



Transfusion Transmitted Diseases/Infections among Blood donors in a Tertiary Care Hospital at Rajkot, Gujrat, India

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Abstract

Blood is life. Transfusion of blood and blood components, has become a specialized modality of patient management and saves millions of lives all over the world and reduce morbidity. Blood transfusion is associated with many complications, some are only trivial and others are potentially life threatening, which demands for meticulous pretransfusion testing and screening particularly for transfusion transmissible diseases/infections. These transfusion transmitted diseases / infections are a threat to blood safety. The priority objective of blood transfusion services is thus to ensure safety, accessibility and adequacy of blood supply at all levels. The objective of the present study was to assess the prevalence and trend of 5 transfusion transmitted infections (TTI), Human immunodeficiency virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Syphilis and Malaria, among donors in the blood bank of P.D.U. Medical College and Hospital, Rajkot (Gujarat), India, in the year 2013. A total of 10,788 units of blood were tested in the year 2013 for the presence of p²⁴ antigen and anti-HIV 1/2 IgG/IgM (4th generation ELISA kit of TRANSASIA Pvt. Ltd.) , HBsAg (HepELISA kit of J. MITRA Pvt. Ltd.) , anti-HCV IgG/IgM (ELISA kit of TULIP QUALISA Pvt. Ltd.) and RPR CARBON antigen test for Syphilis (RECKON Pvt. Ltd.) by using FDA (Food and Drug Association) approved kits and following standard protocols. Immunochromatographic method was used for detection of Malarial Parasite antigen (plasmodium falciparum and plasmodium vivax). Seroprevalence of HIV, HBV (HBsAg), HCV, Syphilis and Malaria were observed to be 0.074%, 0.68%, 0.074%, 0.065% and 0.037% respectively. Transfusion transmitted diseases/ infections were dominant among male blood donors compared to female blood donors. Higher HIV and HCV seroprevalence among males compared to females was statistically significant. It is very important to continue screening of donated blood with highly sensitive and specific tests and to counsel donors who are positive to any of the above diseases/infections.

Keywords: Transfusion, HIV, HBV, HCV, Syphilis, Seroprevalence.

Introduction

Blood donation saves millions of lives; however, although blood transfusion plays an important role in the supportive care of medical and surgical patients, unsafe transfusion practices put millions of people at risk of transfusion transmissible diseases/infections¹. Continuous improvement and implementation of donor selection, sensitive screening tests, and effective inactivation procedures can ensure the elimination, or at least reduction, of the risk of acquiring transfusion transmitted diseases/infections². Transfusion transmitted infections can exist as asymptomatic diseases in their hosts, so donors must be screened for the high-risk behaviour³. Transfusion departments have always been a major portal to screen, monitor and control infections transmitted by transfusion of blood. Blood transfusion departments not only screen TTI (transfusion transmitted infections) but also give clue about the prevalence of these infections in population⁴.

We have studied the seroprevalence of HBV, HCV, HIV, Syphilis and Malaria for the year 2013 in a tertiary care hospital based study. This gives information about the safety

associated with blood transfusion and an accurate measurement of risks versus benefits of blood transfusion⁵.

Material and Methods

This cross-sectional study was conducted from January 2013 to December 2013. Prior to blood collection, the donors were requested to answer a questionnaire to determine whether they were eligible for donation as per the criteria set by WHO (World Health Organization). Donors were both new first-time donors and repeated donors. Four millilitres of each donor's blood was collected in a clean test tube labelled with a unique sample number for mandatory screening of the Transfusion Transmitted Diseases/Infections.

Serum samples were tested for p²⁴ antigen and anti-HIV 1/2 IgG/IgM (4th generation Elisa kit of Transasia Pvt. Ltd.), HBsAg (HepELISA kit of J. MITRA Pvt. Ltd.), anti-HCV IgG/IgM (Elisa kit of Tulip Qualisa Pvt. Ltd.) and RPR carbon antigen test for Syphilis (Reckon Pvt. Ltd.) by using FDA (Food and Drug Association) approved kits and following standard protocols. All the test results were recorded in Microsoft Access 2007 suitable for further analysis using available tools.

Results and Discussion

We collected the month wise data about the number of male and female donors and TTI investigations done for the year 2013 in P.D.U. Medical College and Hospital, Rajkot (Gujarat), India (table 1).

The seroprevalence of HIV, HBV, HCV, Syphilis and Malaria were determined to be 0.074% , 0.68% , 0.074% , 0.065% and 0.037% respectively. The prevalence of infections was higher among the male donors (0.95%) compared to female donors (0.85%) (table 3). The prevalence of HIV (0.08%), HBV (0.68%) and HCV (0.08%) was found to be higher in males as

compared to females (table 2). According to our data, prevalence of Syphilis (M= 0.06%, F= 0.14%) and Malaria (M=0.03%, F= 0.14%) is found to be more in females as compared to males (table 2).

Each unit of blood is associated with 1% chance of transfusion related reactions and risk of TTI⁵. TTI has seen a dramatical downfall in developed countries over the past two decades, because of their efforts in preventing viruses associated with transfusion from entering the blood⁶. But the same is not true for the developing nations. The national policy for blood transfusion services in our country are in the crawling phase and are hospital based⁷.

Table-1
Showing Month wise Data TTI'S Detected In Blood Donors For The Year 2013

Month	No. of Donors M=Males F=Females	No. of HIV Positive Cases	No. of HBV Positive Cases	No. of HCV Positive Cases	No. of Syphilis Positive Cases	No. of Malaria Positive Cases
JANUARY 2013	M=730	02	05	01	00	00
	F=60	00	00	00	00	00
FEBRUARY 2013	M=876	03	02	00	01	00
	F=48	00	00	00	00	00
MARCH 2013	M=879	00	07	02	00	01
	F=28	00	00	00	00	00
APRIL 2013	M=671	01	05	00	00	00
	F=55	00	00	00	00	00
MAY 2013	M=986	00	07	01	00	00
	F=62	00	00	00	00	00
JUNE 2013	M=668	00	05	00	00	00
	F=48	00	00	00	00	01
JULY 2013	M=959	00	07	00	00	00
	F=32	00	00	00	00	00
AUGUST 2013	M=787	00	10	00	01	00
	F=44	00	00	00	00	00
SEPTEMBER 2013	M=829	01	03	00	01	00
	F=20	00	00	00	00	00
OCTOBER 2013	M=1162	00	08	01	00	02
	F=140	00	03	00	00	00
NOVEMBER 2013	M=736	01	05	02	01	00
	F=62	00	00	00	00	00
DECEMBER 2013	M=802	00	07	01	02	00
	F=104	00	00	00	01	00

Table-2
Showing Prevalence of Different TTI'S among Males and Females

Sex	No. of Donors	Total No. of HIV Positive Cases	Total No. of HBV Positive Cases	Total No. of HCV Positive Cases	Total No. of Syphilis Positive Cases	Total No. of Malaria Positive Cases
MALES	10,085	08(0.08%)	71(0.70%)	08(0.08%)	06(0.06%)	03(0.03%)
Females	703	00(0%)	03(0.43%)	00(0%)	01(0.14%)	01(0.14%)
Total	10,788	08(0.074%)	74(0.68%)	08(0.074%)	07(0.065%)	04(0.037%)

The majority (93.5%) of the donors in our study were males which is comparable to the studies done by others. These people are Rao and Annapurna⁸ in Pune, Rose⁹ in Vellore, Arora D.⁵ in Southern Haryana, Pahuja¹⁰ in Delhi and Singh B.¹¹ noting more than 90% of the donors were males.

The overall seroprevalence of HIV, HBsAg, HCV, Syphilis and Malaria were 0.074%, 0.68%, 0.074%, 0.065% and 0.037% respectively. The data presenting a picture of TTI burden in India has come from various seroprevalence studies done in different parts of the country (table 4). One study shows that a total of 1600 donors were tested, out of these 113 (7.06%) were reactive for transfusion transmitted infections. This comprised 50 (3.12%) cases positive for the presence of HbsAg, 23 (1.43%) cases positive for the presence of HCV, 6 (0.37%) cases positive for HIV, 32 (2%) cases positive for VDRL, and 2 (0.12%) cases for gametocyte of Plasmodium falciparum “as discussed by Shahtaj et al.¹². In Iran, the results of screening tests for HBV, HCV, HIV, and Syphilis infections performed by Tehran blood transfusion service between 2003 and 2005 in 1004889 subjects showed that the prevalence was 0.9% for HBsAg, 2.1% for anti-HCV, 0.2% for HIV Antibody 1 and 2, and 0.04% for VDRL. Among blood donors in Nigeria, Northwest Ethiopia and Nepal, the seroprevalence rates of HBsAg was found to be 13.2%, 4.7% and 0.47%, respectively. In general, it appears to be lowest in nations with high standards

of living (e.g., Australia, America and North Europe) and highest in nations with low socioeconomic levels (e.g., South East Asia, and South America). One of the primary tools to determine the seroprevalence of various Transfusion associated Infections /diseases are Serosurveys. Evaluation of which helps in estimating the safety and efficacy of blood and blood products and also gives an idea regarding epidemiology of these diseases in the community¹³.

Seroprevalence of TTIs was higher among male donors compared to female donors. Out of five, four TTIs considered for the study can be transmitted by sexual transmission. The findings could indicate some risk behaviours of males, such as outside socialization, polygamy, etc. and may also be due to fewer females donating blood; hence fewer females are screened compared to males. Reason for less females participation for blood donation is lack of awareness, motivation and education regarding blood donation among them. This is an alarming situation requiring immediate action in appropriate counselling of donors before and after the testing. It further shows the need to communicate the test results to the donors. These precautions not only inform donors of their health status, but also prevent them from donating again with infected blood. Furthermore, unnecessary expenditures from the superfluous testing and proper disposal of the infected blood product are also eliminated, thereby lowering costs.

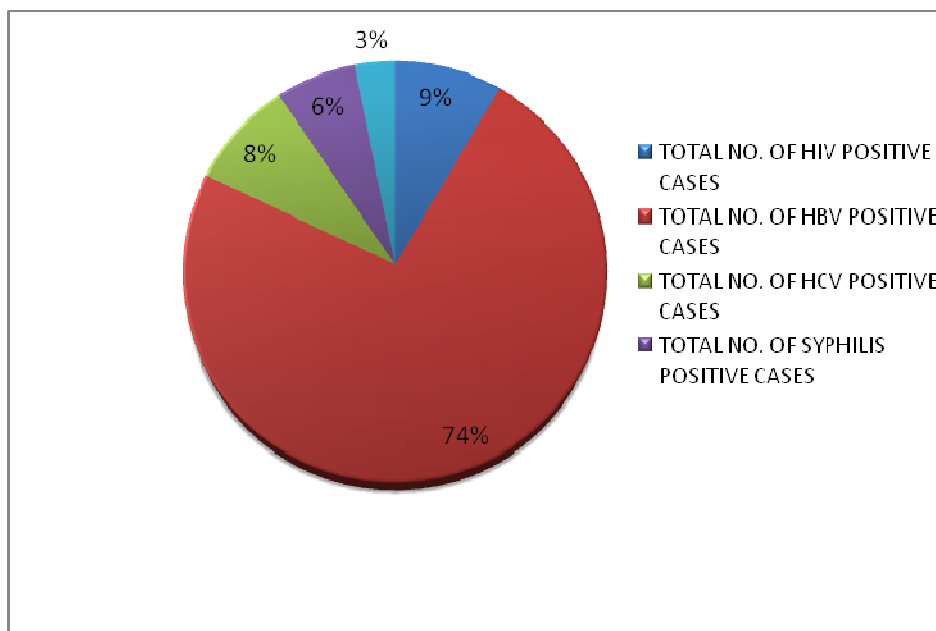


Figure-1
PIE Diagram Showing Prevalence of Different TTI'S among Males and Females

Table-3
Showing overall TTI Positive Percentage among Males and Females

Sex	No. of Blood Donors	TTI Positive Cases	% of TTI Positive Cases
Males	10085	96	0.95%
Females	703	06	0.85%

Table-4
Comparison of TTI Prevalence in Different Parts of India

Place	HIV%	HbsAg%	HCV%	Syphilis%
Ludhiana Gupta, Kumar and Kaur et al	0.084	0.66	1.09	0.85
Delhi Pahuja et al	0.56	2.23	0.66	
Lucknow Chandra et al	0.23	1.96	0.85	0.01
Southern Haryana Arora et al	0.3	1.7	1.0	0.9
West Bengal Bhattacharya et al	0.28	1.46	0.31	0.72
Bangalore Srikrishna A et al	0.44	1.86	1.02	1.6
Present Study	0.074	0.68	0.074	0.037

Conclusion

Even with the implementation of effective preventive strategies, including new laboratory tests, there is significant risk of transmission of infectious agents, including viruses, bacteria and parasites through blood transfusion in India. The need of the hour is to join hands to fight against transfusion transmitted infections, especially HIV. Educating people, creating awareness, encouraging voluntary blood donations and mandatory screening of donors and donated blood are important.

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