

An Evaluation of Donor Deferrals in A Blood Bank of a Tertiary Care Hospital: A 3½-Year Study

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ABSTRACT

Background: Blood transfusion is a crucial life-saving procedure that has become an integral component of modern medicine. It is therefore, imperative that the supply chain of blood to blood banks be optimized so as to meet the minimum demand of patients. This goal can be readily achieved by forming a safe reduction policy in the deferral rate of potential donors. The aim of this study was to explore the various causes for donor deferrals and to assess their frequency over the past 3½ years in a blood bank of a tertiary care hospital in Bangalore city.

Methods: The data for the current retrospective study was collected over a period of 3 years 6 months from October 2015 to March 2019. Donors were asked to fill in a questionnaire followed by physical examination and blood screening tests.

Results: Out of 2942 potential blood donors, only 2781 were accepted while the remaining 161 were deferred, the deferral rate being 5.5%. The age group of the deferred donors ranged from 18 to 49 years old, the highest being between 21-30 years old. There were a total of 119 temporary deferrals and 42 permanent deferrals. The most common cause for temporary and permanent deferral was found to be hypertension and sero-positivity for HBV antigen, respectively.

Conclusion: In descending order of frequency, the most common causes for permanent deferrals were transfusion transmitted infection, hepatitis-B, Hepatitis-C and HIV and that for temporary deferrals were hypertension, alcohol consumption and anaemia. By identification of the causes for temporary deferrals, appropriate measures can be put in place to motivate these potential donors to return for blood donation at a later date after the underlying cause has been rectified.

Keywords: Blood Donation, Deferred Donors, Temporary and Permanent Causes Of Deferral

Introduction

Blood transfusion is a crucial procedure in the current medical practice owing to its life saving ability in various instances such as road accidents, various surgical procedures, post-partum haemorrhage etc. Therefore, adequate supply of safe blood is essential to meet this surpassing need for blood which can in a way be achieved by reducing deferral rates in the blood banks. Donor deferrals is a major problem in the blood banks and can be divided in two categories. Deferrals due to temporary causes and the other due to permanent causes. Temporary causes of deferrals are varied and are correctible in majority of cases while permanent causes are mainly due to transfusion transmitted infections (TTIs). Blood from a healthy donor will ensure safe blood transfusion. To achieve this goal, we should not only screen the blood for TTIs but also screen the donors and defer those donors who do not meet the required criteria. Even though donor deferrals lead to decreased availability of invaluable blood and its components, it is necessary to do so, to make process of transfusion free of unsafe blood. Having said that, it is also important to note that unnecessary donor deferrals should be avoided. Hence it is mandatory for us to have the

knowledge of various causes for which a donor should be deferred and formulate donor deferral criteria. The aim of this study therefore was to delve into the different causes of donor deferrals and also to find out their frequency for the past three and half years in a blood bank of a tertiary care hospital in Bangalore.

Material and methods

This retrospective study was undertaken in an established blood bank of a medical college and research centre located in Bangalore. The data was collected over a period of 3 years 6 months from October 2015 to March 2019, from the registries of the blood bank. Donors were screened on the basis of clinical history, physical examination, hemoglobin levels, temperature and blood pressure. Donors were asked to fill the eligibility questionnaire mandated by NACO. Hemoglobin was estimated using Drabkins method. The blood samples of these donors were screened for transfusion transmitted infections. Screening for anti-HIV 1 and 2, anti-HbsAg and anti-HCV was done using commercially available third-generation ELISA test kits, while syphilis and malaria were screened by using card test (both for IgM and IgG antibodies), and rapid

malaria test, respectively. Trained technicians supervised by blood bank officer performed these tests in the blood bank's well-equipped transfusion transmitted infections wing. In accordance to the manufacturer guidelines, the standard protocol for every test kit was followed. The controls utilized were the already known positive and negative samples given by the manufacturer. The samples which were found reactive or positive were retested before they were labelled as seropositive. The disposal protocol for these seropositive bloods was by autoclaving followed by incineration. [25] The available data was computed using Microsoft Excel software.

Results

Out of 2942 people who came to donate blood, 2781 donors were accepted and 161 donors were deferred, deferral rate being 5.5%. Among 161 deferred donors, 140 were males and 21 were females with male to female ratio of 6.7:1. [See Table 1]

Deferred donors age group ranged from 18 to 49 years with a mean age of 29.5 years. They were divided according to their age groups [See Chart 1]. Deferral rate was highest among 21-30 years (64, 39.8%), followed by 31-40 years (59, 36.6%), 18-20 years (24, 14.9%) and 41-50 years (14, 8.7%)

119 donors were deferred due to temporary causes while 42 donors were deferred permanently. Deferral rate analysis showed that the temporary deferrals were more common than the permanent ones. The most common cause of temporary deferral was hypertension (24, 20.2%) followed by alcohol consumption (21, 17.6%) and low haemoglobin (18, 15.1%) while the most common cause of permanent deferral was seropositivity for HBV antigen (22, followed by other infections like HIV and HCV (6, 14.3% each). [See Table 2 & Chart 2]

Deferral due to hypertension was seen in 20.2% of donors. All were male donors and were predominantly in 31-

40 years of age group. The second most common cause of temporary deferral was due to alcohol consumption (17.6%). All of them were again male donors and were seen more commonly in 21-30 years of age group. The third important cause of deferral under temporary causes category, were due to low haemoglobin (15.1%). In contrast to the above mentioned two causes, here majority of them were women (72.2%) and the most common age group was 18-20 years. Another cause of deferral seen in our study was due to allergy (11, 9.3%). Majority of them were male donors in 31-40 years of age group. Another significant cause was consumption of medications (10, 8.4%). All of them were male donors predominantly in the age group of 31-40 years. Next important cause observed in our study was deferral due to tattoos (8, 6.7%). Majority of them were males and were seen in 18-20 years of age group. Other temporary causes in decreasing order of frequency were hypotension (6, 5.1%), dental extraction and typhoid (3, 2.5% each), dog bite and ear piercing (2, 1.7% each), upper respiratory tract infections, fever, previous donation within 3 months, underweight, poor vein, recent vaccination, skin disease (1, 0.8% each). Causes listed in 'others' category were tremors in hands, not slept previous night, and uneasiness, they amounted to 4 cases (3.5%) in total.

Among the permanent causes of deferral, Hepatitis B was the leading cause accounting for 22 cases (52.4%). All of them were male donors predominantly in the age group of 21-30 years. Hepatitis C and HIV had the same frequency with 6 cases each (14.3%) and were seen in male donors. HCV cases had equal distribution in 3rd and 4th decade whereas HIV cases were predominantly seen in 4th decade. Malarial infection was also observed in 4 male donors (9.5%) with majority of them seen in 21-30 years of age group. 2 male donors aged 30 years and 35 years were deferred due to diabetes (4.7%). Finally, a 30-year old male donor was deferred due to asthma (2.4%) and a 33-year old male donor was deferred due to thyroid disorder (2.4%).

Table 1: Participants who were accepted or deferred to donate blood.

	Accepted	Deferrals	Total
Men	2690	140	2830
Women	91	21	112
Total	2781	161	2942

Table 2: Temporary causes of deferrals.

Causes	Number	Percentage (%)
Alcohol Consumption	21	17.7
Allergy	11	9.3
Antibiotic	05	4.2

Causes	Number	Percentage (%)
Other Tablets	05	4.2
URTI	01	0.8
Fever	01	0.8
Dental Extraction	03	2.5
Dog bite	02	1.7
Previous donation within 3 months	01	0.8
Ear Piercing	02	1.7
Tattoo	08	6.7
Hypertension	24	20.2
Hypotension	06	5.1
Low Hemoglobin	18	15.1
Typhoid	03	2.5
Underweight	01	0.8
Poor Vein	01	0.8
Recent Vaccination	01	0.8
Skin disease	01	0.8
Others*	04	3.5
Total	119	100

*-Tremors in hands, not slept previous night, uneasiness

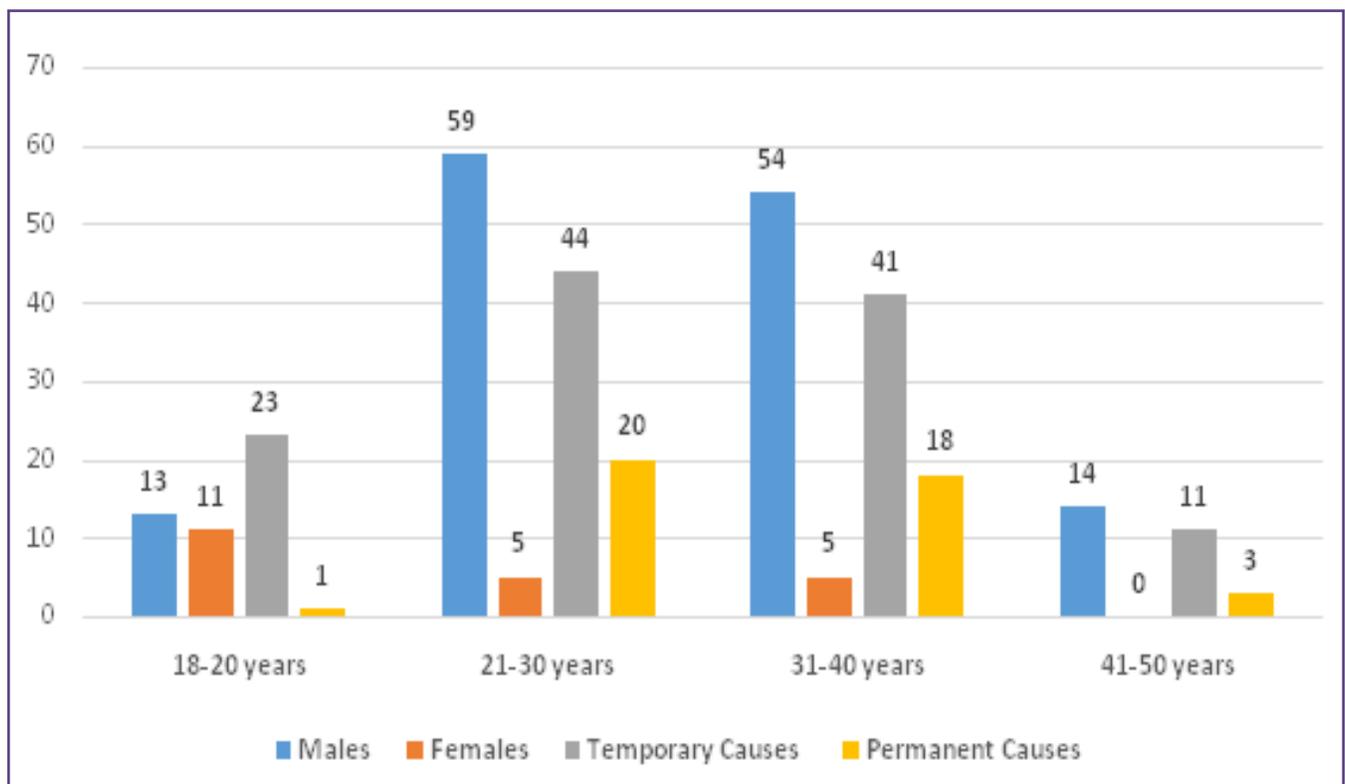


Chart 1: Distribution of Deferred Donors: Gender & Causes.

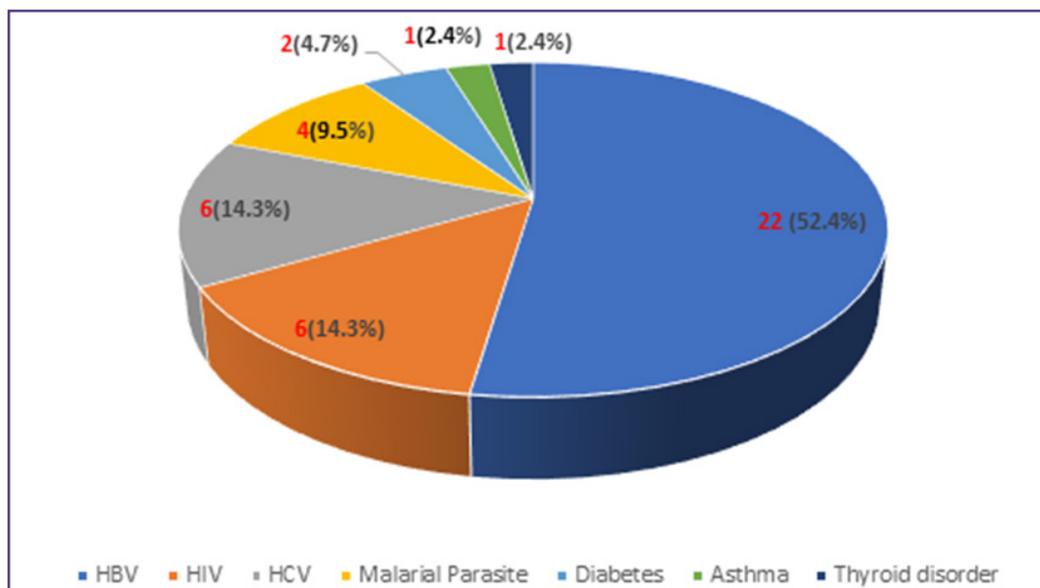


Chart 2: Permanent causes of Deferrals.

Discussion

The aim of this study was to ascertain the prevalence of blood donor deferrals and their causes among the participants for blood donation. The Prevalence of deferrals was 5.5%. This was similar to the study done by Rabeya et al (5.6%), Unnikrishnan B et al (5.2%), Sunder P et al. (6%), Sushant kumar et al (7.1%) and Madhuri S Kate et al (7.55%).^[1-5] Higher rates of deferral were observed by Agnihotri N (11.6%), Lim JC et al. (14.4%), Choudhary R K et al. (16.4%) and Layla AM Bashawri (19.2%).^[6-9] The reason could be attributed to differing donor selection criteria.

Majority of the deferred donors were males with male to female ratio of 6.7:1 which is higher than the study done by Valerian et al who encountered male to female ratio of 3.8:1.^[10] The reason for high deferral rate in males could be assigned to the fact that there were more male donors compared to female donors in the first place.

When the causes of deferrals were analysed it was found that the majority of deferrals were due to temporary causes as seen in the other studies as that of Ngoma et al, Kouao et al, Valerian et al.^[10-12]

In our study we found that 1.51% of the donor population tested positive with infectious disease markers similar to that of the study done in Mangalore (1.58%) while in Srinagar 2.2% of donor population tested positive.^[2,13] Hepatitis B was the most common infection (0.79%) followed by HIV and Hepatitis C infection (0.21% each). Unnikrishnan et al reported almost similar values in his study which were

0.87% and 0.36% for HBV and HCV respectively while Singh et al and Kaur et al reported higher values which were 1.8% and 1.7% for HBV respectively and 0.5% and 0.8% for HCV respectively.^[2,14,15] However the national prevalence of Hepatitis B (1-5%) and Hepatitis C (1%) were much higher compared to our study.^[16] In our study, HIV infection rate was almost similar to the study done in Mangalore (0.28%) as well as that of national prevalence rate (0.29%) while other Indian studies found much higher rate (0.8% by Singh et al and 0.6% by Kaur et al).^[2,14,15,17]

When temporary causes of deferrals were assessed, it was found that most of the deferrals were due to hypertension accounting for 20.2% followed by alcohol consumption (17.7%) and low haemoglobin (15.1%). These results were much higher compared to studies done in Mangalore where deferrals due to hypertension and low haemoglobin were 13.18% and 12.34% respectively and majority (15.5%) of deferrals were due to consumption of medications.^[2]

In a study done in Saudi Arabia, consumption of drugs (26.8%) was reported as a major cause of deferral followed by low haemoglobin (15.5%) and hypertension (5.7%).^[9] However, other studies found anaemia as the most common cause (Arslan et al 20.7% and Halperin et al 46%).^[18,19] In a Trinidad and Tobago study, a history of high risk sexual activity was reported to be the commonest cause of deferral.^[20]

Hypertension is one of the most important causes of deferral as we found in our study and other studies as well.^[2] All of them were males. Possible reasons could be fear of blood

donation, stress, exercise etc. The very fact that many of them are first time donors, stresses upon the cause being fear in these individuals. But having said that, prevalence of hypertension is also rising in our society. So these cases could also be incidental findings of hypertension.

Alcohol consumption was the second most common reason (17.7%) for temporary deferral. Several other studies found this to be a cause for deferral as well.^[21,22] This was seen more commonly in the 21-30 years age group and all were male donors. This could be due to unawareness among the donors regarding the criteria for donation.

Anaemia formed the 3rd commonest cause of temporary deferral (15.1%). In a developing nation like India, anaemia is quite common.^[23] Majority of anaemics in our study were women (13/18, 72.2%). Iron stores are lower in women owing to menstruation, pregnancy and poor diet. Blood donation removes 200-250mg of iron from donor which can deplete an average woman's iron store.^[24] These deferred donors are counselled and referred to physicians for treatment of their anemia, to make them potential future donors after correction of their haemoglobin level.

Conclusion

Blood donor deferrals leads to inadequate blood supply for transfusion. Hence it should not be taken lightly and should be avoided whenever it is possible. This can be achieved by equipping the blood bank personnel with the knowledge of the criteria of deferrals. This study was undertaken to assess the prevalence and the causes for these deferrals. Transfusion transmitted infection, Hepatitis B is the most common cause of permanent deferral followed by Hepatitis C and HIV. Hypertension is the most common cause of temporary deferral followed by alcohol consumption and anemia. Knowing the causes of temporary deferrals, will also help in motivating these donors to come back for blood donation at a later date after correction of the underlying cause.

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