

Seroprevalence of transfusion-transmissible infections (HIV, HBV, HCV, Syphilis, Malaria) among blood donors in a Tertiary care hospital North-West, India

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Abstract

Background: Provision of constant and safe blood has been a public health challenge in India with high prevalence of transfusion-transmitted infections (TTIs). This study was aimed at determining the trend and seroprevalence of HBV, HCV, Syphilis, Malaria and HIV across the years within study among prospective blood donors in a Tertiary care hospital in Jaipur.

Methods: A retrospective analysis of blood donor data from 2016 to 2020 was conducted in a Tertiary care hospital in Jaipur. Sera samples were screened for hepatitis B surface antigen (HBsAg), antibodies to hepatitis C virus (HCV), human immunodeficiency virus (HIV) 1 and 2 using ELISA and Malaria & Treponema pallidum using commercially available immunochromatographic based kits.

Results: Out of total 22493 donors in the 2016-2020 study period, 642 (2.85%) were infected with at least one infective agent. Prevalence of Hep B (1.92%) was highest followed by Syphilis (0.58%), HCV (0.20%), HIV (0.06%) and Malaria (0.08%).

Conclusion: HBV, HCV, HIV, syphilis, and Malaria have remained a big threat to safe blood transfusion in India. It is important to analyze the incidence, prevalence and causes of TTI in our region & compare them with national & international level. Strict adherence to selection criteria and algorithm of donor screening are recommended.

Keywords: Blood donors; Hepatitis B Virus; Hepatitis C Virus; Human Immuno-deficiency Virus; Transfusion Transmitted Infection; Enzyme Linked Immunosorbent Assay; Syphilis; Malaria.

Introduction

Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are the greatest threats to blood safety because of their prolonged presence in the blood as a carrier or latent state. They are the leading cause of death, chronic and life-threatening abnormality. Blood transfusion accounts for 5–10% of HIV infections in sub-Saharan Africa. The frequency of HIV infection among blood donors varies significantly between different countries of the world. There is a strong association between infection with the human immunodeficiency virus and hepatitis C virus infection. HIV infection occurs worldwide and is endemic in central Africa. Transmission occurs through sexual contact, exposure to contaminated blood or blood products, and perennally. Human immunodeficiency virus is one member of the human retrovirus and is associated with progressive immune deficiency accompanied by a wide range of opportunistic infections.¹

Hepatitis B virus (HBV) is generally recognized as highly infectious and associated with long term occurrence of disease and death due to complications like cirrhosis, portal hypertension, and Hepato-cellular carcinoma. Approximately greater than 2 billion people have been infected by HBV and 350 million individual people have chronic infection. The common high-risk groups for HBV infections are parenteral drug abusers, institutionalized persons, health care personnel, multiply transfused patients, organ transplant patients, hemodialysis patients, highly promiscuous persons, sexual transmission and newborn infants born to mothers with hepatitis B virus. The virus is highly infectious and relatively easy to be transmitted from one infected person to another by blood to blood

contact, during birth, unprotected sex, and by sharing needles and has a relatively increase the prevalence in the tropics.²⁻³

Material and Methods

A retrospective study is done in Mahila Chikitsalaya Blood Banking SMS Medical College and Hospital Jaipur. Records of total 22493 donors were analysed for the study. The Voluntary donations were primarily obtained from blood donation camps organised by the NGO's and societies. Replacement donors include family members, friends of the ailing patients and close relatives. Care was taken to avoid paid/professional donors by taking medical history and clinical examination. Basic information of donors including age, sex, occupation, medication, previous donations etc. were obtained.

Donors were selected as per inclusion and exclusion criterion as follows:

Inclusion criteria

1. Age: >18 to <60 yrs.
2. Weight >50kg.
3. Vitals (BP,Pulse,Temp), General physical examination: Within normal limit.
4. Hb > 12.5gm/dl.
5. At least 3 months since last whole blood donation.
6. Adequate venous access

Exclusion criteria

1. Age <18 to >60 yrs.
2. Weight <50kg
3. Hemoglobin <12.5 gm/dl
4. Donor must not have taken aspirin or any antiplatelet drug within 48 hrs.
5. History of any medical disorder, comorbidities.
6. Those not willing to give consent

All samples were screened for human immunodeficiency virus (ELISA, 3th Generation, Erba, Transasia bio-medical ltd.), Hepatitis B virus (ELISA, 3th generation Meril, Meril diagnostic Pvt. Ltd.), Hepatitis C Virus (ELISA, 3th generation Erba, Transasia bio-medical ltd.) Syphilis and Malaria by immunochromatographic rapid card test (Meril / Erba /SD). Tests were performed as per instructions given by manufacturer. Before labelling them seropositive, all the reactive samples were retested and discarded as per

the guidelines. The affected donors are informed through proper channels and are properly counselled. Data collection and analysis was done by compiling data on excel sheet and simple statistics was used to find out the result.

Result

A total of 22493 donors were enlisted in this study from 2016 to 2020. Out Of these 15843 were replacement donors and 6650 were voluntary donors.

Table 1: The trends over prevalence of HBV, HCV, HIV, Syphilis Malaria are shown

	Total donor	HIV	HBs Ag	HCV	Syphilis	MP	TTI Prevalence
2016	5451	4 (0.07%)	167(3.06%)	17(0.31%)	20(0.36%)	18(0.33%)	4.14%
2017	4339	5(0.11%)	84(1.9%)	9(0.20%)	37(0.85%)	1(0.02%)	3.13%
2018	5380	2(0.03%)	78(1.45%)	8(0.14%)	30(0.55%)	0(0.0%)	2.19%
2019	4866	1(0.02%)	78(1.6%)	8(0.16%)	33(0.67%)	0(0.0%)	2.46%
2020	2457	2(0.08%)	26(1.05%)	3(0.12%)	11(0.44%)	0(0.0%)	1.17%

Over all prevalence of HIV 0.06%, HBs Ag 1.92%, HCV 0.20%, Syphilis 0.58%, MP 0.08%

Discussion

One of the main recommendations of the WHO to achieve a safe and sufficient blood supply is the collection of blood from voluntary regular non-remunerated donors who have a lower risk of TTIs compared to family replacement and commercial donors.

The decreasing trend in the prevalence of TTI observed in this study is in line with the global trend resulting from improved control of sexually transmitted infections , introduction of mandatory screening for TTI and launching of intervention programmes . Our finding is lower than another study in Nigeria ³ and Burkina Faso ⁴ that had 19.3 and 19.3%, respectively, but higher than earlier report from Ethiopia ⁵ with

11.5%. The difference in the prevalence may be due to differences in health care system in the different study settings as well as varying magnitude of risk factors for contracting transfusion transmissible infections ⁵in the various settings

Conclusion

HBV, HCV, HIV, syphilis, and Malaria have remained a big threat to safe blood transfusion in India. It is important to analyze the incidence, prevalence and causes of TTI in our region & compare them with national & international level. Strict adherence to selection criteria and algorithm of donor screening are recommended

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