Section: Transfusion Medicine

Original Research Article

EVALUATION OF PRE-DONATION DEFERRAL AMONG VOLUNTARY BLOOD DONORS IN A TERTIARY CARE BLOOD CENTRE IN NORTHEAST INDIA

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ABSTRACT

Background: Blood donor deferral plays a crucial role in maintaining the safety of the blood supply and ensuring donor well-being. Understanding the patterns and causes of donor deferral helps to optimise donor recruitment and retention strategies, particularly in regions with limited donor availability. This study was undertaken to determine the prevalence, demographic distribution, and causes of deferral among voluntary blood donors (VBDs) in a tertiary care centre. **Materials and Methods:** A retrospective study was conducted on 3,818 voluntary blood donors who self-registered for blood donation during the study period. Donor deferral data were retrieved from donor records and categorised by demographic variables (age, gender) and deferral type (temporary or permanent). Statistical analysis was performed to assess the distribution and common causes of deferral. **Results:** Out of 3,818 VBDs, 491 donors (11.4%) were deferred—288 males (8.2%) and 203 females (25.82%). Although males accounted for most of the donor pool (84.75%), females had a significantly higher deferral rate. Most deferrals (96.33%) were temporary, while only 3.67% were permanent. The highest proportion of deferred donors (59.27%) belonged to the 18–30 age group. Among temporary deferrals, hypertension (21.14%), anaemia (11.20%), and hypotension (11.41%) were the leading causes. Hypertension was predominant among males, whereas anaemia and underweight were common among females. Permanent deferrals were primarily due to heart disease (22.22%), high-risk behaviour (22.22%), and a history of jaundice of unknown cause (16.67%). **Conclusion:** The donor deferral rate in this study was comparable to national trends, with temporary causes—especially hypertension and anaemia—being predominant. Female donors showed a higher deferral rate, due to anaemia and low weight. Regular health education, pre-donation screening, and donor counselling can minimise deferral rates and enhance donor retention, thereby improving blood supply management in tertiary care settings.

INTRODUCTION

Healthy, responsive, and motivated voluntary blood donors are the cornerstone of effective blood transfusion services. Blood donation is a noble act and plays a vital role in healthcare by ensuring a consistent supply of safe blood for medical emergencies, surgical procedures, and the treatment of chronic conditions.[1]

The term "blood donor" encompasses individuals who donate whole blood or specific blood components—such as red blood cells, platelets, plasma, and others—through whole-blood donation or apheresis procedures / automated collection systems.[2]

Donor recruitment and retention remain the most difficult challenges for blood transfusion services due to socio-cultural barriers, lack of awareness, and motivational issues among potential donors.[3] The

supply of safe blood and blood components depends on recruiting non-remunerated voluntary blood donors. So, implementing standardised screening and testing protocols, rigorous assessment and selection of healthy donors, efficient collection methods, and strategic efforts to retain safe donors.[4] Recruiting safe donors begins with providing accurate information, education, and counselling to ensure a comprehensive understanding of the blood donation process through effective communication and information exchange.[5]

The blood transfusion service is responsible for ensuring that the blood donation process is safe and does not harm donors. The donor selection criteria should ensure the safety of the donor and recipient.[6] The donor selection criteria define conditions of acceptance and deferral for each criterion. They are meant to ensure the safety of the donor and the recipient while maintaining the product quality.[7] The donor eligibility criteria have been updated by the recent amendments to the Drugs and Cosmetics Rules, which govern the standards for blood donation and transfusion practices in India.[8]

Blood donors are deferred for various reasons and are known as "deferred" donors. The deferral can be either temporary or permanent. The present study was undertaken to determine the prevalence and evaluate the reasons for the pre-donation deferral among the voluntary blood donors attending the blood donation either inside the department of transfusion medicine or at the outdoor blood donation drive organised by the various voluntary blood donor organisations in collaboration with the Department of Transfusion Medicine, in a regional blood centre in Northeast India.

MATERIALS AND METHODS

The present study was a retrospective analysis of voluntary blood donors who attended blood donation in Manipur, Imphal, either at the Department of Transfusion Medicine as indoor donation or at outdoor blood donation drives, during the study period.

Study Design: Retrospective analysis of deferred voluntary blood donors

Study Duration: For a period of 2 years from March 2021 to January 2023

Study Setting: In the Department of Transfusion Medicine, Regional Institute of Medical Sciences, Imphal, Manipur

Study Population: This includes individuals who volunteered for blood donations and were screened with a donor health questionnaire (DHQ) and physical examinations according to the donor eligibility criteria as per the Drugs and Cosmetics Rules, which was recently amended in 2020.

Inclusion Criteria

- All the blood donors who volunteered themselves for blood donation, irrespective of gender
- Age from 18 years to 65 years
- Haemoglobin ≥12.5 gm/dl
- Weight >45kg
- Bp -Systolic between 100-140 and diastolic 60-90
- Last donated >3 months for males and >4 months for females as a major eligibility criterion for whole blood donation

Sampling/Recruitment of samples

- The deferred donors' data were studied concerning their age, gender, and reason for deferral from the register maintained for VBD Deferral in the department.

Statistical Analysis: The collected data was checked for accuracy and consistency. Continuous variables such as the age of donors, were represented as mean values, and the rate of the deferred donors was calculated accordingly. Deferral reasons were analysed in terms of percentage distribution.

RESULTS

A retrospective analysis was conducted on 3,818 voluntary blood donors during the study period who had self-registered for blood donation due to the voluntary blood donor deferral. Among them, 3,235 were male, and 583 were female donors. In assessing the donor deferral rate, 491 VBDs were deferred among the 3,235 donors, yielding a deferral rate of 11.4%. Among the 491 total deferred donors, 288 males were deferred, resulting in a deferral rate of 8.2%. In contrast, among the 583 female voluntary blood donors, 203 were deferred, yielding a significantly higher deferral rate of 25.82%.

When analysed, the gender distribution among the total deferred donors was 58.65% males and 41.35% females. This highlights a notably higher deferral proportion among female donors, despite their lower representation in the donor pool. The above gender distribution of donors and deferral data is presented in Table 1 and Figure 1.

Table 1: Gender distribution of deferrals

Sl. No	Gender of Donors	Registered as VBDs	Deferred Donors	
			n / Rate	%
1	Male	3235	288 / 8.2	58.65
2	Female	583	203 / 25.82	41.35
	Total	3818	491 / 11.4	100

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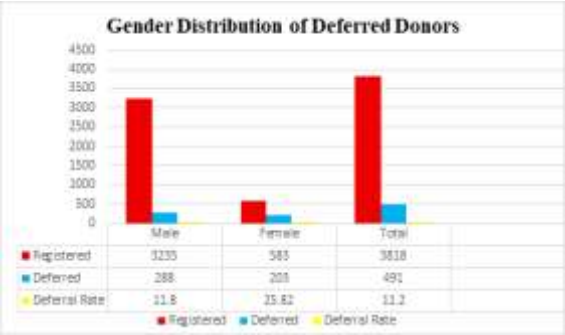

Figure 1: Gender Distribution of Deferred Donors

While comparing the age-groupwise distribution of donor deferral, 291 donors (59.27%) were in the mean age group of 18-30 years, accounting for 136 donors (47.22%) among males and 155 donors (76.35%) among females. Followed by the age group of 31-45 years, amounting to 126 donors (25.66%), with 98 (34.03%) and 28 (13.79%) among male and female donors, respectively. These data are summarised in Table 2 and Figure 2 below.

Table 2: Age Distribution of Deferred Donors

Sl. No	Age group (years)	Male		Female		Total	
		n	%	N	%	n	%
1	<18	5	1.74	11	5.52	16	3.26
1	18-30	136	47.22	155	76.35	291	59.27
2	31- 45	98	34.03	28	13.79	126	25.66
3	46-60	47	16.32	8	3.94	55	11.20
4	>60	2	0.69	1	0.40	3	0.61
	Total	288	100	203	100	491	100

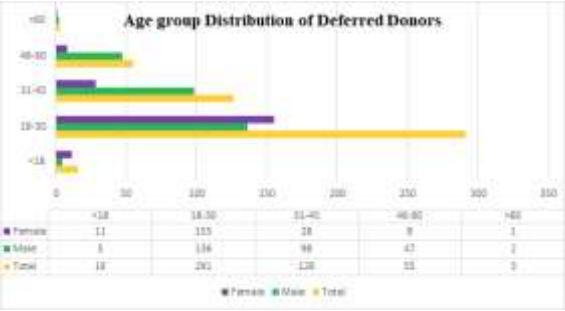

Figure 2: Age group-wise distribution of deferred donors

Among the 491 deferred voluntary blood donors, 473 (96.33%) were temporarily deferred—273 males (57.72%) and 200 females (42.28%). Among the 18 (3.67%) permanently deferred donors, 15 were male (83.33%) and 3 were female (16.67%).

Table 3: Type of VBD Deferral and its Rate

Sl. No	Reason	Male		Female		Total	
		N	%	n	%	n	%
1	Temporary	273	57.72	200	42.28	473	96.33
2	Permanent	15	83.33	3	16.67	18	3.67
	Total	288	58.65	203	41.35	491	100

The present study reported a significantly higher proportion of temporary deferrals (96.33%) and a lower rate of permanent deferrals (3.67%).

On evaluating the actual reasons for both temporary deferrals, blood pressure variations (hypotension or hypertension), anaemia, under medication, recent vaccination history, underweight, and other causes (Lack of sleep, alcohol consumption, fasting, etc.) were identified as deferral reasons.

In the permanent deferral category, history of jaundice of unknown cause, heart disease, cancer treated or undergone surgery, and high-risk behaviour donors were detected. The above causes and their deferral rates were tabulated in Tables 4 and 5.

Table 4: Reason for Temporary Deferrals

Major Reason	Male (n)	Male (%)	Female (n)	Female (%)	Total (n)	Total (%)
Hypertension	89	32.60	11	5.5	100	21.14
Hypotension	16	5.86	38	19.0	54	11.41
Anaemia	1	0.4	52	23.21	53	11.20
Recent Vaccination	35	12.82	12	6.0	47	9.94
On Medications	28	10.26	12	6.0	40	8.46
Underweight	2	0.73	30	15.0	32	6.76
Others	101	37.0	46	23.0	147	31.02
Total	272	100.00	201	100.00	473	100.00

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Table 5: Reason for Permanent Deferrals

Sl. No	Major Reason	Male (n)	Male (%)	Female (n)	Female (%)	Total (n)	Total (%)
1	Heart Disease	4	26.67	0	-	4	22.22
2	High Risk Behaviour	4	26.26	0	-	4	22.22
3	Jaundice of Unknown Cause	3	20	0	-	3	16.67
4	Others	4	26.66	3	100	7	38.89

DISCUSSION

A retrospective analysis of the voluntary blood donor (VBD) deferred, exploring their prevalence, associated causes, demographic patterns, and implications on blood transfusion services (BTS). The deferral rate was 11.4% among 3818 VBDs, with a significantly higher rate among females (25.82%) than males (8.2%). Although female donors accounted for only 15.27% of the total donor population, they accounted for 41.35% of all deferrals.

According to a study by Chaurasiya P et al,[9] 5,051 donors presented to the blood bank during the study period, of whom 306 (6.05%) were deferred. Among the deferred donors, the majority were male (62.7%), while females accounted for 37.3%, which is consistent with the present study's findings on the gender distribution of donor deferral.

As reported in the study by Anegundi R et al,[10] out of 3,332 individuals who volunteered for blood donation, 2,876 successfully donated, while 456 were deferred, resulting in a deferral rate of 13.6%. Among the deferred, 257 (56.35%) were males and 199 (43.64%) were females, indicating a higher deferral rate among male donors.

In the present study, the age-wise distribution of deferred donors closely mirrors the findings of Chaurasiya P et al,[11] with the highest deferral rate observed in the 18–25 years age group (134 donors, 43.8%), followed by 26–35 years (94 donors, 30.7%), 36–45 years (54 donors, 17.6%), 46–55 years (14 donors, 4.6%), and 56–65 years (10 donors, 3.3%).

Similarly, as reported by Nippun Prinja et al,[12] most deferred donors were in the 18–30 age group, accounting for 67.1%, which aligns closely with the present study's findings. While comparing the findings with other studies, low haemoglobin was the leading cause of donor deferral (39.7%). Around 65% of the deferred were females, reflecting widespread anaemia in the female population.

Meinia SK,[13] conducted a prospective study of 16,015 registered whole-blood donors; 14,885 (92.9%) were eligible for donation, and 1,130 (7.1%) donors were deferred. The deferral rate among the male population (815/15,051) was 5.40% while in the female population (315/964) it was 32.7%. This may reflect the higher representation of young adult donors in awareness campaigns or workplace blood drives. However, it also highlights the need to address specific health issues in this age group, including undernutrition, low haemoglobin levels, and lifestyle-related factors.

The present study reported a significantly higher proportion of temporary deferrals (96.33%) and a lower rate of permanent deferrals (3.67%) than earlier studies. For instance, Bahadur et al,[14] in 2009 also observed a high temporary deferral rate (91%). While studies by Suhailur Rehman et al,[15] and Nagarekha Kulkarni et al,[16] in 2012 reported comparatively lower temporary deferral rates of 63.7% and 68%, respectively. Our findings align more closely with Bahadur et al,[14] but show a greater predominance of temporary deferrals, suggesting improvements in donor screening and public awareness over time. These data are depicted in Figure 3.

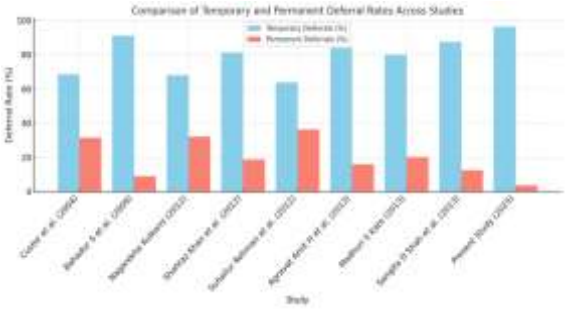

Figure 3: Comparison of category and Deferral rate among Voluntary Blood Donors

Hypertension (21.14%) in males and Anaemia (11.20%) in females were the most common reasons for temporary deferral in the present study. While comparing the findings with other studies, low haemoglobin was the leading cause of donor deferral (39.7%). Around 65% of the deferred were females, reflecting widespread anaemia in the female population as per the study findings of Nippun Prinja et al.[12]

Hypertension was the leading cause of temporary deferral (50%), followed by low blood pressure (35.5%), aligning with findings by Vimal M, Hao J et al, and Chenna D et al.[17,18,19] The latter emphasised the use of blood donation as an opportunity to raise awareness of hypertension.

Anaemia, which is a global problem, especially in developing countries like India, is due to nutritional deficiency. Apart from anaemia, the other causes of temporary deferrals were fever/cough/cold (7.36%), followed by medication (6.57%) and alcohol consumption within 72 hours (6.31%), according to Anegundi R et al.[10]

A study done by Kumar S H et al,[20] medications (10.7%), infections (7.6%), and miscellaneous causes (5.1%), and a study done by Chauhan C et al,[21]

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where alcohol consumption within the last 24 hours (17.68%), was the second common cause.

Permanently deferred donors were related to chronic medical conditions, mostly high-risk behaviours, heart disease, prior jaundice of unknown cause, and high-risk behaviour. High blood pressure is the leading cause of permanent deferral (50%), similar to the study finding of Shariff M H.[22] This highlights the role of blood donation camps in donor screening by minimal physical examination and early detection of undiagnosed hypertension, thereby offering a valuable health benefit.

On evaluating the reasons for both temporary deferrals, blood pressure variations (hypotension or hypertension), anaemia, under medication, recent vaccination history, underweight, and other causes (Lack of sleep, alcohol consumption, fasting, etc.) were identified as deferral reasons. In the permanent deferral category, history of jaundice of unknown cause, heart disease, cancer treated or undergone surgery, and high-risk behaviour donors were detected.

Donor deferral data is crucial for estimating a region's truly eligible blood donor population. Relying solely on age-based criteria overestimates the eligible pool, as shown by William Riley et al,[23] who reported a 59% overestimation. State and regional centers can serve as data hubs to support national planning

From the blood transfusion service perspective, high deferral rates due to temporary reasons pose challenges by narrowing the eligible donor pool and potentially disrupting blood inventory levels. However, temporary deferrals offer an opportunity for donor education and re-engagement through targeted health interventions. For example, improving awareness around nutritional requirements, safe medication use, and pre-donation preparation (adequate rest, hydration, and food intake) can help reduce deferral rates in future donations.

Understanding donor deferral patterns is essential for refining donor selection criteria, planning recruitment strategies, and ensuring a consistent, safe blood supply. Targeted health education and screening programs addressing preventable deferral causes, particularly among women and young adults, could improve donor retention and overall blood availability in the long term.

Table 6: Recommendations for Reducing Donor Deferrals in Blood Transfusion Services (BTS)

Sl No	Recommendation Area	Specific Strategies
1	Pre-Donation Education & Awareness	• Promote awareness on eligibility criteria • Encourage intake of iron-rich diets, hydration, and rest
2	Pre-Screening Programs	• Organize mobile screening camps • Use non-invasive hemoglobin testing for high-risk groups
3	Gender-Specific Interventions	• Iron supplementation for females to prevent nutritional anaemia • Offer post-menstrual donation scheduling options
4	Management of Temporary Deferral	• Maintain a tracking system of deferred donors with reminder alerts • Follow-up communication to encourage re-engagement in donation
5	Counselling for Permanently deferred Donors	• Offering a clear explanation in the local language of the deferral reason • Refer for further medical evaluation if needed
6	Staff Training in BTS	• Train staff in pre-donation screening and proper communication • Conduct training periodically as per the changes in the guidelines
7	Improvement in Policy and infrastructure	• Updating screening criteria regularly as per national guidelines
8	Data-Driven Planning	• Monitor deferral trends through centralized data • Adapt recruitment strategies based on deferral analytics

CONCLUSION

From the blood transfusion service (BTS) perspective, high deferral rates—especially temporary ones—pose logistical challenges by narrowing the eligible donor pool and potentially disrupting blood inventory levels. However, temporary deferrals offer an opportunity for donor education and re-engagement through targeted health interventions. For example, improving awareness around nutritional requirements, safe medication use, and pre-donation preparation (adequate rest, hydration, and food intake) can help reduce deferral rates in future donations.

Understanding donor deferral patterns is essential for refining donor selection criteria, planning recruitment strategies, and ensuring a consistent, safe blood supply. Targeted blood donation awareness and screening programs addressing preventable deferral causes, particularly among women and

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young adults, could improve donor retention and overall blood availability in the long term.

By adopting targeted donor-based strategies, BTS can significantly reduce preventable deferrals, thereby enhancing donor satisfaction, ensuring a consistent, sustainable, and safe blood supply, and improving the efficiency of blood collection.

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REFERENCES

1. World Health Organization. Towards 100% voluntary blood donation: A global framework for action. Geneva: WHO Press; 2010.
2. World Health Organization. Blood donor selection: guidelines on assessing donor suitability for blood donation. Geneva: WHO Press; 2012.
3. Glynn SA, Kleinman SH, Schreiber GB, Zuck T, McCombs S, Bethel J, et al. Motivations to donate blood: Demographic comparisons. Transfusion. 2002 Sep;42(2):p .216–25.
4. Directorate General of Health Services. Manual on quality standards for blood banks and blood transfusion services. 3rd ed. New Delhi: Ministry of Health and Family Welfare, Government of India; 2017. p. 20.
5. Agrawal A, Tiwari A. Tele recruitment for donor retention. Indian J Hematol Blood Transfus. 2014;30(1):p.22–25.
6. Kujur P, Tiwari AK, Bagde S, Bombeshwar V, Behera TR. Assessment of blood donor selection and deferral pattern in a tertiary care hospital in Central India. Trop J Pathol Microbiol. 2020;6(1):83–88. doi:10.17511/jopm.2020.i01.13.
7. Directorate General of Health Services. Technical manual: standards for blood banks and blood transfusion services. 3rd ed. New Delhi: Ministry of Health and Family Welfare, Government of India; 2023.
8. Ministry of Health and Family Welfare. Notification GSR 123(E), dated 10th February 2023: Amendment to the Drugs and Cosmetics Rules, 1945 – Part X-B Blood Banks and Blood Products. New Delhi: Government of India; 2023.
9. Chaurasiya P, Tyagi MS, Singh S, Kumar S. Analysis of blood donor deferral pattern in a tertiary care hospital in Northern India. Santosh Univ J Health Sciences. 2024; 10:220-4.
10. Anegundi R, Divyashree B N. Patterns of predonation deferral in voluntary blood donors with their impact on the donor pool-A study in a tertiary care hospital. Trop J Pathol Microbiol. 2021;7(1):55-59.
11. Chaurasia P, Shukla R, Qureshi A, Thakur UK, Choudhary RK. Analysis of donor deferral in 101 voluntary blood donation camps by a tertiary care hospital of North-Western India. Asian J Transfus Sci. 2022;16(1):23–28.
12. Prinja N, Narain R, Bundas S, Sharma A, Meena BS, Pachori P, Capoor V. Analysis of donor deferral in 101 voluntary blood donation camps by a tertiary care hospital of North-Western India. Asian J Transfus Sci. 2021;15(1):55–59.
13. Meinia SK, Sawhney V. Analysis of donor deferral rate and its various causes in voluntary and replacement blood donors in Jammu, India. Int J Health Sci Res. 2016; 6(1):49-56.
14. Bahadur S, Pujani M, Jain M. Donor deferral due to anaemia-A tertiary care centre-based study.Asian J Transfus Sci. 2011;5;53-5.
15. Rehman S, Arif SH, Mehdi G, Mirza S, Saeed N, Yusuf F. The evaluation of blood donor deferral causes: A tertiary care centre-based study. J Blood Disord Transfus. 2012;3(5):1–4. doi:10.4172/2155-9864.1000165.
16. Kulkarni N. Analysis of donor deferral in blood donors. Journal of Evolution of Medical and Dental Sciences. 2012;1(6)1076-83.
17. Vimal M, Jayashree K. Reasons for permanent deferral among blood donors in a tertiary care hospital in South India. Asian J Transfus Sci. 2012;6(1):42–45.
18. Hao J, Li Y, Wu Q, Zhang J, Liu T. Prevalence of hypertension in blood donors and potential for donor education. Transfus Apher Sci. 2011;45(3):239–243.
19. Chenna D, Shastry S, Murugesan M, Baliga PB. Implication of deferral pattern on the donor pool- Study at a Tertiary Care Hospital. J Appl Haematol. 2015;6;111-4.
20. Kumar SH, Sudhamani S, Roplekar P. Analysis of predonation deferral of blood donors in a tertiary care hospital. J Sci Soc. 2019;46(3):86–9. doi: 10.4103/jss.JSS-40-19.
21. Chauhan C, Chauhan R, Seema A, Dutta S, Joshi H. Pattern and outcome of donor deferral?- Need of the hour. Int J Res Med Sci. 2018 Jan;6(1)289-92.
22. Shariff M H, Sadiqunissa, Sultana Q. Impact of blood donor deferrals on blood availability in a tertiary care centre of Dakshina Kannada. Indian Journal of Pathology and Oncology. Jul-Sept 2016;3(3)376-78.
23. Riley W, Schwei MM, McCullough J. The United States' potential blood donor pool: estimating the prevalence of donor-exclusion factors on the pool of potential donors. Transfusion. 2007;47(5):1004–1012. doi:10.1111/j.1537-2995.2007.01252.

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