

## An Analysis of Donor Rejection Trends: A Retrospective Study in a Specialized Blood Transfusion Service

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### Abstract

### Original Research Article

**Background:** Blood transfusion services are essential for patient care, but donor rejection is necessary to ensure both donor safety and blood quality. Donor deferral can result from medical, non-medical, physical, and serological factors, with temporary or permanent exclusion depending on risk. Understanding these causes helps optimize donor selection and transfusion safety. **Objective:** To assess the patterns and causes of donor rejection in a tertiary care hospital blood transfusion service. **Methods:** This retrospective, cross-sectional descriptive study was conducted in the Department of Transfusion Medicine, National Institute of Kidney Diseases, Dhaka, Bangladesh, over a one-year period from January 2025 to December 2025. A total of 9,619 blood donors were included, of whom 241 were rejected, giving a rejection rate of 2.5%. Data were obtained from the departmental donor register book and reviewed retrospectively to extract relevant information on donor demographics, medical history, physical examination findings, and serological screening results. Donor selection and deferral were carried out according to standard transfusion service protocols, including medical assessment, physical examination, hemoglobin estimation, and mandatory infectious disease screening. The collected data were checked for accuracy, cleaned, and analyzed using SPSS version 16.0, with results presented as frequencies and percentages. Ethical approval was obtained from the Institutional Review Board of the National Institute of Kidney Diseases, and confidentiality of donor information was strictly maintained throughout the study in accordance with ethical research guidelines. **Results:** Assessment of physical causes of donor rejection revealed that high blood pressure was the leading factor, responsible for 3.9% of deferrals. Underweight donors accounted for 2% of the rejected cases. The study showed that donor rejection was most common among individuals aged 31–40 years (55.0%), followed by 18–30 years (24.5%) and 41–60 years (18.4%), with a clear male predominance (78.5%). The leading medical cause of deferral was past history of jaundice (9.8%), followed by medication use and low platelet count (8% each), while active allergy accounted for 5% and other conditions such as hematocrit >48%, heart disease, typhoid history, recent vaccination, diabetes, and menstruation contributed smaller proportions. Non-medical causes were mainly poor venous access and short interval since last donation (8% each), with fewer cases due to underage (2%) and overage (0.7%) donors. Among physical causes, high blood pressure (3.9%) was the most frequent, followed by underweight status (1.4%). Serological screening revealed HBV reactivity as the leading cause of rejection (14%), followed by HCV (8%) and TPHA (4%), indicating that transfusion-transmissible infections remain a major contributor to donor deferral in this population. **Conclusion:** This study demonstrates that donor deferral is most common among middle-aged adults, particularly those aged 31–40 years, with a marked male predominance. Medical causes, especially past history of jaundice, medication use, and low platelet count, were the major contributors to donor rejection. Non-medical and physical factors such as poor venous access, short donation interval, and hypertension also played important roles. Serological screening identified HBV reactivity as the leading infectious cause of deferral, followed by HCV and TPHA positivity. Overall, both preventable and non-preventable factors significantly influence donor rejection, highlighting the need for improved screening and preventive strategies.

**Keywords:** Blood Donor Rejection, Donor Deferral, HBsAg, HCV, Transfusion Safety.

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## INTRODUCTION

Blood transfusion services play a critical role in modern healthcare by ensuring the availability of safe and adequate blood for patients in need. The process of blood donation, however, requires strict screening procedures to protect both donors and recipients. Donor rejection, also referred to as donor deferral, is an essential component of this screening process, aimed at minimizing the risk of transfusion-transmissible infections and preventing adverse effects on donor health [1-3].

Donor rejection can be classified as temporary or permanent, depending on the underlying cause. Temporary deferrals may occur due to conditions such as low hemoglobin levels, recent infections, medication use, or recent vaccination, where the donor may become eligible after a specified period [4]. Permanent deferrals, on the other hand, are imposed in cases of chronic diseases, high-risk behaviors, or confirmed infections that pose a long-term risk to blood safety, such as hepatitis B, hepatitis C, or human immunodeficiency virus (HIV) [5].

One of the most common causes of donor rejection is anemia, particularly among female donors. Low hemoglobin levels not only affect donor safety but also compromise the quality of the collected blood. Other medical conditions such as hypertension, diabetes, or recent surgical procedures may also lead to deferral if they are not adequately controlled. Additionally, individuals with a history of jaundice, cardiovascular diseases, or bleeding disorders are often excluded to avoid complications [6-8].

Risk factors associated with transfusion-transmissible infections are another major cause of donor rejection. These include high-risk sexual behavior, intravenous drug use, recent tattoos or piercings, and a history of multiple blood transfusions. Such criteria are essential to reduce the risk of transmitting infections through donated blood, thereby ensuring recipient safety. Travel history to endemic areas for certain infectious diseases may also lead to temporary deferral.

Lifestyle-related factors and recent exposures also contribute significantly to donor rejection. Lack of adequate sleep, alcohol consumption within a short period before donation, and recent illness such as fever or flu can result in temporary deferral. Moreover, pregnancy, breastfeeding, and the menstrual cycle in women are considered during donor selection to ensure donor well-being [9].

**Objective:** To assess common causes of donor rejection in blood transfusion services.

## METHODOLOGY

This retrospective, cross-sectional descriptive study was conducted in the Department of Transfusion Medicine, National Institute of Kidney Diseases, Dhaka, Bangladesh, over a one-year period from January 2025 to December 2025. The study aimed to evaluate the pattern and causes of donor rejection in a tertiary care blood transfusion service, with the objective of understanding donor eligibility trends and deferral characteristics.

A total of 9,619 blood donors were included during the study period, of whom 241 donors were rejected, resulting in a rejection rate of 2.5%. Data were collected retrospectively from the departmental donor register book. All donor records within the defined period were reviewed, and relevant information regarding demographic profile, medical history, physical examination findings, and serological screening results was extracted for analysis.

Donor selection and rejection were based on standard transfusion service screening protocols, including medical history assessment, physical examination, hemoglobin estimation, and mandatory serological testing. These criteria were applied uniformly to ensure the safety of both donors and recipients.

The collected data were systematically checked, cleaned, and verified for accuracy and completeness. Statistical analysis was performed using SPSS version 16.0, and results were expressed in terms of frequencies and percentages for appropriate interpretation.

Ethical approval was obtained from the Institutional Review Board of the National Institute of Kidney Diseases. Confidentiality of donor information was strictly maintained throughout the study, and all procedures were conducted in accordance with established ethical guidelines for research involving human subjects.

## RESULTS

The demographic analysis of the rejected donors showed that the majority belonged to the 31–40 years age group, accounting for 55.0% of the study population. This was followed by donors aged 18–30 years (24.5%) and 41–60 years (18.4%). A smaller proportion of donors were in the 15–17 years and 60–65 years age groups, comprising 1.4% and 0.7%, respectively. In terms of sex distribution, males constituted the predominant group at 78.5%, while females accounted for 21.5% of the rejected donors. These findings indicate that donor deferrals were most common among middle-aged adults, with a marked predominance of male donors.

**Table 1: Demographic Status of the Study Group**

Variables	Percentage
<b>Age group (years)</b>	
15–17	1.4%
18–30	24.5%
31–40	55.0%
41–60	18.4%
60–65	0.7%
<b>Sex</b>	
Male	78.5%
Female	21.5%

The analysis of medical causes of donor rejection revealed that a past history of jaundice was the most common reason, accounting for 9.8% of deferrals. This was followed by medication use and low platelet count (<1,50,000), each contributing 8% of cases, and active allergy at 5%. Other notable causes included hematocrit >48% (1.8%), heart disease (1.5%), past history of typhoid (1.3%), recent vaccination (1.2%), low

HB 7% and H/O Dengue withing 6 month 1.9%. Menstruation and diabetes on insulin each accounted for 1% of deferrals. Less frequent causes included asthma, tuberculosis, breastfeeding, minor surgery, and blood transfusion within one year, each contributing 0.5%. These findings indicate that both past medical history and current clinical conditions played a significant role in donor rejection.

**Table II: Distribution of Donor Rejection Based on Medical Causes**

Medical Causes	Percentage
Medication	8%
Menstruation	1%
Past history of Jaundice	9.8%
Asthma	0.5%
Recent vaccination	1.2%
Active allergy	5%
Past history of Typhoid	1.3%
Tuberculosis	0.5%
Diabetes on insulin	1%
Breastfeeding	0.5%
Minor surgery	0.5%
Blood transfusion within 1 year	0.5%
Heart disease	1.5%
Platelet count <1,50,000	8%
Hematocrit >48%	1.8%
Low HB	7%
H/O Dengue withing 6 month	1.9%

The analysis of non-medical causes of donor rejection showed that poor venous access and a short duration since the last blood donation were the most common reasons, each accounting for 8% of deferrals. Underage donors (<18 years) contributed to 1.4% of the

rejections, while overage donors (>65 years) comprised a smaller proportion at 0.7%. These findings suggest that procedural factors and eligibility criteria, particularly related to venous access and donation interval, play a significant role in non-medical donor deferrals.

**Table III: Distribution of Non-Medical Causes of Donor Rejection**

Non-Medical Causes	Percentage
Poor venous access	8%
Short duration since last donation	8%
Underage	1.4%
Over age	0.7%

The evaluation of physical causes of donor rejection showed that high blood pressure was the most common factor, accounting for 3.9% of deferrals. Underweight donors constituted 2% of the rejected cases.

These findings indicate that abnormal vital parameters and inadequate body weight were notable physical factors contributing to donor deferral in this study population.

**Table IV: Causes of Donor Rejection According to Physical Findings**

Physical Causes	Percentage
Underweight	2%
High BP	3.9%

The analysis of serological causes of donor rejection demonstrated that hepatitis B virus (HBV) reactivity was the most prevalent, accounting for 14% of cases. This was followed by hepatitis C virus (HCV) reactivity at 8%, while *Treponema pallidum*

hemagglutination assay (TPHA) reactivity accounted for 4% of the rejected donors. These findings indicate that transfusion-transmissible infections, particularly hepatitis B and C, were significant contributors to donor deferral in this study population.

**Table V: Distribution of Rejected Donors by Serological Tests**

Serological Causes	Percentage
HBV reactive	14%
HCV reactive	8%
TPHA reactive	4%

## DISCUSSION

In the present study, donor deferral was observed predominantly among individuals aged 31–40 years (55.0%), followed by 18–30 years (24.5%). This pattern is consistent with findings reported in several regional studies where middle-aged adults constituted the largest proportion of donor pool and consequently the highest number of rejections due to their active participation in blood donation programs. Similar observations were made by one study who reported that the majority of deferred donors were in the 30–45 years age group, reflecting higher donor turnout in this economically active population [10]. The male predominance in our study (78.5%) also aligns with previous studies, which reported male donor rates exceeding 70–80%, largely due to lower female participation influenced by anemia, menstruation, pregnancy, and sociocultural factors [11].

Regarding medical causes of deferral, our study identified past history of jaundice (9.8%) as the most common reason, followed by medication use and low platelet count (8% each). These findings are comparable with studies by where transfusion-transmissible infection-related histories and temporary medical conditions were major contributors to donor rejection [12]. The relatively high proportion of hepatitis-related deferral history in our study reflects ongoing endemicity of viral hepatitis in the region, a trend also reported in South Asian blood donor populations [13]. Active allergy, hypertension-related hematocrit changes, and other chronic illnesses were less frequent but still significant, similar to patterns described in earlier hospital-based donor screening studies.

In non-medical causes, poor venous access and short donation interval (8% each) were the leading factors for deferral. This is in agreement with findings which highlight technical and procedural limitations as common barriers in donor eligibility. Underage and overage deferrals were relatively low in our study,

indicating better pre-donation screening and awareness of eligibility criteria in the donor population [11].

For physical causes, high blood pressure (3.9%) was the leading reason for rejection, followed by underweight donors (2%). These findings are consistent with studies by where hypertension was frequently reported as a transient but important cause of donor deferral, often linked to anxiety during donation [12]. Underweight status, particularly among younger donors, has also been widely documented as a contributing factor in donor ineligibility.

Serological testing revealed HBV reactivity as the most common cause of deferral (14%), followed by HCV (8%) and TPHA reactivity (4%). This pattern closely mirrors findings from multiple studies in South Asia, where hepatitis B consistently remained the leading transfusion-transmissible infection among blood donors [10]. The relatively higher HBV prevalence compared to HCV and syphilis underscores the need for strengthened vaccination programs, donor awareness, and strict screening protocols.

## CONCLUSION

In conclusion, this study demonstrates that donor deferral is most common among middle-aged adults, particularly those aged 31–40 years, with a clear male predominance among rejected donors. The major medical causes of rejection include past history of jaundice, medication use, low platelet count, and active allergies, while non-medical causes such as poor venous access and short donation interval also contribute significantly. Among physical factors, elevated blood pressure and underweight status were notable reasons for deferral. Serological screening revealed hepatitis B virus reactivity as the leading cause of rejection, followed by hepatitis C virus and TPHA reactivity, highlighting the persistent burden of transfusion-transmissible infections. Overall, both preventable and non-preventable factors play important roles in donor deferral, emphasizing the

need for improved donor screening, better health education, and strengthened preventive strategies to reduce avoidable rejections and ensure a safe and adequate blood supply.

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