections among voluntary blood donors at a tertiary healthcare teaching hospital. It was a hospital based retrospective study. Donor samples were tested over a period of five years. 8110 blood donors of both sexes attended the blood bank during this period which was screened for Hepatitis B, Hepatitis C, HIV and syphilis, malaria. The overall seroprevalence of TTI is 56 (0.68%)/8110. The seroprevalence of HIV, HBsAg, HCV, syphilis and malaria was 0.04%, 0.5%, 0.05%, 0.09% and nil respectively in total donors. All blood should be tested for compatibility and TTI's with reduction in unnecessary blood transfusion. Thus ensuring safe blood supply to the recipients

Keywords: Healthy blood donors, Seroprevalence, Transfusion transmissible infections.

INTRODUCTION

Blood transfusion service is an integral and indispensable part of the healthcare system. It is one of the treatment modality that saves millions of lives everywhere in health care services. It is well known fact that blood transfusion is associated with a large number of complications, some are only trivial while others are potentially life threatening, demanding for meticulous pre-transfusion testing and screening. Transfusion-transmitted infections (TTIs) hamper blood safety and cause a serious public health problem [1].

A person can transmit an infection during its asymptomatic phase and so transfusion can contribute to an increase of infection in the population. Screening TTI is also essential for blood transfusion safety and for protecting human life.

Transfusion-transmissible infections which are more frequent includes Hepatitis B and C, HIV and Syphilis, malaria and very rare cases of toxoplasmosis, brucellosis and viral infections like CMV, Epstein Barr Virus and Herpes.4 Measuring their severity, WHO has recommended pre-transfusion blood test for HIV, HBV, HCV and Syphilis as mandatory[2,3]. All these diseases are capable of causing significant mortality, morbidity along with a financial burden for both the affected person and the country.5 Government of India published in the year 2002 the National Blood Policy. The objective of the policy is to provide safe, adequate quantity of blood, blood components and products. Each blood unit shall be tested for presence of HIV 1&2

antibodies, Hepatitis B surface antigen, and Anti-hepatitis C virus antibody, syphilis and malaria parasite and results of such testing shall be recorded on the label of the container [4].

The objective of the present study is to estimate the seroprevalence of transfusion transmitted infections among voluntary blood donors at a tertiary healthcare teaching hospital.

MATERIALS & METHODS

Setting of the study & Study design

This study was conducted in a Tertiary Care Hospital. It was a hospital based retrospective study.

Study location

The data was collected from the blood bank of Tertiary health care teaching hospital. Donor samples were tested over a period of five years. The screening of

blood for TTIs is mandatory for blood safety in the source hospital.

Study population

8110 blood donors of both sexes attended the blood bank during this period which was screened for Hepatitis B, Hepatitis C, HIV and syphilis, malaria.

METHODOLOGY

Records were collected from blood bank of all donors coming to blood bank of hospital from 1st January 2013 to 31st December 2017. Name, age (18-60 years), Sex, date of birth, address and contact number were recorded for each donor, while giving them a unique identification number. Detailed history of immunization was taken. A written informed consent was taken from each patient before the blood donation. Weight, pulse, blood pressure and temperature were recorded for each donor. Screening for anemia was done clinically along with copper sulfate specific gravity method. Any donors with previous history of

HBV, HCV, HIV, syphilis & malaria infections were excluded. Inspection was made for any marks of drug abuse or any skin lesions/ infections at the venepuncture site.

All samples were screened for HIV, HBsAg, and HCV by ELISA method using the kit developed by M/S J. Mitra & Company Ltd., New Delhi, India, RPR Test by Carbogen diagnostics kit, Malaria card by

STATISTICS

Simple descriptive statistics was used in this study.

RESULTS

In the present study, out of 8110 healthy voluntary donors, 7950 were males and 160 were females, the table shows predominance of males as compared to females which spanned over a period of five years. (Table 1) Sixty percent of the donors were in the age group of 21- 30 years.

Table-1: Gender wise distribution of the study participants

YEAR	Total donors	Male N (%)	Females N(%)
2013	1048	1012 (96.6)	36(3.4)
2014	1535	1520 (99)	15(1)
2015	1948	1907(97.9)	41(2.1)
2016	1539	1503(97.6)	36(2.4)
2017	2040	2008(98.4)	32(1.6)
Total	8110	7950(98)	160(2)

Table-2: Seroprevalence of HIV, HBsAg, HCV, RPR and malaria among healthy donors

Year	Blood donors	HIV positive	HBsAg positive	HCV positive	RPR positive	Malaria positive
2013	1048	Nil	9	nil	7	Nil
2014	1535	1	7	nil	1	Nil
2015	1948	2	7	2	Nil	Nil
2016	1539	Nil	8	2	Nil	Nil
2017	2040	Nil	10	Nil	Nil	Nil
Total	8110	3 (0.04%)	41(0.5%)	4 (0.05%)	8(0.09%)	Nil

Total number of positives 56 (0.68%)/8110

DISCUSSION

Blood transfusion is a life-saving integral remedy in current medical practices, but also carries contemporary risk of transmitting dreadful TTIs like HIV, hepatitis B and C.1With every unit of blood, there is 1% chance of transfusion associated problems including TTI.

The prevalence of TTIs among blood donors in well-structured health care system with a well-organized blood establishment can be used as a reliable tool for statistical estimations of those infectious agents that can be transmitted through blood products and can contribute to statistical estimation of these viruses in the general population “as discussed by Gharehbaghian [5].”

In the present study, the total number of donors being 8110 with the seroprevalence of TTI being (0.68%).The other studies have reported considerably a higher prevalence where Mathai *et al.* [6] (3.1%), Karmakar *et al.* [7] (2.79%) and Koshy *et al.* [8] (2.9%). This was probably achieved by proper counseling of the donors, vigorous screening of donors and donated blood.

Majority of the donors were males (98%) which is comparable to the studies done by Rajvir Singh *et al.* [1], Rao *et al.* [9] and Arora *et al.* [10]. The sero-prevalence of HIV in the present study is (0.04%) which is very low when compared with the whole Indian scenario (0.3%)[11]. Gupta *et al.* [12] (0.08%), Agrawal *et al.* [13] (0.1%) and Giri *et al.* [14] (0.07%) identified much less number of HIV-infected donors

.On the contrary Garg *et al.* [15] (0.47%), Kaur *et al.* [16](0.6%), Sinha *et al.* [17](0.64%) and Karmakar *et al.* [7] (0.6%) traced a little bit higher values.

The sero-prevalence of HBsAg in the present study is around (0.5%) which is low when compared to other studies in India. Seroprevalence of HBsAg in various other studies were 1.4%, 2.9%, 1.7% and 5% [16-19]. The occurrence of HBsAg is more than other infectious diseases because of asymptomatic carriers.

The sero-prevalence of HCV is around (0.05%) in the present study .Various studies in India have shown data ranging from the lowest (0.31%) in the study by Bhattacharya *et al.* in 2007 [20] to the higher one of 1.09%. Indian studies indicate that seroprevalence of HCV ranges between 0.41- 09% [21].

The overall prevalence of RPR in the present study is around (0.09%), but from 2015-2017, no cases have been reported among blood donors in the present study. This is significantly lower than the reports from the rest of the country which ranges from 0.7% by Bhattacharya *et al.* [20] to 1.6% by Srikrishna *et al.* [22].

None of the donors were positive for malaria by RDT from 2013-2017 in the present study. This indicates stringent counseling and proper screening of donors are done so as to prevent transfusion related malaria.

In conclusion, the latest study highlights that blood transfusion is one of the major modes to contact HIV, HBV, HCV, syphilis and malaria. Males as much as the voluntary donors overwhelmingly predominate the donor subpopulation in modern world. HBsAg positivity is more and malaria positivity is least common TTI from the present study. All blood should be tested for compatibility and TTI's with reduction in unnecessary blood transfusion. Thus ensuring safe blood supply to the recipients. With the implementation of strict donor selection criteria, use of sensitive screening tests and establishment of strict guidelines for blood transfusion the incidence of TTI must be reached to zero levels.

REFERENCES

1. Singh R, Vohra P, Singla P, Chaudhary U. Seroprevalence of transfusion transmissible infections among healthy blood donors at general hospital, Sonapat, North India. J Evol Med Dent Sci. 2013;2(26):4816-20.
2. Chandekar SA, Amonkar GP, Desai HM, Valvi N, Puranik GV. Seroprevalence of transfusion transmitted infections in healthy blood donors: A 5-year Tertiary Care Hospital experience. Journal of laboratory physicians. 2017 Oct;9(4):283.
3. Klein HG, Anstee DJ. Infectious agents transmitted by transfusion. Mollison's Blood Transfusion in Clinical Medicine. New York: Wiley Blackwell Publishing. 2009:701-4.
4. Ahmed Z, Umaru N, Shreesha K. Seroprevalence of transfusion transmitted infections among blood donors in Mangalore. Medica Innovatica. 2012;1(2):24-7.
5. Gharehbaghian A. An estimate of transfusion-transmitted infection prevalence in general populations. Hepatitis monthly. 2011 Dec;11(12):1002.
6. Mathai J, Sulochana PV, Satyabhama S, Nair PK, Sivakumar S. Profile of transfusion transmissible infections and associated risk factors among blood donors of Kerala. Indian journal of pathology & microbiology. 2002 Jul;45(3):319-22.
7. Karmakar PR, Shrivastava P, Ray TG. Seroprevalence of transfusion transmissible infections among blood donors at the blood bank of a Medical College of Kolkata. Indian J Public Health. 2014;58:61e64.
8. Koshy JM, Manoharan A, John M, Kaur R, Kaur P. Epidemiological profile of seropositive blood donors at a tertiary care hospital in North India. CHRISMED J Health Res. 2014;1:91e94.
9. Rao P, Annapurna K, HIV status of blood donors and patients admitted in KEM Hospital Pune. Indian J Hemat Blood Transf 1994;12:174-6.
10. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. Indian J Pathol Microbiol 2010; 53(2):308-9.
11. Pramanik S, Chackrabarti SN. A study on problems of construction workers in West Bengal based on neutrosophic cognitive maps. International Journal of Innovative Research in Science, Engineering and Technology. 2013;2(11):6387-94.
12. Gupta N, Kumar V, Kaur A. Seroprevalence of HIV, HBV, HCV and syphilis in voluntary blood donors. Indian J Med Sci. 2004;58:255e257.
13. Agrawal VK, Sharma VP, Agrawal P, Gupta D. Sero-prevalence of transfusion transmissible infections among blood donors in urban area. Asian J Med Res. 2012;1:112e114.
14. Giri PA, Deshpande JD, Phalke DB, Karle LB. Seroprevalence of transfusion transmissible infections among voluntary blood donors at a tertiary care teaching hospital in rural area of India. J Family Med Prim Care. 2012;1:48e51.
15. Garg S, Mathur DR, Garg DK. Comparison of seropositivity of HIV, HBV, HCV and syphilis in replacement and voluntary blood donors in western India. Indian J Pathol Microbiol. 2001;44:409e412.
16. Kaur H, Dhanon J, Pawar G. Hepatitis C infection amongst blood donors in Punjab e a six year study. Indian J Hematol Blood Transfus. 2001;19:21e22.
17. Sinha SK, Roychoudhury S, Biswas K, Biswas P, Bandopadhyay R. Prevalence of HIV, Hepatitis B, Hepatitis C and Syphilis in donor's blood: a study from eastern part of India. Open J Hematol. 2012, 3e1.

18. Nilima Sawke, Sawke GK, Chawla. Seroprevalence of common transfusion – Transmitted infections among blood donors. People's journal of scientific research 2010; 3(1):5–7.
19. Tulika Chandra, Ashutosh Kumar, Ashish Gupta. Prevalence of transfusion transmitted infections in blood donors: an Indian experience. Tropical Doctor 2009; 39(3):152–4.
20. Bhattacharya P, Chandra PK, Datta S, Banerjee A, Chakraborty S, Rajendran K, Basu SK, Bhattacharya SK, Chakravarty R. Significant increase in HBV, HCV, HIV and syphilis infections among blood donors in West Bengal, Eastern India 2004-2005: Exploratory screening reveals high frequency of occult HBV infection. World Journal of Gastroenterology: WJG. 2007 Jul 21;13(27):3730.
21. Ahmed MU, Begum HA, Hossain T, Chakraborty P. Incidence of common transfusion transmitted diseases among blood donors. Journal of Armed Forces Medical college, Bangladesh. 2009;5(1):4-6.
22. Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors?. Indian journal of pathology & microbiology. 1999 Oct;42(4):411-6.