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Predominance of HBsAg (+ve) and Anti-HCV Positivity among Blood Donors: Experience in a Private Hospital of Dhaka, Bangladesh

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Abstract

Background: Hepatitis B and C virus infection in Bangladesh continues to be a public health problem for the last few decades. Transfusion related hepatitis is a major concern among the transfusion medicine community in Bangladesh.

Objectives: This study was conducted out to characterize the security profile of Bangladeshi healthy blood donors and to point out the importance of screenings programs that must be applied, and also patterns of virus positivity among different age & sex groups were determined.

Patients and methods: Through out this study we reviewed the testing records of 3048 healthy blood donors (Male-2680 and Female-368) who presented by random at blood bank's records from January 1st, 2010 to December 31st, 2010 at a private Hospital in Dhaka, Bangladesh. All the samples were examined using 3rd generation enzyme linked immunosorbent assays for Anti-HCV and HBsAg (+ve) detection. Statistical Analysis was done using standard procedure.

Results: The study found the overall predominance of HBsAg (+ve) was 1.24% and Anti-HCV was 0.17%. Predominance of co-infection with HBV and HCV was 0.00%.

Conclusions: Impact of this paper will help to provide information on the current risks of blood transfusion in Bangladesh thus to advise of alternatives to transfusion can mitigate some of those concerns now and near future.

Keywords: HBsAg(+ve); Anti-HCV; Anti-HIV; Virus; Co-infections

Background

Hepatitis has become an issue of global importance for its alarming appearance in the global health problem. Most of the blood collected for transfusion in Bangladesh is collected mainly from the community blood centers; approximately one-half of these centers are maintained by the different local and international blood collecting agencies, whereas the rest are run by other nonprofit self service community agencies.

Hepatitis B virus a member of the *Hepadnavirus* family transmitted via blood transfusion, I.V. drug abuse, during intercourse and parentally from mother to newborn. Hepatitis B infection is the most common infectious diseases in the earth and a major public health crisis. It has been predictable that 350 million people through the world are persistent hepatitis B Virus (HBs) carriers [1]. Also, blood transfusion strikingly raises the incidence of Anti-HCV reactivity. Co-infection by *Hepatotropic* viruses is not uncommon because of the fact that Hepatitis B virus and C virus share analogous routes of transmission. The relative role of the infecting viruses in determining the concluding clinical picture is not yet well defined. Several reports indicate that clinical and pathological severity of liver disease among co-infected patients is high and in case of Hepatocellular Carcinoma (HCC), co-occurrence of both viruses is a common phenomenon [2]. The predominance of different virus infection among North American population show wide regional variation, according to the previous findings the overall predominance of Anti-HCV was 1.8%. A survey showed a predominance of hepatitis B virus to be 6.6% for the core antigen in Mexico [3]. A community-based study conducted that 13% people were HBsAg(+ve) and 17% were positive for Anti-HCV in Taiwan [4]. The Predominance of hepatitis C antibodies was 0.28% in healthcare workers in a study area depended on rural areas of Scotland [5].

In Bangladesh, the predominance of HBsAg(+ve) cases are about 8% among the intravenous drug users [6], 9.7% in commercial sex workers [7] and also 5.9% in truck drivers. However that of Anti-HCV a predominance of less than 1% in truck drivers reported formerly [8-10]. Only a very few studies has been studied so far in Bangladesh to determine the predominance rate of *Hepatotropic* virus infection among healthy blood donors. Through the study it was determined the predominance of Hepatitis B & C infections among the healthy blood donors at a private hospital in Bangladesh.

Objectives

Hepatitis B continues to represent a serious challenge in Bangladesh with the increasing predominance among healthy blood donors. The results of this study tinted the high predominance and correlates of HBsAg(+ve) in Bangladesh. The high predominance underscores the need for preventive measures against hepatitis B virus infection among women. This paper has attempted to provide information on the current risks of blood transfusion in Bangladesh thus to advise of alternatives to transfusion can mitigate some of those concerns now and in the future.

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Patients and Methods

Study population

A total number of 3048 healthy blood donors were screened for HBsAg (2680 male & 368 female) and a total number of 3010 (2779 male & 231 female) healthy donors were screened for Anti-HCV.

Sample collection

This is a retrospective study we reviewed the testing records of 3048 donors who presented at random at a blood Bank as well as the blood drives conducted between January 1st, 2010 to December 31st, 2010 at Anwer Khan Modern Medical College & Hospital Ltd, Dhaka, Bangladesh. Blood donor's data and results of HBsAg (+ve) and Anti-HCV were retrieved using the blood banks records of donors.

Serological test

All the samples were examined using 3rd generation enzyme linked immunosorbant assays (ELISA Innogenetics, Belgium) for Anti-HCV and HBsAg detection.

Statistical Analysis

Statistical analysis was done on all variables to obtain a frequency distribution. Quantitative variables were reported with range, frequency and percentage. Proportions were analyzed with chi-square test. P value of 0.05 or less was considered as statistically significant at 95% confidence interval. Data were analyzed using Graph Pad 5 Prism.

Results

Characteristics of study groups

During the surveillance through one year duration mentioned, a total number of 3048 healthy blood donor were screened for HBsAg (2680, 87.92% male & 368, 12.08% female) and a total number of 3010(2779, 92.32% male & 231, 7.68% female) healthy donors were screened for Anti-HCV.

Distribution of infectivity by sex and age groups

A total number of 3010(2779, 92.32% male & 231, 7.68%) healthy donors were screened for Anti-HCV. Among those screened for HBsAg (3048), positive results for HBsAg (+ve) was found on only on 38 (1.24%) people of the total (male 29, 1.08% and female 9, 2.44%) donors, yielding a predominance of 1.24% of total. Statistically, there was no significant difference on the predominance of HBsAg (+ve) for gender difference. But in case of anti- HCV there were only 5 donors who tested positive, with a predominance rate of 0.17% of total tested. The predominance of anti-HCV between males and females were 0.17% and 0.00%, respectively (Table 1; Figures 1 and 2).

Proportional statements of infection by Anti-HCV, HBsAg

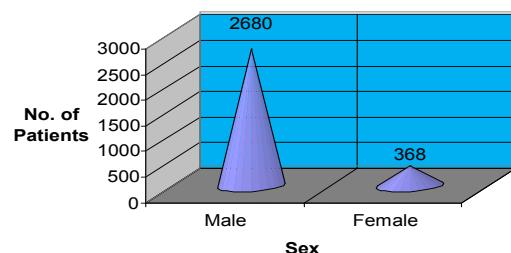
Stratification according to age groups was done using the following

Group (Sex)	HBsAg				Anti-HCV	
	Patient's Number	Positive	Chi-Square Test	Patient's Number	Positive Case	Chi-Square Test
Male	2680	29 (1.08%)	0.0545	2779	5 (0.17%)	0.2596
Female	368	09 (2.44%)	NS	231	0	NS
Total	3048	38 (1.24%)	Male vs Female	3010	5 (0.17%)	Male vs Female

Significance(S) = P<0.05

Table 1: Frequency of HBsAg(+ve) and anti-HCV among blood donors according to gender.

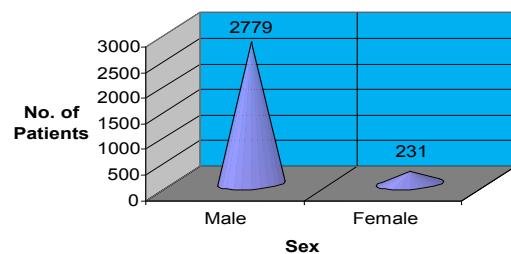
Frequency of Sex for HBsAg Screening



Abbreviations: HBsAg(+ve), hepatitis B surface antigen

Figure 1: Frequency of HBsAg(+ve) according to Sex group.

Frequency of sex for Anti-HCV Screening



Abbreviations: Anti-HCV, hepatitis C virus antibody

Figure 2: Frequency of Anti-HCV according to Sex group.

age limits: 18-28(A), 29-39(B), 40-50(C) years and above 50 years (D). Among the groups , majority of the donors tested for HBsAg on ages groups- A, B, C & D is 1761 (57.77%) , 631 (20.70%) , 592 (19.42%) and 64 (2.09%) donors correspondingly (Table 2 and Figure 3). This trend is also similar among those tested for anti-HCV with values of 2166 (71.96%) for ages- A, 492 (16.34%) for B, 329 (10.93%) for C, and 23(0.76%) for ages-D. The predominance of HBsAg (+ve) along with the age groups were 0.62% for A , 2.69 % for B , 1.01% for C and 6.25% for D. Statistically, the predominance rates of HBsAg(+ve) donors were considerably different according to age groups (Table 2; Figures 3 and 4). Pragmatic predominance of anti HCV values 0.04%, 0.40% 0.30% 0.4.34% for diverse age groups A, B, C & D respectively (Table 2 and Figure 4). These values show noteworthy difference among the different age groups.

Discussion

The focus of the current study is the predominance of HBsAg (+ve) obtained was 1.24%. This is lower compared to the 8.0% predominance rate in I.V. drug users and 9.7% predominance in commercial sex workers reported by *Bangladesh Medical Research Council Bulletin (BMRCB)* published 1989. One reason for the high predominance identified the feasible insertion of proficient blood donors which have been demonstrated which have higher predominance rate compared to volunteer blood donors. Anti-HCV predominance was 0.16% observed through the study. Factors that may contribute to the wide discrepancy include ethnic mix of population, frequency of injection drug use and the proportion of the population that engages in high risk behavior. Injection drug use was mentioned to be the single most important risk factor for HCV infection. HCV infection is also proportionally

Age Group (Years)	HBsAg		Chi-Square Test	Anti-HCV		Chi-Square Test
	Patient's Number	Positive Case		Patient's Number	Positive Case	
18-28(A)	1761	11 (0.62%)	< 0.0001 S According to Age	2166	1 (0.046%)	< 0.0001 S According to Age
29-39(B)	631	17 (2.69%)		492	2 (0.40%)	
40-50(C)	592	06 (1.01%)		329	1 (0.30%)	
Above 51(D)	64	04 (6.25%)		23	1 (4.34%)	

Significance(S) = P<0.05

Table 2: Frequency of HBsAg(+ve) and anti-HCV among blood donors according to Age group.

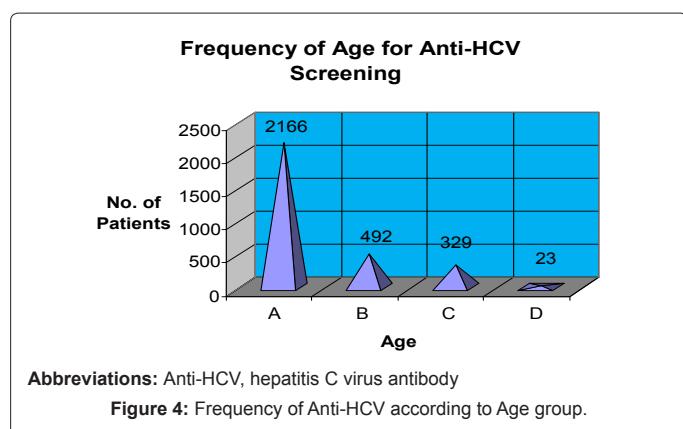
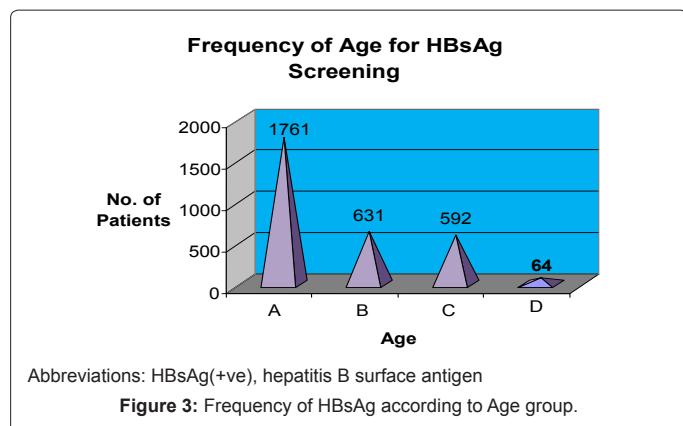
associated with high risk sexual behavior, taking into accounts the number of sexual partners. Furthermore, patients who tested positive for HBsAg was not anymore screened for Anti-HCV for cost cutting purpose, hence excluding hepatitis B(+ve) who may have concomitant hepatitis C.

Several studies were also conducted in other countries on the predominance of Hepatitis in blood donors. In Egypt, the predominance of hepatitis B among blood donors was 39.4%, while hepatitis C showed a value of 24.8% [11]. The values were higher compared with the values obtained in this study. A similar study was conducted in Indonesia with Hepatitis B predominance of 8.8% [12], and in Ghana, blood donor population showed that 15% were chronic carriers of Hepatitis B. In Bangladesh anti HCV reported a predominance of 2.4% in professional blood donors [13]. In the USA, a study among blood donors showed an HCV predominance of 0.4% [14] while in West Mexico, 0.8% of the blood donors were reported to be anti HCV positive [15]. A hospital based study in Lebanon showed that 0.4% [16] were anti HCV positive among blood donors may not be aware of their condition and therefore have the potential on this study.

The predominance of HBsAg (+ve) among healthy blood donors is apparently high. These results underlie the importance of screening programs in identifying blood borne pathogens which pose threat to potential recipients. Most developing countries including the Bangladesh are facing several threats to the safety of their blood supply. Screening for hepatitis viruses should be done most especially in high Predominance areas, since up to 20% of the collected blood might be unsafe. Both hepatitis B and C blood borne pathogen which could be transmitted by the parenteral route. Sometimes, infection results chronic asymptomatic carrier state for several years before the developments of symptoms. Hepatitis infected blood donors may not be conscious of their condition and therefore have the potential to pass on a disease to patients.

Follow up on blood donors who tested positive should also be done and if feasible to screened family members as they are at high risk for infection, due either to intra familial transmission or because they share risk factors for infection. Accurate identification and clinical management of both blood donors and family member would reduce the probability of transmission, preventing further dissemination in the community. Consciousnesses about blood safety have focused much attention on alternative blood transfusion strategies such as autologous blood, viral inactivation, and simulated blood substitutes.

On the basis of the HBsAg (+ve) carrier rate, the world can be divided in three regions as: high, medium and low endemicity. The major concern is about high endemicity countries, where the most



common route of infection remains vertical transmission from mother to child. Screening of all pregnant women and passive immunization with human hepatitis B immunoglobulin are not affordable for many developing countries. The infection rate can be abridged by modifying behavior, improving individual education, testing all blood donations, assuring asepsis in clinical practice and screening all pregnant women. However, availability of a safe and efficient vaccine and adoption of suitable immunization strategies are the most effective means to prevent HBsAg (+ve) infection and its consequences. The unsolved problem for poor countries, where the number of people currently infected is high, is the cost of the vaccine.

This work has attempted to provide information on the current risks of blood transfusion in Bangladesh among the healthy blood donors.

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Authors Contributions

All authors contributed equally to this work. All authors discuss the results and implications and commented on the manuscript at all stages.

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