



RESEARCH ARTICLE

TRANSFUSION TRANSMITTED INFECTION AMONGST BLOOD DONORS AT A TERTIARY CARE TEACHING HOSPITAL OF NORTHEAST INDIA

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ABSTRACT

Blood transfusion is an important mode of transmission of infections to recipients. The aim of the study was to assess the prevalence of transfusion-transmissible infections among blood donors. A five years retrospective study was conducted at F.A.A. Medical College, Barpeta, Assam among voluntary and replacement donors from the 2011 to 2015. Donors were screened for prevalence of HIV, HBV, HCV, Malaria and syphilis. (A total of 18279 donors undergone screening test MP, RPR, HbsAg, HCV and HIV prior to collection. The voluntary donors count was 17048 (93.3%) compared to 1231 (6.7%) replacement donor. All the TTI's prevalence rates were found to be significantly lower amongst voluntary blood donors compared to replacement blood donors. Prevalence of malaria were high given the fact that it is endemic in our area. There was no HCV case signifying the need of more sensitive kits in our population than the commonly employed rapid test. Rate of HIV infection in subject population was found to be lower than the national average. The voluntary donors can be considered safe compared to replacement donor.

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INTRODUCTION

Blood transfusion (also component transfusion) is one of the very crucial procedures in modern healthcare delivery system. But this also carries the risk of transfusion transmitted infections (TTIs) by variety of microbes including the dreaded HIV (Human Immunodeficiency Virus 1 & 2), HBV (Hepatitis B Virus), Hepatitis C Virus (HCV), Malaria, Syphilis etc. The transfusion of safe blood to a pertinent recipient is a responsibility of the blood bank officials and other staff members. Strict screening test of donor for transfusion transmitted infection to the recipient is of utmost importance in preventing and spreading the TTIs. An adequate and optimal donor screening programme can prevent TTIs effectively and for this reason in India it is mandatory to screen blood donors for HIV, HBV, HCV, Malaria and Syphilis as of now (Ref). Despite this elaborate screening mechanism diseases still occurs, primarily because of the inability of the test to detect the disease in the 'window' period of infection, immunologically variant viruses, immune-silent carriers and

inadvertent laboratory testing errors.(Ref). Surely TTIs are topic serious concern for stake holders namely patients, physicians, policy makers etc. The present study was carried out with the aim to find out the prevalence of common TTIs and their trends among the voluntary and replacement donors from a newly established rural hospital based blood transfusion service set up in north east India over a period of five years.

MATERIALS AND METHODS

A retrospective pilot study was conducted at FAA Medical College and Hospital, Barpeta, Assam for a period five (5) years from 2011 to 2015. Subjects were selected from people attending voluntary blood donation camps organized at adjacent sites as well as replacement donors of our Hospital (mainly family members). Serum from total of 18279 donors underwent screening test for malaria parasite (MP-Rapid antigen detection for HRP2, pAldolase & pLDH), Syphilis (Rapid Plasma Reagin test i.e. RPR/VDRL, Carbogen, Tulip), HBV (HbsAg by ELISA, make: J Mitra's), HCV (antibody detection by ELISA, make: J Mitra's 3rd gen ELISA) and HIV (antibody detection by ELISA, make: J Mitra's 4th gen) prior to actual blood donation. Comparisons of prevalence rates

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throughout 2011–2015 were carried out using Chi-square or Fisher's exact test. The same statistical tests were used for subgroup analyses. A significance criterion of $p \leq 0.05$ was used in the analysis. The prevalence was calculated based on the number of donations tested and number of donations with positive results in screening tests

RESULTS

17048 voluntary donors were compared with 1231 replacement donor. The male female ratio was 16694 to 354 in voluntary donors, on the other hand 1200 to 31 in replacement donors. The age of donors in voluntary category in between 21 to 50 years (Mean Age 28.59 ± 3), while in replacement category it was 24 to 46 years (Mean age 26.34 ± 2)

et al (2014) in a Dehradun Based study found MP in 0.08% of cases (mainly replacement donor). The VDRL (RPR) reactive donors were slightly higher in replacement than voluntary donors 0.081% to 0.029%. (Negi *et al.*, 2014) This increase reactivity is not significant (high p-value) as replacement donors are consistently low compared to voluntary donors. Fernandez *et al* (2010) found somewhat similar finding in their Karnataka based study with 0.04% in voluntary donors and 0.07% amongst replacement donors. (Fernandes *et al.*, 2010) Study by Pallavi *et al* (2011) higher rates at 0.25% amongst voluntary donors and 0.32% in replacement donors. (Pallavi *et al.*, 2011) According to National AIDS Control Organization of India, the prevalence of AIDS in India in 2013 was 0.27 (<http://www.nacoonline.org/upload/REPORTS/NACO%20Annual%20Report%202010-11.pdf>). The spread of

Table 1. Voluntary and replacement blood donor over a period of 5- years (2011-2015)

Year	Voluntary Donors	Male	Female	Replacement Donors	Male	Female	Total
2011	1682	1652	30	536	532	4	2218
2012	3486	3312	174	186	180	6	3672
2013	3552	3479	73	305	296	9	3857
2014	4152	4116	36	133	124	9	4285
2015	4176	4135	41	71	68	3	4247
Total	17048 (93.3%)	16694	354	1231 (6.7%)	1200	31	18279

Table 2. Results of TTI screening in voluntary and replacement donor over a period of 5 years (2011-2015)

Type of donation	Tests	Year					Overall	Overall prevalence	p-Value
		2011	2012	2013	2014	2015			
Voluntary	MP	1	4	2	3	0	10	0.059	0.073
	RPR	0	2	2	0	1	5	0.029	0.87
	HBsAg	2	9	8	5	5	29	0.17	0.001
	HCV	0	0	0	0	0	0	0	-
	HIV	0	5	0	3	1	9	0.053	0.83
	RPR	0	0	0	1	0	1	0.081	-
	HBsAg	0	2	2	1	3	8	0.65	-
	HCV	0	0	0	0	0	0	0	-
	HIV	0	1	0	0	0	1	0.081	-

The Screening test result for different transfusion transmitted infections in our study subjects (voluntary as well as replacement donors) are shown in table I and Table II. The 5 year seroprevalence for MP screening (rapid test) was 0.059% in voluntary donors compared to 0.24% in replacement donors. The RPR screening revealed 0.029% in voluntary compared to 0.081% in replacement donors. The overall 5 years HBsAg positivity was 0.17% and 0.65% in voluntary and replacement donors respectively. There was no HCV positive donor in the subject population. The HIV sero-positivity (screening by ELISA) were 0.053% in voluntary and 0.081% in replacement donors. Statistical significance was found only with lower prevalence of HBV (HBsAg positives) amongst the voluntary donors compared to replacement donor. (see Table II)

DISCUSSION

The present study was dominated by voluntary donors (i.e.93.3%) corroborating some similar studies done earlier. {Pahuja *et al* (2007) at 99.48%,Singh *et al* (2004) at 82% and Kakkar *et al* (2004) at 94.7%}.^{2, 3, 4}The five years period from 2011 to 2015 when analyzed it was observed that malarial parasite rapid test was positivity was high over all (at 0.3%) as well as individually in both voluntary (0.06%) and replacement donors (0.24%) probably due to the fact that malaria infection is endemic in this part of the country. In contrast Fernandez *et al* (2010) in a Manglore based study found 0.01% positivity (voluntary donor only). (Fernandes *et al.*, 2010) Similarly Negi

HIV in India is primarily restricted to the southern and north-eastern regions of the country and India has also been praised for its extensive anti-AIDS campaign (Clinton lauds India Aids campaign, 2005). The HIV prevalence in our study was 0.053% and 0.081% in voluntary and replacement donors respectively, which is much less than national average. The prevalence of HIV is higher in replacement donor though the total number of replacement donors is low. The prevalence of HBsAg in the present study is 0.17 % and 0.65% in voluntary and replacement donor respectively. This is somewhat similar to finding of Gupta *et al.* (2004) who reported seropositivity of 0.66% particularly in replacement donor. On the other hand Kaur *et al.* (2005) reported 1.07% and 0.65% in replacement and voluntary donors. Pahuja *et al.* (2007) reported much higher prevalence of 2.23%. In the present study the donor screening for HBsAg is more in replacement than voluntary donor. Increasing trends of HBsAg infection was seen in replacement donors which may be due to fact that replacement donors conceal information about their health during donor selection to get the blood for their patient, thus compromising blood safety. The HCV prevalence in our study in both voluntary donor and in replacement donors was nil. This may be due to low sensitivity of rapid test kit especially in low prevalence population. A better kit (e.g. 4th generation ELISA or PCR) could have detected some HCV cases. Over all low prevalence was detected by Gupta *et al.* (2011) (0.11%) in replacement donors. Kaur *et al.* (2010) reported 0.5% and 0.3%, while Sharma *et al.* (2004) reported 0.52% and 0.23% in

replacement and voluntary donor, respectively. To conclude, prevalence of different TTIs in present study was lower than that reported in other studies. This may be due to (as per National AIDS Control Organization) low prevalence of HIV and hepatitis in our population (Batham *et al.*, 2009). Voluntary donors were found to be safer than replacement donors. Better donor motivation, recruitment and retention strategies along with public awareness through multisectoral involvement of voluntary blood donation organization, blood bank personnel's, government and non-government agencies and media to improve voluntary donation should be implemented to increase the blood safety.

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