

## ANALYSIS OF CAUSES FOR PRE-DONATION DEFERRAL AMONG VOLUNTARY BLOOD DONORS AT A TERTIARY CARE HOSPITAL

SARAVANAN S, MANIMALA SA, PARIMALAM M, JEYARAJ RAVISHANKAR\*<sup>ORCID</sup>

Department of Immunohematology and Blood Transfusion, Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India.

\*Corresponding author: Jeyaraj Ravishankar; Email: docjravishankar@gmail.com

Received: 29 May 2023, Revised and Accepted: 10 July 2023

### ABSTRACT

**Objectives:** 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. The aim of the present study was to determine the rate and reasons for pre-donation donor deferral among voluntary blood donors.

**Methods:** This was a single-center, retrospective cross-sectional study conducted by analyzing 3 years of data, from January 2020 to December 2022, over a period of 2 months (December 2022 and January 2023) retrieved from the donor deferral register. The data was entered in Microsoft Excel and analyzed using the Statistical Package for the Social Sciences software. Descriptive statistical measures were utilized to present the data.

**Results:** Among 29,847 voluntary donors, 13.81% (4123/29,847) were deferred, of whom 84.2% (3472/4123) were males. The deferral rate among males was 12.19% (3472/28,480), while it was 47.62% (651/1367) in females. 53.04% of the deferred donors were in the age group of 18–30 years (2187/4123). 98.73% (4071/4123) of the deferrals were temporary. Hypothyroidism on treatment (42.30%, 22/52), uncontrolled diabetes on insulin (34.62%, 18/52) and epilepsy on treatment (11.54%, 6/52) were the common reasons for permanent deferral, while low hemoglobin (13.07%, 532/4,123), medications (11.67%, 475/476/4,071) and body piercing (9.85%, 406/4,123) were the most common reasons for temporary deferral. Low hemoglobin was the common reason for deferral among repeat donors (55.45%, 295/532) compared to first-time donors.

**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 donation, Body piercing, Deferral, Medication.

© 2023 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2023v16i12.48457>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>

### INTRODUCTION

Blood transfusion is a life-saving procedure in many instances, and it requires an adequate supply of safe blood. Many measures have been taken to make the blood transfusion safe by the National blood transfusion council [1]. It is estimated that donation by 1% of the population (10/1,000 population) is generally the minimum needed to meet a nation's most basic requirements for blood; the requirements are higher in countries with more advanced health-care systems. The National AIDS Control Organization's statistics show that the annual rate of blood donation in India is about 5.83 million units, against the requirement of 10 million units [2]. The demand for blood is increasing due to the increase in population. This requires recruiting safe donors and preventing high-risk donors from donating [3]. Blood donor selection is a cornerstone for blood transfusion safety, designed to safeguard the health of both donors and recipients. Reducing the risk of donor adverse reactions improves donor safety and compliance. Stringent blood donor selection attempts to reduce the risk of transfusion-transmitted infections [4].

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 [5]. Donor deferrals can be temporary or permanent, which can result in a blood shortage and burden the blood centers [6]. 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 [7].

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) [8]. 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 [5]. The aim of this study was to describe the reasons and frequency of donor deferral in the blood center of a tertiary care hospital, thereby helping in planning efficient recruitment strategies and maintaining a continuous and safe blood supply.

### METHODS

This was a single-center retrospective cross-sectional study conducted by analyzing 3 years of data, from January 2020 to December 2022, over a period of 2 months (December 2022 and January 2023) retrieved from the donor deferral register at the Department of Immunohematology and Blood Transfusion, Tirunelveli Medical College Hospital, Tirunelveli, Tamil Nadu, India. This study was approved by the Institutional Ethics Committee (TIREC Number: 20232591). Blood

donors were screened as per the guidelines of the Drug and Cosmetic Act of 1940 (recent amendment in March 2020) and supplemented by guidelines of the DGHS guidelines, Ministry of Health and Family Welfare (2022), and when deferred, categorized as temporary or permanent deferral. Deferred donors were counseled and informed of the reason behind deferral and counseled for donation at a further date or for treatment in special clinics. Data on all blood donors who were deferred from voluntary blood donation during the study period was included for analysis.

### Statistical analysis

Data was entered in Microsoft Excel and data analysis was performed using the Statistical Package for the SPSS software version 20 (IBM, USA). Descriptive statistical measures, i.e., frequency and percentage, were utilized to present the data.

### RESULTS

In the present study, out of a total of 29,847 registered donors, 13.81% (n=4123/29,847) were deferred due to various reasons. Among the deferred donors, 84.2% (n=3472/4123) were males, and 15.8% (n=651/4123) were females. The percentage of deferral among male and female donors was 12.19% (n=3472/28,480) and 47.62% (n=651/1367), respectively. 98.73% (4071/4123) of deferrals were temporary, while 1.26% (52/4123) were permanent deferrals (Table 1).

The age of the deferred donors ranged from 18 years to 65 years. The deferral rate was highest in the age group of 18–30 years (53.04%, n=2187/4123) in the present study, followed by the age group of 31–45 years (30.53%, 1259/4123) (Fig. 1). The most common reason for temporary deferral was low hemoglobin (Hb<12.5 g/dL) in 13.07% (n=532/4123), followed by intake of medications in 11.67% (n=475/4071) (Table 2), while hypothyroidism on L-thyroxine treatment in 42.30% (n=22/52), uncontrolled diabetes on insulin in 34.62% (n=18/52) and epilepsy on treatment in 11.54% (n=6/52) were the common reasons for permanent deferrals (Tables 2 and 3).

Medications (11.08%; n=385/3472) and body piercing (11.08%; n=385/3472) were the major reasons for the temporary deferral in males. Low hemoglobin (31.18%; n=203/651) and medications (13.82%; n=90/651) were the major reasons for temporary deferral in females (Table 3) (Fig. 2). Deferral due to upper respiratory tract infections (68.94%; n=182/264) was more common than lower respiratory tract illness (31.06%; n=82/264). Deferrals due to vaccination were mainly due to anti-rabies vaccine (39.88%; n=268/672) and COVID vaccine (39.73%; n=267/672).

### DISCUSSION

In the present study, reasons for donor deferrals and their frequency were analyzed at the blood center of Tirunelveli Medical College Hospital. The study showed an overall deferral rate of 13.81%. This was similar to studies conducted in various parts of the country. This rate varies from 5.56% to 14.87%, while it varies from 8.69% to 14% in different parts of the world, like Japan (14%), Northern Tanzania (12.7%), Nepal (9.5%) and Southern Nigeria (8.69%).

S. No.	Studies	Deferral rate
Indian studies		
1.	Present study	13.81%
2.	Vimal <i>et al.</i> [9]	14.87%
3.	Ahmad <i>et al.</i> [10]	12.6%
4.	Sundar <i>et al.</i> [11]	5.84%
5.	Chauhan <i>et al.</i> [12]	5.56%
Studies in world		
1.	Okoroiwu <i>et al.</i> (Southern Nigeria) [13]	8.69%
2.	Koju <i>et al.</i> (Nepal) [14]	9.5%
3.	Valerian <i>et al.</i> (Northern Tanzania) [15]	12.7%
4.	Ngoma <i>et al.</i> (Japan) [16]	14%

Out of total deferrals, 98.73% (4,071/4,123) accounted for temporary deferrals and 1.26% (56/4,123) accounted for permanent deferrals. This was similar to the study by Jaiswal *et al.*, where temporary and permanent deferral were accounted for at (96.32%) and (3.68%) [17].

Although a greater number of male donors were deferred in the present study, the deferral rate was higher in females (47.62%, n=651/1,367). This was similar to the studies by Krishna and Harish [5] and Taneja *et al.* [8], where the deferral rate in females was 50% (n=12/24) and 49.5% (n=1,375/2,773). The present study showed high rates of donor loss due to low hemoglobin (13.07%, n=532/4,071) and low body weight (2.65%, n=108/4,071) indicating low awareness of health and nutrition in the general population.

In the present study, the most common reason for temporary deferral was low hemoglobin (13.07%; n=532/4,071) followed by the intake of medications (11.47%; n=475/4,071). This was similar to the study by Chauhan *et al.*, where the deferral rate due to low hemoglobin and medications was 15.45% and 10.45% [7]. This rate was lower than the study by Arun *et al.* (37.11% and 18.47%) [18]. The common reasons for permanent deferral were hypothyroidism on L-thyroxine treatment (42.30%, n=22/52), uncontrolled diabetes on insulin (34.62%, n=18/52) and intake of anti-epileptic drugs (11.54%, n=6/52), while in the study by Patil and Jayaprakash, reasons for permanent deferrals

Table 1: Demography and deferral of donors

Gender of Blood donor	Total registrations (%)	Total donations (%)	Total deferrals (%)	Temporary deferral (%)	Permanent deferral (%)	Deferral rate among total registrations (n=29,847) (%)
Male	28,480/29,847 (95.41)	25,008/25,724 (97.21)	3472/4123 (84.2)	3442/4071 (84.55)	30/52 (57.69)	11.63
Female	1367/29,847 (4.59)	716/25,724 (2.79)	651/4123 (15.8)	629/4071 (15.45)	22/52 (42.31)	2.18
Total	29,847 (100)	25,724 (100)	4123 (100)	4071 (100)	52 (100)	13.81

Table 2: Percentage of permanent deferrals

Reason for deferral	Male	Female	Total	Percentage of permanent deferral
Hypothyroidism on L-thyroxine	2	20	22	42.30
Uncontrolled diabetes on insulin	18	0	18	34.62
On anti-epileptic drugs	4	2	6	11.54
History of myocardial infarction	3	0	3	5.77
Extensive psoriasis	2	0	2	3.85
Congenital blindness and deafness	1	0	1	1.92
Total	30	22	52	100

Table 3: Reasons and percentage of temporary deferral

Reasons for the deferral	Male	Female	Total number of deferrals	Percentage among temporary deferrals
Low haemoglobin	329	203	532	13.07
Medications	385	90	475	11.67
Tattoo/body piercing (<1 year)	385	21	406	9.97
Inadequate sleep	319	12	331	8.13
Anti-rabies vaccine (<1 year)	231	37	268	6.58
COVID vaccination (<2 weeks)	248	19	267	6.55
Respiratory illness	211	53	264	6.48
Smoking (<4 h)	253	0	253	6.21
Alcohol (<24 h)	237	0	237	5.82
Localised lesions/ulcers	217	15	232	5.69
Other vaccines	126	11	137	3.36
Under age (<18 years)	118	5	123	3.02
Jaundice (within 1 year)	76	42	118	2.89
Under weight	83	25	108	2.65
Donation interval<3 months	56	0	56	1.37
Hypotension	49	6	55	1.35
Dental caries	42	8	48	1.18
Surgery	31	13	44	1.08
Allergy	19	5	24	0.59
History of COVID infection (<28 days)	22	2	24	0.59
Menstruation	0	21	21	0.52
Dengue (within 1 year)	12	4	16	0.39
Typhoid (within 1 year)	7	5	12	0.30
Tuberculosis (<5 years)	11	0	11	0.27
History of blood transfusion (<1 year)	4	5	9	0.22
Total			4071	100

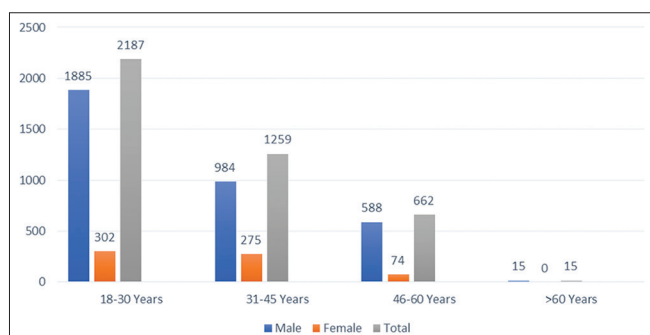


Fig. 1: Deferral rates among different age groups

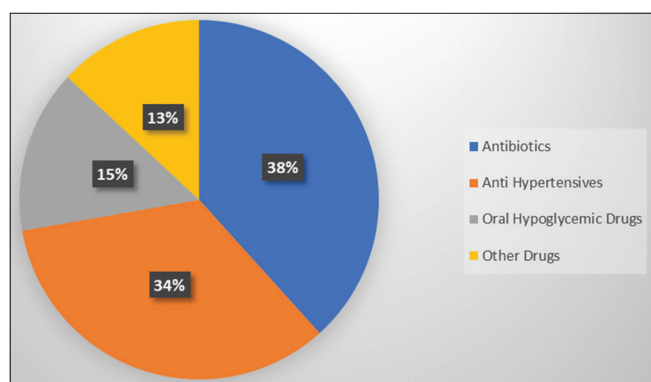


Fig. 2: Rate and reasons for deferrals due to medications

were hypertension 97.12% (n=371/382), uncontrolled diabetes 1.05% (n=4/382) and asthma 1.05% (n=4/382) [19].

The study showed high rates of donor loss due to tattoos and body piercing (9.97%, n=406/4,071), smoking (6.21%, n=253/4,071), and alcohol (5.82%, n=237/4,071), indicating a lack of knowledge about blood donation criteria in the population. Tattooing is on the

rise among the younger population in recent times. The study also revealed high rates of donor loss due to vaccination against COVID (6.55%, 267/4,071), indicating a period of deferral after vaccination during the COVID pandemic. The study also revealed high rates of donor loss due to inadequate sleep (8.13%, n=331/4,071), indicating that many donors were patient attenders and that there was a lack of awareness about adverse donor reactions among voluntary blood donors.

## CONCLUSION

To conclude, the current study showed that the majority of donor deferrals were due to temporary causes like smoking, alcohol and inadequate sleep. So, donors should be properly evaluated before blood donation and counseled to come back for donation after the temporary deferral period is over. This will not only increase blood center resources but will also improve donor compliance. Regulatory guidelines need to be updated from time to time according to the current health scenario. Corrective actions should be taken to minimize the loss of blood donors without compromising the safety of blood.

The limitation of the present study was that it was a retrospective study. A prospective study can follow donors who were deferred to find out if donors with temporary deferral can be encouraged for successful blood donation after the deferral period. Donors who were permanently deferred can be followed to see if they donate again without disclosing their deferral status.

## ACKNOWLEDGMENT

The authors would like to acknowledge all staff from the blood center for their cooperation and support in conducting this study.

## SOURCES OF SUPPORT

Nil.

## CONFLICT OF INTEREST

None declared.

## AUTHOR'S CONTRIBUTIONS

SS conceptualized the study and collected data. MSA critically analyzed and approved the final draft. PM edited manuscript and analyzed data. JR analyzed data and prepared manuscript.

## REFERENCES

- Kulkarni N. Analysis of donor deferral in blood donors. *J Evol Med Dent Sci* 2012;1:1081-7. doi: 10.14260/jemds/17
- Girish CJ, Chandrashekar TN, Ramesh BK, Kantikar SM. Pre-donation deferral of whole blood donors in district transfusion centre. *J Clin Diagn Res* 2012;6:47-50.
- 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.
- Gillet P, Neijens E. An original approach to evaluating the quality of blood donor selection: Checking donor questionnaires and analyzing donor deferral rate. *Front Med (Lausanne)* 2018;5:74. doi: 10.3389/fmed.2018.00074, PMID 29619370
- 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.
- 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 Pathol Microbiol* 2021;7:55-9. doi: 10.17511/jopm.2021.i01.09
- 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
- 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
- Vimal M, Sowmya S, Nishanthi A, Ramya G. Evaluation of blood donor deferral causes: A retrospective study from South India. *Ann Pathol Lab Med* 2016;3:605-11.
- 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.
- Sundar P, Sangeetha SK, Seema DM, Marimuthu P, Shivanna N. Pre-donation deferral of blood donors in South Indian set-up: An analysis. *Asian J Transfus Sci* 2010;4:112-5. doi: 10.4103/0973-6247.67037, PMID 20859511
- Chauhan C, Chauhan R, Awasthi S, Dutta S, Joshi H. Pattern and outcome of donor deferral-? Need of hour. *Int J Res Med Sci* 2017;6:289-92. doi: 10.18203/2320-6012.ijrms20175736
- 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
- 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
- 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
- Ngoma AM, Goto A, Sawamura Y, Nollet KE, Ohto H, Yasumura S. Analysis of blood donor deferral in Japan: Characteristics and reasons. *Transfus Apher Sci* 2013;49:655-60. doi: 10.1016/j.transci.2013.06.020, PMID 23891317
- Jaiswal M, Maheshwari S, Saxena R, Yadav P. Analysis of pre-donation deferral causes in blood donors at a rural medical institute of Rohilkhand region, India. *Int J Biomed Adv Res* 2016;7:113-18. doi: 10.7439/ijbar.v7i3.3060
- Arun R, Subash S, Arumugam P. Analysis of blood donor deferral causes in Chennai, India. *Int J Med Health Sci* 2012;3:61-5.
- Patil O, Jayaprakash CS. Evaluation of causes of deferral among blood donors. *J Hematol Transfus* 2021;8:1089.