http://www.banglajol.info/index.php/JNINB

Original Article

DOI: https://doi.org/10.3329/jninb.v11i1.83516

Journal of National Institute of Neurosciences Bangladesh,
January 2025, Vol. 11, No. 1, pp. 9-12

ISSN (Online) 2518-6612
ISSN (Print) 2410-8030

Seroprevalence of Transfusion Transmitted Infections among Blood Donors at Referral Neuroscience Hospital in Bangladesh

Mohammad Sayeed Hassan[1], Sabrina Islam[2], Kaniz Fatema[3], Hasina Begum[4], Urmi Rahman[5], Daanish Arefin Biswas[6], Sheikh Farjana Sonia[7], Md. Abdullah Yusuf[8], Rafi Mehrab[9], Mohammad Nur Uddin[10], Ferdous Ara[11]

[1]Associate Professor, Department of Neurology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [2]Assistant Professor, Department of Transfusion Medicine, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [3]Assistant Registrar, Department of Transfusion Medicine, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [4]Assistant Professor (Blood Transfusion), National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [5]Medical Officer, Department of Transfusion Medicine, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [6]Associate Professor, Department of Transfusion Medicine, Sir Salimullah Medical College, Dhaka, Bangladesh; [7]Associate Professor, Dr. M. R. Khan Shishu Hospital and Institute of Child Health, Dhaka, Bangladesh; [8]Associate Professor, Department of Microbiology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [9]FCPS Part 2 Trainee, National Institute of Mental Health & Hospital, Shaymoli Dhaka, Bangladesh; [10]Registrar, Department of Clinical Neurology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [11]Professor, Department of Transfusion Medicine, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh

Abstract

Background: Transfusion transmitted infections (TTI) have become the main concern regarding the safe use of blood in clinical practice in Bangladesh. **Objective:** To assess the status of transfusion transmitted infections among the apparently healthy blood donors in Bangladesh. **Methodology:** This retrospective study was carried out among 15,478 blood donors from November 2022 to October 2023 in Department of Transfusion Medicine, at National Institute of Neurosciences and Hospital (NINS&H), Dhaka, Bangladesh. All the samples were screened for Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human Immunodeficiency Virus (HIV), Syphilis and Malaria to see the prevalence of TTI. **Results:** Among 15,478 donors, 167 (1.079 %) were positive for TTIs. Seropositivity of HBV, HCV, HIV, and syphilis were 0.795%, 0.032%, 0.006% and 0.246% respectively. No blood donor was tested positive for malarial parasite. **Conclusion:** Hepatitis B Virus infection is the most common Transfusion transmitted infection in Bangladesh. *[Journal of National Institute of Neurosciences Bangladesh, January 2025;11(1):9-12]*

Keywords: Transfusion transmitted infection, blood donor, Bangladesh

Introduction

Blood transfusion is a therapeutic procedure that plays a crucial role in saving patient lives. Globally, about 92 million people donate blood annually[1]. But 1.6 million of these blood units are discarded because of the presence of infectious agents[2]. Blood transfusion carries the risk of transmitting major infections, such as hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), syphilis, cytomegalovirus (CMV), herpes simplex virus (HSV), and Epstein-Barr virus (EBV), as well as toxoplasmosis and malaria[3]. Therefore, collected blood units must be serologically tested to prevent the transmission of infections caused by such pathogens, as per the recommendation of the World Health Organization (WHO)[4].

At present, screening of healthy blood donors is regularly performed for hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), syphilis and malaria in Bangladesh. But transmission of infections through blood and blood products is still a matter of concern. HBV infection results in broad spectrum of disease from subclinical infection to fulminant hepatic failure. Both HBV and HCV can cause chronic liver disease, liver cirrhosis and hepatocellular carcinoma. HBV and HCV infections are emerging as major health problems in Bangladesh.

HIV is one of the human retroviruses that preferentially

Correspondence: Dr. Mohammad Sayeed Hassan, Associate Professor, Department of Neurology, National Institute of Neurosciences & Hospital, Shar-E- Bangla Nagar, Agargaon, Dhaka-1207, Bangladesh; Email: dr.sayeed@yahoo.com; Cell: +8801711442626; ORCID: https://orcid.org/0009-0007-3330-7585

infects helper (CD4) T lymphocytes, resulting in the loss of cell mediated immunity and a high probability of opportunistic infections. Treponema pallidum is transmitted from infected person to other persons by intimate contact and transfusion of blood and blood products. Malaria is caused by four Plasmodia species. *Plasmodium vivax* and *Plasmodium falciparum* species are common causes of malaria in Bangladesh. This study was undertaken to know the prevalence of transfusion transmitted infections (TTI) among blood donors in Bangladesh.

Methodology

Study Settings and Population: The retrospective observational study was carried out among 15,478 blood donors from November 2022 to October 2023 in the department of Transfusion Medicine at National Institute of Neurosciences and Hospital (NINS&H), Dhaka, Bangladesh. At first blood donation form was filled up by donor with informed written consent. Then donors were selected or deferred by physician of this department. If the donors were selected through questionnaire and clinical assessment, blood grouping, cross matching and screening of the donor were done.

Study Procedure: Screening was done for five transfusion transmitted diseases: Hepatitis B & C, HIV, Syphilis, Malaria. Tests were HBsAg, Anti HCV, Anti-HIV, TPHA, Malaria. In our laboratory, transfusion transmitted infections (TTI) screening was carried out by rapid ICT (Immunochromatographic test) method. For this method we detected HBV by qDetect Hepatitis B Virus (HBV) Combo test kit, HCV by qDetect Hepatitis C Virus (HCV) Antibody test device, HIV by qDetect Human Immunodeficiency Virus (HIV) test device, Malaria by qDetect Malaria PF/Pan antigen test device and Syphilis by qDetect Treponema Pallidum (TP) Antibody test device. For TTI screening donor blood samples were collected in test tube and sera were separated as soon as possible to avoid haemolysis. Then serum was placed in test device for detection of HBV, HCV, HIV, Syphilis and cell were placed in test device for Malaria according to the manual instruction of Rapid test device kit. If any test became positive donor was deferred with proper counseling.

Statistical Analysis: Statistical test was performed in Statistical Package of Social Science (Version 22). The qualitative data were expressed as frequency and percentage and quantitative data were expressed as mean and standard deviation (SD).

Ethical Clearance: Ethical Clearance was taken from local ethical committee. All procedures of the present study were carried out in accordance with the principles for human investigations (i.e., Helsinki Declaration 2013) and also with the ethical guidelines of the Institutional research ethics. Formal ethics approval was granted by the local ethics committee. Participants in the study were informed about the procedure and purpose of the study and confidentiality of information provided. All participants consented willingly to be a part of the study during the data collection periods. All data were collected anonymously and were analyzed using the coding system.

Results

The total number of blood donors were 15478 cases. All of them were apparently healthy voluntary donors. Most of the donors were male (n=14962; 96.67%) and remainder were female (n=516; 3.33%). Male to female ratio was 29:1 (Figure I).

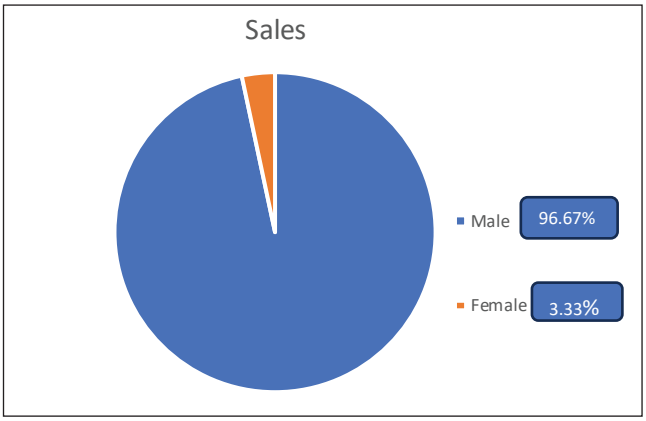

Figure I: Gender Distribution of Study Population (n=15478)

The age range of the donors was from 18 to 57 years with mean age of 25.4 (± 5.3) years. Most of the donors (47.8%) were in the age group of 18 to 27 years (Table 1).

Table 1: Age Distribution of Study Population (n=15478)

Age Group	Frequency	Percent
18 to 27 Years	7399	47.8
28 to 37 Years	5943	38.4
38 to 47 Years	1796	11.6
48 to 57 Years	340	2.2
Total	**15478**	**100.0**

Out of 15478 donors, majority were students (n=6516, 42.1%). About 4690(30.3%) were service holder and 2848 (18.4%) were businessman (Figure II).

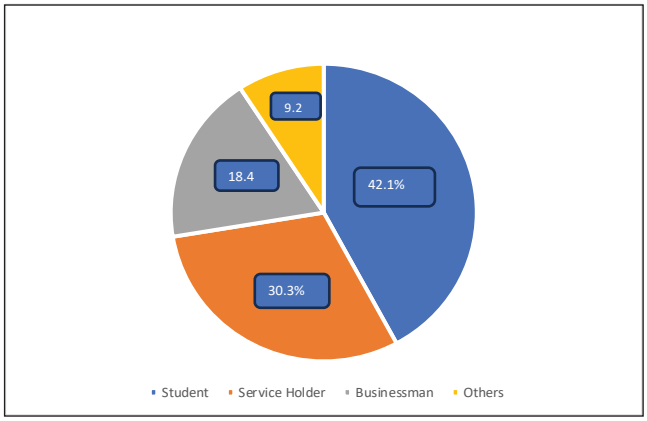

Figure II: Distribution of Blood Donors by Occupation

Hepatitis B Virus was the most prevalent transfusion transmitted infections (TTI) in this study. Seropositivity of HBV, HCV, HIV, and syphilis among 15478 donors were 123(0.795%), 5(0.032%), 1(0.006%) and 38(0.246%) respectively. No blood donor was tested positive for malarial parasite. Total 167(1.079%) donors were positive for transfusion transmitted infections (TTIs). None of the donors was tested positive for more than one transfusion transmitted infections (TTIs) (Table 2).

Table 2: Seroprevalence of Transfusion Transmitted Infections (TTI) among blood donors

TTI	Frequency	Percent
HBV	123	0.795
HCV	5	0.032
HIV	1	0.006
Syphilis	38	0.246
Malaria	0	0.0
Total	**167**	**1.079**

Discussion

Transfusion of blood and blood products carry risk of transmitting infections like hepatitis B and C, HIV, syphilis and less commonly malaria, toxoplasmosis, brucellosis, other viral infections[5]. Worldwide, prevalence of Hepatitis B Virus infection varies between 0.1% and 11.7% cases[6]. Prevalence of HBsAg in various Indian studies showed the range between 1.86 and 4% cases[7-8]. Seroprevalence of HBsAg in various studies in Pakistan has been shown to range between 1.55 and 8.4% cases[9-10]. In Bangladesh, the prevalence of HBsAg was 1.27% cases, 1.39% cases and 2.19% cases in different studies[11-13]. In our study, seropositivity of HBV among 15478 donors was 0.795%. So, the prevalence of HBV in our study is slightly lower than the findings of previous studies performed in Bangladesh.

Globally, 0.01 to 19.2% blood donors were tested positive for HCV14-16. The prevalence of HCV in various Bangladeshi studies showed the range between 0.013% to 0.25% cases[11-13]. Indian studies showed that seroprevalence of HCV ranges between 0.4 and 1.1% cases[7-8]. Several studies in Pakistan showed that the seroprevalence of HCV ranges between 0.07 and 4.9% cases[9-10]. In the present study the prevalence of HCV was 0.032% which is consistent with previous studies.

In this study, it has been found that the seroprevalence of HIV reactivity was 0.006%, which is very similar to Ahmed et al[11], Saha et al[12], Daanish et al[13] and Karim et al[17] in Bangladesh. In Indian studies, the HIV seroprevalence was between 0.2 and 1% cases[18-19]. Interestingly, Pakistan has reported no transfusion transmitted HIV infection[9-10].

In one study in Bangladesh, the syphilis was found positive in 0.078% donors[13]. The prevalence of syphilis in a study in Khulna Medical College Hospital, Khulna was 0.00% cases[11]. In another study in Sir Salimullah Medical College Dhaka, the prevalence was 0.17% cases[12]. In our study syphilis was present in 0.246% donors.

In this study, seroprevalence of Malaria among donors was 0.00%. In two previous studies in Bangladesh, prevalence of malaria was 0.01% and 0.00% among their donors respectively[17,20]. A study from India showed a prevalence of 0.107% cases[19].

The overall seroprevalence of five transfusion transmitted infections (TTIs) among the studied donors was 1.079% cases. Previous studies from Bangladesh showed prevalence of 1.42% cases10, 1.45% cases20 and 1.37% cases[13]. The results are identical probably due to sociodemographic similarity.

Conclusion

Transfusion transmitted infection (TTI) is a matter of concern that affect blood donation in Bangladesh. Hepatitis B Virus infection is the most common TTI in Bangladesh, followed by Syphilis. Though there is a downhill tendency in overall seroprevalence through the years, attention should be paid toward the prevention of TTI specially hepatitis B virus infection.

Acknowledgements
None

Conflict of interest: All authors declare that they have no competing interest.

Financial Disclosure
This research project was not funded by any organization.

Contribution to authors: Hassan MS, Islam S, Fatema K conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Fatema K, Begum H, Rahman U involved in the manuscript review and editing. Biswas DA, Sonia SF, Yusuf A, Mehrab R, Uddin MN, Ara F conceived and manuscript writing. All authors read and approved the final manuscript.

Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article: Hassan MS, Islam S, Fatema K, Begum H, Rahman U, Biswas DA, Sonia SF, Yusuf A, Mehrab R, Uddin MN, Ara F. Seroprevalence of Transfusion Transmitted Infections in Blood Donors at Referral Neuroscience Hospital in Bangladesh. J Natl Inst Neurosci Bangladesh, 2025;11(1):9-12

ORCID:
Mohammad Sayeed Hassan: https://orcid.org/0009-0007-3330-7585
Sabrina Islam: https://orcid.org/0009-0008-7517-5936
Kaniz Fatema: https://orcid.org/0009-0007-6978-2708
Hasina Begum: https://orcid.org/0009-0000-0346-1417
Urmi Rahman: https://orcid.org/0009-0004-7082-1709
Daanish Arefin Biswas: https://orcid.org/0000-0002-8083-1204
Sheikh Farjana Sonia: https://orcid.org/0000-0003-4159-1874
Md. Abdullah Yusuf: https://orcid.org/0000-0002-8551-7185
Rafi Mehrab: https://orcid.org/0009-0002-3425-8248
Mohammad Nur Uddin: https://orcid.org/0000-0001-8627-8705
Ferdous Ara: https://orcid.org/0009-0007-7781-3017

Article Info
Received on: 7 October 2024
Accepted on: 24 November 2024
Published on: 1 January 2025

References

1. Mohammed Y, Bekele A. Seroprevalence of transfusion transmitted infection among blood donors at Jijiga blood bank, Eastern Ethiopia: retrospective 4 years study. BMC research notes. 2016; 9:1-6.
2. World Health Organization. Blood donor selection: guidelines on assessing donor suitability for blood donation. World Health Organization; 2012.
3. Noubiap JJ, Joko WY, Nansseu JR, Tene UG, Siaka C. Sero-epidemiology of human immunodeficiency virus, hepatitis B and C viruses, and syphilis infections among first-time blood donors in Edéa, Cameroon. International Journal of Infectious Diseases. 2013;17(10): e832-7.
4. World Health Organization. Blood Safety and Availability; WHO Fact Sheet No. 279; World Health Organization: Geneva, Switzerland, 2018.
5. Mollison PL, Engelfriet CP, Contreras M, Jones J. Blood transfusion in clinical medicine. Oxford: Blackwell Scientific; 1987.
6. Koshy JM, Manoharan A, John M, Kaur R, Kaur P. Epidemiological profile of seropositive blood donors at a tertiary care hospital in North India. CHRISMED J Health Res. 2014;1:91–94.
7. Chandrasekaran S, Palaniappan N, Krishnan V, Mohan G, Chandrasekaran N. Relative prevalence of hepatitis B viral markers and hepatitis C virus antibodies (anti-HCV) in Madurai, South India. Indian Journal of Medical Sciences 2000;547:270-73.
8. Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors? Indian Journal of Pathology and Microbiology 1999; 424:411-16.
9. Khan MA, Rehman A, Ashraf M, Ali A, Ditta A. Prevalence of HBV, HCV and HIV in blood donors at Liaquatpur. Professional Med J. 2006; 13:23-26.
10. Mahmood MA, Khawar S, Anjum AH et al. Prevalence of Hepatitis B, C and HIV infection in blood donors of Multan region. Ann King Edward Med Coll. 2004; 10:459-61.
11. Ahmed MU, Begum HA, Hossain T, Chakraborty P. Prevalence of Transfusion Transmitted Infection among Blood Donors. JAFMC Bangladesh. 2009;5(1):4- 8.
12. Saha SK, Banik RK, Saha MR, Habibullah MM, Mahtab MA. Prevalence of Transfusion Transmitted Infection in Healthy Blood Donors in Sir Salimullah Medical College. Euroasian Journal of Hepato-Gastroenterology 2011;1(2):68-70.
13. Biswas DA, Parvin F, Naznin B, Ara F, Hoque MA, Begum I, et al. Prevalence of Transfusion Transmissible Infections among Blood Donors at a Tertiary Care Hospital at Dhaka, Bangladesh. Journal of Medical Science and Clinical Research 2019;7(7): 320-326
14. Datta S. An overview of molecular epidemiology of hepatitis B virus (HBV) in India. Virol J. 2008; 5:156.
15. Panda M, Kar K. HIV, hepatitis B and C infection status of the blood donors in a blood bank of a tertiary health care centre of Orissa. Indian J Public Health. 2008; 52:43–44.
16. Sood G, Chauhan A, Sehgal S, Agnihotri S, Dilawari JB. Antibodies to hepatitis C virus in blood donors. Indian J Gastroenterol. 1992; 11:44.
17. Karim S, Hoque E. Transfusion Transmissible Diseases Among Healthy Blood Donors Attended at Transfusion Medicine Department of DMCH in 2014. Anwar Khan modern medical college journal 2016; 7(1): 11-13
18. Garg S, Mathur DR, Garg DK. Comparison of seropositivity of HIV, HBV, HCV and syphilis in replacement and voluntary blood donors in Western India. Indian Journal of Pathology and Microbiology 2001; 444:409-12.
19. Paramjit K, Basu S. Transfusion transmitted infections: Existing and emerging pathogens. Journal of Post Graduate Medicine 2005; 51:146-51.
20. Ara F, Nasreen Z, Islam MA, Yusuf MA, Hassan MS, Sonia SF. Frequency of Transfusion Transmitted Infection Among Blood Donors at Specialized Tertiary Care Hospital in Bangladesh, J Natl Inst Neurosci Bangladesh 2015;1(1): 12-14.