

The Evaluation of Blood Donor Deferral Causes: A Tertiary Care Centre-based Study

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Abstract

Blood safety is a major issue all over the world in transfusion medicine. For this, donor selection is necessary in addition to the screenings of blood bags for infectious diseases. Deferrals lead to loss of precious blood/components available for transfusion. For preventing this, we should be having knowledge of causes of deferral and their frequency. In this study, causes of donor deferral were evaluated retrospectively from January 2007 to December 2011 in the blood bank of Jawaharlal Nehru Medical College (JNMC), Aligarh Muslim University (AMU), ALIGARH (India). Analysis of the deferrals showed that temporary deferral was more common than permanent deferral. Most common cause in permanent deferral was HBsAg positivity. Causes among temporary deferral were anemia (Hb<12.5 gm%), malaria in last 3 months, jaundice, alcohol intake in last 3days, weight <45 kg, age <18 yrs, patients on antibiotic, previous donation in last 3 month, typhoid in last 1 year, dog bite etc.

Keywords: Blood donor; Deferral; Blood safety

Introduction

In current medical and surgical practice, a blood transfusion can be a vital, life-saving procedure. But it requires an adequate supply of safe blood from a healthy donor. For this, donor selection is necessary in addition to the screenings of blood bags for infectious diseases. However deferrals lead to loss of precious blood/components available for transfusion. For preventing this we should be having knowledge of causes of deferral and their frequency. The National AIDS Control Organization's (NACO) statistics show that the annual rate of blood donation in India is about 7.4 million units, against the requirement of 10 million units [1]. According to World Health Organization (WHO) figures, over 81 million units of blood are collected annually worldwide but only 39% are collected in developing countries which have 82% of the world's population [2]. A blood bank plays an important role in ensuring the supply of safe blood as and when required. While it is important to ensure that there is an adequate supply of blood, it is also essential that the blood collection process does not harm either the donor or the recipient. This is achieved by having donor deferral criteria [3] and stringent screening of collected blood for possible Transfusion Transmissible Infections (TTIs) [4]. Deferrals are divided into permanent and temporary. Few studies done in India in the past have provided different common reasons for deferral of whole blood donors, highlighting differing demographic profile in different parts of the country [5,6]. The aim of our study is to know the profile of the blood donors and causes of the permanent and temporary deferral and their frequency. This retrospective study was conducted in the blood bank of JNMC, AMU, Aligarh (India) from January 2007 to December 2011.

Materials and Methods

This retrospective study included all the donors reporting for blood donation in the blood bank of JNMC, AMU, Aligarh (India) from 1st January 2007 to 31st December 2011. The donors were evaluated on the basis of clinical history, physical examination, Hb estimation, blood pressure, and temperature. NACO guidelines were used for deferral of blood donors. Data was collected from the records maintained by the blood bank. Hemoglobin was measured by Haemometer Sahli

plano paralal (Toptech biomedical, Thane, India). Blood samples of these donors were screened for HBsAg by Microscreen HBsAg ELISA Test kit (NACO supplies, Third National HIV/AIDS Control Project, Span diagnostics limited, India) and anti HCV by SD HCV ELISA 3.0 the 3rd Generation Anti-HCV ELISA test (NACO supplies, Third National HIV/AIDS Control Project, SD Bio standard diagnostics private limited, India), anti-HIV by SD HIV1/2 ELISA 3.0 the 3rd generation Anti HIV1/2 ELISA test (NACO supplies, Third National HIV/AIDS Control Project, SD Bio Standard Diagnostics Private limited, India), Malaria by SD Malaria Ag Pf/Pan (SD Bio Standard Diagnostics Private Limited, Gurgaon, Haryana, India) and syphilis by CARBOGEN, RPR card test (Tulip diagnostics private limited, India) from 2007 to 2010 and in 2011 by SD BIOLINE syphilis (Bio standard diagnostics private limited, Gurgaon, Haryana, India) a solid phase immunochromatographic assay for the qualitative detection of antibodies of all isotypes (IgG, IgM, IgA) against Treponema pallidum antigen.

Result

Out of 53,950 people who had come for blood donation, 51,266 were males (95%) and 2,684 were females (5%) (Table 1). 6,690 donors (12.4%) deferred out of which 4,262 (63.7%) were temporary and 2,428 (36.3%) were permanent (Table 2). Overall males (6,142; 11.38%) were deferred more than the females (548; 1.02%) but females (548; 20.41%) were found to have higher deferral rate among the female donors than males (6,142; 11.98%) (Table 3). Analysis of the deferrals showed that the temporary deferral was more common than permanent deferral.

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	No. of registrations	No. of deferrals	% deferrals of total registration
Male	51266	6142	11.38%
Female	2684	548	1.02%
Total	53950	6690	12.40%

Table 1: Demographic profile of the donors.

	No. of deferrals	% of total deferrals	% deferrals of total registration
Temporary	4262	63.7%	7.90%
Permanent	2428	36.3%	4.50%
Total no. of deferrals	6690 (12.4% of total registration)	100%	12.40%

Table 2: Frequency of permanent and temporary deferrals.

	No. of donations	No. of deferrals	% of deferrals among male/female donors
Male	51266	6142	11.98%
Female	2684	548	20.41%

Table 3: Frequency of deferrals among male and female donors.

Most common cause among temporary deferral was anemia (Hb <12.5%), followed by malaria in last 3 months (Table 4). Most common cause in permanent deferral was HBsAg positivity followed by age >60 yrs (Table 5).

Discussion

Donor selection has vital importance in blood banking and transfusion medicine. The preamble of our study was to devise a protocol which could prevent the loss of whole blood/component and be safe for the donors and recipients.

Most of the donors were males (95%); women accounted for only 5% of the donors. Present study showed that female donors (20.41%) were deferred more frequently than male donors (11.98%) which might be due to wide prevalence of anemia in female donors.

Donor deferral (12.40%) in the study was very much similar to various American, European and Asian studies. Zou et al. [6] reported a deferral rate of 12.8% in their 6 years study of American Red Cross blood service and Custer et al. [7] showed a deferral rate of 13.6%. In a European study conducted by Lawson-Ayayi and Salmi [8], 10.8% of donors were deferred. Arslan [9] reported a donor deferral rate of 14.6% in Turkish donors. Lim et al. [10] reported a deferral rate of 14.4% in Singapore (Asia) and Bahadur et al. [4] reported 9% in Delhi (India). Rabeya et al. [11] found a very low deferral rate in their study (5.6%) which could be due to different donor selection criteria.

The most common cause among temporary deferral was anemia (17.95%) as compared to Halperin et al. [12] which showed low hemoglobin as the most common cause in 46% of the temporary deferral. The study done by Arslan [9] in Turkish donors showed low hemoglobin as the most common cause of deferral in 20.7% of overall deferral. The findings in our study were very much similar to these studies. Malaria accounted for second most common cause of temporary deferral which might be due to the fact that Aligarh city and its surroundings from where most of the donors received were in endemic zone. This finding is not reported in any of the previous studies, due to the fact that most of the studies were conducted in non endemic zones of malaria. The incidence of malaria can be decreased if the breeding of mosquito is controlled by organizing educational programs regarding the control of mosquito breeding as well as by upgrading the malaria control programs in these endemic zones by the government. Anemia can be cured if proper treatment of these donors

Causes	Number	% Temporary deferrals	% Total deferrals
Anemia, Hb <12.5%	765	17.95%	11.43%
Malaria in last 3 month	505	11.85%	7.54%
Weight <45 kg	454	10.65%	6.79%
Jaundice last 1 year	390	9.15%	5.83%
Alcohol in last 72 hrs	380	8.92%	5.68%
On antibiotic/ aspirin for last 3 days	279	6.55%	4.17%
Upper respiratory tract infection	251	5.90%	3.75%
Age < 18 years	200	4.70%	3.00%
Previous donation in last 3 months	171	4.01%	2.56%
Syphilis for 1 month	164	3.85%	2.45%
Hypertension	140	3.29%	2.09%
Typhoid in last 1 year	128	3.00%	1.91%
Dental extraction/surgery in last 6 month	120	2.80%	1.80%
Diabetes on insulin	110	2.58%	1.64%
pregnant/lactating female	90	2.10%	1.35%
H/O Tuberculosis with no ATT intake/ incomplete treatment.	51	1.20%	0.76%
Dog or cat bite/rabies vaccination in last 1 year	43	1.00%	0.64%
Poor vein	9	0.20%	0.13%
Stroke	4	0.10%	0.06%
Tattoo /ear piercing in last 1 year	4	0.10%	0.06%
Bhang addiction	4	0.10%	0.06%
	4262	100%	63.70%

Table 4: Causes of temporary deferrals with their relative proportions.

Causes	Number	% Permanent deferrals	% Total deferrals
HBV positive	1571	64.70%	23.48%
Age >60 years	276	11.37%	4.13%
HCV positive	169	6.96%	2.53%
Chronic obstructive lung disease	110	4.53%	1.64%
HIV-1,2 positive	96	3.95%	1.43%
Heart disease	90	3.71%	1.35%
Asthma	70	2.88%	1.05%
Epilepsy	30	1.24%	0.45%
leukemia/lymphoma/multiple myeloma	10	0.41%	0.15%
patient who received chemotherapy	6	0.25%	0.09%
	2428	100%	36.3%

Table 5: Causes of permanent deferrals with their relative proportions.

is undertaken with follow up. The other causes of temporary deferral included low body weight, upper respiratory infection, syphilis, jaundice and others which are easily curable. A proper track for follow up of temporarily deferred donors regarding their management should be made in the blood bank so that these donors can be recruited back in donors' pool.

In our study 36.3% of donors were deferred for permanent reasons. Our findings (36.3%) were much higher than Custer et al. [7] who reported a permanent deferral rate of 10.6% and Arslan [9] who reported a rate of 10%. This high frequency was due to the inclusion of transfusion transmissible infection in our study especially Hepatitis B infection (HBV) which was not studied thoroughly in the above mentioned publications. Present study showed HBsAg positive as the most common cause of permanent deferral as compared to Bahadur

et al. [4] who showed Hypertension as the most common cause. The method used for Hepatitis B testing as mentioned in material and method detect HBsAg positivity, indicates that either the donor had a subclinical disease/acute or chronic viral infection/false positive cases. So for the benefit of the patients these donors were deferred permanently. This is very important finding which should be of great concern as Hepatitis B infection is increasing more among the local population and knowledge of routes of transmission of TTI can decrease the seroprevalence of Hepatitis B infection, further this infection can be controlled by vaccination which should be encouraged. Public awareness programs relating to routes of transmission for these infections should be encouraged.

Conclusion

The present study showed that although donor deferral rates were very much similar in different populations, the reasons for deferral differ, reflecting difference in socioeconomic status and environment. However, some studies showed different deferral rate which could be due to different donor selection criteria. Analysis of deferral patterns may help medical personnel and doctors to be more focused in donor screening especially of those who are having higher frequency e.g., Anemia, Malaria and Hepatitis B infection. Temporary deferred donors require proper follow up and management so as not to lead to a diminished supply of future donors. Government establishment need proper attention to control malaria. For this prevention of mosquito from breeding is needed. Hepatitis B infection can be prevented by educating people regarding the importance of Hepatitis B vaccination and routes of transmission. Finally, the approach to improve safety of blood and blood products and to decrease loss of precious blood/component must include four steps: (1) detail history based on NACO/WHO guidelines, (2) physical examination, (3) laboratory tests including ELISA for anti HIV, anti HCV and HBsAg and other test for malaria and syphilis and (4) public awareness programmes.

So to conclude, it is important to determine the rate and causes

of blood donor deferral for the safety of blood/component transfusion and also to guide the recruitment efforts to prevent loss of precious blood/components at local, national and international levels.

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