



## EVALUATION OF BLOOD DONOR DEFERRAL PATTERN IN CENTRAL INDIA: A STUDY IN A TERTIARY CARE CENTRE BLOOD BANK

### Transfusion Medicine

**Prakriti Gupta** Demonstrator, Department of Pathology, Gajra Raja Medical College, Gwalior

**Reema Bhushan** Assistant Professor, Department of Pathology, Gajra Raja Medical College, Gwalior

**Sudha Iyengar** Professor, Department of Pathology, Gajra Raja Medical College, Gwalior

### ABSTRACT

**Introduction:** Blood donation is a vital and life saving procedure. According to the WHO (World Health Organization), less than 45% blood is collected in developing countries, home to 80% of the world's population. Various causes of the pre-blood donation deferral need to be studied systematically to improve the donation rate. The aim of the study was to evaluate different causes of donor deferral in blood bank, GR Medical College and JAH group of hospital in Gwalior. **Materials and Methods:** This was a retrospective study which included all the donors reporting for blood donation in blood bank GR Medical College and JAH group of hospital in Gwalior from January 2019 to December 2022. The donor deferral can be divided and suitable donors were selected based upon the NACO and WHO guidelines. Proper records were kept for deferral. Deferred donors data was analysed with respect to causes of deferral, both for temporary and permanent causes. **Result:** Out of 51812 people who have come for blood donation, 49791 (96.1%) were males and 2021 (3.9%) were females. Among them, number of deferred donors was 6217 (12%). 5794 (93.2%) were deferred due to temporary causes while 423 (6.8%) due to permanent causes. There were 6017 males and 200 females deferral. Most common cause among temporary deferral was anaemia (Hb <12.5%), followed by fever. Most common cause in permanent deferral was high risk behaviour followed by asthma. **Conclusion:** It is important to analyse and study the causes of blood donor deferral in order to ensure safe blood/component transfusion.

### KEYWORDS

Anemia, Jaundice, Temporary, Permanent

#### Introduction:

Blood donation is a vital and life saving procedure. According to the WHO, of the estimated 80 million units of blood donated annually worldwide, less than 45% is collected in developing countries, home to 80% of the world's population(1). NACO (*National Aids Control Organization*) states that there is a serious mismatch between demand and availability of blood in the developing country: against 8.5 million units/year requirement, the availability is only 4.4 million units/year. Another concern is that voluntary blood donation is only 52 percent (2). Blood Bank plays a crucial role in providing safe blood to the recipients as and when required. Proper donor selection is an important in order to ensure safe blood donation. In order to ensure that the blood do not harm the donor or recipient, stringent donor deferral criteria is mandatory. Various causes of the pre-blood donation deferral need to be studied systematically to improve the donation rate. Deferral is a painful and sad experience for blood donor as well as the transfusion centre and it necessitates additional efforts towards new recruitments. Moreover, deferring prospective donors often leaves them with negative feelings about themselves as well as the blood donation process(3). Those donors who are deferred temporarily need to be counselled and provided with proper follow up in order to avoid any psychological effect or negative impact on them, which may prevent them from future donations. Few studies conducted in India in the past have provided different common reasons for deferral of whole blood donors (4, 5). Deferrals are divided into permanent and temporary. The aim of this study is to analyse the frequency and causes of temporary and permanent deferral among the blood donors in blood bank of Gajra Raja Medical College and JA Group of Hospitals.

#### MATERIALS AND METHODS

This was a retrospective study which included all the donors reporting for blood donation in the Blood Bank of Gajra Raja Medical College and JA Group of Hospitals, from 1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2022. The donors were evaluated on the basis of clinical history, physical examination, haemoglobin estimation, blood pressure and weight. The donor deferral can be divided into three stages and suitable donors were selected based upon the NACO and WHO (World Health Organization) guidelines of assessing donor suitability for blood donation. Data was collected and records were maintained by the Blood Bank, Gajra Raja Medical College and JA Group of Hospitals

The clinical history included pertinent questions related general information i.e. age, sex, residence, history of previous blood donation and any complication associated with it like dizziness. Questionnaire included history of malaria in last three months, typhoid in last one year, any history of allergic reaction on medication during last 6 months, any fainting spells or convulsions, prolonged bleeding;

history of minor or major surgery in last three months and six months respectively; antirabies vaccination, tattooing, skin piercing in last one year; dental extraction, antibiotics, aspirin, alcohol, vaccination or steroid intake in last 72 hours. Donor was inquired about any swollen glands, repeated episodes of diarrhoea, persistent cough, unexplained weight loss and continuous low grade fever in last six months. Previous history of donor regarding heart, kidney, thyroid or lung disease, cancer, epilepsy, jaundice, tuberculosis and uncontrolled diabetes was also asked for. In case of female donors, additional information was obtained regarding pregnancy; abortion in last three months; breast feeding, and menstrual history. If answer to any of the above questionnaire is yes, the donor is deferred. This is regarded as the first stage of the deferral. If donor is found fit based on the clinical history provided by him/her, he/she was counselled about the high risk behaviour. The donor is deferred at this stage if history points towards high risk behaviour. This could be regarded as deferral at second stage. If the high risk history is negative, donor is taken for examination in which height, weight (>45kgs), pulse(60-100 beats/minute), blood pressure(more than 90/60mmHg and less than 120/80 mmHg), temperature(afebrile), blood group was recorded. Hemoglobin(>12.5 g/dl) was estimated using hemocue apparatus. If physical parameter do not fall within normal limits, the donor is deferred( third stage deferral).

Proper records were kept for deferral. Deferred donors data was analysed with respect to causes of deferral, both for temporary and permanent causes, to find causes separately in male and female donors and among the resident versus non residents donors.

#### RESULT

Out of 51812 people who have come for blood donation, 49791 (96.1%) were males and 2021 (3.9%) were females. Among them, number of deferred donors was 6217(12%) (table 1). 5794 (93.2%) were deferred due to temporary causes while 423 (6.8%) were deferred due to permanent causes (table 2). There were 6017 males and 200 females deferral

Most common cause among temporary deferral was anemia (Hb <12.5%), followed by jaundice in last 1 year (table 3). Most common cause in permanent deferral was high risk behaviour followed by asthma (table 4, 5).

**Table 1: Total number of registrations, number and percentage of deferrals among males and female donors**

|       | No. Of Registrations | No. Of Deferrals | % Deferrals Out Of Total Registrations |
|-------|----------------------|------------------|----------------------------------------|
| Males | 49791                | 6017             | 12.1%                                  |

|         |       |      |       |
|---------|-------|------|-------|
| Females | 2021  | 200  | 9.8%  |
| Total   | 51812 | 6217 | 11.9% |

**Table 2: Number and percentage of temporary and permanent deferrals.**

|                        | No. Of Deferrals | % Of Total Deferrals | % Deferrals F Total Registration |
|------------------------|------------------|----------------------|----------------------------------|
| Temporary              | 5794             | 93.1%                | 11.2%                            |
| Permanent              | 423              | 6.8%                 | 0.81%                            |
| Total No. Of Deferrals | 6217             | 100                  | 11.9%                            |

**Table 3 : Causes of temporary deferrals with their respective percentage among the total temporary deferrals and the total number of deferrals**

| Cause                        | No.  | %Temporary Deferrals | %Total Deferrals |
|------------------------------|------|----------------------|------------------|
| Hb                           | 2277 | 39.3                 | 36.7             |
| Jaundice                     | 590  | 10.2                 | 9.5              |
| Antibiotic                   | 486  | 8.4                  | 7.8              |
| Wt                           | 434  | 7.5                  | 6.9              |
| Dog Bite                     | 330  | 5.7                  | 5.3              |
| Tattoo                       | 295  | 5.1                  | 4.7              |
| Donated                      | 237  | 4.1                  | 3.8              |
| Tb                           | 203  | 3.5                  | 3.2              |
| Typhoid                      | 203  | 3.5                  | 3.2              |
| Alcohol 3 Hr Bk              | 104  | 1.8                  | 1.6              |
| Major Sx                     | 93   | 1.5                  | 1.5              |
| Rash On Site                 | 87   | 1.4                  | 1.4              |
| Malaria                      | 52   | 0.9                  | 0.8              |
| Ear Piercing                 | 52   | 0.9                  | 0.8              |
| Smack Intake                 | 40   | 0.7                  | 0.6              |
| Minor Sx                     | 28   | 0.5                  | 0.5              |
| Dengue                       | 28   | 0.5                  | 0.5              |
| Active Infection             | 28   | 0.5                  | 0.5              |
| Acute Infection              | 28   | 0.5                  | 0.5              |
| Hemorrhoid With Active Bleed | 24   | 0.4                  | 0.4              |
| Breast Feed                  | 23   | 0.4                  | 0.4              |
| Period                       | 16   | 0.3                  | 0.3              |
| Age<18                       | 16   | 0.3                  | 0.3              |
| No Suitable Vein Seen        | 16   | 0.3                  | 0.3              |
| Dental Extraction            | 16   | 0.3                  | 0.3              |
| Chicken Pox                  | 12   | 0.2                  | 0.2              |
| Not Slept Prev. Night        | 5    | 0.1                  | 0.1              |
| Low Bp                       | 5    | 0.1                  | 0.1              |
| Allergic Dis                 | 5    | 0.1                  | 0.1              |
| Hep B Vaccine                | 5    | 0.1                  | 0.1              |
| Abortion                     | 5    | 0.1                  | 0.1              |
| Received Blood Transfusion   | 5    | 0.1                  | 0.1              |
| Misc                         | 46   | 0.8                  | 0.7              |
| Total                        | 5794 | 100                  | 93.2             |

**Table 4: Categories among the permanent deferrals with their individual percentage among the permanent deferrals and among the total deferrals**

|                                          | No. Of Deferrals | % Of Permanent Deferrals | % Total Deferrals |
|------------------------------------------|------------------|--------------------------|-------------------|
| Hrb                                      | 169              | 40                       | 2.71              |
| Asthma                                   | 58               | 13.6                     | 0.9               |
| Age>65                                   | 50               | 11.8                     | 0.8               |
| Epilepsy                                 | 48               | 11.3                     | 0.8               |
| Uncontrolled Dm                          | 42               | 10                       | 0.7               |
| Heart Disease(Chest Pain,Breathlessness) | 19               | 4.4                      | 0.30              |
| Hbs Ag Positive                          | 8                | 1.9                      | 0.13              |
| Chronic Liver Dis                        | 8                | 1.9                      | 0.13              |
| On Diuretic,Pedal Edema                  | 5                | 1.3                      | 0.08              |
| Coagulation Disorder                     | 5                | 1.3                      | 0.08              |
| Mi                                       | 5                | 1.3                      | 0.08              |
| Chronic Renal Disease                    | 3                | 0.6                      | 0.04              |
| Throat Cancer                            | 3                | 0.6                      | 0.04              |
| Total                                    | 423              | 100                      | 6.8               |

**Table 5: Five Leading Causes Of Deferral In Male And Female Donors**

| Males=2136 |      |                  | Females=200 |    |                  |
|------------|------|------------------|-------------|----|------------------|
| Causes     | N    | %Total Deferrals | Causes      | N  | %Total Deferrals |
| Hb         | 2277 | 36.7             | Hb          | 95 | 47.5             |
| Jaundice   | 590  | 9.5              | Wt          | 24 | 12               |
| Antibiotic | 486  | 7.8              | Antibiotic  | 20 | 10               |
| Wt         | 434  | 6.9              | Jaundice    | 20 | 10               |
| Dog Bite   | 330  | 5.3              | Breast Feed | 9  | 4.5              |

**DISCUSSION**

Proper donor selection is the first basic step towards providing safe blood by any blood bank.

The rate of deferral differs from region to region and sometimes in same region between one center to another center (5). The analysis of the donor deferral pattern in specific demographic areas is important to develop a safe pool of blood donors

Most of the donors were males (96.1%) Women accounted for only 3.9% of the donors. Female donors were deferred more commonly due to the wide prevalence of anemia in female donors, reflecting ill health and poor nutritional status of females.

This study showed donor deferral rate of 12%. Zou et al. (6) reported a deferral rate of 12.8% in their 6 years study of American Red Cross blood service. Custer et al. (7) and Arslan et al(8) showed a deferral rate of 13.6% and14.6% respectively in their studies. Lim et al. (9) reported a deferral rate of 14.4% in Singapore (Asia) and Bahadur et al. (10) reported 9% in Delhi (India).

The most common cause among temporary deferral was anemia (39.3%) (table 3). This was comparable with study done by Halperin et al. (11) which showed low hemoglobin as the most common cause in 46% of the temporary deferral. Arslan et al(8) showed low hemoglobin as the most common cause of deferral in 20.7% of overall deferral among the Turkish donors. Rabeya Y et al(12) also reported low Hb as most important cause of deferral (40.7%). Annam V et al (13) also found low Hb as the most common cause of deferral in his study (34.1%). Jaundice was the second most common cause of temporary deferral (9.5%). The deferral due to jaundice was 9.52% in the study done by Khan S et al (14) while Rehman S et al (15) showed a deferral rate due to jaundice to be 9.15%. Intake of medication (6.9%) by donors was third cause. This included analgesics and antibiotics especially during the covid era for which donor is deferred for few days. Low body weight i.e. less than 45 kg (5.3%), the fourth common cause.

In this study, 6.8% of donors were deferred due to permanent causes (table 2) which is lower than the study done by Custer et al (6) who reported a permanent deferral rate of 10.6% and Arslan (7) who reported a rate of 10%. In the present study, high risk behaviour was the most common cause of permanent deferral. Gülen H et al (16) and Jashnani et al (17) showed similar findings. Hence, being a permanent cause of deferral, can lead to tremendous loss in future blood donation.

**CONCLUSION**

Analysis of deferral patterns is of help to the medical personnel to be more focused in donor screening. Deferred donors especially temporarily deferred ones require proper follow up and management so as not to lead to a diminished supply of future donors. One should also make an effort to avoid any psychological effect or negative impact on the prospective donors, which may prevent them from future donations. Anemia which is the most common cause of deferral in both males and females can be easily alleviated by proper nutrition supplement. Deferral data, if collected and studied in a systematic way will definitely improve the collection of blood from prospective blood donors.

So to conclude, it is important to analyse and study the causes of blood donor deferral in order to ensure safe blood/component transfusion and also make efforts to prevent loss of precious blood/components at local, national and international levels.

**REFERENCES**

1. Universal Access to Safe Blood Transfusion - World Health Organisation. Available from: [www.who.int/bloodsafety/publications/UniversalAccessToSafeBT.pdf](http://www.who.int/bloodsafety/publications/UniversalAccessToSafeBT.pdf)
2. Access to safe blood- NACO- National AIDS Control Organisation. Available from : [http://www.naco.gov.in/NACO/National\\_AIDS\\_Control\\_Program/Services\\_for\\_Prevention/Access\\_to\\_Safe\\_blood/](http://www.naco.gov.in/NACO/National_AIDS_Control_Program/Services_for_Prevention/Access_to_Safe_blood/)
3. Girish C.J., Chandrashekar T.N., Ramesh B.K., Kantikar S.M.Pre-Donation Deferral

- of Whole Blood Donors in District Transfusion Centre. *Journal of clinical and diagnostic research*; 2012; 6 :1: 47 - 50
4. Kujur P, Tiwari AK, Bagde S, Bombeshwar V, Behera T.R. Assessment of blood donor selection and deferral pattern in a tertiary care hospital in Central India. *Tropical Journal of Pathology & Microbiology* 2020; 6 (1):83-88.
  5. Chaudhary RK, Gupta D, Gupta RK. Analysis of donor deferral pattern in a voluntary blood donor population. *Transfus Med* 1995; 5:209-12.
  6. Zou S, Musavi F, Notari EP, Rios JA, Trouern-Trend J, Fang CT. Donor deferral and resulting donor loss at the American Red Cross Blood Services, 2001 through 2006. *Transfusion* 2008; 48:2531-9.
  7. Custer B, Johnson ES, Sullivan SD, Hazlet TK, Ramsey SD, et al. (2004) Quantifying losses to the donated blood supply due to donor deferral and miscollection. *Transfusion* 44: 1417-1426.
  8. Arslan O (2007) Whole blood donor deferral rate and characteristics of the Turkish population. *Transfus Med* 17: 379-383.
  9. Lim JC, Tien SL, Ong YW (1993) Main causes of pre-donation deferral of prospective blood donors in the Singapore Blood Transfusion Service. *Ann Acad Med Singapore* 22: 326-331.
  10. Bahadur S, Jain S, Goel RK, Pahuja S, Jain M (2009) Analysis of blood donor deferral characteristics in Delhi, India. *Southeast Asian J Trop Med Public Health* 40: 1087-1091.
  11. Halperin D, Baetens J, Newman B (1998) The effect of short-term, temporary deferral on future blood donation. *Transfusion* 38: 181-183.
  12. Rabeya Y, Rapiaah M, Rosline H, Ahmed SA, Zaidah WA, Roshan TM. Blood pre-donation deferrals--a teaching hospital experience. *Southeast Asian J Trop Med Public Health*. 2008 May; 39(3):571-4.
  13. Annam V, Mrinalini V, Sivachandran. Evaluation of Pre-donation Deferral Causes in Whole Blood Donor Population at a Tertiary Rural Health Centre. *International Journal of Science and Research (IJSR)* 07/2014; 3(7):668-671.
  14. Khan S, Rehman N, Raziq FE. Donor Deferral: Evaluation of Causes On Pre Donor Screening. *Gomal Journal of Medical Sciences* January-June 2012, Vol. 10, No. 1
  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 Disorders Transf* 2012, 3:5.
  16. Gülen H, Tüzün F, Ayhan Y, Erbay A, Oztürk E et al. The evaluation of blood donor deferral causes. *Pediatr Hematol Oncol*. 2006 Mar; 23(2):91-4.
  17. Jashnani KD, Patil LN. Blood donor deferrals: Can this be reduced? *Asian J Transfus Sci*. 2011 Jan; 5(1): 60