



SEROPREVALENCE OF HUMAN IMMUNODEFICIENCY VIRUS, HEPATITIS B AND HEPATITIS C AMONG HEALTHY BLOOD DONORS AT A TERTIARY CARE HOSPITAL IN EASTERN UTTAR PRADESH INDIA: A RETROSPECTIVE STUDY

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ABSTRACT

Blood transfusions are inseparable entity of various treatment modalities in healthcare system. The chances of transfusion transmitted infections (TTIs), in blood transfusion services are a major problem faced in blood banks and hospitals in the world and our country. Being one of the largest tertiary care hospital handling a huge urban as well as rural population of eastern Uttar Pradesh the voluntary donation is one of the major source for blood and blood components. The aim of this study was to determine the trend of seroprevalence of Transfusion transmitted infections such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) in a pool of voluntary healthy blood donors. This study was conducted at the blood bank of a Baba Raghav Das Medical College, Gorakhpur serving the urban and rural population in Eastern Uttar Pradesh. A retrospective study on blood donors over a period of 2-year (January 2021-December 2022) was conducted to assess the seroprevalence and the trend of Human Immunodeficiency Virus, hepatitis B and hepatitis C infection in voluntary blood donors in our institution.

KEYWORDS

Transfusion Transmitted Infections

INTRODUCTION

Blood donation is the most important and essential part of blood transfusion services, usually donated voluntarily or in the form of replacement. Millions of lives are saved each year through blood transfusions, who have lost large volumes of blood from serious accidents, major Surgical Operation, Cancer patients requiring therapy, women with haemorrhage at childbirth, patients of hereditary disorders like Haemophilia and Thalassaemia. Blood transfusion carries the risk of transmitting major infections. Transfusion transmitted infections are a major problem all over the world. 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.¹ According to every year almost 108 million units of blood are collected worldwide & from these units there is 1% chance of transfusion associated problems including transfusion transmitted infections (TTIs).² The HIV seroprevalence in India in adult population (15-49 years) has been estimated to be 0.22% (0.16% to 0.30%).³ As for HBV, India falls in the intermediate endemicity zone showing a prevalence of 2-7%, with an average of 4%.⁴ The estimated prevalence of HCV infection in India is about 0.5-1.5%.⁵ The aim of this study was to investigate the seroprevalence of HIV, HBV, HCV among blood donors at our centre.

METHODS

This study was conducted over a period of 2-year (January 2021-December 2022) at Baba Raghav Das Medical College, Gorakhpur. The study was conducted on voluntary blood donors who came to our blood bank and voluntary blood donation camps as well as on replacement donors. People who donate blood without expecting any favor in return or in voluntary blood donation camps were classified as voluntary blood donors. Donors were screened by the standard criteria for donor fitness. They were carefully selected for donation by trained personnel after medical examination and a detailed predonation questionnaire form which included the donor register form, information regarding risk factor such as history of surgery, previous illness, hospitalization, and blood transfusion. Donors who did not fulfill the criteria for blood donation as well as those with high risk behaviour were deferred and special care was taken to defer paid professional donors. The screening was done by Enzyme linked immunosorbent assay (ELISA) for HIV, HBV and HCV.

Statistical Analysis

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

RESULTS

A total of 20051 blood units were collected from January 2021 to December 2022. A total of 19770 (98.6%) males and 281 (1.40%) females donated blood. 13236 (66.01%) donors were repeat donors.

Table 1: Distribution Of Donors According To Gender

TIME DURATION	TOTAL DONORS	
	MALE	FEMALE
JANUARY 2021- DECEMBER 2021	9376 (98.5)	134 (1.4)
JANUARY 2022- DECEMBER 2022	10394 (98.6)	147 (1.3)
TOTAL	19770 (98.6%)	281 (1.4%)

TTI positive units were 218/ 20051 making the overall seroprevalence of TTIs to be 1.08%. Out of these 218 seropositive donors, 27 (0.13%) were HIV positive, 153 (0.76%) were HBV positive and 38 (0.18%) were positive for HCV.

Table 2: Year Wise Distribution Of Seropositivity For TTIs (HIV, HBV, HCV) Among Donors.

Time Period	Total Collection	Seroprevalence		
		HIV	HBV	HCV
January 2021- December 2021	9510	15 (0.15%)	76 (0.80%)	26 (0.27%)
January 2022- December 2022	10541	12 (0.11%)	77 (0.73%)	12 (0.11%)
TOTAL	20051	27 (0.13%)	153 (0.76%)	38 (0.18%)

Table 3: Distribution Of TTIs Among First Time Donors.

Time Period	Total First Time Donor	HIV	HBV	HCV
January 2021- December 2021	2754 (28.9%)	09 (0.32%)	40 (1.45%)	18 (0.65%)
January 2022 - December 2022	4061 (38.5%)	09 (0.22%)	56 (1.38%)	10 (0.24%)
TOTAL	6815	18 (0.26%)	96 (1.40%)	28 (0.41%)

Table 4: Distribution Of TTIs Among Repeat Donors.

Time Period	Total Repeat Donor	HIV	HBV	HCV
January 2021- December 2021	6756 (71.0%)	06 (0.08%)	36 (0.53%)	08 (0.11%)
January 2022 – December 2022	6480 (61.5%)	03 (0.04%)	21 (0.32%)	02 (0.03%)
TOTAL	13236	09 (0.06%)	57 (0.43%)	10 (0.07%)

DISCUSSION

Blood transfusion is a lifesaving intervention that plays an important role in patient management. Since Blood transfusion is a potential source of infection for patients, transfusion transmissible infections (TTIs) pose a huge challenge to blood transfusion services. In our study we found highest seropositivity with HBV (0.76%) followed by HCV (0.18%) and HIV (0.13%). Majority of the donors in our study were male donors (98.6%) as compared to female donors (1.4%). Various Indian studies have also observed a higher percentage of male donors as compared to female donors as shown by Shaikh et al (99.23%),⁶ Makroo et al (95.86%),⁷ Shah et al (97.12%).⁸ This reflects a general trend of more male blood donors in our population. Poor nutritional status and low haemoglobin levels in females in our population and sociocultural factors leads to more deferral and lesser blood donation by females.

Table 5: Comparison Of Different Studies Of TTI

Study	Time period	Seropositivity		
		HIV	HBV	HCV
Makroo et al ⁷	2005-2013	0.24	1.18	9.87
Jency et al ⁹	2008-2010	0.27	1.11	1.53
Patil et al ¹⁰	2008-2014	0.40	1.48	0.37
Mandal et al ¹¹	2010-2012	0.42	1.24	0.62
Kaur K et al ¹²	2017-2018	0.13	0.46	0.77
Our Study	2021-2022	0.13	0.76	0.18

In our study majority of the donors were repeat donors (13236/ 20051). Out of the total 218 seropositive donors 76 (34.9%) were repeat donors and 142 (65.1%) were first time donors showing a higher seropositivity among first time blood donors than repeat donors in our study. These findings were similar to those of Qureshi et al who found 0% seroreactivity in repeat voluntary donors.¹³ Dhar et al who also found higher seropositivity in first time donors than repeat donors (0.001%).¹⁴ Kaur K et al also found similar results in their study in which (38.5%) were repeat donors and 320 (61.4%) were first time donors showing a higher seropositivity among first time blood donors than repeat donors.¹⁵ Anusha P et al found higher seroreactivity in repeat donors as compared to first time donors for HIV (25% for first time donors vs 75% for repeat donors) and HBV (38.9% for first time donors vs 61.1% for repeat donors).¹⁶ The results provide additional support to the general notion, widespread in blood transfusion literature, that first-time donors constitute a high risk group. This position is premised on the suggestion that these donors have ambiguous motive to donate and have had no previous pre-donation screening for TTIs. Moreover, the possibility of accessing screening for particular TTIs (HIV for instance) may incentivise some individuals to donate blood.^{16,17}

CONCLUSION

Transfusion is one of the prime essence of treatment modalities in health care system. Blood donation becomes of utmost importance in this scenario. Transfusion is also related with risk of transfusion transmitted infection and so the screening of donated blood is necessary. The only way to prevent these TTIs is proper screening. Voluntary donors understand the importance of safe blood donation and have been repeatedly tested for TTIs, so should be preferred while requirement is there. The increasing awareness through blood donation camp not only increases the supply but also the propagation of knowledge in general population about TTIs which in turn allows the avoidable behaviour for high risk activities. Seeing lesser proportion of females as voluntary blood donors even when willing is mainly due to sociocultural beliefs and deferral due to health and nutritional status.

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