

**INCIDENCE OF HBV, HCV AND HIV AMONG THE BLOOD DONORS IN A TERTIARY CARE CENTRE, KOLKATA*****DR. ASHIS KUMAR SAHA, M.D.(CAL), D.T.M & H (CAL), FICP, FACP¹
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Blood transfusion .a life saving procedure in many critical cases may transmit hepatitis B, C, HIV viruses. According to WHO, these diseases should be screened in the donated blood before keeping it ready for transfusion. So, it is necessary to know the prevalence of HBV, HCV and HIV infections in the blood donors. Obviously, our aim in this present study is to detect the prevalence of seropositivity of HBV, HCV and HIV in the donors in K P C Medical College and Hospitals, Kolkata. In this retrospective study, serological tests of HBV, HCV and HIV viruses were done in total 7044 blood donors. Number of seropositive donors were collected and tabulated according to age groups, analyzed in Excel and were compared with the data of different studies worldwide.. Ratio of male to female donors was 5.55:1. Most of the donors were from 21 to 40 years. Among 7044 donors, the overall prevalence of HBV, HCV and HIV seropositivity were 1.19%, 0.2% and 0.11% respectively. Males were significantly involved, but sex wise (males: 5969, females: 1075), no significant involvement was seen in male. In our study, there was a low prevalence of HBV, HCV and HIV seropositivity which may be due to non-use of updated method of laboratory testing for donor screening, lack of public awareness to donate blood, lack of proper educational programs and vigilance error. So, continuous public awareness program for above diseases, avoidance of professional donors, updated method of laboratory testing can reduce actual incidence of seropositivity in donors.

KEY WORDS: Blood groups, Seropositivity, HIV, HBV, HCV, Donors in Kolkata**DR. ASHIS KUMAR SAHA, M.D.(CAL), D.T.M & H (CAL), FICP, FACP**
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INTRODUCTION

It is well known fact that the lives of many patients have been saved by properly timed transfusion of blood and its products worldwide throughout the year. In high income countries, like, UK, USA, transfusion is necessary as a support of advanced medical treatment, like, open heart surgery, as a part of trauma care. On the contrary, in low income countries, like, Sub-Saharan Africa, few Asian countries, transfusion is required during surgical and obstetric emergencies, road-traffic accidents, different parasitic infections producing anemia, like, hook worm infestation, malaria and severe malnutrition¹. According to commitment of all members of WHO in 2005, safe and adequate blood and blood products must be provided to all patients². In spite of this commitment, transfusion related infection with HBV, HCV and HIV viruses are of major concern due to inadequate blood transfusion services, inadequate infrastructure, inadequately trained personnel and lack of adequate transfusion resources³. According to the statement of "To error is human", as many as 98000 people die every year needlessly due to preventable medical errors⁴. This is because of inadequate and improperly tested blood of the donors before transfusion. There are wide spectrum of infections in human being through transfusions of blood and blood products. These are hepatitis B, Hepatitis C, HIV, cytomegaly virus, malaria, syphilis, human T cell lymphotropic virus (HTLV- I/II), Trypanosoma and west-nile virus infections. Among the above infections, according to the recommendation of WHO, all the donated blood must be tested for HIV, HCV, HBV and syphilis. In few selected countries, according to the epidemiological characteristics and evidences, screening of the other agents, like, malaria, Chagas disease, HTLV- I/II, cytomegaly virus should be done also². We are major concern with HIV, HBV and HCV related diseases, because of their wide spectrum of presentations, like, acute and fatal stage, chronic stage, prolonged infective stage and carrier stage which is most threatening to the community⁵. Again, the chance of infection through blood transfusion is very high due to administration of large viral dose during this procedure as compared to other routes⁶. So, man behind the transfusion of blood to the patient is mainly responsible transfusion related infection. Again transfusion related infection with HBV, HCV and HIV may produce serious long term consequences to the family and wider society⁷. India being the second most popular nation in the world is classified into intermediate HBV endemic (HbsAg carriage 2-7%) zone and declared as second largest global pool of chronic HBV infection. Here, our aim is to observe the frequencies of HBV, HCV and HIV seropositivity in blood donors in K P C Medical College, Jadavpur, Kolkata, and West Bengal.

MATERIALS AND METHODS

This retrospective study was performed only after getting permission from our local ethical committee. We collected retrospectively the data of the donors who

came to donate blood in K P C Medical College & Hospital or voluntary blood donation camp organized by local clubs and or municipality (blood was collected by this hospital) during the year 2012 to 2014. Total number of blood donors was 7044. We have excluded the professional donors, patients with chronic kidney disease, ischemic cardiac disease, severe anemia of nutritional origin, thyroid disease, liver disease. Otherwise, we included all the donors. All the blood samples were tested for the presence of seromarkers of HBV, HCV and HIV viruses, like, HbsAg for HBV, anti HCV antibody for HCV and antibody for HIV viruses. HbsAg and HCV antibody were tested by 3rd generation ELISA test and HIV (I and II) by 3rd and 4th generation ELISA methods with the help of commercially available kits approved by NACO. Age groups were divided into following categories: <20 years, 21-30 years, 31-40 years, 41-50 years and 51-60 years. We selected the donors strictly by donor selection criteria to exclude the professional donors. We selected the donor who gave their written consent for screening of their blood to detect any transfusion transmitted infection before donating blood. Information regarding past blood donation, occupation, high risk behavior, tattoo markers, previous history of operations and previous history of hospitalization were taken. We have excluded the donors having following diseases, like, liver disease, heart failure, renal failure, chronic infection, hypothyroidism, bronchial asthma. Donors getting steroids, immunosuppressive drugs also were excluded. All the serologically positive blood were sent for repeat testing before labeling them as seropositive and subsequently those blood bottles were discarded.

Statistical analysis

All the data were compared at 95% confidence level and p value was extracted.

RESULTS

Total number of males and females were 5969 (84.74%) and 1075 (15.26%) respectively. Among all age groups, most donors were from 21 to 30 years (2731, 38.77%) followed by 31 to 40 years (2124, 30.15%) and smallest groups being 51 to 60 years (340, 4.82%) [Table 1]. Among total 7044 donors, HbsAg, HCV and HIV seropositivity were 1.19%, 0.2% and 0.11% respectively. In all seropositive donors, males were significantly involved as compared to females (77 vs.7, 10 vs. 4 and 7 vs. 1 in cases of HbsAg, HCV and HIV respectively). It was shown that 21-30 and 31-40 years age groups were mostly HbsAg seropositive (36 and 30 respectively) [Table 2]. Again when seropositive males (n=5969) and females (n=1075) were compared, there were no significant differences seen between them (10 vs. 4, p=0.17 in HCV; 77 vs. 7, p=0.07; 7 vs. 1 p=0.82) [Table 3]

DISCUSSION

In developed countries, reduction of unnecessary blood and blood product transfusion, accurate exclusion of donors having specific risk factors, exclusion of professional blood donors, accurate screening of donated blood help to prevent transfusion transmitted infection, whereas, in developing countries, no above interventions are applied regularly, as a result, there is high incidence of transfusion related infection⁸. Prevalence rate of HCV antibody, HbsAg and HIV antibody in our study were 0.2%, 1.19% and 0.11% respectively, whereas, HCV antibody and HBV antigen in Egyptian study and study in Eastern Mediterranean regions demoed high prevalence rate (HCV antibody is 7.1% and 2.7% and HbsAg 2.1% and 4.3% respectively)^{9, 10}. Again, 13.6% blood donors were seropositive in another Egyptian study⁸ and Turkey study demonstrated HbsAg and HCV antibody positivity rates were 1.76% and 0.07% respectively¹¹. In different regions of Saudi Arabia, the prevalence rate of HbsAg and HCV antibody were 3% and 18.7% respectively in North-Western region¹², prevalence rate of HbsAg was 6.7% in Eastern region¹³ and 5.4% in Southwestern region¹⁴. Incidence of HbsAg seropositivity was higher in Syria (3.8%)¹⁵, Yemen¹⁶ as compared to our study (1.19%). Again, prevalence rate of HbsAg seropositivity in Egypt and other parts of India were similar to our own study (1.2% in Egypt, 1.2%-1.7% in India)^{17, 18}. This may be due to many factors, like, effective infection control measures due to the presence of high level of health care facilities preventing blood borne pathogen transmission, infrequent evidence of tattooing, cauterization, as a result of better utilization of free and accessible better health care facilities, non-sharing of toothbrushes, shaving agents and towels in the communities. In our study, incidence of seropositivity was lower in higher age group (41-60 years). This is contrary to other studies in Jordon where the incidence are high in

higher age group^{19,12}. This may be due to many factors, like, greater number of years of potential exposure, absence of adult hepatitis B virus vaccination program and awareness of HBV infection in earlier decades. Again, studies in Nigeria demonstrated the evidence of seropositive age groups were between 28 to 37 years and no evidence of seropositivity in case of donors having more than 47 years of age²⁰. Similarly, study in Niger Delta South Zone, Nigeria, demoed similar seropositive age prevalence²¹. Our study revealed HCV seropositivity as 0.2%, which was similar to the study done in West Bengal (0.3%) but lower than the value found in other studies in and outside India^{22,23,24,25,26,27}. Again, higher value was found in the study done by Shah N et.al.¹². The reason may be due to different life style of the residents in those particular areas. Again prevalence of HbsAg seropositivity in our study was 1.19%, which was comparatively lower than the studies done in different areas in India^{22,24,25,26,27}, but higher than the studies done by Shah N et.al and Gupta N et. al.^{13, 23}. This wide variation in HCV positivity may be due to different generation of ELISA kits with seropositivity and specificities. We are still relying only on antibody based screening which lacks in capacity to detect antigen in window period from the infected blood. In our study, ratio of male to female donor was 5.55:1 which was similar to many studies in and outside India.^{20, 23}. The cause of decrease in female donors may be non-attendance due to monthly menstrual flow, frequent pregnancies, poor nutrition and lack of proper public health awareness. Decreased seropositivity in female donor may be due to small population size in female donors and improper documentation of gender results. Study done in Nigeria demoed prevalence of HIV in 20-29 age group which was similar to our study²⁸. In our study seropositivity in case of HbsAg and HCV was demoed in the age group of 21 to 40 years. But in contrary, study in Mali demonstrated prevalence of HbsAg in young healthy group but HCV in older age group²⁹.

Table 1
Age and sex wise distribution of blood donors

Serial number	Age(years)	Total patients (%)	Males (percentage)	Females (percentage)
1	11-20	733 (10.44)	599 (8.50)	134 (1.90)
2	21-30	2731 (38.77)	2361 (33.51)	370 (5.25)
3	31-40	2124 (30.15)	1782 (25.29)	342 (4.85)
4	41-50	1116 (15.84)	942 (13.37)	174 (2.47)
5	51-60	340(4.82)	285 (4.04)	55 (0.78)
	Total	7044	5969(84.74%)	1075 (15.26%)

Table 2
Age and sex wise incidence of seropositive patients in the donors

Sex	Number	HCV anti-body positive	Incidence %	P value	HBsAg	Incidence %	P value	HIV	Incidence %	P value
Males	5969	10	0.17	0.17	77	1.29	0.07	7	0.11	0.82
Females	1075	4	0.37		7	0.65		1	0.09	
Total	7044	14	0.2		84	1.19		8	0.11	

Table 3
Prevalence of HCV, HbsAg and HIV positive cases according to gender

References	Place	HIV	HbsAg	HCV
Gupta N et al	Ludhiana	0.084	0.66	1.09
Pahuja S et al	Delhi	0.56	2.23	0.66
Chandra T et al	Lucknow	0.23	1.96	0.85
Arora D et al	Southern Haryana	0.3	1.7	1
Bhattacharya P et al	West Bengal	0.28	1.46	0.31
Srikrishna A et al	Bangalore	0.44	1.86	1.02
Shah N et al	Ahmadabad	0.16	0.98	0.11
Present study	West Bengal	0.11	0.2	1.19
Abdul Gani F	Jordon	0	1.4	0.9

Table 4
Comparison of TTI prevalence in different parts of India and outside India with our present study

Age in years	Total patients	HBsAg			HCV			HIV		
		Males	Females	Total	Males	Females	Total	Males	Females	Total
11-20	733	7 (0.09%)	0	7 (0.09%)	1 (0.01%)	1 (0.01%)	2 (0.02%)	1 (0.01%)	0	1 (0.01%)
21-30	2731	34 (0.48%)	2 (0.02%)	36 (0.51%)	3 (0.04%)	1 (0.01%)	4 (0.05%)	3 (0.04%)	1 (0.01%)	4 (0.06%)
31-40	2124	25 (0.48%)	5 (0.07%)	30 (0.43%)	4 (0.06%)	1 (0.01%)	5 (0.07%)	2 (0.02%)	0	2 (0.02%)
41-50	1116	5 (0.07%)	0	5 (0.07%)	1 (0.01%)	1 (0.01%)	2 (0.02%)	1 (0.01%)	0	1 (0.01%)
51-60	340	6 (0.09%)	0	6 (0.09%)	1 (0.01%)	0	1 (0.01%)	0	0	0
Total	7044	77 (1.09%)	7 (0.09%)	84 (1.19%)	10 (0.15%)	4 (0.06%)	14 (0.2%)	7 (0.09%)	1 (0.14%)	8 (0.11%)

CONCLUSION

HbsAg, HCV and HIV seropositivities were low in our study- it may be due to non-updated method of screening procedure, mode of donor selection and documentation. So, method of screening procedure in regional blood banks should be updated to antigen-based method. Donor should not be professional and commercial blood donor. Government and each blood bank official should come with new policies which promote public awareness of safe blood practices as well as promote non-remunerated blood donation policies. Through nucleic

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acid amplification techniques help in Western communities to reduce the incidence of transfusion transmitted infection. But due to high cost it is not possible to start this method of screening procedure in our country.

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