



Original Research Article

Seroprevalence of Transfusion Transmitted Infections among Healthy Blood Donors

Yashovardhan Araveti^{1*}, Anusha.D.R^{2**}, Rama Mohan Pathapati^{3***}, Naveeth Ahamed.Sk^{4*}, Srujan Babu Y⁵

¹Assistant Professor, ²Senior Resident, ³Associate Professor, ⁴Technical Supervisor,
*Department of Transfusion Medicine, ** Department of General Medicine, *** Department of Pharmacology,
Narayana Medical College & Hospital, Nellore, Andhra Pradesh, India.

⁵Student, MBBS Final Year Part - 1 Narayana Medical College, Nellore, Andhra Pradesh, India.

Corresponding Author: Yashovardhan Araveti

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ABSTRACT

Introduction: Blood transfusion is a life saving measure to reduce mortality and morbidity in critical situations. Screening of donated blood for the presence of transfusion transmitted infections is the major step to prevent transmission of infections from donor to patient. Hence the present study carried out to assess the prevalence of transfusion transmitted infections (TTIs) among blood donors and also safety of donated units.

Materials & Methods: This is a prospective cross sectional study conducted over a period of one year from July 2014 to Jun 2015 and a total of 5433 donors were included in the study. All the donors were screened for the presence of TTIs by using enzyme linked immunosorbent assay (ELISA) for human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HBV), syphilis by rapid plasma reagin test (RPR), malaria by rapid card test.

Results: Out of 5433 donations, 2.71% were found reactive for all TTIs. 0.62% for HIV, 1.69% for HBV, 0.22% for HCV, 0.16% for syphilis and none found reactive for malaria.

Conclusion: In our study the risk of TTIs more in replacement donors than in voluntary donors. So encouraging voluntary blood donation, stringent donor selection guidelines, proper predonation counselling and use more sensitive tests will help to reduce the burden of TTIs.

Key Words: Blood donors, Seroprevalence, Transfusion Transmitted Infections (TTIs).

INTRODUCTION

Transfusion of blood and its components is life saving as well as it has life threatening hazards. With every unit of blood there is a 1% chance of transfusion associated problems including transfusion transmitted diseases. [1] Transmission of these infections through blood poses a serious challenge to blood transfusion

services. To prevent transmission of diseases, tests should done as per guidelines of the ministry of health and family welfare (Government of India) under the Drugs and Cosmetics act, 1940 and Rules, 1945 (amended from time to time), all the blood donations are to be screened against the five major infections namely Human Immunodeficiency Virus (HIV) I & II,

Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), syphilis and malaria. [2,3] Even though after thorough screening tests there is chance of transmission of diseases due to window period of these infections. Hence the present study was carried out to find the prevalence of transfusion transmitted infections in various groups of blood donors. This study helps to make stringent donor selection guidelines and also in evaluating safety of donated blood units.

MATERIALS & METHODS

This is a prospective cross sectional study conducted over a period of one year from July – 2014 to June – 2015 in the department of Transfusion Medicine at Narayana Medical College & Hospital a tertiary care teaching hospital in Nellore, Andhra Pradesh. A total of 5433 donations were collected from all blood donors who donated in blood bank and outdoor blood donation camps were included in the study. The rules laid down by the Drugs and Cosmetics act, 1940 and Rules, 1945 were strictly followed in proper donor selection and rejection.

Blood was collected from donors after obtaining informed consent, details like age, gender, category of blood donation (voluntary or replacement) and thorough screening of their health status. Phlebotomy was carried out under strict aseptic precautions and blood was collected in the blood bag. At the end, 5ml of blood sample was collected separately into pilot tubes for Transfusion Transmitted Infections (TTIs) screening. Blood samples were stored at 2-8 °C for further testing. Later, the serum samples were screened for HIV (ELISA, Benespha - Avantor performance materials India ltd.) HBV (ELISA, Benespha - Avantor performance materials India ltd.), HCV (ELISA, Benespha - Avantor performance materials India ltd.), Syphilis (RPR card test - Tulip Diagnostics) and

Malaria by rapid card test (Pan Malaria card – J.Mitra&Co).

Statistical Analysis: The data was collected, entered and analyzed using the excel sheet and measures of prevalence were expressed in mean percentages.

RESULTS

A total of 5433 donations screened, 147 (2.71%) were found reactive for all TTIs. Out of these, 34 (0.62%) found reactive for HIV, 92 (1.69%) for HBV, 12 (0.22%) for HCV, 9 (0.16%) for syphilis and none of the donation was found reactive for malaria (Fig-1).

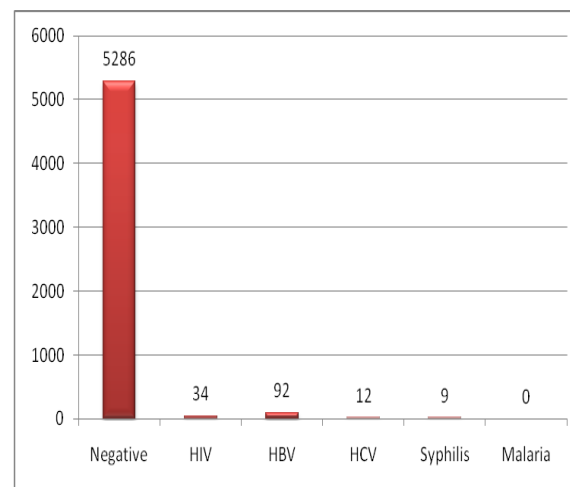


Fig – 1: Prevalence of Transfusion Transmitted infections

Out of 5433 donors 5393 (99.2%) were males and only 40 (0.8%) were females. Voluntary donors were 535 (9.9%) and replacement donors were 4898 (90.1%). The donor age ranged from 18-60 years in that most of the donors were in the age group of 21-30 years 3162 (58.1%). Table-1 shows the distribution of seropositivity in donors. Of total 147 reactive donations 89(1.64%) donors in the age group of 21-30 years & 147 were from the male donors. 2.58% of the replacement donors were reactive for TTIs and remaining small percentage i.e. 0.13% constituted by the voluntary donors.

Table- 1- Clinical characteristics of the donors vs. infections

N=5433	HIV		HBs Ag		HCV		Syphilis		Total	Overall %	
Blood Group											
A	4	11.76	15	16.30	3	25.00	4	44.44	26	17.69	0.48
B	13	38.24	24	26.09	4	33.33	4	44.44	45	30.61	0.83
AB	1	2.94	12	13.04	0	0.00	0	0.00	13	8.84	0.24
O	16	47.06	41	44.57	5	41.67	1	11.11	63	42.86	1.16
Total	34		92		12		9		147		2.71
Rh											
Negative	3	8.8	5	5.4	1	8.3	0	0.0	9	6.1	0.17
Positive	31	91.2	87	94.6	11	91.7	9	100.0	138	93.9	2.54
Total	34		92		12		9		147		2.71
Age range (yrs)											
18-20	6	17.65	11	11.96	1	8.33	1	11.11	19	12.93	0.35
21-30	21	61.76	54	58.70	7	58.33	7	77.78	89	60.54	1.64
31-40	6	17.65	24	26.09	4	33.33	1	11.11	35	23.81	0.64
41-50	1	2.94	3	3.26	0	0.00	0	0.00	4	2.72	0.07
Total	34		92		12		9		147		2.71
Gender											
Female	0	0	0	0	0	0	0	0	0	0	0.00
Male	34	100	92	100	12	100	9	100	147	100	2.71
Total	34		92		12		9		147		2.71
Donation Type											
Replacement	32	94	88	96	11	92	9	100	140	95	2.58
Voluntary	2	6	4	4	1	8	0	0	7	5	0.13
Total	34		92		12		9		147		2.71

DISCUSSION

The first step in the assessment of blood safety of any blood transfusion service is the evaluation of the seroreactivity of the donated blood for transfusion transmitted infections. [4] Accurate estimates of risk of TTIs are essential for monitoring the safety of blood supply and evaluating the efficacy of the currently employed screening procedures “as discussed by NACO. [5]” Blood should be transfused only with proper indication to avoid unnecessary complications including TTIs. [6] In developing countries the prevalence of TTI is much higher and quite far from attaining a zero risk level at the present moment. [7] The prevalence of TTIs may depend on the prevalence of infections in the general population.

The overall prevalence of TTIs was around 2.71%. This is comparable to the observations of Ray Karmakar, et al [8] i.e. 2.79%. The Indian National AIDS Control

Organization (NACO) suggested an overall prevalence of 0.91% (2005) in India. [9] The prevalence rate of HIV in our study is 0.62%. This coincides with observations of Ray Karmakar et al [8] 0.6% (2014) Pahuja S et al [10] 0.54% (2007) Sawke N et al [11] 0.51% (2010). Low prevalence of HIV was reported by Fernandez H et al [7] 0.06% (2010), Ahmed Z et al 0.1% (2012). [6]

In India, HBV prevalence among general population ranges from 2 to 8%, placing our country in intermediate HBV endemicity zone. [12] But in our study we noticed a lower prevalence i.e.1.69%. Slightly lower prevalence was reported by Bhawani et al [13] 1.41% and Jasani et al [14] 1.35% and the higher prevalence was reported by Sinha SK et al [15], (2012) i.e. 2.27% and Rani K et al [16], (2011) i.e.2.14%.

In our study HCV prevalence was 0.22%. A higher prevalence rate was reported by Gupta N et al [17] 1.09%(2004),

Bhawani et al ^[13] 0.84% and lower prevalence rate was reported by Jasani J et al ^[18] 0.16% (2012), by Fernandez H et al., 0.06% (2010). The prevalence of VDRL reactivity was 0.16% in our study. Chaudhary V et al ^[19] reported similar prevalence 0.16%, Ray Karmakar, et al ^[8] reported a slightly higher prevalence 0.23%. None of the blood donors found reactive for Malaria.

58% of the donors were in the age group of 21-30 years and 1.63% infections were noted in the age group. Similar prevalence was reported by Ray Karmakar, et al ^[8] in the age group of 21-40 years. We observed a seroreactivity of 2.71% in male donors and zero seroreactivity seen in female donors. This is due to few female donors in study and constitute about 0.8% of total donations. The study by Giri PA et al ^[20] (2012) also reported higher prevalence in male donors. This higher prevalence in male donors may be due to difference in sex behaviour.

Group O (40.58%) and B (33.13%) were the two most prevalent blood groups among the donors followed by A (19.1%) and AB (7.19%). Majority (93.58%) were rhesus factor positive and only 6.42% were rhesus factor negative. The majority prevalence of TTI was 1.16% O group donors and 2.54% in rhesus factor positive donors.

Seroprevalence of infections were more commonly seen in replacement donors HIV (0.58%), HBV (1.62%), HCV (0.2%) and Syphilis (0.16%) when compared with voluntary donors. The difference in infection rates between voluntary and replacement donors has been observed in many earlier studies. ^[21,22] Concealment of the medical history by professional or replacement donors poses a great threat to the safety of blood supply. ^[6]

CONCLUSION

To conclude the prevalence of TTIs were more in replacement donors. So for safe blood supply and to reduce transmission of infections voluntary non remunerated blood donors will be encouraged. This will be achieved by proper education and creating awareness among population. Implementation of strict donor selection guidelines, proper donor predonation counselling and donor self exclusion may reduce the seroreactivity in donated blood and wastage of resources. Use of more sensitive tests may help detection of infection in earlier during window period will further reduce the risk of transmission of infections.

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