

# Frequency of Transfusion Transmitted Infection among Healthy Blood Donors Attending Transfusion Medicine Department of Chattagram Maa-O-Shishu Hospital Medical College

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## Abstract

**Background:** Transfusion of blood and blood components, as a specialized modality of patient management, saves millions of lives worldwide each year and reduces morbidity. Transmission of infectious diseases through donated blood is of concern in order to provide safe blood for transfusion which forms an integral part of medical and surgical therapy. The aim of the present study was to analyze the status of transfusion-transmitted infections among the apparently healthy donors to increase awareness of complications of blood transfusion and make the clinicians more vigilant with regard to judicious use of blood.

**Materials and methods:** This retrospective study was carried out in the Department of Transfusion Medicine at Chattagram Maa-O-Shishu Hospital Medical College from January to December 2022. After proper ethical consideration, a total of 7,289 blood donors were included in this study. All the samples were screened for Hepatitis B surface antigen (HBsAg) Hepatitis C Virus (HCV) Human Immunodeficiency Virus (HIV) 1 and 2, Venereal Disease Research Laboratory test (VDRL) and malaria to determine the prevalence of TTI. All the healthy blood donors were 18 to 60 years old.

**Results:** The prevalence of Hepatitis B Virus (HBV) HCV and syphilis was 3.014% and 0.109%, respectively. No blood donor tested positive for malarial parasites or HIV. Strictly maintain the donor selection criteria and mandatory screening of the donor's blood for HBV, HCV, HIV, malaria and syphilis using sensitive laboratory screening tests to reduce the incidence of TTI in the Bangladeshi population and to ensure the safety of the blood for the recipient.

**Conclusion:** Strictly maintain the donor selection criteria and mandatory screening of the donor's blood for HBV, HCV, HIV, malaria and syphilis using sensitive laboratory screening tests to reduce the incidence of TTI in the Bangladeshi population and to ensure the safety of the blood for the recipient.

**Key words:** Blood donors; HBV; HCV; HIV; Prevalence; Syphilis; Transfusion transmitted infection.

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## INTRODUCTION

The discovery of Transfusion-Transmissible Infections (TTIs) has heralded a new era in blood transfusion practice worldwide with emphasis on two fundamental objectives: safety and protection of human life. Blood transfusion is usually lifesaving but can cause diseases if the collected units are not tested properly for the presence of microorganisms before transfusion.<sup>1</sup> The important diseases transmitted through blood are hepatitis, AIDs, malaria, and syphilis, and these infections are the major public health problems, alarming the most developing countries like Bangladesh. In developing countries like Bangladesh, blood safety remains an issue of major concern. Now a days in Bangladesh routine screening of healthy blood

donors is done for Hepatitis B Virus (HBV) Hepatitis C Virus (HCV) Human immunodeficiency Virus (HIV) syphilis and malaria. These strategies have been extremely effective, but transmission of diseases still occurs. HBV, HCV and HIV are of great concern because of their prolonged viraemia and carrier on latent state.

HBV is highly contagious and relatively easy to be transmitted from one infected individual to another by blood transfusion, during birth by unprotected sex and by sharing needles.

It is one of the most common causes of chronic liver disease and hepatocellular carcinoma. Approximately 250 million people have chronic HBV infection. Chronic hepatitis can lead to cirrhosis or hepatocellular carcinoma.<sup>2</sup>

HCV primarily affects the liver and causes viral hepatitis. Of all HCV cases, 60% to 70% are asymptomatic. Of HCV infected individuals, 75% to 85% become chronic carriers, 60% to 70% develop chronic liver disease, 5% to 20% develop cirrhosis and hepatocellular carcinoma.<sup>3</sup> The risk of long-term infection is greater in HCV-infected individuals than those infected with HBV.

Human immunodeficiency virus infects and destroys the T-4 lymphocytes and thus interferes in all functions of immune system resulting in profound immunodeficiency and later the host will develop opportunistic infections.<sup>1</sup>

Syphilis is a systemic chronic infectious disease caused by *Treponema pallidum*.<sup>4</sup> It is usually spread through sexual contact but can be transmitted through blood transfusion.<sup>3</sup> It is transmitted through direct contact with syphilitic chancres or sores that develop in the skin or mucous membrane of the genitalia, mouth, and rectum of an infected person to other person.

Malaria is an infectious febrile disease produced by several species of plasmodia (*P. vivax*, *P. falciparum*, *P. malariae*, and *P. ovale*).<sup>4</sup> Among them, *P. vivax* and *P. falciparum* are more common causes of malaria in Bangladesh.

The aim of the present study was to analyze the status of transfusion-transmitted infections among the apparently healthy donors so as to increase awareness of complications of blood transfusion.

## MATERIALS AND METHODS

This retrospective study was carried out in the Department of Transfusion Medicine at Chattogram Maa-O-Shishu Hospital Medical College from January to December 2022. After proper ethical consideration, a total of 7,289 blood donors were included in this study. Donors were selected by taking history, clinical examination and following strict donor selection criteria. All the healthy blood donors were 18 to 60 years old. Blood samples were collected in a pre-labeled tube during the collection of blood. Serum was separated from the clotted blood. The study included all the donors who pretested blood grouping, Rh factor and cross-matching with the blood of the

irrespective recipient admitted in different wards. All the samples were screened for hepatitis B surface antigen (HBsAg) HCV, HIV malaria and syphilis by the Immuno Chromatography (ICT) method. All the reactive samples were repeat tested before being labeled seropositive and the irrespective blood units were discarded.

## RESULTS

The total number of blood donors was 7,289. Most donors were male 6,936 (95.15%) and rest 353 (4.84%) were female. The age range of the donors was from 18 to 57 years (Table I). Results are showing in following tables.

**Table I** Distribution of blood donor by age group

| Age group (Years)□ | Frequency□ | Percentage |
|--------------------|------------|------------|
| 18-27□             | 3,973□     | 54.5       |
| 28-37□             | 2,811□     | 38.56      |
| 38-47□             | 464□       | 6.36       |
| 48-57□             | 41□        | .56        |

**Table II** Distribution of blood donor by sex

| Sex□    | Frequency□ | Percentage |
|---------|------------|------------|
| Male□   | 6936□      | 95         |
| Female□ | 353□       | 5          |

**Table III** Distribution of blood donor by occupation

| Occupation□ | Frequency□ | Percentage |
|-------------|------------|------------|
| Student□    | 2,155□     | 29.56      |
| Service□    | 2,587□     | 35.49      |
| Business□   | 1,445□     | 19.82      |
| Others□     | 1,102□     | 15.12      |
| Total□      | 7,289□     | 100.00     |

Prevalence of Hepatitis B virus (HBV) HCV and syphilis were 3,014% and 0.109% respectively. No blood donor tested showed positivity for malarial parasite and HIV.

**Table IV** Positive case among the donors of transfusion medicine unit of CMOSHMC (n=7,289)

| Screening test□   | Frequency□ | Percentage |
|-------------------|------------|------------|
| HBV (HBsAg)□      | 22□        | .3         |
| Anti HCV□         | 1□         | .014       |
| VDRL□             | 8□         | .109       |
| Malaria parasite□ | 0□         | 0          |
| Anti HIV□         | 0□         | 0          |

## DISCUSSION

Studies in the West have shown that the estimated risk of transfusion-transmitted HIV, HCV and to a lesser extent, HBV infection via blood products is very low.<sup>5,6</sup> This is not the

same in developing countries like Bangladesh. In the present study, the prevalence of HBsAg was 3.3%. The prevalence of HBsAg in a study at Khulna Medical College Hospital, Khulna, was 1.39%.<sup>7</sup> In another study at Sir Salimullah Medical College, Dhaka, the prevalence was 2.19% (8). In the National Institute of Neuro Sciences (NINS) study, the prevalence was 1.196%.<sup>9</sup> The seroprevalence of HBsAg in various other Indian studies has been shown to range between 1.86 and 4%.<sup>10,11</sup> The seroprevalence of HBsAg in various studies in Pakistan has been shown to range between 1.55 and 8.4%.<sup>12,13</sup> In the present study, the prevalence of seropositivity for anti-HCV was 0.014%. The prevalence of anti-HCV in a study at Khulna Medical College Hospital, Khulna, was 0.024%.<sup>7</sup> In another study at Sir Salimullah Medical College, Dhaka, the prevalence was 0.25%.<sup>8</sup> In the National Institute of Neurosciences (NINS) study, the prevalence was 0.684%.<sup>9</sup> The global prevalence of chronic HCV infection is estimated to be approaching 3%. Extremely low anti-HCV prevalence (0%) has been reported among the blood donors in the UK and Scandinavia. The highest prevalence (28%) has been reported in Egypt.<sup>14</sup> Indian studies indicate that the seroprevalence of HCV ranges between 0.4 and 1.09% (10).<sup>11</sup> Several studies in Pakistan showed that the seroprevalence of HCV ranges between 0.07 and 4.9%.<sup>12,13</sup> The prevalence of HIV seropositivity was 0.0%. The prevalence of HIV in a study at Khulna Medical College Hospital, Khulna, was 0.008%.<sup>7</sup> In another study at Sir Salimullah Medical College, Dhaka, the prevalence was 0.08%.<sup>8</sup> In the National Institute of Neurosciences (NINS) study, the prevalence was 0.0% (9). The HIV seroprevalence in the Indian scenario has been reported between 0.2 and 1%<sup>14,15</sup> Two studies in Pakistan showed a prevalence of HIV 0.0%.<sup>12,13</sup>

In the present study, the VDRL reactivity was 0.109%. The prevalence of VDRL in a study at Khulna Medical College Hospital, Khulna, was 0.00%.<sup>7</sup> In another study at Sir Salimullah Medical College, Dhaka, the prevalence was 0.17%.<sup>8</sup> In the National Institute of Neurosciences (NINS) study, the prevalence was 0.341%.<sup>9</sup>

## CONCLUSION

In the present study, the incidence of HBsAg seropositivity was found to be the highest as compared with other transfusion-transmitted infections. Hepatitis B-free person should be taken Hepatitis B vaccine. It is essential to exclude high-risk donors and stop professional blood donation. HIV infection is a major health problem worldwide, but it is still not common in Bangladesh. So attention should be paid toward the prevention of the hepatitis B and C viruses as well as HIV. Therefore, strict selection of blood donors and comprehensive screening of the donor's blood for HIV, HBV, HCV, malaria and syphilis using sensitive laboratory screening test methods are highly recommended to reduce the incidence of TTI in Bangladesh and to ensure the safety of blood for recipient.

## DISCLOSURE

All the authors declared no competing interest.

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