



Original Research Article

Seroprevalence of Transfusion-Transmissible Infections HIV, HBV and HCV among Blood Donors in Perambalur, Tamilnadu

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ABSTRACT

Background: Screening of transfusion-transmissible infections (TTIs) among blood donors can be a cost-effective approach to monitor the prevalence, distribution, and trends of the infections among healthy-looking individuals.

Aims: The study aimed to determine the seroprevalence of three TTIs, Human immunodeficiency virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV) among blood donors in our area, Perambalur.

Methodology: A total of 2964 were screened samples in our blood bank during a period of March 2012 to Feb 2013, among them 49 samples were found to be positive for infections like HBV, HIV and HCV. Blood samples were tested for the presence of HIV 1/2 antibodies, HBsAg, HCV antigen using commercial ELISA kits following standard protocols.

Results: Seroprevalence of HIV, HBV (HBsAg) and HCV were observed to be HBsAg (1.11%), HCV antigen (0.47%), HIV (0.07%) in our study, among the blood donors. TTIs were prevalent among male blood donors and nil among female blood donors.

Conclusions: It is of at most importance to continue screening donated blood with highly sensitive and specific tests and to counsel donors who are positive to any of the above infections. It is absolutely necessary to avoid the transmission of infection from repeat donors.

Key words: Transfusion, HIV, HBV, HCV, Seroprevalence

INTRODUCTION

Infectious diseases are among the leading causes of morbidity and mortality in healthcare institutions throughout the world and are considered a major public health problem.^[1] Modes of transmission of infectious agents include vertical

transmission from mothers to infants, sexual contact (except for *T. cruzi*) and exposure to blood and/or transfusion of blood products, sharing sharp objects and undergoing boring.^[2] Blood donation saves millions of lives. However unsafe transfusion practices also makes millions of people at risk of

transfusion-transmissible infections (TTIs).^[3]

The World Health Organization (WHO) estimates that there are 350 million people worldwide with chronic HBV infection and 130 million people infected with hepatitis C, most of whom have chronic HCV infection.^[4,5] In 15 percent of total patients infected with HIV, blood transfusion has been the responsible mechanism of transmission. 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 foetalis. Poor health education and lack of awareness may be a factor for current problem.^[6] This study aimed to determine the prevalence of serological markers of HIV-1/2, HBV and HCV among the blood donors in our area Perambalur.

MATERIALS AND METHODS

This was a retrospective hospital based study. The study was conducted in blood bank, tertiary care institute, Perambalur for the duration of one year from March 2013 to February 2014. The demographic data such as age and sex was taken after informed written consent.

Investigation method of blood:

HIV ELISA- Enzyme-linked immunosorbent assay (ELISA J. mitra & co.pvt .Ltd) was employed for antibody & antigen detection

HBsAg ELISA- Enzyme-linked immunosorbent assay (ELISA J.mitra & co.pvt .Ltd) was employed to detect the viral antigens in the plasma of donors

HCV ELISA - Enzyme-linked immunosorbent assay ((ELISA J. mitra & co.pvt .Ltd) was employed to detect the antibodies in the plasma of donors

All ELISA procedure was followed according to manufacturer's instruction.

Statistical analysis: The information was interpreted in terms of percentages, chi square test and p value. The significance of p value was considered when it was less than 0.05.

RESULTS

Total 2964 donors were screened in one year in our blood bank of Perambalur for HIV, HBV and HCV. The percentage of blood donors was found highest among 21 to 30 years. There were only 9.41% blood donors with Rh negative blood. Majority of blood donors were males.

The percentages of blood group O positive was highest (37.71%) followed by B positive (30.54%). A positive blood group was 22.53%. There was AB negative blood group with least.

The age groups and infections were not statistically associated with each other.

Among all three, HBsAg positive blood donors were between 21 – 30 being highest i.e., 14 out of 33 HBV infected samples, Among HCV infected blood 10 – 20 years donors were being highest i.e., 6 out of 14. Among 2964 donors 1.11% were seropositive for HBsAg, 0.47% were positive for HCV, 0.07% were found to be positive for HIV virus infection. All of seropositive donors were found to be males, 100%. There were no confectons in our study.

Table no. 1. Distribution Rh positive/Rh negative among blood donors

Blood group	Blood donors	Percentage
Rh Positive	2685	90.59
Rh Negative	279	9.41
Total	2964	100

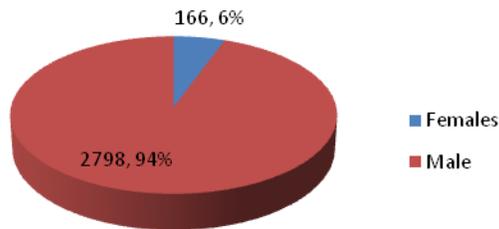


Figure no. 1. Distribution of blood donors according to sex.

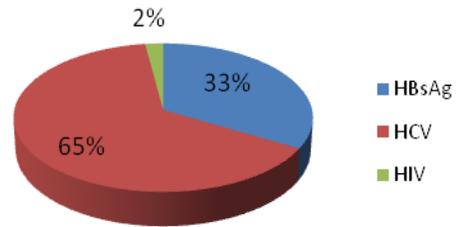


Figure no.3. ELISA positive tests wise distribution of blood donors.

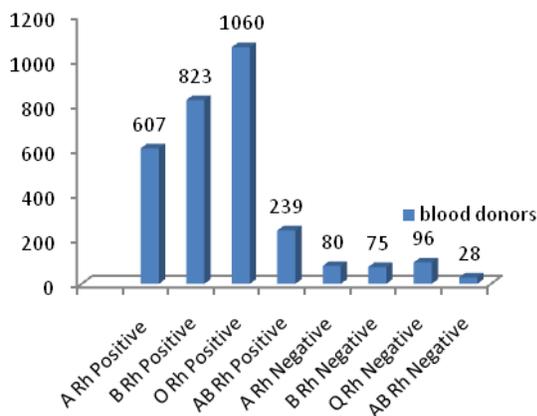


Figure no 2. ABC blood group wise distribution of blood donors

Table: 2 Seroprevalence of among blood donors (HBsAg, HCV and HIV) by ELISA; N=2964

Age group	HBsAg	HCV	HIV
15-20	4	6	1
21-30	14	5	nil
31-40	6	2	nil
41-50	9	1	1
Total	33	14	2

$$\chi^2=8.675, df=6, p=0.1927$$

Table no. 3. ELISA positive tests wise distribution of blood donors

Blood tests	Blood donors	PERCENTAGE
HBsAg	33	1.11
HCV	14	0.47
HIV	2	0.07

DISCUSSION

Total 2964 donors were screened in one year in our blood bank of Perambalur for HIV, HBV and HCV. In current study group the blood donors were majorly belong to 21 – 30 years i.e. 1270 (42.85%) and majority of them were Rh positive males. In present study seroprevalence of HIV was meager when compared to HBV& HCV. The HIV seroprevalence of 5.5% was found in the adult population between 15 and 49 years in 2004 during the National Demographic Survey among blood donors. [7]

In present study it is low i.e., 0.07%. This could be explained by the fact that families search for “physically healthy” blood donors. 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. If screening is done for

HIV antibodies during this period case detection is not possible. [9]

There is increased incidence of these diseases in our country and low quality of selection of donors may be a factor for increase in incidence. [10] HIV prevalence is different in various parts of India and that of HBV has been 1-3% in 2004 blood donors. Seroprevalence of HCV has been 0.12- 4% in India. [11] Out of total donors, in our study in 2013 March TO 2014 February the seroprevalence of HIV, HBV, HCV is as follows HBsAg (1.11%), HCV (0.47%), HIV (0.07%). In a study by Carole Else Eboumbou Moukoko et al the prevalence of HCV, HIV, HBV and were 1.3%, 1.8%, 3.5% respectively. [12] This is correlating with our country statistics but is higher when compared to prevalence in our area.

Tulika Chandra et al have showed the seroprevalence donors as, HIV-0.29%, HBV-1.96%, HCV-0.85% . These values are comparable with our study, but seroprevalence was even less than the above study in current study. This may be again due to high quality selection of donors. There are no infected female blood donors in present study which does match any other study. [13]

This may be due to decreased awareness in the female population about the blood transfusion in current area and also about the diseases transmitted by blood transfusion. Seroprevalence of HIV is far less (0.07%) than study of Dimple Arora *et al* which is (0.3%). National data also states that higher incidence is found in Maharashtra and South India. [9] In our study seroprevalence of HBV (1.11%).

The prevalence of positive HBsAg is (1.7%) in study of Dimple Arora. The seroprevalence of HBV in present study area is little less in the study area of Dimple Arora & Shrikrishna *et al*. [9] The seroprevalence of HCV in our study of (0.47%), is lesser than the study of Dimple

Arora et al of (1%). Increased incidence of HCV in the area of Haryana where Dimple Arora *et al* may be the reason to carry 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%. [13] Their values are much lesser except for HIV which could be due to high quality selection of donor and education of people.

HIV prevalence in their study is correlating with our study with the prevalence HIV infection (0.07%) in donors. In a study by Ranga Rao Despande the prevalence of HIV, HBV, HCV is as follows 0.38%, 2.82% and 0.22%.when compared to our study the prevalence of HIV, HBV and HCV were higher. [14] In 2011, Monika Meena *et al* studied these seroprevalence of HCV (0.57%) and HBV (1.43%) search which is comparable with our study. [15]

CONCLUSION

Among blood donors that were screened for seroprevalence, only few blood donors were found to be positive for HBV, HIV and HCV. A donor 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. Even though there is low prevalence of infectious diseases like HBV, HIV, HCV in local area, continuous surveillance regarding strict selection of blood donors and comprehensive screening of donor's blood using standard methods are highly recommended to ensure the safety of blood for recipients in future. Health education and motivation of females is also needed in this area in order to ensure adequate blood donors in cases of emergency. Lastly, strategies should be put in place to take care of infected blood donors.

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