

Study of Seroprevalence of HIV, Hepatitis B and C And Syphilis Among Blood Donors In A Tertiary Care Hospital, Kolkata

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Abstract: Transfusion transmitted infections (TTIs) are a real concern worldwide. Blood transfusion is an important mode of transmission of infections to recipients.

The aim of our study was to assess the prevalence of transfusion transmitted infection among blood donors, a 10years retrospective study, from April 2002 to March 2012 was conducted at the blood bank of Calcutta National Medical College and Hospital, Kolkata, West Bengal. Donors were screened routinely for seroprevalence of HIV, HBV, HCV and syphilis and malaria. Our study was focused on mainly HIV, Hepatitis and syphilis. A total of 128119 donors were tested, out of which 523 (0.40%) were replacement donors and 127596 (99.59%) were voluntary donors. The seroprevalence of HIV was 0.28% in the donors. The seroprevalence of HBV, HCV and syphilis was 1.75%, 0.37% and 0.44% respectively in total donors. Seroprevalence of HBV, HCV, and HIV in voluntary blood donors is high throughout this study.

Key words: TTI, Blood donors, Hepatitis, HIV, Seroprevalence, Prevention

I. Introduction:

Blood transfusion forms an integral part of modern mode of therapy. Transmission of infectious diseases through donated blood is of concern to blood safety. Blood transfusion carries the risk of transfusion-transmissible infections, including HIV, hepatitis, syphilis, malaria and infrequently toxoplasmosis, and some viral infections like CMV, EBV and herpes. With every unit of blood, there is 1% chance of transfusion-associated problems including transfusion-transmitted diseases.^[1] Among the TTIs, hepatitis B (HBV), hepatitis C (HCV), and HIV are the most dreadful. 2 billion people have been infected with HBV and 360 million have chronic infection worldwide and it is the 10th leading cause of death worldwide causing 500000 to 1.2 million deaths per year due to chronic hepatitis, cirrhosis, and hepatocellular carcinoma.^{[2],[3]} In Asia and most of Africa, chronic HBV infection is common and in Western countries, the disease is relatively rare.^[3] Nearly 3.9 million people are estimated to be infected with HCV, the most common chronic blood-borne infection, leading to 8000 to 10000 deaths annually in USA.^[4] The Indian subcontinent is classified as an intermediate HBV endemic (HBsAg carriage 2-7%) zone and has the second largest global pool of chronic HBV infections.^[3] The improved screening and testing of blood donors has significantly reduced transfusion-transmitted diseases in most developed countries. This has not been so in developing nations. Poor health education and lack of awareness result in the reservoir of infections in the population.

The aim of our study was to know the seroprevalence of transfusion-transmitted infections in donors screened in blood bank in CNMCH, Kolkata.

II. Materials And Methods:

This cross-sectional observational study was done among voluntary and replacement blood donors who attended blood bank of CNMCH or blood donation camps during the period of April 2002 to March 2012. In this we included followings : (1) subjects of either sex, (2) age group (in years) - 18 to 60, and (3) subjects otherwise healthy for blood donation.

The screening for HIV was done by ELISA using kits (Monozyme; J. Mitra, India). Hb_sAg was detected by ELISA (Transasia, India and J. Mitra, India). Anti-HCV test was done by ELISA (Monozyme, J Mitra, India and Transasia, India). Test for syphilis was done by RPR (Mediclone, India and Tulip, India). Statistical analysis done by Chi-square test where p value less than 0.001.

III. Results:

Table 1. Yearwise distribution and seroprevalence of TTI among the donors

YEAR(APRIL-MARCH)	VOLUNTARY DONOR	REPLACEMENT DONOR	TOTAL DONOR	HIV	HBV	HCV	RPR (SYPHILIS)
2002-2003	7490	20	7510	28	107	6	26
2003-2004	9674	14	9688	44	130	21	41
2004-2005	8207	28	8235	24	109	18	36
2005-2006	9358	24	9382	35	187	31	29
2006-2007	9997	32	10029	37	240	36	39
2007-2008	10455	33	10488	44	293	58	44
2008-2009	14007	58	14065	23	332	65	74
2009-2010	16374	78	16452	45	359	68	51
2010-2011	20201	27	20228	41	190	85	40
2011-2012	21833	209	22042	74	300	97	185
Total	127596	523	128119	395	2247	485	565
%	99.59%	0.40%		0.28 %	1.75 %	0.37 %	0.44%

Table 2. Yearwise distribution of donors having TTI according to described age groups

YEAR(APRIL-MARCH)	AGE(YRS)	HIV	HBV	HCV	RPR
2002-2003	18-35	16	78	04	14
	36-60	12	29	2	12
2003-2004	18-35	28	95	15	21
	36-60	16	35	06	20
2004-2005	18-35	15	76	13	19
	36-60	09	33	05	17
2005-2006	18-35	20	147	23	14
	36-60	15	40	08	15
2006-2007	18-35	24	182	28	20
	36-60	13	58	08	19
2007-2008	18-35	30	227	44	24
	36-60	14	66	14	20
2008-2009	18-35	16	240	40	36
	36-60	07	92	25	38
2009-2010	18-35	28	272	41	26
	36-60	17	87	27	25
2010-2011	18-35	21	141	63	22
	36-60	20	49	22	18
2011-2012	18-35	42	208	74	90
	36-60	32	92	23	95

Table 3. Yearwise sex distribution of donors having TTI

Year(APRIL-MARCH)	TOTAL DONAR	MALE	HIV	HBV	HCV	RPR
		FEMALE				
2002-2003	7510	6845	25	103	05	25
		165	03	04	01	01
2003-2004	9688	7900	38	125	19	39
		1788	06	05	02	02
2004-2005	8235	6890	20	106	17	33
		1345	04	03	01	03
2005-2006	9382	8193	31	180	30	27
		1189	04	07	01	02
2006-2007	10029	8609	34	232	34	37
		1420	03	08	02	02
2007-2008	10488	9364	42	279	54	40
		1124	02	14	04	04
2008-2009	14065	12296	22	316	60	66
		1769	01	16	05	08
2009-2010	16452	14320	39	332	55	44
		2132	06	27	13	07
2010-2011	20228	17192	36	178	68	33
		3036	05	12	17	07
2011-2012	22042	18434	67	267	75	133
		3608	07	33	22	52

Table 4. Statistical analysis of donors as per the age and sex distribution (value in bold letters are statistically significant. Figures in brackets are percentages.)

	Total	HIV	HBV	HCV	RPR
Sex					
Male	110543	354(0.32)	2118(1.92)	417(0.38)	477(0.43)
Female	17576	41(0.23)	129(0.73)	68(0.39)	88(0.50)
Age					
18-35yrs	89639	240(0.27)	1666(1.9)	354(0.38)	286(0.32)
36-60yrs	38480	155(0.4)	581(1.5)	140(0.36)	279(0.73)
Total	128119	395	2247	485	565

A total 128119 blood donors were studied. Among them, majority, 1275969(99.59%), were voluntary donors and 523(0.40%), were replacement donors. Among the three viruses, prevalence wise, HBV outnumbered the other two. Prevalence of HBV was 1.75%, whereas HCV, HIV and syphilis were 0.37%, 0.28% and 0.44% respectively.

Among total donors (128119), male donors and female donors were 110543 & 17576 respectively. Among male donors and female donors majority, 2118(1.92%) & 129(0.73%) were HBV positive respectively. Both were statistically significant (p value <0.001).

Total number of donors in age group 18-35 years and 36-60 years were 89639 & 38480 respectively. Among the age group 18-35 years HIV, HBV and Syphilis were positive in 240(0.27%), 1666(1.9%) and 286(0.32%) donors. These were statistically significant (p value<0.001). Among the age group 36-60 years HIV, HBV and Syphilis were positive in 155(0.4%), 581(1.5%) and 279(0.73%) donors. These were statistically significant (p value<0.001).

IV. Discussion:

Blood transfusion is a significant route of transmission of infectious disease like HBV, HCV, and HIV. These diseases are of great concern because they can cause fatal acute and chronic life-threatening disorders. Risk may be reduced by the vigorous screening of donors and donated blood. Prevalence of HBV, HCV, and HIV among the healthy blood donors or the replacement donors reflects the disease prevalence in the community.^[5] Due to limitation in current blood screening practices in developing countries, donation by such individual is a potential threat to recipients.^[6] A WHO report states that the viral dose in HIV transmission through blood is so large that one HIV positive transfusion leads to death on an average after two years in children and after three to five years in adults.^[7] Blood donation collected in latent period of infection may be infectious despite of negative antibody test.^[8] The report of National AIDS control organization showed a considerable increase in HIV prevalence in the year 2005 in antenatal clinic (0.5 - 0.84%) and sexually transmitted diseases clinic (0.8 - 2.16%) from the state of West Bengal, whereas adult HIV prevalence in the rest of the country was comparable with the previous years.^[9] Seropositivity for HIV (0.28%) in this study was lower than the studies reported from other parts of India & also study done in Kolkata on 2010.^{[10],[11],[12][5]} A slow and steady increase of HIV incidence in voluntary blood donors (from 1.6 per 1000 in 1988-1989 to 3.8 per 1000 in 1996-1997) was noted in Vellore.^[13] An increase in HIV incidence from 0.04 to 0.55% was shown in New Delhi between 1989 and 1995, whereas a decreasing trend of HIV incidence (0.81% in 2006, 0.32% in 2007, and 0.53% in 2008, overall 0.51%) was noted in blood donors of Bhopal and it is comparable with present study.^{[14],[15]} Incidence of HIV (0.16-0.18%) in Kerala remained constant from 1990 to 1999.^[16] No voluntary blood donors were found to be HIV positive in Haryana.^[17]

In India, detection of HBV infection among blood donors is carried out by HBsAg screening, while detection of anti-HBc is rarely done.^[18] In West Bengal, mandatory HCV screening started from June 2001.^[5] An increasing prevalence of HBV (1.28 - 1.66%), HCV (0.28 - 0.35%), and HIV (0.23 - 0.35%) was observed in blood donors of Kolkata in 2004 to 2005.^[19] and in study done in 2010 in Kolkata where the prevalence of HBV, HCV, and HIV was 1.55%, 0.35%, and 0.32%, respectively.^[5] In the present study, TTIs were maintaining nearly the same prevalence (HBV: 1.75%, HCV:0.37%, HIV: 0.28%) even in 2012.

In developed country like USA, the risk of HBV transmission through blood transfusion is 1: 63 000 units transfused.^[20] Seroprevalence of HBV in other Indian studies had shown to range between 1.86 to 4.84%, which was much higher than the prevalence of the present study.^{[21],[14],[22],[23]} An increasing incidence of HBV (2.6% in 2006, 2.67% in 2007, and 3.43% in 2008 and overall - 2.9%) was noted in blood donors of Bhopal.^[15]

Voluntary blood donors of Chandigarh had 0.66% seropositivity of HBV.^[24] In different Indian studies, HCV seroprevalence ranged between 0.57 to 1.49%, which was much higher than the present study (0.35%).^{[16],[21],[14],[15],[24]}

Majority of the donors were male (86.28%), similar findings were also found in studies in different parts of India.^{[25],[13],[16][5]}

The highest prevalence of HBsAg, HIV, HCV and syphilis infections occurred among commercial blood donors and those aged 18 to 47 years old, the most sexually active age group.^[26] This is also comparable with present study.

Seroprevalence increased after the age of 30 years, though not linearly, with the highest rate (3.2%) recorded in the 31-40 years and 51-70 years age. ; age and gender of donors seem to be important factors affecting it.^[27]

V. Conclusion:

In the 10- year period, 128119 donors were studied. Among them 99.96% were voluntary donors. Male donors constituted 86.28%. Seroprevalence of HIV in total donors was 0.28%. The sero-positivity of HBS Ag, HCV and syphilis was 1.75%, 0.37% and 0.44% respectively. Proper pre donation screening of blood donor and post donation testing of blood bag should be done to minimize transfusion transmitted disease. We should educate the donors as well as medical staffs and makes awareness about transfusion transmitted diseases, so that we can provide safes blood as much as and to reduce transmitted disease to recipient.

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