

Original Research Article

STUDY OF BLOOD DONOR PROFILE AND CAUSES OF BLOOD DONOR DEFERRAL IN A TERTIARY CARE BLOOD CENTRE - A RETROSPECTIVE STUDY

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ABSTRACT

Background: Safe blood donation depends on appropriate donor selection. Understanding donor demographics and causes of donor deferral helps improve blood donation services and donor retention. Blood donation is vital in India.

Materials and Methods: This is a retrospective study conducted among blood donors from September 2024 to August 2025 at voluntary outreach blood donation camps and blood donations done at blood bank for a period of one year. Total 15123 blood donors were subjected to study the blood donor demographic profile.

Results: In our study the majority of the registered donors were voluntary donors (88.88%). A total 15123 people registered for donating blood during the study period (1 year), of whom 12830 (84.83%) were males and 2293 (15.16%) were females. Among the 14,139 selected donors, blood group B was the most common (33.82%), followed by O (32.26%), A (24.93%) and AB (8.98%); 95.29% were Rh-positive and 4.71% were Rh-negative. A total 984 (6.50%) donors were deferred by the medical officer based on detailed medical history and brief physical examination of donors with regard to haemoglobin, blood pressure, temperature, and pulse irregularity and rate. The majority of donors were deferred for high blood pressure (34.75%). The overall deferral rate is 6.50%, the male deferral rate is 6.36%, and the female deferral rate is 7.33%.

Conclusion: The voluntary blood donation camps indirectly help the public in routine health checkups and screening for illness. Pre-donation screening may help identify previously unrecognized health conditions among prospective donors. Targeted donor education and appropriate health awareness programmes may help reduce avoidable deferrals and improve future donor retention.

Keywords: voluntary donor, replacement donor, deferred donor, anaemia, blood pressure.

INTRODUCTION

The National AIDS Control Organization's (NACO) statistics show that the annual rate of blood donation in India is about 14.6 million units. According to the WHO, over 120.4 million units of blood are collected annually worldwide, but only 36% are collected in developing countries, which have 82% of the world's population^[2]. Blood collection is the most important and essential function of blood transfusion service, and accordingly, its organization should be given due attention. Easily accessible and adequate supply of

safe and quality blood and blood components collected/procured from a voluntary, non-remunerated regular blood donor in well-equipped premises, which is free from transfusion-transmitted infections, and is stored and transported under optimum conditions.^[1]

There are five types of blood donors: voluntary non-remunerated donors, replacement or relative donors, professional or commercial paid donors, directed donors, and autologous donors. Among these, voluntary donors those who donate altruistically and are aware of the risks - are considered the safest.^[4]

Blood transfusion has an important role in the modern practice of medicine, and without it many surgical procedures e.g., cardiac surgeries, transplant surgeries, and treatment of various disorders would be impossible. Blood donation rates vary significantly across countries, influenced by socioeconomic factors. For example, whole blood donation rates per 1,000 populations per year were 32.1 in high-income countries, 14.9 in upper-middle income countries, 7.8 in lower-middle-income countries, and 4.6 in low-income countries.^[3]

Blood transfusion is a key part of modern health care. It is the responsibility of the national blood program to provide an adequate supply of blood for all patients requiring transfusion and to ensure the quality of blood and blood products for clinical use. All products must be safe, clinically effective, and of appropriate and consistent quality. A large number of donors are deferred from donating blood for several reasons, either temporarily or permanently. Such donor deferrals can create a negative impact on donors and can reduce return rate, ultimately affecting the donor pool.^[5,6]

According to the Drugs and Cosmetics Act 1940 and rule 1945, not every person who walks into a camp/blood bank for blood donation is a donor. A donor by definition, is a person who, after a complete medical examination by the doctor, is declared fit for donation of blood. To make blood donation safe and increase the confidence of the masses in voluntary blood donation, many safety measures are implemented by the blood transfusion community. The most important of all safety measures is donor selection. Stringent, meticulous, and serious donor screening is necessary to afford protection to blood donors and recipients.^[7]

Objectives:

1. To study the demographic profile of blood donors attending the blood centre and voluntary blood donation camps.
2. To determine the overall and cause-specific deferral rate.
3. To assess the distribution of ABO and Rh(D) blood groups among blood donors.

MATERIALS AND METHODS

Place and type of study: This is a retrospective record-based study done at the blood centre of Ballari Medical College and Research Centre, Ballari, Karnataka.

Sampling methods: The blood donor's data from September 2024 to August 2025 was collected from the blood bank registry at the study site and was analysed.

Inclusion criteria: Donors who have donated blood at the outdoor voluntary blood donation camps as well as at the blood bank (indoor), whose donor records are available, were included in the study.

Exclusion criteria: Blood donors whose records are missing or incomplete were excluded in the study.

Statistical Analysis: Data were entered into Microsoft Excel and analysed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages. The overall donor deferral rate and sex-specific deferral rates were calculated. As this was primarily a descriptive retrospective study, no inferential statistical analysis was performed.

Standard operating procedures based on the National Blood Policy (2007) and the Drugs and Cosmetic Act 1940 and rules, from 1945 used for donor selection and deferral. Pre-donation screening tests like donor questionnaires followed by physical examination and haemoglobin estimation by the Mission Hb haemoglobinometer (finger prick) method with a cut off value of 12.5 gm/dl were done. Donors with systolic BP between 100 & 150 mm of Hg and diastolic BP between 60 and 100 mm of Hg were accepted for blood donation. Deferred donor data was analysed with respect to age, sex and causes of deferral (temporary or permanent). The different causes of deferrals in blood donors were also analysed.

Ethical approval was obtained from the Institutional Ethics Committee, Ballari Medical College and Research Centre, Ballari, Karnataka.

(Approval No. IEC/BMCRC/07/08/26 dated 07/08/2026).

RESULTS

There were outreach blood donation camps in all months of the year; the highest number of camps was in the month of June 2025, and the lowest number was in the month of April 2025 (Graph 1a). There were a total of 123 blood donation camps. The total number of camps and total donation was noticeably higher in the months of June 2025 and February 2025, that is, 2273 and 1793 respectively (Graph 1b).

In our study we divided blood donors mainly into three types: voluntary donors at camps, voluntary donors at blood bank, and replacement/relative blood donors at blood bank (Graph 2). Among all these voluntary donors (88.88%) are more compared to replacement donors (11.11%).

The study was done by collecting and analyzing the data of one year from 1st September 2024 to 31st August 2025 in the blood bank. In our study most of the registered donors were voluntary donors (88.88%) and replacement donors accounted for 11.11%. A total of 15123 people registered for donating blood during the study period, of whom 12830 (84.83%) were males and 2293 (15.16%) were females.

The demographic profile of the gender distribution of registered blood donors, selected and deferred donors, is shown in Graph 3.

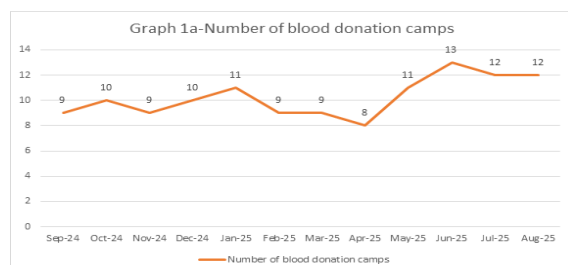
The majority of blood donors were in the 31–40 age group, comprising 48% of all donations. The 18–30 age groups represented 32%, while donors aged 41–

50 and those above 50 years contributed 17% and 3%, respectively (Chart 4).

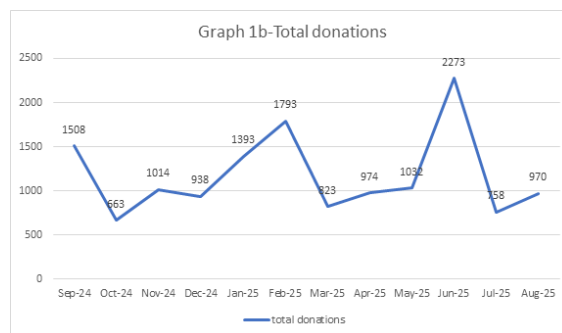
984 donors were deferred by medical officers based on detailed medical history and brief physical examination of donors with regard to haemoglobin, blood pressure, temperature, and pulse regularity and rate. Among the 984 deferred donors, 816 (82.93%) were males and 168 (17.07%) were females. The sex-specific deferral rate was 6.36% among males and 7.33% among females.

Among 984 of the total deferred cases, high blood pressure was the major cause for deferral 34.75% followed by anaemia (low haemoglobin) (17.07%) and underweight (14.83%) respectively. Major causes for donor deferral with the percentage given in table 1.

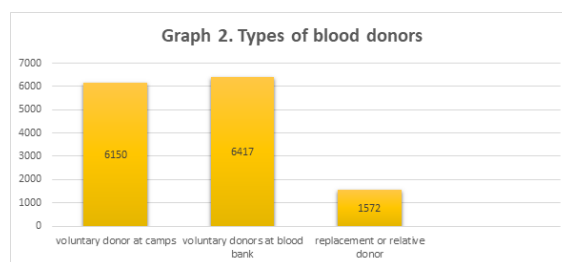
In our study the different blood groups of blood donors are as follows . The blood donors having blood group A are 3525 (24.93%); among these, the A positive blood group is 3328 (23.53%), and the A negative blood group is 197 (1.39%). Blood group B are 4782 (33.82%); among these, the B positive blood group is 4606 (32.57%), the B negative blood group is 176 (1.24%). The O blood group is 4562 (32.26%); among these, the O positive blood group is 4304 (30.44%), the O negative blood group is 258 (1.82%). AB blood group is 1270 (8.98%); among these, the AB positive blood group is 1235 (8.74%), the AB negative blood group is 35 (0.25%). Overall Rh-positive blood group donors are 13473 (95.29%) and the Rh-negative blood group donors are 666 (4.71%) table 2.



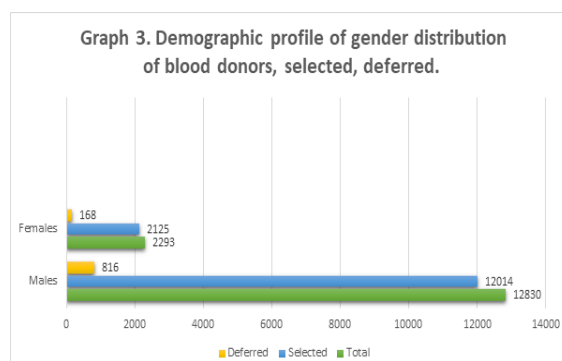
Graph 1a: Numbers of blood donation camps



Graph 1b: Total donations



Graph 2: Types of blood donors



Graph 3: Demographic profile of gender distribution of blood donors.

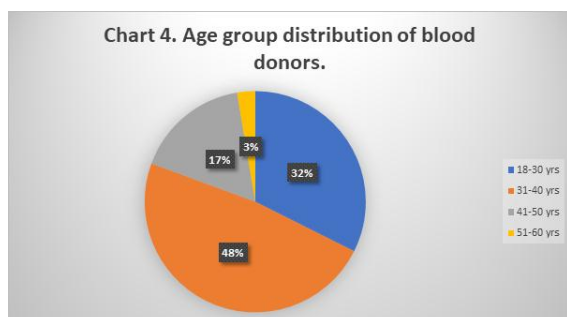
Table 1: Causes for donor deferral and percentage.

Causes for donor rejection	Number of cases	Percentage
High blood pressure	342	34.75%
Low haemoglobin	168	17.07%
Underweight	146	14.83%
History of medication	118	11.99%
History of alcohol	92	9.34%
Menstruation	88	8.94%
Previous blood donation	30	3.04%
Total	984	100%

Table 2: Different types of blood groups among total collected.

	total	A+	A-	B+	B-	O+	O-	AB+	AB-
Sep-24	1508	418	10	465	24	454	17	119	1
Oct-24	663	152	6	201	8	203	23	69	1
Nov-24	1014	283	2	348	8	255	35	82	1
Dec-24	938	207	4	328	15	302	10	70	2
Jan-25	1393	339	15	450	14	458	7	108	2
Feb-25	1793	478	43	576	14	497	32	151	2
Mar-25	823	150	14	308	18	239	29	62	3

Apr-25	974	194	8	309	7	342	16	91	7
May-25	1032	222	10	349	14	358	20	56	3
Jun-25	2273	520	66	647	32	654	38	307	9
Jul-25	758	186	11	232	15	241	17	52	4
Aug-25	970	179	8	393	7	301	14	68	0
Total	14139	3328	197	4606	176	4304	258	1235	35



Graph 4: Age group distribution of blood donors

DISCUSSION

Lack of awareness about the necessity for blood donation, fear of transmission of serious blood born infections like HIV while donating blood and loss of physical well-being after donation have been proposed as potential reasons for ethnic and racial disparities in blood donation.^[8]

National and international efforts are on to ensure a safe blood supply through screening, education and strict criteria laid down by the National Blood Policy (2007) and the Drugs and Cosmetics Act 1940 and Rules, 1945, used for donor selection and deferral. In our study most of the donors were men (84.83%) when compared to women (15.16%). This finding was similar to various other studies. Nanik Jethani et al. reported 95.89% male and 4.1% female donors, Birjandi reported 95.6% male and 4.4% female donors, and Unnikrishnan et al. reported 95.13% male and 4.8% female donors.^[1,10,11] The low female donor population can be attributed to ignorance, fear, lack of awareness about low haemoglobin and motivation among females.

Targeted campaigns to raise awareness among women and improve access to donation sites could help address this issue. Our study found that the majority of blood donors were in the 31-40 age group (48.22%), followed by the 18-30 age group (32.37%), while donors aged 41-50 and above 50 years contributed 16.76% and 2.63%, respectively. These findings are similar to studies in the southern part of India, where the 30-39 age group was most common among whole blood donors.^[12] And differ from studies in the northern part of India, where the 18-30 age group was most common among whole blood donors.^[13]

A study by Garg et al. from Dr. S. N. Medical College, Jodhpur, Rajasthan, from years 1994-1999, showed that a total of 46,957 donors were tested, out of which 42,291 (90.1%) were replacement donors and 4666 (9.0%) were voluntary donors^[9]. Our study, in contrast, showed the majority of donors were of the voluntary type (88.88%).^[14] Which is similar to a

study conducted by Parveen K et al. at Seth GS Medical College and KEM Hospital, Mumbai.^[14]

In our study high blood pressure (342 cases, 34.75%) was reported as the main cause of deferral in elderly people followed by low haemoglobin (168 cases, 17.07%) and medication history (118 cases, 11.99%), which is similar to a study done by Nidhi Rajendra, Prashanth Madapura et al.^[15]

Limitations:

- This was a single-centre retrospective study.
- Data depended on the accuracy of blood bank records.
- Temporary and permanent deferrals were not analysed separately.
- Repeat donors and first-time donors were not compared.
- Inferential statistical analysis was not performed.

CONCLUSION

Pre-donation screening identified previously unrecognized conditions such as elevated blood pressure and low haemoglobin among some prospective donors. So annual routine health checkups and screenings for illness should be recommended for the general public to reduce deferral rates during blood donation.

The regular motivation of voluntary blood donors will have a positive effect on the different categories of society, leading to minimization of irrelevant fear associated with voluntary blood donation.

Studying the profile of blood donors could help to identify sections of the population that could be targeted to increase the pool of voluntary blood donors and also to guide and provide the necessary essential database for designing policy and programme implementation.

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