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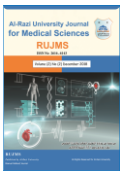

Seroprevalence of HIV, Hepatitis B and C Virus Infections Among Voluntary and Replacement Blood Donors Attending Al-Sabeen Hospital, Blood Bank, Sana'a City

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Abstract

***Background**: Blood donation saves millions of lives. The blood donor program is the life force of any transfusion service.* ***Aim**: To assess the seroprevalence of transfusion-transmissible infections (HIV, HBV, and HCV) in the voluntary and replacement donors.* ***Methods**: The study included 2475 blood donors both voluntary and replacement blood donors attended at the blood bank, at Al-Sabeen Hospital, Sana'a, Yemen. The blood samples of all the blood donors were. Few milliliters of each donor's blood were dispensed in a small clean test tube labelled with the name and sample number for mandatory screening of the Transfusion. All the blood donors' samples over the period of study were centrifuged to obtain the serum samples in a small clean test tube labeled with the name and sample number were analysed and tested by the immunoassay analyser assay (ELIZA) Cobas e-411 IInd generation for anti HIV IgG and IgM antibodies, detection of HBsAg and anti-HCV IgG and IgM.* ***Results**: The total Seroprevalence of HIV, HBsAg and HCV was 359 donors in the present study, out of them 263 (14.3%) were replacement blood donors and 96 (15.2%) were voluntary blood donors. The total seroprevalence of HIV among blood donors was 42 donors in the present study, out of them 1.8% among replacement blood donors and 1.7% among voluntary blood donors. The total seroprevalence of HBsAg among blood donors was 286 donors out of them 11.2% among replacement blood donors and 12.6% of HBsAg among voluntary blood donors. The total seroprevalence of HCV among blood donors was 31 donors out of them 1.3% were replacement donors and 1.1% were voluntary blood donors.* ***Conclusion**: It has been observed that replacement blood donation is safe as compared to voluntary as a high prevalence of HIV, HBsAg, and HCV are observed in replacement donors. It is recommended to following the international standers for the blood collection criteria and screening.*

Keywords: HIV; HBsAg and HCV; voluntary; replacement; blood donors

Introduction

Blood is the elixir of life[1, 2]. There is no substitute for blood. Scientists agreed that artificial blood cannot be manufactured by a man in the foreseeable future[3]. Blood donation saves millions of lives[4]. The blood donor programme is the life force of any transfusion service. It is essentially an operation that interacts with the community and relies totally on the support and goodwill of individual donors. A blood donation is when an individual voluntarily has

blood drawn, usually for a blood transfusion to another person. A transfusion transmitted infection (TTI) is any infection that is transmissible from person to person through parenteral administration of blood or blood products[5]. Transmission of infectious diseases through blood transfusion in developing countries is difficult given that the resources required are not always available, even when policies and strategies are in place. The strategies that have been used to reduce TTI includes improving donors selection, testing the donated blood for specific antibodies for infectious agents, reducing exposure to allergenic blood by use of autologous transfusion and changing transfusion guidelines to use blood more conservatively. These strategies have been extremely effective but transmission of infections still occurs primarily because of the inability of the test to detect the disease in the pre-sero conversion or "window" phase of their infection, immunologically variant viruses, non- sero converting chronic or immuno-silent carriers and laboratory testing errors. Transfusion-transmitted infection is still a major concern to patients, physicians and policymakers who wish to see a risk-free blood supply[6].

Aim of the study

To assess the seroprevalence of transfusion-transmissible infections (HIV, HBsAg, and HCV) in the voluntary and replacement donors at Al-Sabeen hospital, Blood Bank.

Subjects and Methods

The descriptive, cross-sectional study was done from March 2017 to April 2018, at the Blood Bank, Al-Sabeen Hospital, Sana'a, Yemen. 2458 blood donors were admitted to the study.

633 of the donors were voluntary and 1842 were replacement donors. Age less than 18 and more than 60, weight <45 kilograms, donated blood in last three months, underwent major surgery in last and minor surgeries in last three months, not completed one year after tuberculosis treatment، suffered from typhoid, mumps, measles, and chicken pox in last six months, received any vaccination in last one month، suffered from malaria during last three years, jaundice in last one year , uffering from any one of the diseases such as hypertension, diabetes mellitus, malignancy, asthma, epilepsy, AIDS, syphilis, bleeding disorders and disease of heart, liver or kidney were excluded from the study.

The data were collected though special form which included demographic data of blood donors (donors' types, age, and sex) and seroprevalence of HIV, HBsAg and HCV. The blood samples from all the blood donors were collected as follows: Few milliliters of each donor's blood were dispensed in a small clean test tube labeled with the name and sample number for mandatory screening of the Transfusion Transmitted Infections.

All the blood donors samples over the period of study were centrifuged to obtain the serum samples in a small clean test tube labeled with the name and sample number were analysed and tested by the immunoassay analyser assay (ELIZA) Cobas e-411 IInd generation for a). Anti HIV IgG and IgM antibodies, b). For detection of HBsAg, c). For Anti-HCV IgG and IgM. ELISA assays play important roles in clinical detection. Three necessary. ELISA reagents include A. Immunosorbent, B. Conjugate, C. Substrate. All the components of ELISA reagents for a complete ELISA assay or an ELISA kit are as follows: Immunosorbent: Solid supporter which has been coated with antigens and antibodies can be stored in low-temperature (2~8℃) and drying

condition for six months . In the ELISA test, solid carrier is adsorbent and container, so do not react. There are lots of materials, usually polystyrene, that can be used in ELISA. Polystyrene is strong in adsorbing protein. Antibody or protein antigen remains activity after adsorbed on it. In addition, it is widely used because of the cheap price. Polystyrene is plastic material, so it can be made all kinds of shapes.

***Collection of Blood Samples*:** A blood sample (5 mL) was taken from each study participant through venipuncture using a vacationer device. The sample was allowed to clot naturally to separate the serum for analysis and was stored upright in an ice box/refrigerator at a temperature of 2–8 °C (for up to 3 days) until it is sent to the laboratory for analysis. Donor's blood were dispensed in a small clean test tube labelled with the name and sample number for mandatory screening of the Transfusion Transmitted Infections.

Analysis of the Blood Samples:

All the blood donors samples over the period of study were centrifuged to obtain the serum samples in a small clean test tube labelled with the name and sample number were analyzed and tested by the immunoassay analyzer assay (ELIZA) cobas e-411 IInd generation for:

- Anti HIV IgG and IgM antibodies.
- For detection of HBsAg.
- For Anti-HCV IgG and IgM.

The data were analysed through SPSS, version 22. Descriptive statistics were used. Informed oral consent was obtained. Confidentiality and privacy concerning all information were ensured.

Results

Distribution of donors according to demographic data

Table 1 reveals the distribution of donors according to demographic data. The findings of the sstudy showed that 633 (25.6%) of the donors were voluntary and 1842 (74.4%) were replacement donors. Out of 2475 blood donors, 2458 (99.3%) were male and 17 (0.7%) were female donors. In the present study 866 of the donors (35%) belonged to 18-25 years' age group followed by 860 (34.7%) donors between 26 to 33 years, 538 (21.7%) of the donors between 34- 41 years, 181 (7.3%) donors between 42 - 49 years, and 30 (1.2%) above 50 years old. The maximum age group recorded was 18-25 years and minimum age group was above 50 years.

Table 1: Distribution of demographic data among donors

Demographic data	F	%
Donor type		
• Replacement	1842	74.4
• Voluntary	633	25.6
Sex		
• Male	2458	99.3
• Female	17	0.7
Age		
• 26-33	860	34.7
• 34-41	538	21.7
• 42-49	181	7.3
• ≥ 50	30	1.2

Total seroprevalence of HIV, HBsAg and HCV blood donors

Out of 2458 blood donors, the total seroprevalence of HIV, HBsAg and HCV was 359 of all the donors in the present study, out of them 263 (14.3%) were replacement blood donors and 96 (15.2%) were voluntary blood donors. Table 2**.**

Seroprevalence of HIV among replacement and voluntary blood donors

The total seroprevalence of HIV among blood donors was 42 donors in the present study, out of them 34 (1.8%) of seroprevalence of HIV among replacement blood donors and 8 (1.7%) among voluntary blood donors. Table 3.

Table 2: Total seroprevalence of HIV, HBsAg and HCV among blood donors

Donor Type	F	%
• Replacement	263	14.3
• Voluntary	96	15.2
Total	359	14.5

Table 3: Total seroprevalence of HIV among replacement and voluntary blood donors

Donor type	F	%
• Replacement	34	1.8
• Voluntary	8	1.3
Total	42	1.7

Seroprevalence of HBsAg and HCV among replacement and voluntary blood donors

The results of the study showed that the seroprevalence of HBsAg among replacement blood donors was 206 (11.2%) and 80 (12.6%) of HBsAg among voluntary blood donors. As regards to the seroprevalence of HCV there was 24 (1.3%) of replacement donors was infected with HCV and 7 (1.1%) were voluntary blood donors. Table 4.

Table 4: Seroprevalence of HBsAg and HCV among replacement and voluntary blood donors

Type of donor	HBsAg infection		HCV infection	
	F	%	F	%
• Replacement	206	11.1	24	1.3
• Voluntary	80	6	7	1.1
Total	**286**	**11**.6	**31**	**1.2**

Discussion

The present study was respective in nature and done over a period of one year from March 2016 till April 2017. The study included 2475 blood donors including both voluntary and replacement blood donors attending at the blood bank, at Al-Sabeen Hospital, Sana'a, Yemen. In the present study, the number of replacement donors 1842 (74.4 %%) was more than voluntary donors 633 (25.6%). Another study conducted on Saudi donors also showed that a number of

replacement donors (88%) was more than voluntary donors (12%) [7]. Another study conducted on Pakistan donors showed similar results, that is, a number of replacement donors (92.9%) was more than voluntary donors (7.1%)[8] The low percentage of voluntary donors in all the studies was because of lack of awareness and knowledge of blood donation. Some of the replacement donors are actually professional donors who are paid by the patients' relatives instead of a blood bank.

As regards to the age wise distribution of the donors, the maximum numbers of blood donations were from young donors, that is, in the age group of 18-25 years 866 (35%), followed by donors between 26-33 years followed by the age group 34-41 years, the age group 42-49 years was followed, and more than 50 years old as 860 (34.7%%), 538 (21.7%), and 181 (7.3%) & 30 (1.2%) respectively. The high percentage in the age group 18 to 29 years is because of good health, a higher level of education and voluntary attitude. In this study, the least donation was from the age group, more than 50 years (1.2 %), the reasons being old age, ill-health and lower level of education. Another study conducted on donors in north India showed a maximum number of donors in the same age group, that is, 16- 25 years (89.3%)[9] The age group with a maximum number of donors was higher in other studies done in north India, that is, 20 to 45 years (90%)[9] and Tanzania where it was 20 to 39 years (72.2%)[11].

Out of 2475 blood donors, 359 (14.5%) were tested positive for transfusion-transmissible infections including HIV, hepatitis B & hepatitis C. In the present study, the overall percentage of transfusion-transmissible infections, that is, 14.5% was comparatively low as compared to other study conducted on blood donors in Tanzania (15.9%). In other Indian studies, the prevalence was 4.38%[12] and 0.44%[13] respectively. Higher percentages of infections in our study may be because of poor awareness of the above infections. In the present study, the prevalence of HIV was 1.7% HBsAg was 11.2%, HCV was 1.2% In the present study, the prevalence of Hepatitis B was highest among all the transfusion-transmissible infections (11.2%).

Prevalence of Hepatitis B was also highest among all the transfusion-transmissible infections in other studies conducted on Indian donors, 3.44%[12] and 2.26%[14] respectively. Prevalence of HBsAg was also high (3.4%) in another study done on Georgian blood donors [15].

The prevalence of hepatitis CV was low in this study that is 1.2% It is comparable with other studies done on Indian blood donors, that is 0.285%[16] 0.19%[17] and 0.23%[13] respectively. The study done on Georgian blood donors showed an even higher prevalence that is 6.9%[15]. Prevalence of HIV was also low in the present study that is 0.4% as compared to other studies done on Indian blood donors, that are 0.22%[12], 0.62%[14] and 0.45%[16] respectively. It was highest in the study conducted on Georgian blood donors that are 2.3%[15].

Conclusion

Screening of blood samples for various TTI plays an important role in preventing hazards of various infections. It has been observed that replacement blood donation is safe as compared to voluntary as a high prevalence of HIV, HBsAg, and HCV are observed in replacement donors.

Recommendation

We recommended that, with the implementation of strict donor criteria and by use of sensitive laboratory screening tests it is possible to reduce the incidence of TTI in Yemen.

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