

Original article

Frequency of Hepatitis B Virus carrier by Detecting AntiHbC Antibody among HBsAg Negative Blood Donors

Islam K¹, Hoque M², Taimur SDM³, Nahar S⁴, Rahman ZF⁵, Sultana N⁶

Abstract:

Background & Objective: Transfusion associated hepatitis B virus (TAHBV) infection continues to be a major problem despite mandatory screening for hepatitis B surface antigen (HBsAg). This is because HBsAg is not detected during the window period of the infection. This study was designed to assess the frequency of anti HbC antibody among HBsAg negative donor and also to determine the demographic profile of healthy blood donors. **Material & Method:** This cross sectional observational study was carried out in the Department of Transfusion Medicine, BSMMU, Dhaka during the period of May 2014 to April 2015. A total number of 100 consecutive healthy blood donors who were clinically and physically healthy and serologically found to be free from HBsAg, HCV and HIV by rapid chromatographic test were included in this study. **Results:** Within the 100 patients among them h/o jaundice was found in 17(17.0%). There all (100.0%) subjects had negative HBsAg and 14(14.0%) subjects had positive anti HbC-Ab. Anti HbC-Ab was statistically significant ($p < 0.001$) in Z-test. **Conclusion:** This study was undertaken to assess the prevalence of anti HbC antibody among healthy blood donors with HBsAg negative in rapid chromatography method. The prevalence of anti HbC antibody was about 14(14.0%) among 100 HBsAg negative blood donors. H/O blood donation was found in almost two third 65(65.0%). So, anti HbC antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.

Key Words: HBsAg; HBV; ELISA; Anti HbC.

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Introduction:

Hepatitis B virus (HBV) infection is a serious global health problem affecting two billion people worldwide, and 350 million people suffer from chronic HBV infection¹. Despite mandatory screening for HBsAg by ELISA for over 20 years, transfusion-associated HBV (TAHBV) continues to be a major problem worldwide, more in patients receiving repeated transfusions³⁻⁵. It has been demonstrated that some HBsAg-negative individuals and those reactive for anti-HbC continue to

replicate HBV¹. Thus the absence of HBsAg in the blood of apparently healthy individuals may not be sufficient to ensure lack of circulating HBV. Blood containing anti-HbC with or without detectable presence of HBsAg might be infectious; therefore, routine blood donor screening for anti-HbC has been implemented in some countries resulting in a decrease in the risk of post-transfusion HBV infection⁸⁻¹⁰.

Generally, HBV Infection is diagnosed by the detection of HBsAg in the serum or plasma of

1. Dr.Kashfia Islam, MD, MCPS, Medical Officer, Department of Transfusion Medicine, Shaheed Sohrawardi Medical College & Hospital.
2. Prof. Dr. Mazharul Hoque, MTM, Professor & Head of the Department of Transfusion Medicine, Dhaka Medical College & Hospital.
3. Dr. Samsun Nahar, MD, FCPS, Specialist, Department of Cardiology, United Hospital.
4. Dr. Syed Dawood Md. Taimur, MBBS, D.CARD(DU), Assistant Professor of Cardiology, Ibrahim Cardiac Hospital & Research Institute, Dhaka.
5. Dr. Zeenat Farzana Rahman, Research officer, Department of Immunology, BIRDEM.
6. Dr. Nahid Sultana, MTM, Chief Medical Officer, Department of Transfusion Medicine, BSMMU.

Corresponds to: Kashfia Islam, Department of Transfusion Medicine, Shaheed Sohrawardy Medical College & Hospital. **E-mail:** kashfiai74@gmail.com

an individual³. Detection of HBsAg in blood is a diagnostic marker for infection with HBV and in the blood banks screening for HBsAg is carried out routinely to detect HBV infection. Occult HBV infection is defined as the presence of HBV DNA in blood or liver tissues in patients negative for HBsAg but who may or may not be positive for HBV antibodies¹⁴⁻¹⁶. It is possible that, donors with occult HBV infection, who lack detectable HBsAg might have exposure to HBV infection indicated by positive for antibodies against HBV core antigen and HBV DNA, are a potential source of HBV infection⁶. This study is intended to be conducted among healthy donor to determine the presence of anti Hbc antibody (total) that are screened and found to be HBsAg negative and thus allowed to donate blood in Bangladesh.

Methods:

This study was carried out from May 2014 to April 2015 on the blood donor who was clinically and physically healthy and serologically found to be free of HBsAg, HCV and HIV by rapid chromatographic test. The donors with positive HBsAg and who will not give consent are excluded form the study. The preliminary screening panel for each patient was included the complete history, physical examination and the necessary laboratory tests. Therefore during this study period 100 samples were enrolled according to inclusion and exclusion criteria.

This assay was based on competitive ELISA. All data were compiled and edited meticulously by thorough checking and rechecking. All omission and inconsistencies were corrected and were removed methodically. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as mean, standard deviation, and categorical variables as frequencies and percentages. Z-test was used for proportion test. P-value was considered to be statistically non significant if >0.05 and statistically significant if ≤ 0.05.

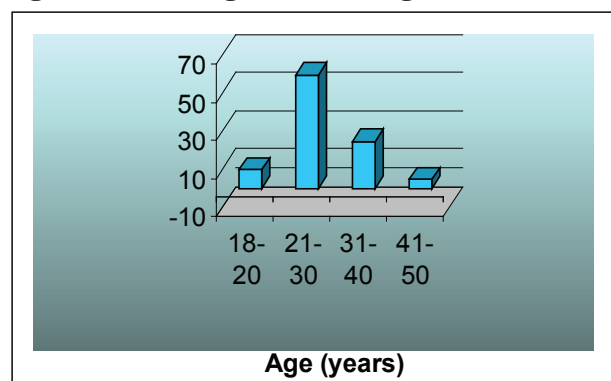
Results:

This cross sectional observational study was carried out with an aim to assess the frequency of anti Hbc antibody among HBsAg negative donor. A total of 100 healthy blood donors who were clinically and physically healthy and serologically found to be free of HBsAg study was done in Transfusion Medicine Department of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during May 2014 to

April 2015, were included in this study.

A total of 100 blood donors screened during the study there majority (94.0%) subjects were male and 6(6.0%) subjects were female. Male female ratio was 15.7:1. and among them majority subject (60%) belonged to 21-30 years(Fig.-1) The mean age was found 27.8±6.4 years with range from 18 to 45 years.

Figure I: Bar diagram shows age distribution of



the study subjects

Among the donors H/O jaundice was found in 17(17.0%) cases. H/O jaundice was found in 17(17.0%) cases among them 10(58.8%) subjects had jaundice duration of 6-10 years ago. H/O blood donation was found in 65(65.0%) cases among them 47(72.3%) subjects had blood donation duration of 1-5 times. (Table-I)

Table I: Distribution of the study subjects according to clinical findings (n=100)

Clinical findings	Number of subjects	Percentage (%)
H/O Jaundice		
Yes	17	17
No	83	83
Duration of Jaundice		
Childhood	3	17.7
6-10 years ago	10	58.8
11-15 years ago	4	23.5
H/O blood donation		
Yes	65	65
No	35	35
Duration of H/O blood donation		
1-5 times	47	72.3
6-10 times	18	27.7

Anti HBc Ab total was found in 14% which

indicated the persistence of carrier state or the recent past infection with convalescence and which was statistically significant ($p < 0.001$). (Table- II)

Table II: Distribution of the study subjects by anti HBc-Ab (n=100)

Anti HBc-Ab	Number of subjects	Percentage	Z value	P value
Positive	14	14.0	4.03	<0.001 ^s
Negative	86	86.0		
Total	100	100.0		

^s=significant

P value reached from Z-test

Discussion:

Hepatitis B virus is considered as one of the most common viruses spreading through blood transfusion and organ transplants. This usually results in more considerable cases of disease and mortalities; so it is necessary to perform tests for viral infection in all blood donors. Transfusion associated Hepatitis B virus (TAHBV) continues to be a major problem despite mandatory screening for Hepatitis B surface Antigen (HBsAg). Presence of HBsAg is the common method for detecting hepatitis B infection. Unfortunately, this marker is not detected during the window period of the infection^{6,7}. During this window period, detection of the anti HBc serves as a useful serological marker for HBV infection. To address this issue a total of 100 healthy blood donors were included in this study. It was observed that 60(60.0%) of the subjects were age belonged to 21-30 years. The mean age was found 27.8 ± 6.4 years with range from 18 to 45 years. In another study¹ found the median age of blood donors was 32 years varied from 16 to 59 years, which is comparable with the current study. One study observed the mean age of blood donors was 24.9

years varied from 18 to 50 years⁷. In another study found the median age of blood donors was 32 years varied from 16 to 59 years², which is comparable with the current study. On the other hand higher mean age (38 ± 11 years) among 1000 donors¹¹⁻¹³, which may be due to geographical variations, racial and ethnic differences and different lifestyle of their study population.

It was found that H/O jaundice was found in 17(17.0%) cases among them 4(23.5%) cases had anti HBc-Ab positive. Out of these 17 donors 10(58.8%) subjects had jaundice 6-10 years of ago. H/O blood donation was found in 65(65.0%) cases among them 47(72.3%) had donated blood 1-5 times. Our study showed that 14(14.0%) subjects had positive anti HBc-Ab. The difference was statistically significant ($p < 0.001$) in Z-test. Out of the 1027 HBsAg negative blood samples screened⁴, 18.3% were found to be anti-HBc positive. Another study showed the prevalence of HBsAg, anti-HBc total (IgG and IgM)¹⁵, anti- HBs were investigated and was found to be 3.5, 10.9, 5.7 and 3% respectively among blood donors. So, anti HBc antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.

Conclusion:

This study was undertaken to assess the prevalence of anti HBc antibody among healthy blood donors with HBsAg negative in rapid chromatography method. The prevalence of anti HBc antibody was about 14(14.0%) among 100 HBsAg negative blood donors. Most of the subjects were in 21-30 years age group and male predominant 96(96.0%). H/O blood donation was found in almost two third 65(65.0%). So, anti HBc antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.

References:

1. Schmidt M, Nubling C.M, Scheiblaue H, Chudy M, Walch LA, Seifried E, Roth WK, Hourfar MK. Anti-HBc screening of blood donors: a comparison of nine anti-HBc tests. *Vox Sang.* 2006; 91:237–243.
2. Allain JP, Candotti D, Soldan K, Sarkodie F, Phelps B, Giachetti C et al. The risk of hepatitis B virus infection by transfusion in Kumasi,Ghana. *Blood.* 2003; 101:2419–25.
3. Badur S, Akgun, A Diagnosis of hepatitis B infections and monitoring of treatment. *J Clin Virol,* 2001; 21: 229-37.
4. Bhattacharya P, Chandra P, K Datta, S Banerjee, A Chakraborty, S, Rajendran, K Basu, SK Bhattacharya, SK Chakravarty R. Significant increase in HBV, HCV, HIV and syphilis infections among blood donors in West Bengal, Eastern India 2004-2005.exploratory screening reveals high frequency of occult HBV infection. *World J Gastroenterol.*2007;13: 3730–33.
5. Chaudhuri V, Nanu A, Panda SK, Chand P, 2003. Evaluation of serologic screening of blood donors in India reveals a lack of correlation between anti-HBc titer and PCR-amplified HBV DNA. *Transfusion,* 2003;43:1442–1448.
6. Dreier J, Kroger M, Diekmann J, Gotting C, Kleesiek K. Low-level viraemia of hepatitis B virus in an anti-HBc- and anti-HBs-positive blood donor. *Transfus Med,* 2004;14: 97-103.
7. Japhet MO, Adesina OA, Donbraye E and Adewumi, MO. ‘Hepatitis B Core IgM antibody (anti-HBcIgM) among Hepatitis B Surface antigen (HBsAg) negative blood donors in Nigeria’. *Virology Journal,*2001; 8: 513.
8. Kleinman SH, Kuhns MC, Todd DS, Glynn SA, McNamara A, DiMarco A, Busch, MP. 2003. Frequency of HBV DNA detection in US blood donors testing positive for the presence of anti-HBc: implications for transfusion transmission and donor screening. *Transfusion,* 2003;43: 696–704.
9. Mosley JW, Stevens CE, Aach RD, Hollinger FB, Mimms LT, Solomon LR, et al. Donor screening for antibody to hepatitis B core antigen and hepatitis B virus infection in transfusion recipients. *Transfusion.* 1995;35:5-12.
10. Nanu A, Sharma SP, Chatterjee K, Jyoti P. Markers for transfusion-transmissible infections in north Indian voluntary and replacement blood donors: prevalence and trends 1989-1996. *Vox Sang,*1997;73:70–73.
11. Vaezjalali, M, Rashidpour, S, Rezaee, H, Hajibeigi, B, Zeidi, M & Gachkar, L et al. 2013, ‘Hepatitis B Viral DNA Among HBs Antigen Negative Healthy Blood Donors’, *Hepat Mon.* 2013; 13(3):6590.
12. Yotsuyanagi H, Yasuda K, Iino S, Moriya K, Shintani Y, Fujie H, et al. 1998. Persistent viremia viremia /vi·re·mia/ (vi·re´me-ah) the presence of viruses in the blood. viremia. The presence of viruses in the bloodstream. after recovery from self-limited acute hepatitis B. *Hepatology.* 1998;27:1377-82.
13. Yotsuyanagi H, Yasuda K, Moriya K, Shintani Y, Fujie H, Tsutsumi T, Nojiri N, Juji, T, Hoshino H, Shimoda K, et al. 2001. Frequent presence of HBV in the sera of HBsAg-negative, anti-HBc-positive blood donors. *Transfusion.*2001;41: 1093–99.
14. Zervou EK, Dalekos GN, Boumba DS, Tsianos EV. Value of anti-HBc screening of blood donors for prevention of HBV infection: results of a 3-year prospective study in Northwestern Greece. *Transfusion.*2001; 41:652–8.
15. LavanyaV, ViswanathanT, Malar AS, MalarvizhiA, Moorthy K. 2012 Prevalence of hepatitis B virus infection among blood donors with antibodies to hepatitis B core antigen,2012;4(6): 128-37.
16. Schreiber, G.B., Busch, M.P., Kleinman, S.H., Korelitz, J.J. 1996. The risk of transfusion-transmitted viral infections. *N Engl J Med.*1996;334(26):1685–90.