ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

Seroprevalence of Transfusion-Transmissible Infectious Agents (HIV, HBV, HCV, Syphilis, and Malaria) in Voluntary Blood Donors in a Tertiary Care Center in Ghaziabad (U.P.)

Received: 7 August 2022, **Revised:** 12 September 2022, **Accepted:** 13 October 2022

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Keywords
Hepatitis C Virus, Hepatitis B Virus, Hepatitis B surface antigen, Transfusion transmissible infections.

Abstract
Background: Voluntary blood donation is undoubtedly, the highest form of humanitarian service as it is done without expectation of even knowing who it will help. One single blood donation actually helps many patients as blood is usually segregated into red blood cells (RBCs), Platelets, white blood cells (WBCs) and Plasma and given accordingly for their requirement.

Aim and Objective: Seroprevalence of transfusion-transmissible infectious agent (HIV, HBV, HCV, syphilis, and malaria) among voluntary blood donors in a tertiary care facility in Ghaziabad (U.P.)

Methodology: The current study was carried out from June 2018 to May 2020 at the blood bank connected to Santosh Medical College & Hospital, in Ghaziabad, Uttar Pradesh. Clear serum was prepared by centrifuging blood taken from the collection bag's tubing into a labelled tube. The samples were then tested for Syphilis, Malaria, HIV, HBV, and HCV as these all are blood borne infections that can spread by blood transfusions.

Result: All blood donors were screened for five transmissible infections viz HIV, HBV, HCV, Malaria and Syphilis. Out of all voluntary blood donors 5 cases were seropositive cases, of which 2 were positive for HBV, 1 for HCV, 2 for Syphilis infection.

Conclusion: For a safe blood service in our country, where comprehensive laboratory tests are neither possible nor pragmatic, it is best to switch over to 100% voluntary donations, as it is now established that only voluntary non-remunerated regular donation is the safest. Thus, one of our key strategies to enhance blood safety is to focus on motivating non-remunerated blood donors and phasing out even replacement donors.

1. INTRODUCTION

Blood transfusion is an important aspect in medical treatment of patients. During blood transfusion, there is transfer of biological material from one person to other. This may sometimes leads to transfer of infectious disease to the recipient [1].

According to NACO guidelines, blood donors should be tested for human immunodeficiency

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virus (HIV), hepatitis B virus(HBV), hepatitis C virus (HCV), syphilis and malaria. Blood tested positive for any of these infection should be discarded [3].

The evaluation of prevalence of transfusion transmitted infections (TTIs) like human immunodeficiency virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), syphilis and malaria, among blood donor population and consequently the safety of collected donations. It also gives an idea for the epidemiology of these infections in community [3] . Adequate, safe and timely given transfusion saves millions of life; however, unsafe transfusion leads to many life-threatening complications and increases the possibility of transfusionstransmitted infections (TTIs).

Unsafe transfusions are costly from both human and economic points of view and leads to high morbidity and mortality [3].Infectious agent that pose a serious threat to transfusion recipients are those that persist in the circulation of asymptomatic individuals who are healthy enough to be blood donors [1] . Most common TTIs are human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis and malaria. An effective donor screening protocol for donor selection, proper counselling of donor, sensitive screening tests and effective discarding techniques for reactive units can ensure a reduction in the risk of acquiring TTIs.Blood transfusion have saved many lives but also lead to transfusion transmissible infections (TTIs) in recipients. There are various landmarks in transfusion medicine as mentioned below [4]. In 1665First dog to dog blood transfusion proceeded by animal to man and In 1818 there was a first successful man to man transfusion in post partum hemorrhage patient by Dr James Blundell.

Donor evaluation, laboratory screening tests and pathogen inactivation tools may reduce problems of blood incompatibility and possibility of transmissible infections which has arisen in recipients of blood [5].In India, it is mandatory to test each blood unit for HIV, HBV, HCV, syphilis and malaria [1] as these are main transfusion transmitted infections.

HIV was first recognized in 1981[6]. Historical aspects [6,7,8] are as follows-In 1981 Centre for disease control (CDC), USA officially recognized a new syndrome in a homosexual patient dying suddenly with Pnemocystisjiroveci and candidiasis.In India [6,7,9] In 1985 ICMR (Indian council of medical research) initiated surveillance of HIV infection as part of AIDS task force and the first report of HIV infections in sex workers in Chennai and first reports of AIDS in Mumbai (1986).In 1990-91 National AIDS control organization (NACO) was established. Indian national AIDS control program was launched.

ELISA [11,16] is the most commonly performed screening assay in blood banks and tertiary care hospitals. It is sensitive, specific, cost effective and easy to perform. Also adaptable to large number of samples.

2. MATERIALS AND METHODS

The current study was conducted at Blood bank attached to Santosh Medical College Hospital, a tertiary care centre in Ghaziabad, Uttar Pradesh from June 2018 to May 2020. Donors were selected by pre donation questionnaire according to the criterion laid in blood bank. Blood from the tubing of collection bag was collected in a labelled tube and centrifuged to obtain clear serum. The samples were then screened for transfusion transmissible infections like HIV, HBV, HCV, Syphilis and Malaria and the data was recorded.

3. RESULTS

The present study was carried out in blood bank at tertiary care centre located at Ghaziabad, Uttar Pradesh. The blood donors who presented to blood bank from june 2018 to may 2020 were included in study. During this period 525 units of donated blood were screened for five transmissible infections viz HIV, HBV, HCV, Syphilis and Malaria

The donors were between the ages of 18 to 65. (mean age: 29.2 years). 96.38% of donors were between the ages of 18 to 45, bringing up themajority of the donor population. 79.05% of the donors were men. 415 of the blood donors were men and 110 were women.

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Only 5 (0.95%) cases were seropositive among voluntaryblood donors. Voluntary donors had seropositivity rate of 0, 0.38%, 0.19%, 0.38% and 0 for HIV, HBV, HCV, Syphilis and Malaria respectively.

As shown in table 3: There were no cases found of HIV .Out of 5 seropositive cases 2 were of HBV and belongs to younger age groups (18-45)yrs . All blood donors who tested seropositive for HBV were male. One was married and belongs to urban area and the other was unmarried and belonging to rural background. Out of allseropositive cases 1 tested for HCV, belongs to the age groups 18-25yrs, male, married and from urban background.2 seropositive cases were tested positive for syphilis, both were male, 1 was married and another was unmarried, 1 from rural background and 1 from urban background.Out of 5 seropositive cases no one was tested positive for HIV and malaria parasite.

4. DISCUSSION

The transfusion of blood and its component saved many lives at one hand, but at the other hand it has also raised the concern of infections contracted to recipient so called transfusion transmissible infections (TTIs).

This study was carried out at blood bank of tertiary care centre at Ghaziabad, Uttar Pradesh from June 2018 to may 2020. This study included 1683 blood units which were screened for five transfusion transmissible infections (TTIs). Prevalence of HIV, HBV, HCV, Syphilis and Malaria was estimated and analyzed based on donation type, age group, marital status and social background. The donor age of the present study ranged from 18 to 65 years with mean age 29.2 years. Most of donors (96.38%) were in younger age group (18-35 years). Most (79.05%) of donors in the present study was male and only 20.95% of donors were female. Pallavi P et al showed 97.8% were male [46],Patel PA et al in which 85% were male47 and 89.4% male in study done by Meena S et al [48].. In our study, voluntary donation comprised about 31% of the total donors. In northern India, the voluntary donor rates vary from 9.1% to 52.3% and the National AIDS Control Organization (NACO) reported that in 2007, voluntary donations in India were about 55% [53]

The present study showed the overall prevalence of TTIs in blood donors to be 0.95%. The prevalence of different TTIs in descending order was HIV(0%),HBV(0.38%),Syphilis (0.38%), HCV (0.19%), HIV (0.12%) and Malaria (0%) seen in the present study.

5. CONCLUSION

Our results showed that though TTIs were seen in voluntary donors, the seropositivity was c was higher for HBV 2(0.38%) and Syphilis 2(0.38%).It is mandatory to screen the blood units for transfusion transmissible infections (TTIs) to decrease the risk of infections in recipients. More sensitive tests are needed to increase the sensitivityand decrease the window period. Voluntary donors are the best way of achieving the safest blood, as they are younger and have a better education, which creates awareness among them about the importance of donation and the risks of transmitting various blood borne infections.

In present study,none of the blood donors were positive for Malaria. The reason may be appropriate selection of donors and use of better sensitive method of detecting malaria. Chandra T et al. [65] reported overall seroprevalence rate of malaria approximately 0.009%, and replacement donors had lower prevalence (0.009%) than that of voluntary donors (0.01%).Thus, there is a need to increase public awareness regarding voluntary donation and its benefits. Meticulous donor screening and use of highly sensitive techniques for detection of TTIs may help reduce the risk of TTIs.Voluntary donations are safer as compared to replacement ones and should be encouraged. Efforts should be made to increase the number of voluntary donors and reduce replacement donations to a minimum.

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Table1:Showing prevalence of transfusion-transmissible infectious agents (HIV, HBV, HCV, syphilis and malaria) in voluntary blooddonars

Characteristics		Numberofdonors(%)
Age group	18-25	168 (32.00%)
	26-35	215 (40.95%)
	36-45	123 (23.43%)
	60 and above	19 (3.62%)
Gender	Male	415 (79.05%)
	Female	110 (20.95%)

Table2: Showing overall seroprevalnece of different TTIs

DonorTypes	Seropositivecases(%)	HIV	HBV	HCV	Syphilis	Malaria
Voluntary (525)	5 (0.95%)	0	2 (0.38%)	1 (0.19%)	2 (0.38%)	0

Table3: Demographic profile of SeropositiveTTIs

Characteristics		Seropositive cases		
		HBV	HCV	syphilis
Agegroup	18-25	1 (50%)	1 (100%)	1 (50%)
	26-35	1 (50%)	0	1 (50%)

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	36-45	0	0	0
	46 & above	0	0	0
Gender	male	2(100%)	1 (100%)	2(100%)
	female	0	0	0
Maritalstatus	Married	1 (50%)	1(50%)	1 (50%)
	Unmarried	1(50%)	0	1 (50%)
Place of stay	Urban	1 (50%)	1 (100%)	1(50%)
	Rural	1(50%)	0	1 (50%)