

Seroprevalence of HIV, Hbsag, HCV and Syphilis in Blood Donors At Tertiary Care Center, Ahmadabad

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Abstract: Background & objectives: Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), Hepatitis C (HCV) and syphilis infections pose a great threat to blood safety. This study was done to investigate the seroprevalence of markers for transfusion transmitted infections (TTIs) among blood donors at Gujarat Cancer and Research Institute (GCRI) over a period of three years. Methods: This retrospective analysis was conducted from January 2012-December 2014 at GCRI, Ahmedabad, Gujarat, India. A strict donor selection criterion was employed during collection of blood, and each unit was screened for TTI using commercially available 4th generation enzyme-linked immunosorbent assay (ELISA) kits for HIV, 3rd generation ELISA kits for Hepatitis B surface antigen (HBsAg), and anti-Hepatitis C virus antibody (HCV). Screening for syphilis was performed by Rapid Plasma Reagin (RPR) test. All seropositive samples were repeat tested before discarding. Results: The data of 44017 donors [43094(97.9%) males and (2.10%) females] were analyzed. Replacement donations [26,214(59.55%)] represented the majority whereas, only (40.5%) donations were from the voluntary donors. Reactivity risk was near to double in male donors as compared to female donors. A total of 44,017 donations were received, of which 40.5 % were voluntary donors and (59.5 %) were replacement donors. Interpretation & conclusion: Every blood transfusion has a risk of TTI. Hepatitis B having the highest risk. This risk can be reduced by improving donor selection criteria, increased vigilance, use of sensitive tests in screening of blood, and by making mandatory testing of all donated blood for certain infectious diseases. [D Patel, Natl J Integr Res Med, 2018; 9(2):72-75]

Key Words: HIV, HBV, HCV, Syphilis, Transfusion Transmitted Infections.

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Introduction: A well organized Blood Transfusion Service (BTS) is a vital component of any health care delivery system. An integrated strategy for Blood Safety is required for elimination of transfusion transmitted infections and for provision of safe and adequate blood transfusion services to the people. The policy aims to ensure easily accessible and adequate supply of safe and quality blood and blood components collected / procured from a voluntary non-remunerated regular blood donor in well-equipped premises, which is free from transfusion transmitted infections if stored and transported under optimum conditions.¹

The diseases transmitted by blood are HIV, hepatitis B and C, syphilis, malaria and infrequently cytomegalovirus, Epstein Barr virus, brucellosis etc. Preventing transmission of these infectious diseases through blood transfusion presents one of the greatest challenges of transfusion medicine.²

In developing countries transfusion-transmitted infections (TTIs) often threaten the safety of patients requiring blood transfusion, and medical care providers face serious challenges with blood availability, safety, and affordability.

In the past several decades have great advance in techniques of detecting TTIs with the advance of nucleic acid tests (NAT-PCR), western countries have shown decline in the risk of TTI to the major extent. As per guidelines of the ministry of health and family welfare (Government of India) under The Drug and Cosmetic Act ,1945 (amended from time to time), all the blood donations are to be screened against the five major infections namely HIV I & II, HBsAg, HCV, syphilis and malaria.^{3,4}

Aims & Objectives: The prevalence of the transfusion transmitted infections (TTIs), among blood donors allows for assessment of epidemiology of these infections in the community. The acquisition of the infections in the healthy blood donor population can be a serious threat to safety of the collected blood donations.

Methods: This retrospective study was carried out at blood bank of The Gujarat Cancer & Research Institute, Ahmedabad during the 3 years from January 2012-December 2014 after permission of Institution Review Board (IRB).

All the blood donors (voluntary as well as replacement) have donated blood at in-house and at

camp during the study period were included. Donor's personal and demographic information regarding age, sex, no of previous donations, voluntary or replacement donation and status of infectious markers was obtained from the records. Every blood unit was routinely tested to exclude HIV, HBV, HCV, Syphilis and Malaria.

In 3 year study period, 44,017 donors were selected and tested. Standard donor selection criteria were followed for donor fitness. Screening of HIV was done by ELISA using kits(4th generation Biorad). HBsAg was detected by 3rd generation ELISA kits (Biorad) . Test for Anti-HCV was done by 3rd generation ELISA(Biorad). Test for syphilis was done by RPR(Biolab). All the reactive samples were retested in duplicate as recommended by National AIDS Control Organization for donor information.

Results: The data of 44,017 donors who donated blood during the study period were analyzed. Among them 43,094(97.90%) were male donors and 923(2.10%) were female donors. 26,214(59.55%) were

Replacement donors and 17,803(40.5%) were Voluntary donors (Table 1).

The overall seroprevalance of HIV, HBsAg, HCV and Syphilis were 54(0.12%), 412(0.94%), 67(0.15%) and 66(0.15%) respectively (Table 2). There were 599 (1.36%) infectious markers positive during the study period. While comparing seroprevalence of the infectious markers among replacement and voluntary donors, it was observed that HBsAg, HCV were significantly higher in replacement donors.

Table: 1 Donor Category and Gender Distribution

Year	Total Donor	Voluntary Blood Donors		Replacement Blood Donors	
		Male	Female	Male	Female
2012	14212	4526	243	9377	66
2013	14737	5132	260	9286	59
2014	15068	7388	254	7385	41
Total	44017	17046	757	26048	166

Table: 2 Overall Seroprevalence of various infectious markers among blood donors

Year	No of donations tested	HIV N(%)	HBsAg N(%)	HCV N(%)	VDRL N(%)	Total Positive
2012	14212	19 (0.13%)	147 (1.03%)	34 (0.24%)	18 (0.13%)	218 (1.53%)
2013	14737	19 (0.13%)	149 (1.01%)	21 (0.14%)	26 (0.18%)	215 (1.46%)
2014	15068	16 (0.10%)	116 (0.77%)	12 (0.08%)	22 (0.15%)	166 (1.10%)
	44017	54 (0.12%)	412 (0.94%)	67 (0.15%)	66 (0.15%)	599 (1.36%)

Table: 3 Comparison between replacement and voluntary donors and male and female donors

Infectious Markers	Replacement v/s Voluntary		Male v/s Female	
	Replacement N (%)	Voluntary N (%)	Male N (%)	Female N (%)
HIV	40 (0.15%)	14(0.08%)	53(0.12%)	1(0.11%)
HBsAg	288(1.10%)	124(0.70%)	409(0.95%)	3(0.33%)
HCV	46(0.18%)	21(0.12%)	65(0.15%)	2(0.22%)
VDRL	50(0.19%)	16(0.09%)	65(0.15%)	1(0.11%)
Total	424	175	592	7

Table: 4 Comparison of seroprevalences (%) of infectious markers from various studies in different parts of India

	Place	HIV	HBsAg	HCV	Syphilis
North India	Delhi ⁷	0.56%	2.23%	0.66%	-----
	Haryana ⁸	0.3%	1.7%	1.0%	0.9%
	Lucknow ⁹	0.23%	1.96%	0.85%	0.01%
South India	Karnataka ²	0.44%	1.86%	1.02%	1.6%
East India	West Bengal ¹⁰	0.28%	1.46%	0.31%	0.72%
West India	Maharashtra ¹¹	0.07%	1.09%	0.74%	0.07%
	Present Study	0.12%	0.94%	0.15%	0.15%

Table: 5 Comparison of seroprevalences (%) of infectious markers from various studies in different parts of Gujarat

Study	HIV	HBsAg	HCV	Syphilis
Piyush A.Patel et al. 2012 ¹²	0.08%	0.30%	0.09%	0.06%
Dhruva GA et al. 2012 ¹³	0.43%	0.97%	0.41%	0.31%
Sangita patel et al. 2013 ¹⁴	0.30%	0.86%	0.21%	0.26%
Dhaval Mehta et al. 2013 ¹⁵	0.3%	1.2%	0.26%	0.5%
Present study	0.12%	0.94%	0.15%	0.15%

Discussion: In the western world the transmission rates of HIV, HBV, HCV and syphilis through blood transfusion have been reported to be around 1 in 2-5 million, 1 in 0.5-1 million, 1 in 2-4 million, 6 in a million respectively^{5,6}. Comparison of seroprevalences of various infectious markers from different parts of

India are given in Table-4.^{7,8,9,2,10,11} Comparison of seroprevalences of infectious markers from various studies in different parts of Gujarat are given in Table-5.^{12,13,14,15}

Conclusion: Every blood transfusion has a risk of TTI, But this risk can be reduced by improving donor selection criteria, increased vigilance, use of sensitive tests in screening of blood and by making mandatory testing of all donated blood for certain infectious diseases. Voluntary donation is safer. Prevalence of HbSAG is highest in India among all TTIs. Stringent measures should be continued to be employed to reduce the risks of spread via blood donations; self-deferral must also be advocated.

References:

1. National Blood Policy (India) [cited on 2017 May 31]. Available from: <http://www.naco.nic.in>
2. Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors? Indian J. Pathol Microbiol. 1999; 42; 411-6.
3. Government of India .Drugs and Cosmetics rules, 1945 (amended till 30THJune2005)available<http://www.cdsc.nic.in/html/Drugs&cosmeticsAct.pdf>.
4. "National Blood Policy" produced & published by NACO (National AIDS Control Organization), Ministry of Health and Family Welfare, Government of India, New Delhi. June 2003 (reprint 2007).
5. Bihl F, Castelli D, Marincola F, Dodd RY, Brander C. Transfusion-transmitted infections. J Transl Med. 2007;5:25.
6. Chiavetta JA, Maki E, Gula CA, Newman A. Estimated risk of transfusion transmitted infection in the Canadian blood supply (1987-1996) Vox Sang. 2000;78(Suppl 1):360.
7. Pahuja S, Sharma M, Baitha B, Jain M. Prevalence and trends of markers of hepatitis C virus, hepatitis B virus and human immunodeficiency virus in Delhi blood donors.a hospital based study. Jpn J Infect Dis. 2007;60:389-91.
8. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. Indian J Pathol Microbiol. 2010;53:308-9.
9. Chandra T, Kumar A, Gupta A. Prevalence of transfusion transmitted infections in blood donors: an Indian experience. Trop Doct. 2009;39:152-4.
10. Bhattacharya P, Chandra PK, Datta S, Banerjee A, Chakraborty S, Rajendran K, et al. 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 J Gastroenterol. 2007;13:3730-3.
11. 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;1:48-51.
12. Patel PA, Patel SA, Oza HV. Seroprevalence of Transfusion Transmitted Infections (TTIs) in Blood Donors at Western Ahmedabad-A Secondary Care Hospital Based Study. Int J Biol Med Res.2012; 3(2):1806-1810
13. Dhruva GA, Agravat AH, Pujara KM. Seroprevalence of HIV, HBV, HCV and Syphilis in Blood Donors in Saurashtra Region of Gujarat: Declining Trends Over a Period of 31/2 Years. Online J Health Allied Scs. 2012;11(1):5.
14. Patel SV, Popat CN, Mazumdar VS, Shah MB, Shringarpure K, Mehta KG, et al. Seroprevalence of HIV, HBV, HCV and Syphilis in blood donors at a tertiary hospital (Blood Bank) in Vadodara. Int J Med Sci Public Health 2013; 2:747-750.

15. Mehta D, Vachhani JH, Desai NJ. Seroprevalence of Hiv, Hbv, Hcv and Syphilis in Blood Donors. Indian J of research 2013; 2(2)

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