Original article

Prevalence of Hepatitis B Infection Among Healthy Blood Donors in Rangpur, Bangladesh

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Abstract

Background:
Transfusion transmitted infection (TTIs) is still an alarming issue associated with blood transfusion, as hepatitis B remains a critical public health concern in a country like Bangladesh. The predisposition of the prevalence of HBsAg infection among healthy blood donors even in a tertiary-level hospital could be a strategy for scheming and observing this problem.

Methods:
A cross-sectional study was conducted among all samples of a total of 11,566 units of blood screening for hepatitis B surface antigen at Rangpur Medical College Hospital, Rangpur from January 2021 to December, 2021. The prevalence of HBV infection was measured to observe the trends. Data were collected by non-probability convenient sampling, maintaining inclusion and exclusion criteria. Face-to-face interviews, blood grouping tests, and hepatitis B surface antigen (HBsAg) screening were conducted.

Results:
About 66% of the blood donors were between 18 and 30 years of age, and 89.6% of them were males. All the donors were replacement donors who came voluntarily. The overall seroprevalence rate of HBV among all healthy blood donors was 1.09%. About 98.4% of HBsAg-positive blood donors were males and only 1.6% were female. Hepatitis B infection was more prevalent in the 28–36 years age group and least prevalent among those older than 48 years of age.

Conclusion:
The decreasing trend in the prevalence of HBV infection might be the result of improvement in donor recruitment and selection, built-up awareness, proper TTIs screening, HBV vaccination and possibly decreasing HBV infection prevalence in the general population.

Keywords: Hepatitis B; Blood Transfusion; Blood Donors; Bangladesh.

Introduction:

Hepatitis B is a common blood-borne viral infection with high mortality and morbidity rate. It is a serious global health problem. HBV causes acute and chronic liver diseases and is one of the reasons for the development of hepatocellular carcinoma.[1] All age groups are almost equally at risk of being affected.[2] This virus (HBV) is now an obvious threat in developing countries like Bangladesh. HBV is infectious 50 to 100 times more than HIV. Unlike HIV, HBV can survive outside the body for at least 7 days and is an important occupational hazard for health workers.[3] About 2 billion people have been infected with the virus worldwide and about 350 million live with chronic HBV, referring to the virus as one of the most common human pathogens and a significant health concern worldwide and almost 75% in Asia. [3,4]

The virus is still the most significant transfusion transmissible infection, with a per-unit risk of 1:82,000.[5] So early detection is important to resist the consequence of this virus. A various diagnostic tests are available to detect this virus. Among them, HBsAg is the most commonly used biological biomarker.[6-9] Evaluation of data on the prevalence of this transfusion transmitted

infections (TTIs), that is HBV among healthy blood donors is actually an assessment of the occurrence of infections in the blood donor and concurrently for safe blood transfusion protocol. It also gives a glimpse of the epidemiology of this virus in the local society. To calculate the prevalence of HBsAg among healthy blood donors, we performed a study among blood donors who came to donate blood as replacement donors in Rangpur Medical College Hospital, Rangpur.

Methods:

A cross-sectional study was conducted at the department of Transfusion Medicine, Rangpur Medical College Hospital, Rangpur, Bangladesh. A total of 11,566 units of blood were collected from replacement donors (family members, friends, or relatives of the patients for whom the blood would be donated) over a period of 12 months from January to December, 2021, utilizing a standard protocol for blood donor selection and laboratory procedure. All samples were screened for hepatitis B surface antigen along with anti-human immunodeficiency virus antibodies, anti-hepatitis C virus antibodies, malaria parasite, and TPHA test. The total number of sero-reactive cases and their distribution were noted with a sociodemographic background of all the blood donors collected from the donor's data and screening results recorded as registrar. Informed consent was obtained from the participants after the rationale and goal of the study, as well as their ability to wi□thdraw from participation voluntarily, were maintained. Proper privacy and confidentiality were maintained throughout the pro□cess. All the test samples were centrifuged at room temperature and clear plasma was collected for screening. To examine the presence of HBV, HBsAg test strips and plasma kits (Q-detect, Canada) which were rapid chromatographic immunoassays for the qualitative detection of HBsAg in Human plasma, were used. If the result was positive, the test was repeated 2 times more (total 3) to make the test a valid one. If 2 out of 3 test results show positivity, then it was considered a positive sample.Data were analysed using IBM SPSS Statistics for Windows version 18.

Results:

Table-I showed the characteristics of the 11,566 blood donors who participated in our study. Young donors between 18 and 30 years of age accounted for the largest proportion (66.0%) of the participating donors. The vast majority of donors (89.6%) were males. Most (82.3%) of the donors were from Rangpur district.

Table-I: Characteristics of Blood Donors (n=11,566)

Characteristics	Number (%)
Age (years)	
18-30	7644(66.0)
31–42	2620(23.5)
43–54	1222(10.6)
>54	80(0.7)
Gender	
Male	10363(89.6)
Female	1203(10.4)
Marital status	
Single	4210(36.4)
Married	7356(63.6)
Place of living	
Same district	9519(82.3)
Outside the district	2047(17.7)
Religion	
Muslim	9565(82.7)
Hindu	2001(17.3)
Blood group	
A+	2637(22.8)
B+	4337(37.5)
O+	3030(26.2)
AB+	1076(9.3)
Others (Rhesus negative)	486(4.2)
HBsAg result	
Positive	126(1.09)
Negative	11,440(98.91)
Positive HBsAg case	
Male	124(98.4)
Female	2(1.6)

The blood group composition of the donors was as follows: 2637 (22.8%) were A positive, 4337 (37.5%) were B positive, 3030 (26.2%) were O positive, 1076 (9.3%) were AB positive, and the remaining 486 (4.2%) were of rhesus-negative groups. Among all the screened blood samples, 126 (1.09%) blood donors were HBsAg-positive. 98.4% of HBsAg positive blood donors were males and only 1.6% were female. The seroprevalence of HBsAg among different blood groups was as follows: 1.2% in A positive donors, 1.01% in B positive donors, 1.16% in O positive donors, 1.11% in AB positive donors and 0.62% in all rhesus negative donors . Seroprevalence of HBsAg in different blood groups was shown in Table-II.

Table-ll: HBsAg Seroprevalence in Different blood Groups (n=126)

Blood Group	Number (%)
A+ve	32(25)
B+ve	44(35)
O+ve	35(28)
AB+ve	12(9.6)
A-ve	1(0.8)
B-ve	1(0.8)
O-ve	1(0.8)

Discussion:

The main purpose of our study was to determine and review the prevalence of HBV infection among healthy blood donors in Rangpur, Bangladesh. The result revealed an HBsAg seropositivity of 1.09% among all healthy donors, which was in between findings from previous studies conducted among blood donors in Khulna and in Faridpur, Bangladesh, which estimated a prevalence of 0.72% –1.5%.[10,11] HBV prevalence was indeed currently lower than it used to be 0% to 4.9% in the past several years, compared to 7.8% in the early 1980s.[12] The prevalence of HBV infection among blood donors in our study was almost similar to those reported by studies conducted in nearby countries (India and Pakistan).[13,14] In comparison, the worldwide seroprevalence of HBsAg is 3.6%.[15]

In our study, we found that HBV infection was more common among donors between 28 and 36 years of age. This might be due to known high-risk behaviors among this age group, including a history of previous blood transfusions, occupational or accidental injuries, and a higher frequency of sexual behaviors. Our study focused only on hepatitis B infection, which was more prevalent among males. B-positive donors constituted the biggest group of donors, but the seroprevalence of HBV infection was higher among O-positive donors and A-positive donors, although the differences were not statistically significant. More frequent studies are required to examine the reasons for these findings.

In this study, we also captured the sociodemographic backgrounds of all blood donors. Our results showed that young age groups (18 to 25 years) were more enthusiastic about blood donation, concurring with previous findings.[1,16,17] Additionally, the vast majority of the donors were males. This could possibly be attributed to the fact that in Bangladesh, females are more occupied with household work and hence have less time for blood donation along with rejection from donation according to selection criteria like running menstruation, iron deficiency anaemia, etc. This finding was supported by a study in a neighboring country with similar socioeconomic conditions.

Conclusion:

The prevalence of HBV infection among healthy blood donors in Rangpur, Bangladesh is not negligible. The rate was similar to those reported in other regions of Bangladesh, which vary between 0.72% and 1.5%. HBsAg positivity of blood donors in Bangladesh was almost similar to those of India and Pakistan. The proportion of HBV infection in blood donors was much lower than in other high-risk groups reported in Bangladesh. In view of these findings, we recommend that proper screening measures for HBsAg and other TTIs should be performed before blood donations. All eligible donors of both gender should be encouraged to donate blood, while risk factors for TTIs should be effectively assessed. Infected blood donors should be informed, managed, and treated accordingly. Appropriate policies should be implemented to ensure the safety of blood donation and safe blood transfusion protocol, for example, through public awareness campaigns about TTIs or vaccination. More research studies are needed to examine the risk factors, epidemiology, trends, update, and preventive measures for HBV infection in Bangladesh.

Limitation:

The study had some limitations. As this was a cross-sectional study, risk factors and natural histories of HBV infection among participating donors could not be determined. The serological rapid screening method had its own limitation, like false negativity. We were aware that our study, conducted in a small area, might not be representative of a larger area. Nonetheless, we were able to assess the distribution of different variables such as age, sex, blood groups, and type of blood donation and measure the frequency distribution of HBV infection among different groups.

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