



BLOOD DONOR DEFERRAL PATTERN AS A KEY TOOL FOR SAFE BLOOD TRANSFUSION PRACTICE: A RETROSPECTIVE STUDY FROM NORTH EAST INDIA.

Pathology

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ABSTRACT

Background: Safe blood transfusion practice starts with meticulous selection of blood donors. Recruitment and retention of healthy safe donor is crucial to maintain adequate supply of blood units available for transfusion. The present study was undertaken with the aim to analyze the rate as well as the causes of pre-donation deferral and blood units discarded following screening test for Transfusion Transmitted Infection (TTI). **Material and methods:** This retrospective hospital-based study was conducted in the Blood Centre, Jorhat Medical College and Hospital, Jorhat, Assam over a period of one year i.e., from 1st October, 2021 to 30th September, 2022. All donors who attended the Blood Centre as well as outdoor voluntary blood donation camps were included in the study. Each and every blood donor was screened as per the guidelines of Drugs and Cosmetics (Second Amendment) Rules, 2020. Transfusion Transmitted Infection (TTI) screening tests were done on the collected blood units and those found to be positive were discarded. The donor records were reviewed and analyzed according to sex, donor type (voluntary or replacement) and reason for deferral. **Results:** Out of 17030 prospective donors, 14372 (84.39%) donors were accepted for blood donation while 2658 (15.61%) donors were deferred. The deferral rate was higher in females i.e., 35.63% (88 out of 247) compared to males i.e., 15.31% (2570 out of 16783). Deferral percentage of voluntary donors was 19% (2563 out of 13485) and that of replacement donor was 2.68% (95 out of 3545). The rate of temporary and permanent deferral was 99.17% (2636 out of 2658) and 0.83% (22 out of 2658) respectively. The most common cause of temporary deferral was found to be low hemoglobin (41.81%) whereas in case of permanent deferral high risk behaviour (50%) was found to be the leading cause. 3.21% (462 out of 14372) blood units were discarded following screening tests for Transfusion Transmitted Infection (TTI). Hepatitis C was the most common cause of blood units discarded. **Conclusion:** A systematic and well organised approach to selection of blood donors is the mainstay of safe blood transfusion practice. Analysis of donor deferral pattern guides us to recruit safe healthy donors and to maintain an adequate pool of blood units available for transfusion.

KEYWORDS

Safe blood transfusion practice, Temporary deferral, Permanent deferral, Transfusion Transmitted Infection.

INTRODUCTION

Blood donation is a life-saving procedure which constantly demands an adequate supply of safe blood. The process of selection of blood donors builds the foundation of safe blood transfusion practice¹. The main challenge lies in recruitment and retention of healthy and safe donors because it has been documented that even after execution of standardized protocols; hazards of blood transfusion seem to be a never-ending problem^{2,3}. Hence, the procedure of donor selection and defer should be such that it protects both the blood donor and the recipient. Following standardized pre-donation screening a large sum of blood donors get deferred for numerous reasons owing to both donor and patient safety⁴. A vast majority of these donors get deferred due to temporary causes who in due course of time might become safe and healthy donors^{3,4,5,6}. But this usually leaves a negative impact on the individual and they hardly ever turn up to donate blood. Similarly, a number of blood units are discarded after conducting screening tests for Transfusion Transmitted Infection (TTI) in the collected blood units^{4,5,6}.

The present study was undertaken with the aim to analyze the rate as well as the causes of pre-donation deferral and blood units discarded following screening test for TTI.

MATERIALS AND METHODS

This retrospective hospital-based study was conducted in the Blood Centre, Jorhat Medical College and Hospital, Jorhat, Assam over a period of one year i.e., from 1st October, 2021 to 30th September, 2022. All donors who attended the Blood Centre as well as outdoor voluntary blood donation camps were included in the study. Each and every blood donor was screened based on Blood Donor Questionnaire and Consent Form, medical history, physical examination and hemoglobin estimation. The prospective donors satisfying the donor criteria as per the guidelines of the Drugs and Cosmetics (Second Amendment) Rules, 2020 were accepted for blood donation and the rest deferred based on temporary or permanent causes. Transfusion Transmitted Infection (TTI) screening tests were done on the collected blood units and those found to be positive were discarded. Hemoglobin estimation was done by Hemocue. Hepatitis B virus (HBV), Hepatitis C virus

(HCV), Human Immunodeficiency Virus (HIV) tests were performed by Enzyme Linked Immunosorbent Assay (ELISA); Syphilis by rapid plasma reagin test & malaria by rapid kit test. The donor records were reviewed and analyzed according to sex, donor type (voluntary or replacement), and reason for deferral.

RESULTS

During the study period, a total of 17030 prospective donors reported for blood donation at our Blood Centre as well as outdoor voluntary blood donation camps. Of these, 16783 (98.55%) were males and 247 (1.45%) were females. 13485 (79.18%) were voluntary donors while 3545 (20.82%) were replacement donors.

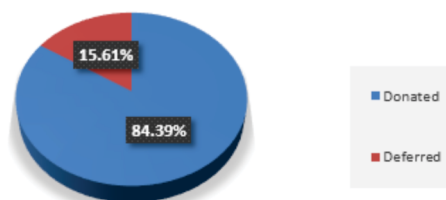


Figure 1: Pie Diagram Showing Percentage of Blood Donated and Deferred

Following, the pre donation screening process, 14372 (84.39%) donors were accepted for blood donation while 2658 (15.61%) donors were deferred (Figure 1). The deferral rate was higher in females i.e., 35.63% (88 out of 247) compared to the males i.e., 15.31% (2570 out of 16783). Deferral percentage of voluntary donors was 19% (2563 out of 13485) and that of replacement donor was 2.68% (95 out of 3545).

Overall, temporary deferral was 99.17% (2636 out of 2658) and permanent deferral was 0.83% (22 out of 2658).

Distribution of deferred donors on the basis of temporary and permanent causes are shown in Table 1 and Table 2 respectively.

Table 1: Causes of temporary deferral

Cause of temporary deferral	Number	Percentage out of temporary deferral (n=2636)	Percentage out of total deferral (n=2658)
1. Low hemoglobin	1102	41.81%	41.46%
2. Alcohol intake	472	17.91%	17.76%
3. Underweight	273	10.36%	10.27%
4. Allergy	175	6.64%	6.58%
5. Hypertension	92	3.49%	3.46%
6. Covid vaccination	89	3.38%	3.35%
7. Skin disease	74	2.81%	2.78%
8. Trauma/ Injury	73	2.77%	2.75%
9. Recent Donation	59	2.24%	2.22%
10. Recent Tattoo	39	1.48%	1.47%
11. High hemoglobin	32	1.21%	1.20%
12. Antibiotic	24	0.91%	0.90%
13. Antirabies vaccination	21	0.80%	0.79%
14. Inadequate sleep	20	0.76%	0.75%
15. Anxiety	13	0.49%	0.49%
16. Menstruation	13	0.49%	0.49%
17. Fever	11	0.42%	0.41%
18. Respiratory infection	10	0.38%	0.38%
19. Generalized weakness	10	0.38%	0.38%
20. Surgery	8	0.30%	0.30%
21. Chicken pox	7	0.27%	0.26%
22. Tooth extraction	5	0.19%	0.19%
23. Ear piercing	3	0.11%	0.11%
24. Covid	2	0.08%	0.08%
25. Breast feeding	2	0.08%	0.08%
26. Hypotension	2	0.08%	0.08%
27. Underage	2	0.08%	0.08%
28. Neck swelling	1	0.04%	0.04%
29. Eye infection	1	0.04%	0.04%
30. Jaundice	1	0.04%	0.04%

Table 2: Causes of permanent deferral

Cause of permanent deferral	Number	Percentage out of total permanent deferral (n=22)	Percentage out of total deferral (n=2658)
1. High risk behaviour	11	50%	0.41%
2. Diabetes	5	22.73%	0.19%
3. Neurological disease	3	13.64%	0.11%
4. Renal disease	2	9.09%	0.08%
5. Overage	1	4.55%	0.04%

The most common cause of temporary deferral was found to be low hemoglobin (<12.5 g/dl) followed by history of alcohol intake whereas in case of permanent deferral high risk behaviour followed by diabetes was found to be the leading cause.

Out of the 14372 donors accepted for blood donation, 462 (3.21%) blood units were discarded following screening tests for Transfusion Transmitted Infection (TTI). Hepatitis C was found to be the most common cause of blood unit discarded (Table 3). 45 blood units were found to be positive for both HIV and HCV whereas 6 blood units were found to be positive for both HCV and HBsAg.

Table 3: Causes of blood units discarded

Causes	Number of blood units discarded	Percentage out of total blood units discarded (n=462)	Percentage out of total blood units collected (n=14372)
1. HIV	99	21.43%	0.69%
2. HBsAg	55	11.90%	0.38%
3. HCV	259	56.06%	1.80%
4. VDRL	49	10.61%	0.34%

DISCUSSION:

Donor selection and deferral criteria for blood donation directly affects the pool of safe blood units in blood transfusion practice. It plays an important role in protecting both the donor and recipient from the adverse effects of blood donation and transfusion respectively.

A total of 17030 prospective donors had registered for blood donation at our Blood Centre as well as outdoor voluntary blood donation camps. Out of which 2658 donors (15.61%) got deferred. This finding was comparable to studies by Chaudhary RK et al¹, Shah A et al⁸ and Mulla FI et al⁹ showing deferral rates of 16.4%, 17.39% and 13.02 % respectively whereas Kulkarni N¹ and Agrawat AH et al¹⁰ reported deferral rates of 4.27% and 3.72% respectively. The difference in donor deferral rate was mostly due to variations in donor selection criteria, regional diversity and high risk behaviours^{11,12,13}.

Similar to the studies done by Sabari Priya E¹⁴, Chauhan DN et al¹⁵ and Patel S et al¹⁶, we also report higher deferral rate in females i.e., 35.63% compared to the males i.e., 15.31%. The increase incidence of female deferral was mainly due to anemia, underweight and physiological causes (menstruation and lactation).

In the present study, 99.17% were temporarily deferred whereas only 0.83% were permanently deferred. The three most common cause of temporary deferral was found to be low hemoglobin (41.81%) followed by history of alcohol intake (17.91%) and underweight (10.36%). The other less common cause includes history of allergy, hypertension, vaccination, skin disease, recent tattoo, inadequate sleep etc.

Study done by Sundar P et al¹⁷ reported about 84% temporary and 16% permanent deferral. Rehman S et al¹⁸ reported temporary deferral of 63.7% and permanent deferral of 36.3%.

Bahadur S et al¹⁹ in their study found low Hb as the most common cause of deferral (32.9%) followed by low weight (26.6%) and history of jaundice/ hepatitis (8.1%). Rabeya Y et al²⁰ also demonstrated anemia as the most common cause of temporary deferral i.e., 40.7% being predominantly females.

Hence, in most of the studies including our study, anemia was documented to be the most prevalent cause of donor deferral. Upon follow up of these deferred donors, nutritional deficiency was found to be the major predisposing cause which can be effectively corrected by motivating and educating them to seek medical advice and proper nutrition. The second most common cause of deferral was history of alcohol intake in the last 72 hours which was comparable to other studies^{14,19}.

The temporarily deferred donors should be meticulously counselled regarding their cause, duration of deferral and lifestyle change. Those requiring medical attention should be encouraged to consult a physician. Creating awareness among the future prospective donors regarding the importance of blood donation and eligibility criteria is of utmost importance. This can be best achieved by organising more voluntary blood donation camps.

High risk behaviour (50%) followed by diabetes (22.73%) was found to be the leading cause of permanent deferral. The individuals with high-risk behaviours (intravenous drug users, professional donors, persons with multiple sexual partners) require substance abuse treatment, psychoeducation, behavioural and lifestyle modifications²¹.

In the present study, 3.21% blood units were discarded following screening tests for transfusion transmitted infection (TTI). Out of total blood units collected (n=14372), hepatitis C (1.80%) followed by HIV (0.69%), hepatitis B (0.38%) and syphilis (0.34%) were tested positive. No cases of malaria parasite reported. On the contrary, Kulkarni AM et al⁴ found hepatitis B (1.58%) as the commonest cause of blood unit discarded. This variation is most probably due to regional diversity and pattern of high-risk behaviours. The ones tested positive should be counselled not only regarding further management but also about the routes of transmission and available vaccination.

CONCLUSION:

A systematic and well organised approach to selection of blood donors is the mainstay of safe blood transfusion practice. An in-depth study of the various causes of donor deferral is crucial to maintain adequate pool of blood units. The knowledge regarding rate and cause of donor

deferral can only guide us in motivating and educating the general population regarding blood transfusion. Depending upon the various causes, the temporary deferrals can be counselled and motivated to donate in near future. Similarly, the permanent deferrals and those tested positive for TTI should be counselled and documented so as to exclude them from the pool of prospective donors. Therefore, analysis of donor deferral pattern guides us to recruit safe healthy donors and to maintain an adequate pool of blood units available for transfusion.

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