Seroprevalence of Transfusion Transmissible Infections among Blood Donors at a Tertiary Care Centre in Maharashtra, India

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ABSTRACT

Introduction: Blood transfusion is an important mode of infection. Transfusion transmissible infections continue to be a great threat to safe transfusion practice. Our study aims at evaluation of the pattern of various transfusion transmissible infections at the blood bank of our tertiary care hospital

Material and Methods: It is a retrospective type of study over a period of 4 years from April 2013 to March 2017. We studied the frequency, age wise and gender wise distribution and year wise trend of seroprevalence of transfusion transmissible infections in the blood units donated at our blood bank

Results: Total 16152 blood units were donated at our blood bank during the study period, of which 253 blood units (1.5%) were positive for infectious marker. The seropositivity was 1.15% for Hepatitis B virus, 0.24% for Human immunodeficiency virus, 0.11% for Hepatitis C virus and nil for syphilis. There was single case of co-infection for Human Immunodeficiency Virus, and Hepatitis C Virus. The percentage of seropositivity was 1.53% (241/15775) in males and 0.53% (2/377) in females. Seropositivity was highest in the age group of 28-37 years followed by that of 18-27 years. It showed decreasing trend over the four years of study.

Conclusion: Voluntary blood donation and diligent donor selection are important to increase blood safety and avoid transmission of infectious diseases through blood transfusion.

Keywords: Transfusion Transmissible Infections, Blood Donors, Hepatitis, Human Immunodeficiency Virus, Syphillis

INTRODUCTION

Transfusion transmissible infections (TTI) create a significant burden on health care system. The magnitude of the TTI varies from country to country depending on the load of TTI in that particular population from where blood units are sourced. Since a person can transmit an infection during its asymptomatic phase, transfusions can contribute to an ever widening pool of infection in the population. WHO recommends that all blood donations should be screened for infections prior to use. Screening for HIV, Hepatitis B, Hepatitis C, and syphilis should be mandatory. Blood screening should be performed according to the quality system requirements.[1] In India, testing of blood units for human immunodeficiency virus (HIV I and II), Hepatitis B virus (HBV), Hepatitis C virus (HCV), syphilis and malaria is mandatory.[2] Considering the grave consequences of these infections and to hold back the transmission to minimum, it is essential to remain cautious about the possible spread of these diseases in the course of blood transfusion. Our aim is to study the trend of various infections among blood donors in our area.

MATERIAL AND METHODS

The present study was carried out at our tertiary care hospital in Sangli district, Maharashtra state, India and includes the analysis of seroprevalence of HIV, HBV, HCV and Syphilis in the donors who donated blood units at our blood bank during the period of 4 years from April 2013 to March 2017. All were voluntary blood donors selected preferentially after detailed clinical history and thorough clinical examination. The screening of all blood units was done by Enzyme Linked Immuno Sorbent Assay (ELISA), for HBsAg, HIV and HCV. Erba Lisa Sen HBsAg kit was used for detection of HBsAg. Erba Lisa HIV gen was used for detection of antibodies to HIV virus. Erba Lisa HCV gen (v2) kit was used for detection of antibodies to HCV virus, while Rapid Plasma Reagin test kit was used for syphilis. These kits were provided by National AIDS Control Organisation (NACO). The criteria for validity of tests and their cut off value for reporting positive results were retested for confirmation. All tests were done meticulously following the standard guidelines. The data regarding age, sex and serology report was collected from blood bank records. It was analysed to evaluate the overall seroprevalence as well as distribution of seroprevalence according to age, sex of donors, type of infection and the trend over 4 years. Seropositive units were discarded as per bio discard management regulations.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for the analysis. Descriptive statistics were used for the analysis.

RESULTS

There were 16152 donors who donated blood from April 2013 to March 2017 (4 years). Out of these, 15775 (97.66 %) were male donors and 377 (2.33%) were female donors. All were voluntary donations. TTI positive units were 243/16152 i.e. 1.50 % over the study period. The percentage of seropositivity was 1.53% (241/15775) in males and 0.53% (2/377) in females. Table 1 shows frequency of seropositivity of various infectious markers in blood donors.

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The seropositivity was highest for HBsAg which was almost more than four times that of HIV and 10 times that of HCV. There was not a single donor positive for syphilis. There was only single donor with co-infection of HIV and HCV.

Table 2 shows frequency of seropositivity, which was highest in age group of 28-37years. For HBsAg and HIV the peak frequency for seropositivity was in the same age group. The peak of seropositivity of HCV infection was seen in the age group of 18-27years.There was decreasing frequency of seropositivity in later age group and it dropped down to zero after 48 years of age. Most of the infections have occurred in sexually active age group. Seroprevalence of syphilis was nil over the study period.

The year wise distribution of TTI (Table no 3) shows that there is decline in the seroprevalence of HBV, HIV and HCV among the donors over the period of 4years. Overall seropositivity has reduced by about 33.33% in fourth year of study as compared to that in first year.

Sr No.	Type of infection	No. of seropositive donors	% out of total donors
1.	HBV	186	1.15
2.	HIV	39	0.24
3.	HCV	18	0.11
4.	SYPHILIS	0	0.00
Total		243	1.50

Table-1: Frequency of seropositivity of TTI in blood donors

DISCUSSION

In the modern health services, blood transfusion is essentially a lifesaving manoeuvre. There is a long list of viruses, parasites, and bacteria, which can be transmitted through blood transfusion. Among them, important transfusion transmissible infections are Human immunodeficiency virus (HIV-I/II), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Syphilis and Malaria. Majority of the problems are due to prevalence of asymptomatic carriers in the society, as well as blood donations during the window period of infections. Transfusion transmissible infections (TTI) is a major challenge to the blood transfusion service all over the world. The problem of TTI is directly proportional to the prevalence of infection in the blood donor's community.

In our study, most prevalent age group was between 28 to 37 years. There were 104 (42.79%) seropositive donors from this age group. Mandal et al also found the highest prevalence of TTI in the age group of 26-35 years.[3] The peaking of infection rates in adulthood suggests a close relationship of acquisition of infection in sexually active age groups and may include high risk behaviour population.[4]

In our study, the seropositivity in females was much lower than that in males. Yanase et al studied the prevalence of TTI among the Filipino blood donors and found that males were at increased risk of both HBV and HCV.[5] Makroo et al observed that the risk of being reactive was three times higher in male donors when compared with female donors.[6] Karmakar et al in their study from Kolkata, India, have also

Infection	18-27 years	28-37 years	38-47 years	48-57 years	Total
HBV	61	84	36	05	186
HIV	11	14	13	01	39
HCV	11	06	01	00	18
Syphilis	00	00	00	00	00
Total No. of seropositive donors	83	104	50	06	243

Table-2: Age wise distribution of seropositivity of TTI in blood donors

Sr. no.	Type of infection	Apr 13 - Mar 14	Apr 14 - Mar 15	Apr 15 - Mar 16	Apr 16 - Mar 17
1.	HBV	52	45	52	37
2.	HIV	14	05	12	08
3.	HCV	06	09	00	03
4.	Syphilis	00	00	00	00
Total		72	59	64	48

Table-3: Year wise distribution of TTI in blood donors

Sr. No.	Author	Area	Year	HBV (%)	HIV (%)	HCV (%)	Syphilis (%)
1	Yanase et al [5]	Philippines	2002-2004	4.16	0.006	0.33	-
2	Kaur et al[8]	Chandigarh, India	2001-2005	1.7	0.6	0.8	0.7
3	Deshpande et al[9]	Latur, Maharshtra	2007-2011	2.82	0.38	0.22	0.22
4	Makroo et al[6]	New Delhi, India	2005-2013	1.18	0.24	9.87	0.43
5	Patil et al[4]	Mumbai, Maharashtra, India	2008-2014	1.48	0.40	0.37	0.11
6	Mandal et al[3]	West Bengal, India	2010-2012	1.24	0.42	0.62	0.65
6	Lathamani et al[10]	Karnataka India	2008-2010	0.53	0.08	0.098	0.09
7	NACO[11]	Maharashtra, India	2015	1.09	0.19	0.28	0.04
8	Our Study	Sangli, Maharashtra, India	2013-2017	1.15	0.24	0.11	0.00

Table-4: Comparison of seropositivity of blood donors in different studies.

shown high seropositivity rates in male donors compared to female donors.[7]

Table 4 shows comparison of different studies of TTI and reveals that the seropositivity of HBV was highest among TTI in most of the studies.[3-6,8-11] The seropositivity rates of HBV and HIV in our study were higher and those for HCV and syphilis were lower than the values of Maharashtra as reported by NACO in year 2015.[11] In our study, there was not a single case showing seropositivity for syphilis. This can be considered as a great achievement in our health care delivery system. The difference in the values of seropositivity in different studies may be due to the difference in prevalence of TTI in different areas, the effectiveness in selection of donors and variable proportion of voluntary and replacement blood donations in different studies.

There was only single donor with coinfection over the study period in our institute. The coinfection was present for HIV and HCV. Kaur et al found 23 blood donors with co-infections, 11 of which were HIV seroreactive. Of the 23 donors with coinfection, 20 were replacement donors.[8]

The risk of having TTI in the replacement donors was found to be significantly more than the voluntary donors in different studies.[3,6,8] The risk of seropositivity for more than one TTI was also higher in replacement donors than voluntary donors.[6,8] This emphasizes the importance of repeat, non-remunerated, regular voluntary donations**.** Promotion of voluntary donations would further reduce the risk of both single as well as co-infections. Hence, the emphasis should be to maximize voluntary blood donations so as to minimize the risk of TTI in accordance with the National Blood Policy of India.[2] Promotion for voluntary blood donation has been achieved up to the mark at our institute as all are voluntary donations in our blood bank.

CONCLUSION

The seropositivity among the blood donors at our blood blank was 1.15% for HBV, 0.24%for HIV, 0.11% for HCV and 0% for Syphilis. The prevalence was highest among the sexually active age group of 18-37 years. The seroprevalence of HBV, HIV and HCV showed a declining trend over 4 years. Voluntary blood donation and diligent donor selection are important to increase blood safety and avoid transmission of infectious disease through blood transfusion.

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