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ORIGINAL ARTICLE

Blood Donor's Status of HIV, HBV, HCV and Syphilis in this Region of Marathwada, India

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Abstract:

Aims & Objectives: Blood transfusion can cause the transmission of infections to recipients. This is an important mode of infection. The aim of study was to assess the prevalence of such type of infections among blood donors and to compare the seroprevalence of transfusion transmitted diseases in voluntary donors and replacement donors. Retrospective study of five years from Jan. 2007 to Dec. 2011 was done. This study was conducted at Blood bank, MIMSR Medical College Latur, Govt. Medical College, Latur and Bhalchandra Blood bank, Latur. *Material & Methods:* Total 10, 4925 donors were tested. Donors were screened for seroprevalance of HIV, HBC, HCV and Syphilis. Screening of HIV, HBV & HCV was done by ELISA method & Syphilis was screened by RPR type. *Results:* The comparison of seroprevalence of HIV, HBV, HCV & Syphilis in voluntary donors and replacement donors showed significant difference only for HIV in the years 2007, 2010, and 2011. *Conclusion:* The seroprevalence of transfusion transmitted diseases in the study is very low or negligible in voluntary donors as compared to replacement donors. There was a declining trend of seroprevalence for all the disease screened. But in our study the difference is not significant, which indicates that the selection of donors is of low quality. The selection of high quality voluntary donors should be achieved by creation of awareness by education of the prospective donor populations.

Key words: Seroprevalence, Blood donation, HIV, HBV, HCV.

Introduction:

To avoid infection by blood transfusion, safety is very important. Blood transfusion is an integral part of medical and surgical therapy. Blood transfusion can cause infection of HIV, Hepatitis, Syphilis, malaria and other viral infections. To avoid this, the tests for HIV, HBV, HCV Syphilis and Malaria are mandatory in the blood bank.

It is now noted that even disease like Brucellosis can be transmitted via blood transfusion [1]. With every unit of blood there is 1% chance of transfusion associated problems including transfusion transmitted diseases [2].

First case of transmission associated HIV infection was described in an infant, given transfusion for erythroblastosis faetalis [3].

Many cases were reported after that all over the world in which transfusion of blood was risk factor [4-6]. Poor health education and lack of awareness results in reservoir of infection in the population.

According to Dolly et al the incidence of seroprevalence is increasing in India [7]. The improved screening and testing of the donors have significantly reduced transfusion transmitted diseases in most of the developed countries. This has not been so in developing countries. Many studies have shown that seroprevalence of these diseases is very low or negligible in voluntary donors as compared to replacement donors. The aim of present study was to know the status of blood donors in HIV, HBV, HCV and Syphilis infection and to compare the seroprevalence in voluntary and replacement donors in this area of Marathwada.

Material & Methods:

Present study was conducted in the blood bank of MIMSR Medical College, Latur, Blood Bank of Govt. Medical College, Latur and Bhalchandra Blood Bank, Latur. Tests were routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria. Data was collected for five years from Jan. 2007 to Dec. 2011. Donors were selected by standard criteria for donor fitness. Screening for infection of HIV was done by microlisa (J. Mitra & Co. Pvt. Ltd) This is microwell ELISA test for the detection of antibodies to HIV-1 (including subgroup o and subtype c) and HIV-2 in human serum/ plasma. It is *in-vitro* qualitative enzyme immunoassay. Screening for HBV infection was done by Hepalisa (J. Mitra & Co.) This is a microwell ELISA test for the detection of hepatitis B surface antigen in human serum / plasma. HCV was done by ELISA (microlisa, J. Mitra) which detects antibodies to Hepatitis C Virus in human serum/ plasma. Screening of syphilis was done by RPR card test where carbon antigen is used for detection of antilipoidal antibodies (Tulip, India). Test applied for statistical significance was "Standard error of difference between two proportions"

Results:

Yearly distribution of infection in voluntary and replacement donors is given along with its statistical significance in Table 1, 2, 3 and 4. Year wise percentage of these diseases in total donors is given in Table 5. In our study difference was significant in HIV positive donors in year 2007, 2010, and 2011 and in total donors.

Table 1. Years Wise Distribution of HIV Positive Donors

Year	Total donors		HIV Positive		Z Score	p Value	Significance
	Voluntary Donors	Replacement Donors	Voluntary Donors No %	Replacement Donors No %			
2007	15599	6074	55	33	1.98	p<0.05	Significant
2008	18148	5335	70	30	1.74	p>0.05	Not Significant
2009	16486	4976	30	16	1.87	p>0.05	Not Significant
2010	17821	4892	40	22	2.67	p<0.05	Significant
2011	15191	403	29	4	3.46	p<0.05	Significant
Total	**83245**	**21680**	**224**	**105**	**5.05**	**p<0.05**	Significant

Table 2. Years Wise Distribution of HBV Positive Donors

Year	Total donors		HBV Positive		Z Score	p Value	Significance
	Voluntary Donors	Replacement Donors	Voluntary Donors	Replacement Donors			
2007	15599	6074	421	165	0.0717	p<0.05	Not Significant
2008	18148	5335	472	139	0.0185	p>0.05	Not Significant
2009	16486	4976	258	86	0.804	p>0.05	Not Significant
2010	17821	4892	403	116	0.455	p<0.05	Not Significant
2011	15191	403	296	12	1.47	p<0.05	Not Significant
Total	**83245**	**21680**	**1850**	**518**	**1.47**	**p<0.05**	Not Significant

Table 3. Years Wise Distribution of HCV Positive Donors

Year	Total donors		HCV Positive		Z Score	p Value	Significance
	Voluntary Donors	Replacement Donors	Voluntary Donors	Replacement Donors			
2007	15599	6074	51	21	0.216	p>0.05	Not Significant
2008	18148	5335	51	15	0.0017	p>0.05	Not Significant
2009	16486	4976	10	4	0.477	p>0.05	Not Significant
2010	17821	4892	20	6	0.190	p>0.05	Not Significant
2011	15191	403	14	1	0.996	p>0.05	Not Significant
Total	**83245**	**21680**	**146**	**47**	**1.27**	**p>0.05**	Not Significant

Table 4: Years Wise Distribution of Donors with Syphilis

Year	Total donors		Syphilis Positive		Z Score	p Value	Significance
	Voluntary Donors	Replacement Donors	Voluntary Donors No %	Replacement Donors No %			
2007	15599	6074	10	5	0.4578	p>0.05	Not Significant
2008	18148	5335	102	31	0.162	p>0.05	Not Significant
2009	16486	4976	20	8	0.675	p>0.05	Not Significant
2010	17821	4892	8	3	0.463	p>0.05	Not Significant
2011	15191	403	10	1	1.36	p>0.05	Not Significant
Total	**83245**	**21680**	**150**	**48**	**1.25**	**p>0.05**	Not Significant

Table 5: Year Wise Distribution of Percentage (%) of HIV, HBV, HCV & Syphilis in Total Donors

Year	HIV	HBV	HCV	Syphilis
2007	0.56	3.75	0.46	0.09
2008	0.55	3.36	0.36	0.73
2009	0.27	2.08	0.08	0.16
2010	0.34	2.91	0.14	0.06
2011	0.21	2.02	0.09	0.07
Average	0.38%	2.82%	0.22%	0.22%

Discussion:

Though the risk of transmission of infection is reduced by vigorous screening of donor and donated blood, the risk remains. In 1989 Cumming and associates estimated the risk of HIV transmission [8].

WHO report states that viral dose of 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. Again the infection is not detected in window period when antibodies are not formed in the blood, where screening is done for antibodies, for HIV infection. Total 104925 donors were screened in five years in three different blood banks of Latur, out of that 83245 (79.33%) were voluntary blood donors and rest 21680 (20.67%) were replacement donors.

It is accepted that seroprevalence of diseases should be less or negligible in voluntary donors. In our study difference in HIV positivity rate between voluntary and replacement donors was significant in the year 2007, 2010, 2011 and in the total donors. In the year 2008 and 2009 this difference was not significant (Table 1). Also this difference was not significant in voluntary donors who were positive for HBV, HCV and syphilis in all five years (Table 2, Table 3 and Table 4).

This non significance could be due to increased incidence of these diseases in this part of the country [10] and low quality of selection of donors.

HIV prevalence is different in various parts of India and that of HBV has been 1-3% in 2004 in voluntary blood donors [9]. Seroprevalence of HCV has been 0.12-4% in India. Tulika Chandra et al have showed the seroprevalence in replacement donors as, HIV-0.29%, HBV-1.96%, HCV-0.85% and Syphilis-0.01%. These values are comparable with our study, but seroprevalence was negligible in voluntary donors in study of Tulika Chandra *et al* [9]. This may be again due to high quality selection of donors.

Out of total donors, in our study in 2007 the seroprevalence of HIV, HBV, HCV & Syphilis has been 0.56%, 3.75%, 0.46%, & 0.09% respectively. In 2011 the seroprevalence of HIV, HBV, HCV & Syphilis has been 0.21%, 2.02%, 0.09%, & 0.07% respectively (Table-5).

On an average the seroprevalence is decreasing in this study from 2007 to 2011 which does not match with Dolly R *et al* [7]. This may be due to increased awareness in the people about the diseases transmitted by blood transfustion. The seroprevalence on an average for HIV, HBV, HCV & Syphilis has been 0.38%, 2.82%, 0.22%, & 0.22% respectively. Seroprevalence of HIV is little more (0.38%) than study of Dimple Arora *et al* [10] which is (0.3%). National data also states that higher incidence is found in Maharashtra and South India [10].

In our study seroprevalence of HBV is 2.82%

which is 1.7% in study of Dimple Arora [10]. The seroprevalence of HBV in study area is more than the study area of Dimple Arora & Shrikrishna *et al* [11].

The seroprevalence of HCV in our study of 0.22%, is lesser than the study of Dimple Arora et al of 1%. The seroprevalence of syphilis in our study is again lesser (0.22%) than that of Dimple Arora *et al* (0.9%). We think this may be due to increased incidence of HCV and syphilis in the area of Haryana where Dimple Arora *et al* carried out their study.

Nalini Gupta *et al* carried out similar study in 2004 which has shown seroprevalence of HIV- 0.08%, HBV- 0.66%, HCV- 0.11% and syphilis- 0.84% [12]. Their values are much lesser except for syphilis which could be due to high quality selection of donor and education of people. This may be due to very low quality of donor's selection and increased incidence of these diseases in Marathwada. The voluntary donors in our study have donated blood in big Blood Donation Camps, which in this area of Maharashtra particularly are arranged as a part of religious function or on the birthdays of leaders. In such situation, there is a compulsion to complete the given target of donation. So it does not make a complete voluntary donation. In study of Dimple Arora et al and other studies seropositivity is negligible in voluntary donors. In our study, in 79.33% voluntary donors' seroprevalence for HIV is 0.27%. In 2011, Monika Meena *et al* [13] studied the seroprevalence of HCV (0.57%) and HBV (1.43%) which is comparable with our study.

Conclusion:

In five years 104925 donors were screened for infection in which maximum donors were voluntary (79.33%) and replacement donors were 20.67%. The difference in the overall seroprevalence of voluntary donors and replacement donors for HIV is significant. It is significant for years 2007, 2010 and 2011. But the difference is not significant for HIV among donors for the year 2008, 2009 and in all other infections for all five years.

Reduction in seroprevalence among voluntary donors requires an effective donor education and high quality selection programme especially during big blood donation camps. Adding of testing for HIV antigen will also reduce risk of HIV infection on a large scale.

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