

# Gender Distribution and Reasons for Donor Deferral in Blood Donors at a Tertiary Healthcare Centre, Kerala, India: A Cross-sectional Study

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## ABSTRACT

**Introduction:** One of the primary responsibilities of the blood bank is to provide safe blood to patients. Blood donors are screened before blood donation and deferred from donating if they have diseases or conditions that may affect blood quality or lead to adverse reactions. Blood donor deferral ensures both donor and patient safety. Understanding deferral reasons can help raise awareness among blood donors.

**Aim:** To determine the percentage of female blood donors and the number of deferrals in male and female donors for various reasons.

**Materials and Methods:** This retrospective cross-sectional study was conducted at Department of Transfusion Medicine, Government Medical college, Kozhikode, Kerala, India. The study period was one year from April 2018 to March 2019. Data on the number of male and female donors, donors accepted for donation, and those deferred for various reasons were collected through questionnaires and blood bank records. Data analysis was performed using Statistical Packages of Social Sciences (SPSS) version 17.0

software, employing the Chi-square test with a significance level of  $p < 0.05$ .

**Results:** Out of 36,318 blood donors, only 1,521 (4.2%) were females. During the study period, 30,007 donors were selected for donation, of which 792 (2.64%) were female donors. Among the 6,311 deferred donors, 1,171 (18.55%) were deferred due to fever and respiratory tract infections, the most common reason for deferral. The deferral rate for females was significantly higher than for males. Females had a deferral rate of 47.9% (729 out of 1,521 female donors), while males had a deferral rate of 16.04% (5,582 donors). Fever and respiratory tract infections were the main cause of deferral among males, with 1,055 (18.9%) deferred for this reason. Among females, low haemoglobin (306, 41.98%) was the primary cause of deferral.

**Conclusion:** Females constitute a minority of the blood donor population. Motivational efforts can increase blood donation among females. Raising awareness about nutritional anaemia and implementing preventive measures can reduce deferrals among female blood donors.

**Keywords:** Anaemia, Blood banks, Blood centre, Donor selection, Haemoglobin, Hypertension

## INTRODUCTION

Blood transfusion is a critical procedure provided by blood centres to ensure safe and timely blood supply to patients [1]. It saves millions of lives annually [2]. Blood donors, whether voluntary or replacement, are vital to the functioning of blood banks, with voluntary donors being the safest [2]. However, blood centres in developing countries like India face challenges such as low donation rates and inadequate blood availability in rural areas compared to urban areas. Ensuring a sufficient supply of safe blood products is crucial to prevent the transmission of viral infections and blood borne pathogens [2].

Maintaining an adequate supply of blood and blood components for all blood groups is a challenge for blood centres, especially those in tertiary healthcare hospitals. To address this, a pool of motivated voluntary donors is essential [2]. It's important to note that blood transfusions can lead to adverse reactions in patients [1,3]. Similarly, adverse reactions can occur in blood donors during or after donation [4].

Donor selection criteria, based on guidelines from the Drug Controller of India or the National Acquired Immune Deficiency Syndrome (AIDS) Control Organisation (NACO), play a crucial role in safeguarding donor health and ensuring the quality of blood products [5-7]. These criteria include permanent deferrals, such as heart disease, Human Immunodeficiency Virus (HIV), and malignancy, as well as temporary deferrals due to infections, drug use, smoking, alcohol

consumption, anaemia, surgical procedures, epilepsy, and certain behavioral patterns that increase the risk of transfusion-transmitted diseases [6,7]. However, deferred donors may experience sadness and disappointment, potentially discouraging future donations [2].

The Indian government promotes blood donation through organisations like NACO, leading to a decrease in paid donations and an increase in voluntary donations. However, the percentage of female donors remains low in India. Factors influencing female blood donation include cultural beliefs, perceptions of females as weaker, and considerations related to pregnancy and breastfeeding [8-14]. Deferral patterns among blood donors vary worldwide, with causes ranging from low haemoglobin to infections like HIV and Hepatitis B [14-21]. Donor screening and deferral not only enhance blood safety but also raise awareness of health conditions among donors [22].

To encourage repeat donations, it is crucial for blood donors to have a positive experience [23]. Understanding the deferral patterns among blood donors helps compare regional trends, plan donation activities, and assess disease prevalence. While several studies have examined donor deferral patterns [14-16], research on deferral patterns in females and donors from North Kerala is limited. The deferral pattern in this region may differ due to variations in different parts of India and unique factors like iron deficiency anaemia, diabetes, and hypertension prevalent in Kerala [18,24-26].

The hypothesis of present study was that the number of female blood donors is very low, and they are more likely to be deferred

compared to males. The aim of the present study was to determine the percentage of female blood donors in that region and identify reasons for deferral among both male and female donors.

## MATERIALS AND METHODS

This retrospective cross-sectional study was conducted at the Department of Transfusion Medicine, Government Medical College, Kozhikode, Kerala, India. The study included blood donors who visited the blood bank and outreach camps from April 2018 to March 2019. Ethical clearance was obtained from the Institutional Ethical Committee (Reference number GMC KKD/RP2019/IEC/252). The study was conducted between January 2020 and June 2020, following ethical approval.

**Inclusion criteria:** A total of 36,318 donors, including both voluntary and replacement donors, were included in the study. Donors of both genders, aged between 18 and 60 years, were included.

**Exclusion criteria:** Donors less than 18 years who came for donation were excluded from study and also blood donors whose deferral reason was not mentioned were excluded from study.

## Study Procedure

Questionnaires were filled out by the donors, containing information on general details (name, age, occupation, medical history) and health status. Blood bank counsellors screened the donors based on the questionnaire, and medical examinations were conducted by doctors, recording blood pressure, pulse rate, and weight. The questionnaire was prepared according to the criteria set by the Director General of Health Services and NACO [6,7]. Donors were either accepted or rejected for donation. The main causes of donor deferral included hypertension, respiratory tract infections, medication history, low haemoglobin, history of jaundice, and history of ear piercing or tattooing. Donors with systolic blood pressure above 140 mmHg or diastolic blood pressure above 90 mmHg were deferred, as well as donors with systolic pressure below 100 mmHg. Both male and female donors with haemoglobin levels below 12.5 were deferred [6]. The donors were divided into two groups, males and females, and the numbers of accepted and deferred donors along with the reasons for deferral were analysed. The study included the entire population of blood donors attending the blood centre for one year, considering the possible seasonal variation in donor deferrals due to fever and respiratory tract infections.

## STATISTICAL ANALYSIS

Data was recorded in Microsoft Excel and analysed using Excel and SPSS software, version 17.0. Descriptive statistics were used, presenting data as frequencies and percentages. Statistical tests, such as the Chi-square test, were employed, considering a p-value <0.05 as significant.

## RESULTS

A total of 36,318 blood donors visited the blood bank during the study period, with 34,797 (95.8%) being male and 1,521 (4.2%) being female. Out of the total donors, 30,007 were selected for donation. Among the selected donors, 29,215 (97.36%) were male and 792 (2.64%) were female. A total of 6,311 donors were deferred, resulting in a deferral rate of 17.38%. Among male donors, 5,582 (16.04%) were deferred, while among female donors, 729 (47.9%) were deferred. Females were significantly more likely to be deferred compared to males, with a p-value <0.05 [Table/Fig-1].

Variables	Accepted for donation	Deferred	Total	p-value
Male donors	29215 (83.96%)	5582 (16.04%)	34797 (100%)	<0.01 Chi-square value 1032.07
Female donors	792 (52.1%)	729 (47.9%)	1521 (100%)	
Total	30007	6311	36318	

[Table/Fig-1]: Blood donors accepted and rejected for blood donation.

[Table/Fig-2] provides information on the different reasons for deferral and the number of donors deferred for each reason. The most common reason for deferral was fever or respiratory tract infections, with 1,171 donors (18.55%) being deferred for this reason. The next most common reason was high blood pressure, with 933 donors (14.78%) being deferred for this reason.

Reason for deferral	Males n (%)	Females n (%)
Fever/respiratory tract infections	1055 (18.9%)	116 (15.9%)
High blood pressure (more than 140 systolic or more than 90 diastolic)	899 (16.1%)	34 (4.7%)
Medicine intake	816 (14.6%)	76 (10.42%)
Low haemoglobin (less than 12.5 gm%)	134 (2.4%)	306 (41.98%)
Low blood pressure (less than 100 mmHg systolic)	271 (4.9%)	55 (7.54%)
Alcohol intake/smoking/substance abuse	757 (13.6%)	15 (2.1%)
History of jaundice/hepatitis	130 (2.3%)	5 (0.7%)
Tattoo/ear piercing	398 (7.1%)	34 (4.7%)
Deferral due to other causes (history of vaccination, surgical procedures, polycythemia, bleeding disorders, malignancy, low weight, other medical problems)	1122 (20.1%)	88 (12.07%)
Total	5582 (100%)	729 (100%)

[Table/Fig-2]: Reasons for deferral in blood donors (N=6311).

Among female donors, the main cause of deferral was low haemoglobin. A total of 306 (41.9%) of the deferred females had low haemoglobin levels. Approximately 20.1% of the female donors had haemoglobin levels below 12.5. In addition to the main causes mentioned above (fever or respiratory tract infections, hypertension, low haemoglobin, drug intake, jaundice, alcoholism, and substance abuse), a total of 1,210 donors were deferred for other reasons. These reasons include recent history of dental procedures, history of surgical procedures, recent vaccination, recent history of blood donation, diabetes on insulin or other complications of diabetes, and so on.

## DISCUSSION

Blood donor selection and deferral are crucial for maintaining blood safety in a blood centre and ensuring an adequate supply of safe blood. In present study authors aimed to determine the percentage of female blood donors among those who visited blood bank. Authors found that females accounted for only 4.2% of individuals who came to donate blood. Among the donors accepted for donation, females constituted only 2.64%. These findings are consistent with studies conducted in other parts of India. For example, in Kashmir, females accounted for 4.4% of blood donors, while in Gwalior, the participation rate of females was 3.84%. In a study conducted in Bangalore over a period of three years, females constituted 11.25% of the total blood donors. However, studies from different parts of the world have shown varying results. For instance, in a study from Spain, 46.5% of blood donation offers came from women, while in the USA, females accounted for about half of the blood donor population. In Africa, females were under-represented in the donor population, constituting only 30% of blood donors. There are several barriers to blood donation for women, including pregnancy and lactation. Women are also more likely to experience vasovagal reactions after blood donation, which may discourage them from donating in the future. Additionally, the lower donation rate among females may be influenced by cultural factors, such as less social activity among females compared to males in Kerala, and the tendency to approach males when a patient needs blood.

In present study, a total of 36,318 donors visited the blood bank, out of which 6,311 were deferred, resulting in a deferral rate of

17.38%. The deferral rates reported in other studies from India ranged from 5.84% to 11.6%. In Nigeria, the deferral rate was 8.69%, while in Spain, it was 8.7%, and in Tanzania, it was 19.4%. The higher deferral rate observed in present study may be attributed to differences in donor selection criteria, the strictness with which deferral criteria are followed, the prevalence of chronic diseases and certain infections in the population, and the nutritional status of the population.

The main causes of deferral among males in present study were fever or respiratory tract infections and hypertension. History of tattooing or ear piercing, medication intake, and alcohol consumption were also common reasons for deferral in both males and females donors with history of ear piercing, tattooing, or with history of drug intake were deferred due to potential risk to blood recipients [27,28]. It is important to adequately explain to deferred donors why they are being deferred and when they can return for blood donation to prevent demotivation.

Notably, the deferral rate among females in present study was significantly higher than among males, with 47.9% of females being deferred compared to 16.04% of males. The main cause of deferral among males was fever or respiratory tract infections, while low haemoglobin was the primary reason for deferral among females. This finding is consistent with other studies conducted in India. In study, 41.98% of deferred females had low haemoglobin levels, which may be attributed to the high prevalence of anaemia among females in India [29]. Iron deficiency anaemia is a common health problem among females in India [24], with a reported prevalence of up to 64%. Improving the nutritional status and addressing iron deficiency anaemia in females may help reduce the number of deferrals among female blood donors.

In conclusion, present study highlights the lower participation of females in blood donation and the higher deferral rate among females, primarily due to low haemoglobin levels, thus supporting the hypothesis. Efforts should be made to address the barriers faced by women in blood donation and improve their nutritional status to reduce deferrals. Additionally, donor selection criteria and deferral criteria should be carefully followed to ensure blood safety while minimising the impact on the bloodstock and donor motivation [30].

## Limitation(s)

Limitations of present study include the lack of analysis on donor deferral rates based on socioeconomic status, rural-urban status, educational status, or other demographic factors. Therefore, the findings of present study cannot be generalised to the entire blood donor population in India.

## CONCLUSION(S)

Understanding the patterns of donor deferral in a specific region is essential for developing regional and national policies to increase the number of voluntary blood donors. In that area, the donor deferral rate was found to be particularly high. Blood donation among females in Northern Kerala is significantly low, and the deferral rate for females is higher than that for males. Low haemoglobin levels were identified as a major cause of deferral among females. To address this issue, efforts should focus on improving nutrition and preventing iron deficiency anaemia, especially among females in that population. Motivating young females and college students can also help increase blood donation rates in females. Additionally, creating awareness among the youth about the risks associated with alcohol intake, smoking, and substance abuse can help reduce deferrals related to these factors.

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