

Frequency of Different Types of Infections among Different Blood Group Carriers

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ABSTRACT

This study was conducted at Haji Roshan Suleman Hospital and College Tandoadam (January, 2015 to March, 2016). Blood donors at the Hospital were used as subjects to study the frequency of Anti-HCV, HBsAg, Syphilis and HIV.

A population of 2200 blood donors were evaluated for Anti-HCV, HBsAg, Syphilis and HIV. Patients were subjected to Immuno-chromatography (ICT method) for the qualitative detection of antigens and antibodies respectively. Enzyme Linked Immuno Assay (ELISA) was used to screen for antigens and antibodies of HBV and HCV, respectively. Collection of the blood samples was conducted under the supervision of a Consultant Pathologist by Technicians of the Hospital Laboratory. Blood grouping via both forward and reverse methods was conducted.

263 patients out of a total population of 2200 suffered through Transfusion-transmitted Infection (11.95 %). The prevalence for Anti-HCV, HBsAg, Syphilis and HIV antibodies was 149 (6.77 %), 40 (1.81 %), 74 (3.36 %) and 3 (0.13 %) respectively. Blood group O+ve is more prevalent (39.54 %). This sky high prevalence of HCV infection in blood donors espouses the implementation of stern screening policies for donors and public awareness campaigns about preventive measures to bring down the escalating frequency of this infection as well as other transfusion transmissible infections.

Key words: Transfusion Transmitted Infections, HCV, HBV, Syphilis, HIV.

INTRODUCTION

With the invention of blood transfusion millions of lives are saved annually. Yet, Blood remains a common transferal source of infectious diseases (HCV, HBV, syphilis and HIV). In order to inhibit this transfer of blood

borne infections regular screening of the blood collected is conducted in the Blood transfusion centers^{1,2}.

These blood borne infections are further subdivided into three types; viral, bacterial and parasitic infections, respectively.

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Viral infections are predominant transmissible infections including HCV, HIV and HBV infections. A leading cause of Hepatitis and certain cancer lymphomas in Human population is the Hepatitis virus. It is a liver disease resulting in inflammation of the liver leading to cirrhosis, liver cancer, liver failure and ultimately death of an individual. Hepatitis B and Hepatitis C remains undiagnosed because majority of the individuals remain asymptomatic whereas certain patients suffering from HCV and HBV are often diagnosed with jaundice, anorexia and diarrhea^{3, 4}. HBV is carried by blood and other body fluids, whereas HCV is blood borne and inherently acquired infection.. The means of transfer or carriers of HCV are; contaminated blood products and contaminated hospital equipment⁵⁻⁸.

Blood transfusion is a widely known curative procedure because there is no substitution of blood. However, contaminated blood transfusions can not only transfer blood but also transfer some infectious diseases as well and can prove fatal instead of beneficial to life. The objective of this study was to analyze the frequency of HBsAg, HCV, Syphilis and HIV in various ABO and Rh (D) blood groups donors.

MATERIAL AND METHODS

Study design and patients

This cross sectional and descriptive study was conducted at the Haji Roshan Suleman Hospital and College Tandoadam during the period from January 2015 to March 2016, with consent taken from ethical committee. A total number of 2200 blood donor patients meeting the donor selecting criteria were included.

Blood samples

Two forms of blood samples were collected from each donor; one EDTA and one clotted sample, respectively. Ethylene diamine tetra acetic acid (EDTA) sample was used for the blood grouping procedure whereas clotted sample was utilized for screening of Anti-

HCV, HBsAg, syphilis and HIV. The screening was conducted serologically, by using immuno-chromatography (ICT method) for the qualitative detection of antigens for Hepatitis B and Hepatitis C virus antibodies, to find the actual carrier status of patients.

The blood was taken by a phlebotomist of the hospitals laboratory under the observation of a consultant pathologist. Firstly, the samples were set to coagulate at room temperature for 30 minutes, and later centrifuged at 3000 revolutions per minute (RPM) for 10 minutes. Secondly the serum samples were separated and were stored in a frozen state at -20°C for chemical and immunoassays. Enzyme Linked Immuno Assay (ELISA) was used to screen for antigens and antibodies of HBV and HCV, respectively. Note that this test only demonstrates the infection of the individual at certain age with HBV or HCV and not that the virus is still present in the patients system or not. HCV and HBV testing kits were used for screening and according to the manufacturers' literature, the relative sensitivity and specificity of HCV and HBV testing kits was 96.8% and 99% respectively.

Patients with positive screening test results were furthermore confirmed by testing through ELISA (Enzyme-Linked Immunosorbent Assay) method (4th generation ELISA). Later, it was further tested on Polymerase Chain Reaction (PCR) for qualitative or quantitative detection of DNA/RNA for the required viral gene.

Data obtained was furthermore statistically tested in SPSS version 16 for measuring the prevalence and percentage of variables.

RESULTS

In one year and 2 months, a total of 2200 patients' blood group was tested. There was a high percentage (39.54%) of infection in donors with "O" blood group. (**Figure 1**)

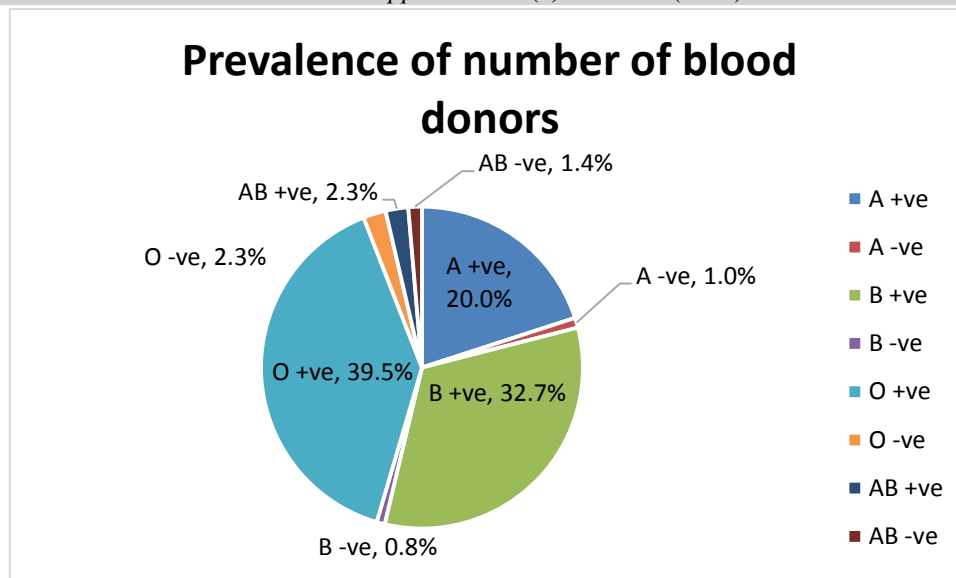


Fig. 1: Prevalence of number blood groups among blood donors

Among 2200 blood donors, 410 were O+ve. Of these, 08 were HBsAg+ve, 22 were anti HCV+ve, 09 were VDRL+ve for syphilis. Among the 22 A-ve donors 04 were anti-HCV+ve, 01 were HBsAg+ve. A total of 750 individuals had B+ve blood group. Among these, 12 were HBsAg+ve, 45 were anti-HCV +ve, 22 were VDRL+ve and 01 was +ve for HIV. A total of 18 donors were B-ve; with 02 HBsAg+ve, 06 Anti HCV+ve and 03 positive for VDRL (syphilis). The most prevalent blood type was O+ve (n=870). Among these, 10 were HBsAg +ve, 55 were Anti HCV +ve,

25 were VDRL+ve for syphilis, one was positive for HIV. O-ve blood group individuals were 50 in strength among whom 02 were HBsAg +ve, 06 were Anti HCV +ve, 10 were VDRL +ve for syphilis, 01 was +ve for HIV. AB+ve were 50 from which 04 were HBsAg +ve, 08 were anti-HCV +ve, 05 were VDRL +ve for syphilis. AB-ve were 30 from which 01 were HBsAg +ve, 03 were anti-HCV +ve tested positive. Breakup of HBsAg and anti-HCV positivity according to blood group types is shown in (Table 1).

Table 2: The prevalence of transfusion transmitted infections in the blood donors

Blood group	No. of Donors		Positive No. of Anti HCV		Positive No. of HBsAg		Positive No. of Syphilis		Positive No. of HIV
	N	%	N	%	N	%	N	%	Binary
A +ve	440	20.0%	22	14.8%	8	20.0%	9	12.2%	0
A -ve	22	1.0%	4	2.7%	1	2.5%	0	0.0%	0
B +ve	720	32.7%	45	30.2%	10	25.0%	22	29.7%	1
B -ve	18	0.8%	6	4.0%	2	5.0%	3	4.1%	0
O +ve	870	39.5%	55	36.9%	12	30.0%	25	33.8%	1
O -ve	50	2.3%	6	4.0%	2	5.0%	10	13.5%	1
AB +ve	50	2.3%	8	5.4%	4	10.0%	5	6.8%	0
AB -ve	30	1.4%	3	2.0%	1	2.5%	0	0.0%	0
Overall/Mean	2200	100.0%	149	100.0%	40	100.0%	74	100.0%	0.38

DISCUSSION

After the discovery of blood groups, their association with various infections and diseases was also further investigated. This aided in better treatment of the diseases. Blood remained the prime source of the transfusion. Currently, screening of the blood is used a major procedure during transfusions to enable patients with a safe blood supply. Seropositive tests are selected along with the physical examination of donors. This study focused of the seropositivity of the donors as well as its relationship with various ABO blood groups was detected.

This study revealed that the donors with “O” positive blood group were abundant having a frequency of 870(39.54%). Prime source for HBV and HCV transmission is via blood and mucous. These viruses are chief source of liver diseases with varying frequencies around the globe. Globally, there are approximately 4 million people infected with HBV and around 170 million people infected with HCV according to the World Health Organization (WHO). As compared to HCV infected mortality rate (366,000), the frequency of the mortality with HBV infection is quite high (563,000) ^[3, 9, 10]. The presence of Hepatitis varies country-wise. In Australia, Canada and Northern Europe, there is low frequency of Hepatitis C (<1%) as compared to that in USA and most Europe. In rural areas due to poor development, the percentage of infected people is notably high ^{4, 11, 12}.

There were a large number of “O” positive blood group donors (39.54%) in our case study. In comparison with Memon¹³ & Bhatti and Sheikh (1999), their study also had a high frequency of “O” positive donors^[14]. As there is high occurrence of “O” positive blood group in Pakistani population, hence it can be inferred that the occurrence of infection is directly proportional to the frequency of “O” positive donors. Thus, the more the frequency of a blood group, the more the chances of infection in it. A large number of HCV was found in “O” positive blood donors (39.54%). According to another study on the relationship between blood groups and HCV, conducted by

Mohammadali and his fellows, it was found that infection was more prevalent in “O” and “AB” blood groups. There is a low frequency of HBV as compared to HCV. This is because the transfusion of HCV is via blood products and infected syringes and in our region of study proper biosafety measures are not used, thus, enhancing the prevalence of HCV. However, it is not clear where the blood group has a direct relationship in acquiring infection. The prevalence of HIV in our study was 0.13% which is less as compared to the national prevalence for women (1.9%) and men (1.0%), this can be compared with overall occurrence of Ethiopian Somali Region (1.5% women and 1.1% male) ^[15]. The frequency of syphilis in our study reported is 3.36% which is almost equal to as compared with the study conducted by Memon¹³.

According to the data observed, there is a possibility that there could be a link between the patients’ blood group of an individual and HCV acquisition. On the contrary, there are certain contradictions to this. Person having a certain blood group were called for donation and not all. Hence, it doesn’t follow the pattern of distribution in a general population. Additionally, the study was conducted in one hospital only and thus its results could have been different as compared with other hospitals. Likewise, some donors must have repeated donating blood thus it can’t be taken as authentic because of no proof record. According to the data collected by our study, there are less RhD negative as compared with RhD positive donors. This is mainly because in nature there is low prevalence of RhD negative blood groups in human. In spite of all the limitations, the prevalence of HCV in RhD positive blood group is an important message that we could use in our further studies. Taking these limitations under consideration, further studies should be conducted to determine the association of blood groups with different diseases in our populations. Conclusively, standard health awareness programs should be launched to better educate people in the rural areas.

CONCLUSION

The main goal of the study was to determine the frequency of infections (HCV, HBV, Syphilis and HIV) in the blood donors. There is a great chance of infection in our population of donors. Hence, it was an utmost desire to screen each donor for such diseases. The medical practitioner henceforth, must use proper biosafety measures; masks, gloves, eye protection glasses, etc., and the used infected equipment should be wasted according to standard biosafety protocols.

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