EVALUATING THE CAUSES FOR PRE-DONATION DEFERRAL AMONG VOLUNTARY BLOOD DONORSAT A TERTIARY CARE HOSPITAL

Dr. Ranvijay Singh, Dr. Garima Singh, Dr. Swaraj Kumar Sharma, Dr. Nitu Chauhan*

Associate Professor[1], Department of Transfusion Medicine,Rajarshi Dashrath Autonomous State Medical College, Ayodhya, Uttar Pradesh, India.

Associate Professor[2], Department of Transfusion Medicine, Autonomous State Medical College, Firozabad, Uttar Pradesh, India.

Associate Professor[3], Department of Pathology, Maharshi Vashishtha Autonomous State Medical College, Basti, Uttar Pradesh, India.

Associate Professor[*], Department of Transfusion Medicine, S.N Medical College, Agra, Uttar Pradesh, India.

Corresponding Author: Dr. Nitu Chauhan[*]

Email ID: drnituchauhan26@gmail.com

ABSTRACT

Background: Safe blood donors form the backbone of safe blood transfusion services.Donor eligibility policies are a critical layer of blood safety designed to ensure selection of healthy donors and to protect recipients from any harm. Blood donors are rejected for various reasons. Deferred donors generally have a negative feeling about themselves as well as the blood donation process and in future, these donors are less likely to return for blood donation.

Aim of the study: This observational study aimed to analyze the causes of pre-donation deferral among voluntary blood donors at a tertiary care hospital.

Results: A total of 1200 donors were assessed, of which 1000 (83.33%) successfully donated blood, while 200 (16.67%) were deferred. Temporary deferrals accounted for 95% (n=190) of cases, and permanent deferrals constituted 5% (n=10). The leading cause of temporary deferral was low hemoglobin (14.17%), followed by medication use (12.67%) and recent tattooing or body piercing (10.83%). Among permanent deferrals, hypothyroidism on L-thyroxine (40%) was the most frequent cause.

Conclusion: The current findings suggest that it is important to increase awareness of voluntary, non-remunerated blood donation among young people and educate people about the common criteria for a healthy donor to minimize the loss of blood donors**.**

Keywords: Blood, Donor deferral, transfusion service

INTRODUCTION

Blood transfusion is a life saving procedure in many medical and surgical practices. According to National AIDS Control Organization's (NACO) statistics the annual rate of blood donation in India is about 7.4 million units, against therequirement of 10 million units [1]. Pre-donation screening of potential blood donors is critical for ensuring the safety of the blood collected, and donor deferral as a result of risk factors is practiced worldwide. It is important to study the pattern of deferrals to reduce unnecessary deferrals and encourage continuous blood donation.

According to World Health Organization (WHO) figures, over 81 million units of blood are collected annually but only 39% are collected in developing countries which have 82% of the world's population [2]. A blood bank plays a key role in providing the safe blood to the recipients as and when required. Donor recruitment and retention is tough task faced even today by every blood bank inspite of the ever changing socio-economic environment and education of the people.Blood donors are rejected for various reasons. Individuals rejected for donating blood are known as “deferred” donors[3].Blood transfusion community undertakes many measures to ensure availability of adequate and safe blood and also ensures safety of recipients and donors by following stringent donor selection criteria[3,4,5].

The criteria for blood donor selection and deferral in India are provided by the Drugs and Cosmetics Act and Rules (1940) and the Technical Manual by the Director General of Health Services (DGHS). Blood donors who wish to donate blood can be deferred during blood donation for different reasons and are called “deferred donors.” The reasons for donor deferral and the deferral rate differ from one blood center to another. There are donor screening criteria to protect blood donors as well as recipients. Pre-donation evaluation of donors and modified physical criteria using a proper check list will lower deferral rates. The deferral rate can be further lowered by increasing public awareness about the common causes of deferral and by allowing prospective donors to pre-screen themselves [6]. Donor deferrals can be temporary or permanent, which can result in a blood shortage and burden the blood

centers [7]. This shortage due to donor deferrals and loss of blood units from improper collection is more common than a shortage due to disease marker testing [8].

However, donor selection processes might have negative impacts on the blood supply at the same time, as many deferred donors might not return to donate again. Thus, an evidence-based donor selection process is needed so as to avoid unnecessary deferral of donors, especially voluntary donors. The Drug and Cosmetics Act of 1940 and its (rules thereunder) recent amendment in March 2020 have laid down the criteria for donor selection and deferral in India, which are supplemented by the technical manual (Directorate General of Health Services, MoH, and FW, Government of India) [9]. Donor eligibility policies are a critical layer of blood safety designed to ensure selection of healthy donors and to protect recipients from any harm.It is important to increase awareness of voluntary, non-remunerated blood donation among young people and educate people about the common criteria for a healthy donor to minimize the loss of blood donors.

Now it is mandatory to identify and rationalize the donor selection criteria, thereby developing strategies so that the blood transfusion services are able to minimize unnecessary deferrals. The aim of this study was to describe the causes of pre-donation deferral among voluntary blood donors at a tertiary care hospital.

MATERIAL AND METHODS

This cross-sectional observational study was conducted in the Department of Blood Bank at a tertiary care hospital over a period of six months. The study included 1200 voluntary blood donors who registered during this period. Data on donor demographics, donation status, and reasons for deferral were collected using a structured questionnaire and donor records. Temporary deferrals were defined as conditions preventing blood donation for a limited period, while permanent deferrals were those barring donation indefinitely.

1. **Inclusion Criteria:**
    - Voluntary blood donors aged 18-60 years.
    - Donors fulfilling initial screening criteria for blood donation.
2. **Exclusion Criteria:**
    - Donors with incomplete data.
3. **Data Collection:**

- Donor demographics such as age, gender, occupation, and donation history were recorded.
- Reasons for deferral were categorized as temporary or permanent.
- Data were collected through face-to-face interviews and verified against hospital records.

4. **Data Analysis:**
    - Descriptive statistics were used to calculate frequencies and percentages using statistical software (e.g., SPSS).
    - Comparative analysis was performed against findings from similar studies to identify trends and deviations.

Statistical analysis:

Data recorded on the case report from and structured proforma were subsequently entered into a spreadsheet. Data management and analysis were performed using Microsoft Excel.

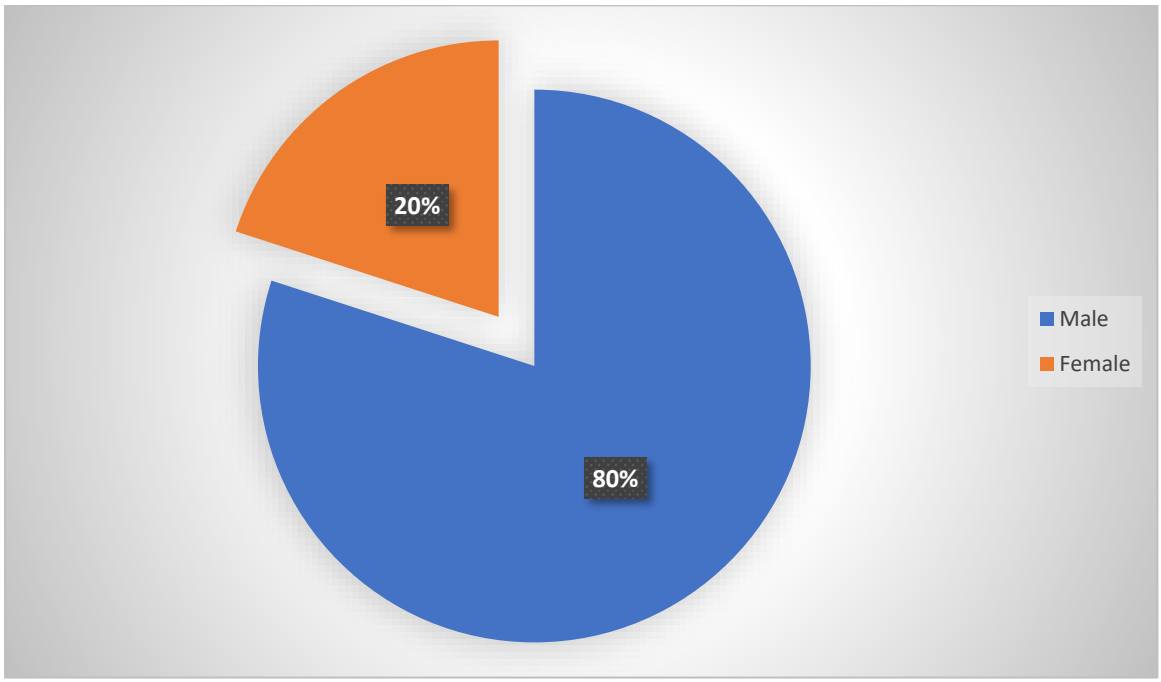
RESULTS

This was a observational studyinvolving 1200 voluntary blood donors, 960 (80%) were male, and 240 (20%) were female. Out of the total registrations, 1000 donors (83.33%) successfully donated blood, while 200 donors (16.67%) were deferred. Among the deferrals, 190 (95%) were temporary, and 10 (5%) were permanent. Male donors accounted for 10.83% of deferrals among total registrations, whereas female donors had a deferral rate of 5.83%.

Table 1: Demography and Deferral of Donors (n=1200)

Category	Total Registrations (n=1200) (%)	Total Donations (n=1000) (%)	Total Deferrals (n=200) (%)	Temporary Deferral (n=190) (%)	Permanent Deferral (n=10) (%)	Deferral Rate Among Total Registrations (%)

Male	**960/1200 (80.0)**	**830/1000 (83.0)**	**130/200 (65.0)**	**124/190 (65.26)**	**6/10 (60.0)**	**10.83**
Female	**240/1200 (20.0)**	**170/1000 (17.0)**	**70/200 (35.0)**	**66/190 (34.74)**	**4/10 (40.0)**	**5.83**
Total	**1200 (100)**	**1000 (100)**	**200 (100)**	**190 (100)**	**10 (100)**	**16.67**



Graph 1. Gender wise distribution

In the present study permanent deferral was observed in 10 cases (0.83% of the total registrations). The most common cause for permanent deferral were hypothyroidism on L-thyroxine, contributing to 40% of permanent deferrals, followed by uncontrolled diabetes on insulin (30%) and use of anti-epileptic drugs (20%). Other reasons included history of myocardial infarction (10%).

Table 2: Percentage of Permanent Deferrals (n=10)

Reason for Permanent Deferral	**Male (n)**	**Female (n)**	**Total (n)**	**Percentage of Permanent Deferrals (%)**
Hypothyroidism on L-	**1**	**3**	**4**	**40.0**

thyroxine				
Uncontrolled diabetes on insulin	**3**	**0**	**3**	**30.0**
On anti-epileptic drugs	**1**	**1**	**2**	**20.0**
History of myocardial infarction	**1**	**0**	**1**	**10.0**
Total	**6**	**4**	**10**	**100**

In the current study out of the 190 temporary deferrals, the most frequent reason was low hemoglobin, accounting for 14.17% of all temporary deferrals. Other significant causes included medication use (12.67%), tattooing or body piercing within one year (10.83%), and inadequate sleep (8.83%). Additional factors like anti-rabies vaccination, COVID vaccination, and respiratory illnesses each accounted for approximately 7% of temporary deferrals. Lifestyle-related causes such as smoking within 4 hours (6.75%) and alcohol consumption within 24 hours (6.33%) were also notable contributors.

Rare causes, including underage (<18 years), surgery, history of COVID infection (<28 days), and dengue within one year, each accounted for less than 2% of the total temporary deferrals.

Table 3: Reasons for Temporary Deferral Among Voluntary Blood Donors

Reason for Deferral	Male (n)	Female (n)	Total Deferrals (n)	Percentage Among Temporary Deferrals (%)
Low hemoglobin	105	65	170	14.17%
Medications	123	29	152	12.67%
Tattoo/body piercing (<1 year)	123	7	130	10.83%

Inadequate sleep	102	4	106	8.83%
Anti-rabies vaccine (<1 year)	74	12	86	7.17%
COVID vaccination (<2 weeks)	79	6	85	7.08%
Respiratory illness	67	17	84	7.00%
Smoking (<4 h)	81	0	81	6.75%
Alcohol (<24 h)	76	0	76	6.33%
Localised lesions/ulcers	70	5	75	6.25%
Other vaccines	41	4	45	3.75%
Under age (<18 years)	38	2	40	3.33%
Jaundice (within 1 year)	25	14	39	3.25%
Underweight	27	8	35	2.92%
Donation interval <3 months	18	0	18	1.50%
Hypotension	16	2	18	1.50%
Dental caries	14	3	17	1.42%
Surgery	10	4	14	1.17%
Allergy	6	2	8	0.67%
History of COVID infection (<28 days)	7	1	8	0.67%
Menstruation	0	7	7	0.58%
Dengue (within 1 year)	4	1	5	0.42%

Typhoid (within 1 year)	2	2	4	0.33%
Tuberculosis (<5 years)	3	0	3	0.25%
History of blood transfusion (<1 year)	1	2	3	0.25%
Total	**1200**	**200**	**1200**	**100%**

DISCUSSION

The most important step in improving the safety of blood and blood products is donor selection. It is important to know the reasons for donor deferral in view of scarcity of blood units in our country so that the temporarily deferred donors can be brought back again into the pool of blood donation. In this study, we have evaluated the various reasons for donor deferral.

This study revealed that temporary deferrals far outnumber permanent deferrals among voluntary blood donors. Low hemoglobin emerged as the leading cause of temporary deferral, consistent with findings from studies by G.W Nyamu et al 2024 [10] and Sheetal et al 2023[11] , which also highlighted nutritional deficiencies as a significant barrier to donation eligibility. Medication use and recent tattoos or piercings were other notable factors, reflecting modern lifestyle trends and healthcare practices.

The higher rate of deferrals among female donors due to low hemoglobin aligns with studies suggesting gender-based nutritional disparities. Targeted interventions such as iron supplementation and dietary counseling could address this issue effectively. The finding of lifestyle-related causes, such as smoking and alcohol consumption, underscores the need for public education about preparation for blood donation.

Permanent deferrals were relatively rare but significant, with hypothyroidism and diabetes being the most frequent causes. These findings align with studies by Saravanan S et al 2023 [12]which emphasize the importance of medical screening in ensuring donor and recipient safety.

Comparison with similar studies:

S.no	Studies	Deferral rate
1.	Present study	16.67%
2.	G.W Nyamu et al 2024 [10]	21.60%
3.	Sheetal et al 2023[11]	16%
4.	Saravanan S et al 2023 [12]	13.81%
5.	Ahmad et al 2020 [13]	12.6%
6.	Valerian et al 2018 [14]	12.7%
7.	Vimal et al 2016 [15]	14.87%
8.	Ngoma et al 2013[16]	14%
9.	Mangwana S et al 2013 [17]	17.88%

Efforts to address modifiable factors, such as nutritional counseling and public awareness campaigns about donation eligibility, could significantly reduce temporary deferral rates. Additionally, targeted interventions for female donors, who exhibited higher rates of deferral due to low hemoglobin, could improve donor retention and availability [18,19].

Safe blood donors form the backbone of safe blood transfusion services. The safety of the blood supply is ensured through several procedures from donor selection to testing of donated units. Donor selection is still emphasized even in the era of sensitive transfusion-transmitted infections (TTIs) screening techniques [20-22].

The blood donor deferral can have subtle variations based on regional aspects that should be considered when national policies are developed as pattern of deferral varies according to the

epidemiology of diseases in different demographic areas. Similar studies should be conducted in other centers of the region to gather more evidence so that the results can be generalized.

CONCLUSION

This study underscores the need for enhanced pre-donation screening and interventions to minimize deferral rates among voluntary blood donors. Addressing temporary causes, particularly low hemoglobin and modifiable lifestyle factors, could significantly improve donor eligibility. Furthermore, public education on permanent deferral conditions is essential to manage donor expectations and encourage safe donation practices. By optimizing donor management strategies, blood donation programs can ensure a more reliable and sustainable blood supply.

Future research should explore the effectiveness of targeted interventions, such as nutritional supplementation and educational programs, in reducing deferral rates. Expanding the donor pool through innovative strategies while maintaining safety standards will be crucial for meeting the growing demand for blood products.

References

1.Department of AIDS Control Ministry of Health and Family Welfare Government of India. Annual report. 2008-2009:27

2.Unnikrishnan B, Rao P, Kumar N, et al. Profile of blood donors and reasons for deferral in coastal South India. The Australasian Medical Journal. 2011;4(7):379-385.

3.Sundar P, Sangeetha SK, Seema DM, Marimuthu P, Shivanna N. Pre-donation deferral of blood donors in South Indian set-up: An analysis. Asian Journal of Transfusion Science 2010;4(2):112-115. doi:10.4103/ 0973-6247.67037.

4. Okoroiwu HU, Asemota EA. Blood donors deferral prevalence and causes in a tertiary health care hospital, Southern Nigeria. BMC Health Serv Res.2019;19:510. doi: 10.1186/s12913-019-4352-2, PMID 31331326

5. Sahani N, Bajaj S, Tirkey R, Tirkey R. Pre-donation deferral of blood donors: A retrospective analysis in a tertiary care hospital. Int J Sci Res.2019;8:1293-96.

6.Krishna MC, Harish SG. Evaluation of reasons for blood donor deferral in a tertiary care teaching hospital blood bank unit, Tumkur, Karnataka, India. Indian J Pathol Res Pract. 2018;7:638-42.

7. Anegundi R, Divyashree BN. Patterns of pre-donation deferral in voluntary blood donors with its impact on the donor pool-a study in a tertiary care hospital. Trop J PatholMicrobiol. 2021;7:55-9. doi: 10.17511/jopm.2021.i01.09

8. Chauhan DN, Desai KN, Trivedi HJ, Agnihotri AS. Evaluation of blood donor deferral causes: A tertiary-care center-based study. Int J Med Sci Public Health 2015;4:389-92. doi: 10.5455/ijmsph.2015.1211201470

9. Taneja K, Bhardwaj K, Arora S, Agarwal A. Analysis of the reasons for deferral of prospective blood donors in a tertiary care hospital in North India. J Appl Hematol. 2015;6:154-6. doi: 10.4103/1658-5127.171988

10.Nyamu GW, Shee MA, Kiende P, et al. Causes of pre and post-donation deferrals among blood donors, at Kwale Satellite Blood Transfusion Center, Kwale County, Kenya, 2018-2022. *BMC Public Health*. 2024;24(1):2197. Published 2024 Aug 13. doi:10.1186/s12889-024-19535-1

11.Malhotra S, Negi G. Analysis of reasons of blood donor deferral at a tertiary care institute in India and its reflections on community health status. *Asian J Transfus Sci*. 2023;17(1):48-52. doi:10.4103/ajts.AJTS_69_19

12. S, Saravanan & Sa, Manimala & M, Parimalam & Ravishankar, Jeyaraj. Analysis Of Causes For Pre-Donation Deferral Among Voluntary Blood Donors At A Tertiary Care Hospital. Asian Journal of Pharmaceutical and Clinical Research.2023; 128-131. 10.22159/ajpcr.2023.v16i12.48457.

13. Ahmad N, Khan S, Hassan MJ, Jetley S. Analysis of blood donor deferral pattern in a new blood bank of a tertiary care hospital in Delhi region. Int Arch Biomed Clin Res 2020;6:PA7-11.

14. Valerian DM, Mauka WI, Kajeguka DC, Mgabo M, Juma A, Baliyima L, et al. Prevalence and causes of blood donor deferrals among clients presenting for blood donation in Northern Tanzania. PLoS One 2018;13:e0206487. doi: 10.1371/journal.pone.0206487, PMID 30359434

15. Vimal M, Sowmya S, Nishanthi A, Ramya G. Evaluation of blood donor deferral causes: A retrospective study from South India. AnnPathol Lab Med 2016;3:605-11.

16. Ngoma AM, Goto A, Sawamura Y, Nollet KE, Ohto H, Yasumura S. Analysis of blood donor deferral in Japan: Characteristics and reasons. TransfusApher Sci 2013;49:655-60. doi: 10.1016/j.transci.2013.06.020, PMID 23891317

17.Anegundi R, Divyashree BN. Patterns of pre-donation deferral in voluntary blood donors with its impact on the donor pool-a study in a tertiary care hospital. Trop J PatholMicrobiol2021;7:55-9. doi: 10.17511/jopm.2021.i01.09

18. Koju S, Bhatt RD, Shankhadev R, Twitwi R. Blood donors and their deferral pattern in a university hospital, Nepal. Glob J Transfus Med 2022;7:23-7. doi: 10.4103/gjtm.gjtm_11_22

19. Patil O, Jayaprakash CS. Evaluation of causes of deferral among blood donors. J HematolTransfus2021;8:1089.

20. Sheetal Malhotra et al. Analysis of reasons of blood donor deferral at a tertiary care institute in India and its reflections on community health status. Asian J Transfus Sci. 2023 Mar 1;17(1):48–52.

21. Gibson Waweru Nyamu et al. Causes of pre and post-donation deferrals among blood donors, at Kwale Satellite Blood Transfusion Center, Kwale County, Kenya, 2018–2022. *BMC Public Health*. 2024; 24.

22. Dr. Gurika et al. To Determine the Blood Donor Deferral Pattern and Its Causes Among Blood Donors in Tertiary Care Hospital et al. International Journal of Health Sciences and Research. 2024; 14 (8).