Bangladesh J Med Microbiol 2018; 12 (1): 20-23
Bangladesh Society of Medical Microbiologists

Original Article

Prevalence of Transfusion Transmissible Infections In Blood Donors

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Abstract

Background: Blood transfusion is a significant life-saving intervention in the present era of patient management system. As the blood and blood products are a potential source of infection and the necessity of transfusion is increasing day by day, transfusion transmissible infections (TTIs) have become a major threat to ensure safe transfusion.

Objectives: The aim of this study was to assess the prevalence of some common and serious TTIs among blood donors as well as evaluate the pattern of seroprevalence in accordance with few other characteristics.

Methods: It was a cross sectional study which was conducted at the Department of Transfusion Medicine of Armed Forces Institute of Pathology (AFIP), Dhaka Cantonment from January 2015 to June 2017. Donors were selected very carefully according to criteria of National Guidelines of Bangladesh Government and by using a detailed questionnaire. They were screened properly for HBV, HCV, HIV, Malaria and Syphilis. All positive cases were confirmed again by using more sensitive and specific tests. We analyzed the data as percentage and comparison.

Results: A total of 32,625 donors were screened. Among them 28,775 were male and 3850 female. Total 135 were found reactive in the screening assays and among them no one was reactive in more than one assays. The prevalence of HBV and HCV in our study population was 0.38% and 0.03% respectively. It was found that percentage of HBV and HCV seropositivity was more among civilian donors. There was no positive case of Malaria, Syphilis and HIV. The number of seropositive cases were found to be decreased gradually in consecutive years. The study also revealed that both HBsAg and Anti-HCV positive cases were more prevalent amongyoung donors.

Conclusion: Our study revealed that a significant number of donors were positive for TTIs who might be a potential source of transfusion related infections. It justifies the necessity of stringent screening of blood donors to prevent the transfusion transmissible infections.

Key words: Transfusion Transmissible Infection, HBV, HCV, Blood Donor, Bangladesh

Introduction

Blood transfusion is a life-saving intervention that has an essential role in patient management within health care systems. The establishment of systems to ensure screening of donated blood is a core component of every national blood program.[1] Safe blood transfusion is saving millions of lives worldwide. Use of unsafe blood keeps patients at risk of acquiring many transfusion transmissible diseases, which in turn imposes a serious challenge in the arena of transfusion medicine.

According to the World health organization (WHO), safe blood is a universal right. A national program is a crucial requirement in the process of procuring safe blood which must include proper donor selection, recruitment, retention and education. This will minimize donations fromdonors who might transmit diseases to the recipients. At the same time it is important to evaluate the burden and risk factors for TTIs in the general population. Minimizing the risk for transfusion transmitted infections (TTIs) relies on selection of safe donors, including microbiological screening and avoidance of unnecessary transfusions.

It is very essential to determine the appropriate indication of transfusion in order to minimizing the risk of infection. As we have a very limited resources of blood and blood products, and a small risk of infection will always remain, its very important to avoid any unnecessary transfusion to limit the prevalence of TTIs.

Every year more than 90 million units of blood are collected worldwide. Each transfusion carries a risk of transmitting blood-borne pathogens. To improve blood transfusion safety, WHO recommends an integrated strategy including establishment of well-organized blood transfusion services, prioritization of blood donation from voluntary non-remunerated donors,

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screening of donated blood for at least the five major transfusion transmissible infections (TTIs) with quality-assured assays, rational use of blood and implementation of effective quality control systems. Selection of blood donors with low TTI risk followed by effective laboratory screening is the critical part of the process, since it has reduced the risk oftransmission to very low levels in the past 20 years.[1]

In Bangladesh, more than 600 thousands units of blood arecollected each year but the majority of these donors are replacement donors, specially family members or close friends of the patient with the intention to help in emergency situations.[2] Transfusion of safe blood and blood products is a crucial need. To ensure this, its mandatory to formulate and upgrade the national transfusion policies, establish well-organized infrastructure along with properly trained and well-educated staff.

The prevalence of Hepatitis B virus (HBV) and Hepatitis C virus (HCV) in Bangladesh is high and has been shown by previous local studies.[3,4,5] The present study provides data on the overall seroprevalence of TTIs in blood donors and evaluates the demographic characteristics of seropositive donors.

Methods

This was a cross sectional study of blood donors attending at AFIP, Dhaka Cantonment from January 2015 to June 2017. Informed consent was taken from all donors. Blood donors were given a unique identification number and their name, age, sex, date of birth, profession, marital status and contact numbers were recorded. Before the donation, each potential donor was required to fill a detailed health history questionnaire which included data regarding their general health, lifestyle, current or past febrile illness, weight loss, chronic disease, unusual or excessive bleeding, drug history, tattoopiercing, dental treatment, previous blood donation or transfusion, history of travel or immigration, sexual history and risk behaviors followed by short private interviews. Vitals and weight were also recorded. Baseline complete blood count (CBC) was done for excluding any donors with anemia (<12.5 g/dl), infection or thrombocytopenia. Moreover, inspection was made for any marks of drug abuse or any skin lesion at the venipuncture site. Proper sterilization and other precautions were taken during blood collection and blood units were stored using appropriate methods. Blood donors were then screened for HBV, HCV, HIV, Syphilis and Malaria.

Screening tests

Screening for HBsAg, Anti HCV, HIV Ag/Ab (HIV-1/HIV-2) and malaria was done byimmunochromatographic tests. RPR test was done for screening for Syphilis. All reactive results were repeated on the same sample using ELISA method for HBsAg and Anti-HCV.

Blood donors selection criteria

Donors were selected according to the criteria of ideal donors present in 'Standing Operating Procedures For Blood Transfusion' formulated by Bangladesh Health Ministry. Physically fit, 18–57 year old who donated blood at AFIP were included.

Only voluntary and non-remunerated blood donors are accepted if fulfill these criteria:

- Age : 18 to 60 years.
- Weight : not less than 45 kgs.
- Temperature : below 99.5°F.
- Pulse : 60-100 bpm.
- Blood pressure : Systolic 100-180 mmHg, Diastolic 60-100 mmHg.
- Haemoglobin level : Male $\geq$ 12.5 g/dl, Female $\geq$ 11.5 g/dl.
- No puncture site, scar mark on arms or forearms indicative of professional donors or intravenous drug users.
- Should be free from respiratory diseases, skin diseases specially at the site of phlebotomy and TTIs.

Blood donors exclusion criteria

Potential donors were excluded if they were: below18-year old, weight<50 kg, anaemic, had a history of jaundice, malaria, asthma, engaged in high risk behavior(i.e. unsafe sexual exposure, drug abuse), had past history of HBV, HCV, HIV I & II, syphilis or were apparentlyunhealthy or malnourished.

Blood donors with the following medical conditions were excluded from this study:

- Cancer
- Cardiac disease
- Diabetes
- Hepatitis B and C
- Chronic nephritis
- Abnormal bleeding tendency
- Tuberculosis
- Asthma
- Epilepsy
- Endocrine Disorders
- Schizophrenia

Results

A total of 32,625 blood donors were screened, who reported at Blood Transfusion Department of AFIP including both military and civilian donors Table-I. Among them 28,775 were male and 3850 female, with a mean age of 28.6 ± 2 years (range 18 to 57 years), of which 96% were replacement blood donors. Of all donations, 135 were reactive in the screening assays and no one was reactive in more than one assays. Age distribution of our study population has been demonstrated in Table-II. Most of the donors were within young age group (59.87%). Characteristics of infections were individually evaluated, as shown in Table-III. The prevalence of HBV and HCV in our study population was 0.38% and 0.03% respectively. Distribution of seropositivity

has been shown in Table-IV. It was found that frequency of HBV and HCV seropositivity was high among civilian donors. There were no positive cases of malaria, syphilis and HIV. The number of seropositive cases were found to be decreased gradually in consecutive years. Age-wise distribution of all seropositive cases has been presented in Table-V, which reveals that both HBsAg and Anti-HCV cases were more prevalent among young donors.

Table-I: Type of donors

Donors	Replacement donors	Voluntary donors	Total
Armed Forces Personnel	10318 (96.04%)	425 (3.96%)	10743
Civilians	21101 (96.4%)	781 (3.6%)	21882

Table-II: Age distribution of donors (n=32625)

Age in years	Armed Forces Personnel	Civilians	Total
18-27	4942 (15.5%)	14589 (44.72%)	19531(59.87%)
28-37	4243 (13%)	4376 (13.41%)	8619 (26.42%)
38-47	1343 (4.12%)	2188 (6.71%)	3531 (10.82%)
48-57	215 (0.66%)	729 (2.23%)	944 (2.89%)
Total	10743 (32.93%)	21882 (67.07%)	32625 (100%)

Table-III: Distribution of screening tests positivity

Screening tests	Armed Forces Personnel	Civilians	Total
HBsAg	26 (0.24%)	98 (0.45%)	124 (0.38%)
Anti-HCV	04 (0.04%)	07 (0.04%)	11 (0.03%)
Anti-HIV	-	-	-
Malaria	-	-	-
Syphilis	-	-	-

Table-IV: Year wise prevalence of seropositivity

Year	Donors	HBsAg	Anti-HCV	Total
2015	13440	62 (0.46%)	04 (0.029%)	66 (0.49%)
2016	12660	43 (0.34%)	05 (0.039%)	48 (0.38%)
2017	6525	19(0.29%)	02(0.030%)	21 (0.32%)

Table-V: Seropositivity in different age groups

Age in years	Positive cases	HBsAg	Anti-HCV
18-27	69	62 (45.93%)	07 (5.19%)
28-37	40	38 (28.15%)	02 (1.48%)
38-47	17	15 (11.11%)	02 (1.48%)
48-57	09	09 (6.66%)	00 (0%)
Total	135	124 (91.85%)	11 (8.15%)

Discussion

Ensuring safe blood transfusion is a significant challenge for healthcare system. Through careful screening of blood we can get an idea about the prevalence of TTIs in blood donors and it helps us to ensure a safe transfusion of blood and blood products. The exact evaluation of the risks of TTI sis imperative to monitor the safety of bloodsupply and ensuring the effectiveness of the presentlyemployed screening procedures.

In our study most of the donors were male and within young age group. Some other local and foreign studies also found the same observations.[3,4,5,6,7] Selection of this population group may underestimate the actual prevalence because around 50% of our population is female.

In our study, most of the donors were replacement blood donors (96%) which is consistent with other local and foreign studies.[3,4,5,6,7,8] The maximum number of donors were in the 18-27 year age group. A similar trend was seen in earlier reports.[3,4,5,6] Furthermore, efforts should also be made to encourage and improve the number of female donors, as our study shows limited number of female donors.

A local study that was done previously had also observed a rising seroprevalence of HBV infection.[5] This observation is not consistent with the decreasing trend of seropositivity in our study. Seroprevalence of HCV was higher in some previous local studies, whereas in our study the rate was relatively low though the size of study population is much bigger.[3,4]

There was no positive case of Syphilis, Malaria and HIV which was consistent with other local studies. Studies done in Pakistan, Israel and Iran found a rising trend of syphilis frequency in their population.[6]

In another local study, 5.5% VDRL positive cases were found, most of them were young donors. This finding is also not consistent with our study finding.[9]

TTIs, specially HBV and HCV infections are found to be more common in transfusion dependent individuals, such as thalasaemic patients.[10]

To ensure the safe blood transfusion it is very important to select donor by assessing the risk behaviors either by providing a detailed questionnaire or arranging a short interview. Donor education and accurate and truthful disclosure are important determinants for the proper donor selection. However, in our study, positive donors for any infection were informed andrequested to visit general physicians.

Conclusion

Bangladesh is a low-resource country with many limitations in the system of providing healthcare. A significant proportion of commercially donated blood remains unsafe as it is neither screened for TTIs or not maintained with the standard quality control. The accurate figures of TTIs in our population are still unknown. Our study revealed that a substantial percentage of the blood donors harbored transfusion transmitted infections. Prevention of TTIs should be emphasized as the main goal to ensure safe transfusion. There is a need for stringent selection of blood donors with the emphasis on getting voluntary donations

and comprehensive screening of donor's blood for HCV, HBV, HIV, syphilisand malaria using standard methods to safeguard the blood recipient. Strict compliance to standard operating procedures for blood transfusion formulated by Ministry of Health of Bangladesh Government should be monitored regularly for prevention of TTIs.

References

1. Screening Donated Blood for Transfusion Transmissible Infections, Recommendations, WHO 2010;1.
2. Standard Operating Procedures for Blood Transfusion, Director General of Health Services, Bangladesh 2013;7.
3. Mondol EA, Giti S, Rahman M, et al. Screening tests of blood donors for safe blood transfusion. Bangladesh Armed Forces Medical Journal 2000; XXVI(1):19-22.
4. Quader MA, Hossain HT, Chowdhury FR, Begum F, Islam KA, Islam QT. Trends of TTIs in a private medical college hospital, Dhaka, Bangladesh. Bangladesh Journal of Transfusion Medicine 2016;3(1):3-9.
5. Yousuf A, Rahman M, Mahmud Z, Rahman M, Islam A, Rahman M. Seroprevalence of TTIS among the voluntary blood donors. Bangladesh Armed Forces Medical Journal 2004; XXXIV(2):67-70.
6. Arshad A, Borhany M, Anwar N, et al. Prevalence of transfusion transmissible infections in blood donors of Pakistan. BMC Hematolog 2016; 16:27. DOI 10.1186/s 12878-016-0068-2.
7. Monjur I, Hashmi NO, Daud SE, Fatima HI, Rasheed ZA, Syed SA. Seroprevalence of TTIs in blood donors. Biomedica 2009;25(10):154-8.
8. Zaheer H, Saeed U, Waheed Y, Karimi Y, Waheed U. Prevalence and trends of HBV, HCV and HIV among blood donors in Islalamad, Pakistan 2005-2013.Journal of Blood Disorders and Transfusion 2014;5(217):2.
9. Bhuiyan MA, Kabir F, Uddin J, Mondol EA, Yousuf A. Prevalence of syphilis seroreactivity among non-commercial blood donors in BSMMU and Dhaka medical college hospital. Bangladesh Armed Forces Medical Journal 2003; XXXI(1):19-22.
10. Mollah AH, Nahar N, Siddique MA, Anwar KS, Hassan T and Azam MG. Common Transfusion-transmitted Infectious Agents among Thalassaemic Children in Bangladesh. Journal of Health Population and Nutrition 2003 Mar; 21(1):67-71.