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To Evaluate the Prevalence of Seroreactivity of HIV, HBV and HCV in a Blood Bank of Tertiary Care Hospital of Aurangabad, Maharashtra: A Retrospective Study

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ABSTRACT
Blood transfusion increases the risk of transfusion associated infections like HIV, Hepatitis B and C, malaria, syphilis and toxoplasmosis. In poorly developed and developing countries it is one of the greatest challenges to obtain safe blood and its components for transfusion. The global distribution of TTIs varies according to the region of the world and even between neighboring countries. This is a retrospective study carried out at the blood bank attached to Indian Institute of Medical Science and research and Noor Hospital, Jalna. A total of 74,539 blood donors were screened during the study period. Data over a period of 5 years (Jan 2016-December 2020) was collected from the records of blood bank. 5 ml of whole blood samples were collected from the subjects into plain sterile tubes and centrifuged and sera were separated and analyzed for different TTI like HIV, HBV, HCV. In the present study highest number of Sero-reactive cases were found in the year 2016. Age of the donors were ranged from 18-60 years and patients with age between 26-35 years have maximum (46.68%) numbers of Sero-reactive donors. Out of 74,539 donors who were screened 72,928 (97.84%) were males and 1611 (2.16%) were females. The highest prevalence of HIV, HBV and HCV were observed in patients with age between 26-35 years. The prevalence of HIV, HBV and HCV in the present study was 0.09%, 0.88% and 0.1% respectively. There was a decreasing trend of seroreactivity in blood donors which indicate that proper screening of donors helps to reduce the risk of transmission.

INTRODUCTION

Transfusion of blood is a therapeutic intervention that can improve or save lives. In poorly developed and developing countries it is one of the greatest challenges to obtain safe blood and its components for transfusion. Transfusion of contaminated blood increases morbidity, mortality and cost of patient care[1,2]. Global blood donations average 118.5 million per year and 60% are donated in low and middle-income countries[3]. Transmission of infections is one of the major complications of blood transfusion. With every unit of transfused blood, there is 1% risk of transfusion related complications including Transfusion Transmitted Infections (TTIs)[4,5]. Blood transfusion increases the risk of transfusion associated infections like HIV, Hepatitis B and C, malaria, syphilis and toxoplasmosis[6]. Before transfusion, blood must be screened for infectious agents, including human immunodeficiency virus (HIV), hepatitis C virus (HCV), and hepatitis B virus (HBV), according to recommendations by the World Health Organization (WHO)[7]. TTIs are serious problem and compromise blood availability and safety, especially in developing countries where financial resources and blood bank infrastructure are limited[8,9]. Current prevalence of TTIs in high-income countries is lower (HIV 0.001%, HBV 0.01%, HCV 0.06%) than in low-income (HIV 0.70%, HBV 2.81%, HCV 1.00%) and middle-income countries (HIV 0.10-0.19%, HBV 0.29-1.96%, HCV 0.18-0.38%), mainly because high-income countries have well-defined and mandatory blood donor selection programs[10]. The global distribution of TTIs varies according to the region of the world and even between neighbouring countries. So, we planned this study to study the prevalence of seroreactivity of HIV, HBV and HCV in a tertiary care hospital blood bank of Aurangabad, Maharashtra.

MATERIALS AND METHODS

This is a retrospective study carried out at the blood bank attached to Government Medical College and Hospital, Aurangabad. Data over a period of 5 years (Jan 2016-December 2020) was collected from the records of blood bank. Blood donors, fulfilling the criteria for donor selection as per the selection criteria laid down by Drugs and Cosmetics Act, 1940 and Rules, 1945 were considered for the present study[4].

Methodology: A total of 74,539 blood donors were screened during the study period. Demographic characteristics of donors such as age, sex, residence and the results of HIV, HBV and HCV serologies were recorded in case record form. 5ml of whole blood samples were collected from the subjects into plain sterile tubes and centrifuged. The sera were separated and analysed for different TTI., HIV, HBV, HCV as per the standard operating procedures followed in the blood bank. Samples were analyzed for antibodies to HIV1, HIV 2, HBsAg and HCV (ERBA LISA Scan EM Transasia Biomedical Limited, MumbaI, Maharashtra), by ELISA. Any serum found reactive by the first assay was retested using a second assay based on different antigen preparations and/or different test principle using the anti-HIV test (Meril, Diagnostic PVT Limited, GUJRAT, INDIA), HBsAg and HCV (Make Sure, HLL Life Care Limited, Gurgaon, Haryana, India) by immunochromatographic sandwich assays. Primary objective of the study was to assess the prevalence of seroreactivity of HIV, HBV, HCV in blood donors. Secondary objective of the study was to study the relation of seroreactivity with demographic profile in blood donors.

Statistical Analysis: The collected data was compiled in MS-EXCEL sheet and Master sheet was prepared. For analysis of this data software 'Graph pad prism 9' was used. Qualitative data was represented in form values and percentages. Quantitative was represented in form of mean and SD. P-value <0.05 considered as statistically significant.

RESULTS AND DISCUSSIONS

The present study was carried out in a tertiary care blood bank during the period from January 2016 to December 2020. During this period screening tests for HIV, HBsAg and HCV done on 74,539 donors. In the present study highest number of Sero-reactive cases were found in the year 2016 followed 2017 (Table No:1).

Table No 1: Year Wise Distribution of Sero-Reactive Cases (2016-2020)

Sr. No	Year	HIV	HCV	HBsAg	TOTAL
1	2016	14	19	172	205
2	2017	22	25	151	198
3	2018	13	13	106	132
4	2019	9	10	126	145
5	2020	8	10	101	119
	Total	66	77	656	799

Age of the donors were ranged from 18-60 years and patients with age between 26-35 years have maximum (46.68%) numbers of Sero-reactive donors followed by patients with age between 18-25 years (28.03%). Patients age 46 or more have the lowest Sero-reactive donors (Table No:2).

Table No 2: Age Wise Distribution of Sero-Reactive Cases

Sr No	Age in years	Sero-reactive donors	Percentage
1	18-25	224	28.03%
2	26-35	373	46.68%
3	36-45	163	20.40%
4	≥46	39	4.89%
	Total	799	100%

Out of 74,539 donors who were screened 72,928 (97.84%) were males and 1611 (2.16%) were females (Table No:4). The highest prevalence of HIV, HBV and HCV were observed in patients with age between 26-35 years (Table No:3).

Table No 3: Age Wise Distribution of HIV, HBV and HCV Sero-Reactive Donors

Age in year	HIV Sero-reactive	%	HBV Sero-reactive	%	HCV Sero-reactive	%
18-25	17	25.75	183	27.89	24	31.16
26-35	32	48.48	311	47.41	30	38.96
36-45	13	19.69	132	20.13	18	23.38
≥46	4	6.08	30	4.57	5	6.50
TOTAL	66	100	656	100	77	100

Table No 4: Gender Wise Distribution of HIV, HBV and HCV Sero-Reactive Donors

Sex	HIV Sero-reactive	%	HBV Sero-reactive	%	HCV Sero-reactive	%
Male	63	95.45	640	97.56	75	97.40
Female	3	4.55	16	2.44	2	2.60
Total	66	100	656	100	77	100

Blood transfusion is a potential route for transmission of transfusion transmitted infections like HIV, HBV, HCV and syphilis. TTIs are common serious problems of blood transfusion[11]. The objectives of present study are to find out the trends of seropositivity of HIV, HBV and HCV in healthy blood donors. In the present study the majority of blood donors were males (97.84%) with a small number of female (2.16%) donors. The findings of present study are comparable to the studies done by Prakash[12], Pahuja[13], Karmakar[14] and Shrestha[15] which noted more than 90% of male donors in their studies. The prevalence of HIV, HBV and HCV in the present study was 0.09%, 0.88% and 0.1% respectively. Over all prevalence of these infections was 1.07% which is comparable to the study done by Prakash[12] which noted an overall prevalence of 1.37% of HIV, HBV and HCV infections in blood donors. In the present study, the seropositivity was highest among the age group of 26-35 years (48.25%), followed by among the age group of 18-25 years (31.42%). The age group ≥46 years showed a small percentage (4.62%) of seropositive rates. This is comparable to the studies done by Prakash[12] who noted seropositive rates of 43.35% in are group of 26-35 years and 27.60% in the age group of 18-25 years and also to Karmakar[14] who noted a seropositivity of 69.36% in the age group of 21-40 years of age. The prevalence of seropositivity of HIV in our study is 0.09% of the total donors which is comparable with study done by Giri[11] (0.07%), Mukherjee[16] (0.073%) and Chattoraj[17] (0.1%). The prevalence of seroreactivity of HIV in various Indian study ranged from 0.07-0.90%. In our study majority of HIV seropositive were males (95.45%) and highest number of HIV seropositive donors were in age group 26-35 years (48.48%). These findings are similar to study by Makroo[18] in which 94.2% male donors and 5.8% female donors showing HIV seropositivity. Hepatitis B is the most prevalent infection among all the TTIs in our study, accounting for a prevalence rate of 0.88% and it is comparable to the studies done by Chattoraj[17] (0.99%), Prakash[12] (0.99%) and Giri[11] (1.0%). Low prevalence was noted by Shreshtha[15] (0.47%) and Mukherjee[16] (0.62%). However, relatively higher prevalence was seen in the study be Kulkarni[19] (3.2%). Seroprevalence in various studies ranged from 0.47-3.2%. In our study majority of the seropositive donors for HBs Ag were males 97.56%. This is comparable to the study done by Singh[20] with males and females having a seroprevalence of 96.82% and 3.18% respectively. In the present study, Hepatitis C was found to be seropositive in 77 donors, giving a prevalence of 0.1%. This is comparable to the studies done by Amutha[21] (0.13%) and Prakash[12] (0.13%). A study done by Mukherjee[16] noted a very low prevalence of seropositivity (0.044%). Relatively higher prevalence rate was noted in the studies done by Rawat[12] (0.73%), Giri[11] (0.74%) and Kaur[23](0.8%).

CONCLUSION

The prevalence of HIV, HBV and HCV in the present study was 0.09%, 0.88% and 0.1% respectively. There was a decreasing trend of seroreactivity in blood donors which indicate that proper screening of donors helps to reduce the risk of transmission.

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