



Analysis of Pre-Donation Deferral of Blood Donors in a Tertiary Care Hospital in North India

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ABSTRACT

INTRODUCTION: Blood transfusion services throughout the world face the enormous challenge of overcoming the disparity between the demand and supply of blood, so that safe blood can be provided to all the patients. In this regard, the important issue that needs to be addressed is the blood donor deferral. Deferral is not only a kind of rejection for the donor, but also loss of precious donors for the blood transfusion services who many a times struggle to provide blood to patients in need. Hence analyzing the factors causing donor deferral which in many cases is temporary can help the policy makers to take corrective measures and formulate plans, so that these donors can be taken back into the donor pool.

AIM: This study was undertaken to evaluate and analyse the causes for blood donor deferral in a tertiary care hospital blood bank and to use the findings to help suggest measures for improving blood donor recruitment and retention strategies.

MATERIALS AND METHODS: The study included the potential blood donors who came to donate blood at the blood bank or outdoor blood donation camps during the study period of 2 years from January 2017 till December 2018. Donor screening was based on department's standard operating procedure for blood donor selection and donors were deferred either temporarily or permanently.

RESULTS: Out of the 40,470 prospective blood donors who registered for blood donation, 38,142 blood donors (94.24%) donated blood. The deferral rate was 5.75% and of those deferred, 4.54% were males and 1.20% were females. 91.58% of the donors were deferred temporarily while 8.41% were permanently deferred. The overall most common cause of deferral was anemia (31.48%). The most common cause of permanent donor deferral in our study was donor being overage (3.30%), followed by jaundice (2.62%) and high risk behaviour (0.94%). Apart from anemia, the other common causes of temporary deferral were acute infection (11.94%) and medication (10.48%).

CONCLUSION: Blood transfusion services should counsel the donors regarding the reason for their deferral and also suggest treatment and preventive measures. The policy makers while formulating donor recruitment and retention strategies should take into consideration the donor demographics and socio-cultural factors present in an area.

Keywords: Blood donor deferral, Temporary deferral, Permanent deferral, Donor demographics, Donor recruitment and retention

INTRODUCTION

Transfusion of blood saves lives, hence every country strives to provide safe blood to its citizens. The provision of safe blood should be an integral part of a country's health care system. According to WHO, all the activities related to collection, testing, processing, storage and distribution of blood should be

coordinated at the national level through effective organization and integrated blood supply networks. This national blood system should be governed by national blood policy in order to ensure that the implementation of standards is uniform throughout

the country and there is consistency in the quality and safety of blood.¹

In India, it is mandatory to screen all donated blood for transfusion transmitted infections (TTIs) like HIV, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), syphilis and malaria. In order to ensure an uninterrupted supply of safe blood, we must create a stable base of voluntary, non-remunerated regular donors as the incidence of TTIs is considered low in this group.² ELISA based serologic testing has been the foundation of blood screening for TTIs, but newer testing techniques like nucleic acid testing (NAT) is also being used increasingly by many blood banks in order to improve blood safety as it helps further shorten the “window period”.³ Currently, there is no technology that completely detects all window period donations. Hence, just testing of donated blood alone is not sufficient. Screening of donors through effective questionnaire is important.

The blood transfusion services have a process of donor selection in which the potential blood donors are subjected to a detailed questionnaire, brief medical examination, and pre-donation counselling and only those who meet all the requirements, qualify as blood donors. Donor suitability is judged based on criteria referring to science, informed medical opinion and regulatory rules.⁴ In India, the criteria for blood donor selection and deferral are provided by the Drugs and Cosmetic Act 1940 (and rules thereunder) supplemented by the Standards for Blood Banks and Blood Transfusion Services.^{5,6}

This study was undertaken to evaluate and analyze the causes for blood donor deferral in a tertiary care hospital blood bank in Punjab, North India, with the aim, that such studies can enable the review of effective policies for recruitment and retention of suitable blood donors.

MATERIALS AND METHODS

This study included the potential blood donors who came to donate blood at the blood bank or outdoor blood donation camps during the study period of 2

years from January 2017 till December 2018. For donor selection, department's standard operating procedure for blood donor selection was followed. The donors were subjected to a detailed questionnaire, brief medical examination followed by hemoglobin testing. Deferred donors' data was analyzed with respect to sex of the donors and causes for deferral, which were also categorized into permanent or temporary.

RESULTS

A total number of 40,470 prospective blood donors registered for blood donation and 38,142 blood donors (94.24%) donated blood at the blood center or in outdoor camps during the study period of 2 years from January 2017 till December 2018. The deferral rate was 5.75% (2328/40470) and represents prospective whole blood donors deferred. Among the donors deferred 4.54% were males, and 1.20% were females. The evaluation is summarized in Table 1.

About 91.58% (2132/2328) of the donors were deferred temporarily while 8.41% (196/2328) were permanently deferred (Table 2). The most common cause of permanent donor deferral in our study was donor being overage (3.30%). The second most common cause was jaundice including donors with history of HBV/HCV (2.62%). The third most common cause of permanent deferral was donors with high risk behavior (0.94%) which included donors with high risk sexual behaviour and injection drug abusers. This was followed by donors with a history of chronic diseases amounting to 0.73% cases of permanent donor deferral. Epilepsy (0.47%) and asthma (0.34%) were the other causes of permanent donor deferral. The analysis is shown in Table 3.

The majority of the cases of temporary deferral were due to anemia (31.48%) followed by acute infection (11.94%), medication (10.48%), underweight donors (5.58%), history of typhoid (4.38%), donation interval less than 3 months (2.92%) and tattoo/ear piercing (2.57%). The detailed list of causes of temporary deferral is shown in Table 4.

Table1: Demographic profile of the donors

	Registrations	Number of donors deferred (% out of total donors deferred)	% out of total registrations
Males	39298	1841 (79.08%)	4.54%
Females	1172	487 (20.91%)	1.20%
Total	40470	2328	5.75%

Table 2: Frequency of Permanent and Temporary Deferrals

	Number of donors deferred (%)	% out of total registrations
Temporary	2132 (91.58%)	05.26%
Permanent	196 (08.41%)	0.48%
Total Deferrals	2328	5.75%

Table 3: Causes of Permanent deferrals with their relative proportions

Causes	Number of donors deferred	% out of 196	% out of Total Donors deferred
Overage	77	39.28	03.30
H/O HBV/HCV and Jaundice	61	31.12	02.62
High Risk Behaviour	22	11.22	0.94
Chronic Disease(CAD,CKD,Stroke,Liver disease)	17	08.67	0.73
Epilepsy	11	05.61	0.47
Asthma	8	04.08	0.34
Total	196	100	100

Table 4: Causes of Temporary deferrals with their relative proportions

Causes	Number of donors deferred	% out of 2132	% out of Total Donors deferred
Anemia	733	34.38	31.48
Acute Infection	278	13.03	11.94
Medication	244	11.44	10.48
Underweight	130	06.09	05.58

Typhoid	102	04.78	04.38
Donation interval< 3 months	68	03.18	02.92
Tattoo/Ear piercing	60	02.81	02.57
Alcohol	58	02.72	02.49
Uncontrolled Hypertension	55	02.57	02.36
Vaccination	53	02.48	02.27
Underage	46	02.15	01.97
Dental Extraction	42	01.96	01.80
Surgery	37	01.73	01.58
Menstruation/Breast feeding	36	01.68	01.54
Dengue	29	01.36	01.24
Uncontrolled Hypothyroidism	29	01.36	01.24
Severe Allergies	26	01.21	01.11
Others**	106	04.97	04.55
Total	2132	100	100

** Includes donors with Anxiety, fatigue or sleep deprivation, repeated adverse donor reactions, chickenpox, chikungunya, uncontrolled diabetes mellitus, breast feeding, psoriasis, hypotension, poor veins, skin infection in phlebotomy site, scabies, migraine, bleeding piles and donor feeling unwell on the day of donation

DISCUSSION

Safe blood transfusion is a major global concern that requires not only efficient blood processing and testing, but also promotion of blood donation by healthy, voluntary, non-remunerated blood donors who are at low risk of infections, that can be transmitted by blood. This can be achieved by an efficient blood donor selection criteria that not only ensures health and safety of recipients but also protects the at risk donors from possible adverse donor reactions. This can in turn help promote voluntary blood donation, especially in the developing countries like India where there is a huge disparity between supply and demand of blood.

In our study the overall deferral rate was 5.75%. The deferral rate was higher in males (4.54%) as compared to females (1.20%). These results were similar to those observed by Sharma et al (5.1%), Chenna et al (5.6%), Sundar et al (5.84%) and Bobati

et al (8.62%).^{7,8,9,10} Lower rate of deferral was seen by Kulkarni et al (4.27%).¹¹ On the other hand, higher deferral rates were reported by Shrivastava et al (11.5%), Zou et al, Agnihotri et al (11.6%) and Chaudhary et al (16.4%),^{4,12,13,14} The lower rates of deferral in our study could be attributed to our emphasis on voluntary, non-remunerated blood donations through outdoor and indoor blood donation camps. Also, in our study, majority of the donors were repeat donors. Out of the total 38142 donors, 25192 were repeat donors. These donors are well aware of the blood donation process and tend to self defer if they realize they aren't fit for blood donation.

Blood donor deferrals are classified into temporary and permanent. Majority of the deferrals in our study were temporary, constituting 91.58% of the total deferrals. This is in concordance with most studies reported in literature.^{8,9,13,15,16,17} In our study, the overall most common cause of deferral was anemia

(31.48%) and majority of those deferred were females. This was similar to what was reported in most Indian studies like those by Chenna *et al* (48.7%), Bobati *et al* (25.3%), Agnihotri *et al* (56%), Kumar *et al* (54.6%), Mangwana *et al* (25.68%) and Bahadur *et al* (32.8%).^{8,10,13,15,17,18} Unlike most of the studies, Shrivastava *et al* in their study found that overall, majority of the donors (28.2%) were deferred due to jaundice followed by low hemoglobin (19.4%).⁴ Similar to this, Shah *et al* also reported majority of the deferrals due to jaundice (35.71%).¹⁹ Poor nutritional status and low hemoglobin levels in females in our population and various socio-cultural factors lead to more deferral and lesser blood donation by females. Poor education, poor socioeconomic status, faulty dietary practices are some of the major socio-cultural factors of anemia among women in India.^{20,21,22} Anemia is a major health concern in India and many other developing countries around the world and concerted efforts at national level are required to ensure that adequate health services are provided to all women of every socioeconomic status. Also, women must be educated regarding correct nutritional choices for themselves and their families. Apart from this, counselling of all blood donors, regarding measures to improve their hemoglobin levels and nutritional status, can go a long way in ensuring, that these large numbers of blood donors can re-enter the donor pool once their anemia is corrected. This can definitely improve the supply of blood in an already resource deficit developing world.

Some of the other common causes of temporary deferral in our study were, acute infection (11.94%), medication (10.98%) and underweight donors (5.58%). Low hemoglobin is the leading cause of deferral in most studies, but other than that, different reasons for blood donor deferral have been reported. This could be due to demographic and sociocultural variations in populations and also, differences in eligibility criteria being followed for donor selection. Vallerian *et al* in their study on blood donors in Tanzania found that low hemoglobin was the leading cause of temporary deferral in their study, and syphilis followed by medication were the second and third most common causes of temporary deferral. Overall, infections (62%) were the most cause of deferral in their study.²³ Shrivastava *et al* in their study from central India reported that low

hemoglobin was the most common cause (19.4%) of temporary deferral followed by malaria as the second most common (12.75%), and medication as the third most common (9.96%) causes of temporary deferral.⁴ Halperin *et al* noted low hemoglobin (46%), cold and/or sore throat (19%) and elevated temperature (10%) as the most common causes of temporary deferrals. In our study 2.3% of the donors were temporarily deferred due to hypertension.²⁴ Although a large number of Indian studies classify hypertension as the leading cause of permanent deferrals, none of these donors gave any history of cardiac changes and we feel that with the correct lifestyle modifications and compliance with medication, these donors can be taken back in the donor pool, once their blood pressure is under long term control. Apprehension and anxiety regarding blood donation such as being in the hospital or blood bank premises especially, amongst first time donors or replacement donors might result in transiently raised blood pressure. It has also been observed that many donors who are aware of their hypertensive status, give history of noncompliance with treatment with many feeling that medication is only reserved for days with high blood pressure and many never follow up with their doctor after the initial treatment. Socioeconomic status and education may have a role to play in this. Also many donors are unaware of their hypertensive status. It is important to counsel all the donors with increased blood pressure regarding importance of seeking medical advice, along with proper follow up and treatment, so that with timely management, these donors can be taken back in the donor pool.

The most common causes for permanent deferral in our study were donor being overage (39.28%), history of jaundice or HBV/HCV (31.12%) and history of high risk behavior (11.22%). Attri *et al* observed that the leading cause of permanent deferral in their study was hypertension (13.49%), overage (1.49%) and diabetes (1.14%) followed by high risk behaviour among donors with multiple sexual partners (0.52%).²⁵ Chauhan *et al* found that among the permanently deferred donors, hypertension with cardiac disorder was the most common cause (1.93%), followed by severe allergic disorders and hepatitis B as the second (0.82%) and third (0.69%) most common causes of permanent deferral.²⁶ Shrivastava *et al* found jaundice to be the most

common cause of permanent deferral followed by hypertension and suspicious identity.⁴

HCV infection poses a major healthcare burden in India and has a relatively higher prevalence in the state of Punjab, India.²⁷ Sood et al conducted a cross-sectional, Punjab state-wide, population-based serosurvey and found an overall weighted prevalence of anti-HCV of 3.6% and HCV RNA of 2.6%. They reported that HCV infection was more common in rural areas where healthcare was mainly imparted by unqualified practitioners who adopt unsafe injection practices, those who lacked education, received a blood transfusion, and had their last injection given by a nurse or other medical practitioners as compared to a medical doctor.²⁸ Another study from Faridkot in Punjab, noted that the most common risk factors for HCV infection were unsafe medical procedures (47.6%), which included history of therapeutic injections and major/minor surgeries followed by blood transfusion (30.2%) and dental procedures (22.2%).²⁹ With a high prevalence of Hepatitis in Punjab and blood transfusion being an important risk factor, efficient screening of donors for viral hepatitis must be done so as to prevent any window period transmissions of the infection into the patients.

High risk behavior was another cause of permanent deferral in our study. Many deferred donors gave history of injection drug abuse. Although drug abuse is a global concern, the state of Punjab has particularly been affected by the drug menace. The geographical location of Punjab, with drug trafficking across the border with Pakistan and Afghanistan and hence easy availability, increasing unemployment among youth may be key factors for this. With a high prevalence of HIV and viral hepatitis among injection drug users as needle sharing is common amongst many, it is of utmost important to elicit a careful history of drug abuse from donors. A study regarding prevalence of HIV and HCV seropositivity across five cities of Punjab noted the prevalence of HIV, HCV, and co-infection with HIV and HCV to be 29%, 49%, and 33% respectively.³⁰

Apart from injection drug abuse, other high risk behavior included donors with history of high risk sexual activity. According to Cai et al, various sociocultural factors may be bringing about changes in population outside of the high risk population group which has classically included transgenders,

men who have sex with men, female sex workers, injection drug users and persons with multiple sexual partners. Migration of people in search of work, particularly from rural to urban areas constitute what is called a “floating population.” Younger age of floating, male population, separation from family members, less education and influence of culture on people's attitudes toward sexuality, larger number of floating population (low-risk group) may participate in high-risk sexual behavior.³¹ A thoughtful and sensitive approach towards history taking for high risk behavior must be adopted whilst maintaining donor privacy and assuring the donors regarding the confidentiality of the information they are sharing with the blood bank staff. Conventional indirect questionnaires do not identify potentially infectious donors. Thus direct questions, though lead to an increased rate of deferrals, are more effective.³¹

It has also been seen that sometimes donors with high risk behavior may donate blood in order to get themselves tested for HIV, HBV, HCV or syphilis. A study in Brazil noted that test-seeking was a motivation for many potential blood donors, and the rate of acknowledged test seekers was 7%.³³ In a study in the United States, 19% of blood donors with sexually transmissible viral infections reported test seeking and in France, 56% of blood donors with HIV had test seeking motivation.^{34,35} Such donors, for obvious reasons may not be honest and forthcoming about their high risk behavior. Hence donors in general need to be made aware of testing facilities for individuals with high risk behavior and these must also be included in the donor information brochures, pamphlets and booklets for the donors, to go through pre-donation.

CONCLUSION

In our study, the blood donor deferral rate was 5.75% and out of these deferred donors, 4.54% were males, and 1.20% were females. Majority (91.58%) of the donors were deferred temporarily while 8.41% were deferred permanently. The overall most common cause of deferral was anemia (31.48%). The most common cause of permanent deferral was donor being overage (3.3%).

The voluntary, non-remunerated donors are the safest group of blood donors. Hence, it is imperative to keep these donors in donor pool by continuous motivation and efforts. Deferral causes loss of

valuable donor time for donors as well and can be perceived as rejection by them. All donors deferred due to temporary reasons must be counselled regarding reasons for deferral and steps to overcome the same. Since low hemoglobin is the leading cause of deferral in most studies, proper counseling of these deferred donors regarding treatment and prevention of anemia is important, so that these donors can eventually become part of the donor pool. As is seen in various studies, there is a demographic variation in the deferral pattern in different areas. Hence, strategies and measures to improve the donor base, relevant to a particular area should be put in place in order to maintain a steady pool of donors. Raising awareness about blood donation and encouraging replacement donors to become voluntary donors can also help to improve blood donor pool. Providing information and education materials to the donors in the form of brochures or pamphlets in the waiting area of blood collection facility can help educate the donors and make them more aware of the donation process, especially, regarding type and duration of deferrals. This may “prime” prospective donors about possibility of deferral. Any such sensitization beforehand results in better acceptability of “rejection” and thereby less “negative” feeling about blood donation and more chances of future return.¹³ The entire blood bank staff should work as a team to make the blood donation process a safe, happy, memorable experience for donors so that they are willing to return again and again which can go a long way in overcoming the shortage of blood.

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