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Original Research Article

Study of Pattern of Blood Donor Deferral at a Tertiary Health Care Centre

Swetaba Solanki[1], Hardik Gohel[2], Piyush Patel[3], Jignasa Bhalodia[4]

[1]Senior Resident, Department of Pathology, GMERS Medical College, Sola, Ahmedabad, Gujarat, India
[2]First Year Resident, Department of Pathology, GMERS Medical College, Sola, Ahmedabad, Gujarat, India
[3]Associate Professor, Department of Pathology, GMERS Medical College, Sola, Ahmedabad, Gujarat, India
[4]Professor and Head, Department of Pathology, GMERS Medical College, Sola, Ahmedabad, Gujarat, India

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Corresponding author: Dr. Swetaba Solanki
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Abstract

Background: Blood donor deferral is an essential practice to ensure transfusion safety, but high deferral rates can reduce the blood supply.

Objective: To analyze the pattern of blood donor deferral at a tertiary healthcare center and identify common causes to inform future donor recruitment.

Material and Methods: A prospective observational study was conducted on 4615 blood donors. Donor demographics, deferral rates, and causes were recorded and categorized as temporary or permanent. Data were analyzed using descriptive statistics.

Results: The overall deferral rate was 14.64%, with temporary deferrals comprising 97.9% and permanent deferrals 2.07%. Low hemoglobin, low body weight, and chronic medical conditions were the leading causes. Males had higher temporary deferrals and permanent deferrals due to chronic disease and high-risk behavior.

Conclusion: Understanding blood donor deferral patterns facilitates targeted interventions for recruitment and retention. Nutritional support, health education, and pre-donation counseling can reduce temporary deferrals and maintain a safe and adequate blood supply.

Keywords: Blood Donor Deferral, Temporary Deferral, Permanent Deferral, Tertiary Healthcare Center.

Introduction

Blood transfusion is a critical component of modern healthcare, serving as a life-saving intervention in various medical conditions. Ensuring a safe and adequate blood supply necessitates the careful selection of blood donors, with deferral practices playing a pivotal role in safeguarding both donor and recipient health [1]. Donor deferral refers to the temporary or permanent disqualification of an individual from donating blood based on established medical criteria, and understanding the patterns and causes of donor deferral is essential for optimizing donor recruitment strategies and maintaining a reliable blood supply [2].

Several studies have investigated the prevalence and reasons for donor deferral in different settings. A study conducted at a tertiary care hospital in Chennai over a 36-month period found that out of 17,082 registered donors, 1,000 (5.85%) were deferred. The majority of deferrals were temporary (76.4%), primarily due to low hemoglobin levels and recent alcohol intake, while 23.6% were permanent, often due to uncontrolled hypertension and diabetes. Notably, a significant association was observed between gender and the type of deferral, with males experiencing higher rates of temporary deferrals and females more frequently deferred permanently [3].

In a study from a university hospital in Nepal, 351 out of 3,697 (9.5%) registered donors were deferred. The most common causes for deferral were hypertension (15.0%), medication use (14.0%), and anemia (12.2%). Temporary deferrals accounted for 92.6% of cases, with females exhibiting a higher deferral rate (14.6%) compared to males (7.8%). Anemia was identified as the leading cause of deferral among female donors [4]. Research in southern Nigeria reported a deferral rate of 24.2%, with low hemoglobin levels being the most prevalent cause of temporary deferral (43.8%), followed by high blood pressure (16.5%). Permanent deferrals were primarily due to

infections such as hepatitis B virus (HBV) and human immunodeficiency virus (HIV). The study also noted significant sex differences in deferral causes, with females more likely to be deferred for temporary reasons and males for permanent ones [5].

A study conducted in a rural medical college hospital in Chhattisgarh, India, analyzed blood donor deferral patterns in a newly established blood center. The findings highlighted the importance of understanding local deferral patterns to improve donor recruitment and retention strategies. The study emphasized the need for tailored interventions to address specific causes of deferral prevalent in the region [6].

Additional research has shown that anemia, low body weight, recent infections, and high-risk behavior are significant contributors to donor deferral [7]. Regional variations in deferral patterns are influenced by socioeconomic factors, public awareness, and donor selection criteria [8]. Comparative analyses across multiple tertiary care centers have revealed differences in temporary and permanent deferral rates, underscoring the need for context-specific strategies [9]. A systematic review of donor deferral studies in India suggested that improving pre-donation counseling and screening could reduce temporary deferrals and enhance overall donor retention [10].

The aim of this study is to evaluate and analyze the blood donor deferral pattern at a tertiary healthcare center, identify the most common causes of deferral, and apply these findings to improve donor recruitment in the future. The study also seeks to compare the findings with previously published literature to assess consistency and inform strategies for optimizing blood donation practices.

Material and Methods

This study was designed as a prospective observational study conducted at the Department of Blood Bank, Pathology in a tertiary healthcare center in India from January 2025 to September 2025. A total of 4615 prospective blood donors were included in the study.

Donors included both voluntary and replacement donors who met the standard eligibility criteria as per national guidelines. Individuals who were medically unfit or refused consent were excluded from the study.

A detailed donor history was obtained from all participants, including demographic information, previous donation history, recent illnesses, medication use, travel history, high-risk behaviors, and any previous deferral records. Physical examination was performed to assess vital signs, hemoglobin levels, and overall health status. Hemoglobin screening was done using a hemoglobinometer, and blood pressure, pulse, and temperature were recorded. Any donor not meeting the inclusion criteria or found with abnormalities in the pre-donation evaluation was classified as deferred.

Deferrals were categorized as temporary or permanent based on the underlying cause. Temporary deferrals included low hemoglobin, recent infections, recent tattoos or piercings, recent alcohol intake, and recent vaccination. Permanent deferrals included chronic medical conditions, uncontrolled hypertension, diabetes, infectious diseases such as HIV, hepatitis B and C, or other conditions rendering the donor ineligible for lifelong donation.

All deferral causes were recorded systematically in a pre-designed data collection sheet and written informed consent was obtained from all participants. Data confidentiality and donor anonymity were maintained throughout the study.

Data were entered into Microsoft Excel 2016 and analyzed using SPSS version 26. Descriptive statistics were used to present donor demographics, deferral rates, and causes of deferral. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation. Comparative analysis with previous studies was performed to identify patterns and variations in donor deferral. Statistical significance was considered at a p-value of <0.05.

Results

Table 1 shows the gender distribution of all accepted and deferred donors among a total sample of 4615 donors. Male donors formed the majority, accounting for 2269 (57.6%) of accepted donors and 387 (57.24%) of deferred donors, while female donors accounted for 1670 (42.39%) of accepted and 289 (42.75%) of deferred donors. Overall, males constituted the majority of the donor population.

Table 2 details the causes of temporary deferrals. Among 662 temporarily deferred donors, low hemoglobin was the leading cause (55.58%), followed by High BP (17.62%), Low BP (9.81%), H/o Medicine (3.77%), low body weight (3.02%), H/o Tattoo (2.87%), Blood donation in last 3 months (2.72%) and menstrual cycle-related issues in females (1.81%). Other minor causes included recent typhoid infection, allergies, and minor OT.

Table 3 summarizes the causes of permanent deferrals. Among 14 permanently deferred donors, Known Case of Hep B and C, Advanced age and High Risk for HIV were the most prevalent cause (21.42%), followed by Diabetes person taking

insulin, Heart Diseases, Unexplained faint, Endocrine disorders except Thyroid and Bleeding Disorder constitute equal part. (7.14%). Table 4 highlights the five leading causes of deferral in males and females. In males, low hemoglobin was the most common (40.05%), followed by high blood pressure (28.42%), low blood pressure (5.17%), Medicine (1.81%) and low body weight (1.03%). In females, low hemoglobin (73.7%) and low blood pressure (15.57%) were the most prevalent, followed by medication history (2.77%), High blood pressure (2.07%) and Low weight (1.73%).

Table 5 presents the age and sex distribution of deferred donors. Among male donors, the majority were aged 26–35 years (25.88%), followed by 18–25 years (16.27%), 36–45 years (7.98%), 46–55 years (6.21%), 56–65 years (0.73%), and >65 years (0.15%). Among female donors (n=289), most were 26–35 years (21.74%), followed by 18–25 years (14.94%), 36–45 years (3.25%), 46–55 years (2.36%) and 56-65 (0.44%).

Table 6 depicts temporary and permanent deferral distribution among males and females. In males, 378 donors (97.67%) had temporary deferrals and 9 (2.32%) permanent. In females, 284 (98.26%) were temporarily deferred and 5 (1.73%) permanently. Overall, temporary deferrals constituted the majority of cases (97.92%), while permanent deferrals represented 2.07%.

Table 1: Gender Distribution of All Accepted and Deferred Donors (N=4615)

Donors	Accepted N (%)	Deferred N (%)	Total N
Male	2269 (57.6)	387 (57.24)	4056
Female	1670 (42.39)	289 (42.75)	388
Total	3939 (100)	676 (100)	4615

Table 2: Temporary Deferral Causes (N=662)

Cause	Number	% of Temporary Deferral	% of All Deferral
Low hemoglobin	368	55.58	54.43
Low body weight	20	3.02	2.95
Menstrual periods	12	1.81	1.77
Typhoid	2	0.3	0.29
Allergy	4	0.6	0.59
Blood donation in last 3 months	18	2.72	2.66
H/o Tattoo	19	2.87	2.81
High BP	116	17.52	17.15
Low BP	65	9.81	9.61
Minor OT	3	0.45	0.44
H/o Medicine	25	3.77	3.69

Table 3: Permanent Deferral Causes (N=14)

Cause	Number	% of Permanent Deferral	% of All Deferral
Known Case of Hep B and C	3	21.42	0.44
Advanced age	3	21.42	0.44
High Risk for HIV	3	21.42	0.44
Diabetic person taking insulin	1	7.14	0.14
Heart Disease	1	7.14	0.14
Unexplained faint	1	7.14	0.14
Endocrine disorders except Thyroid and Pancreas	1	7.14	0.14
Bleeding Disorder	1	7.14	0.14

Table 4: Five Leading Causes of Deferral in Males and Females (N=676)

Males (n=387)	Number	%	Females (n=289)	Number	%
Low hemoglobin	155	40.05	Low hemoglobin	213	73.7
Low weight	4	1.03	Low weight	5	1.73
High blood pressure	110	28.42	Low blood pressure	45	15.57
Low blood pressure	20	5.17	High blood pressure	6	2.07
H/o Medicine	7	1.81	H/o Medicine	8	2.77

Table 5: Age and Sex-wise Distribution of Deferred Donors (N=676)

Age group (years)	Males N (%)	Females N (%)
<18	0	0
18–25	110 (16.27)	101 (14.94)
26–35	175 (25.88)	147 (21.74)
36–45	54 (7.98)	22 (3.25)
46–55	42 (6.21)	16 (2.36)
56–65	5 (0.73)	3 (0.44)
>65	1 (0.15)	0

Table 6: Temporary vs Permanent Deferral by Sex (N=676)

Sex	Temporary N (%)	Permanent N (%)	Total N
Male	378 (97.67)	9 (2.32)	387
Female	284 (98.26)	5 (1.73)	289
Total	662 (97.92)	14 (2.07)	676

Discussion

This study analyzed the pattern of blood donor deferral at a tertiary healthcare center among 4615 prospective donors. The overall deferral rate of 14.64% is consistent with previous studies reporting rates ranging from 5% to 15% in similar Indian and international settings [11]. Temporary deferrals predominated, accounting for 97.9% of cases, highlighting the importance of pre-donation counseling and addressing modifiable causes such as low hemoglobin, low body weight, and recent minor illnesses [12].

Low hemoglobin was the most common cause of temporary deferral, particularly among female donors, consistent with other regional studies that have identified anemia as a major barrier to blood donation [13]. Low body weight and blood pressure related issues were additional significant contributors, reflecting the physiological and nutritional vulnerabilities of certain donor populations [14]. The high prevalence of temporary deferrals emphasizes the need for targeted nutritional interventions, iron supplementation programs, and health education to improve donor eligibility and retention.

Permanent deferrals constituted 2.07% of total deferrals, primarily due to chronic medical conditions such as infections as well as advanced age. These findings underscore the importance of strict donor selection criteria to safeguard recipient safety while balancing the need for an adequate blood supply [15]. High-risk behaviors, prior transfusions, and suspicious identity verification issues also contributed to permanent deferrals, highlighting the need for careful donor screening and counseling [16].

Age and sex distribution analysis revealed that the majority of deferred donors were young adults aged 26–35 years, reflecting the demographic profile of active blood donors in tertiary care settings [17]. Male donors predominated in absolute numbers, but females exhibited a slightly higher proportion of temporary deferrals, primarily due to physiological factors such as lower hemoglobin levels and menstrual-related deferrals [18]. These findings are in line with global observations on sex-based differences in deferral patterns [19]. Understanding donor deferral patterns is essential for developing strategies to minimize unnecessary deferrals and improve future donor recruitment. Pre-donation screening, nutritional supplementation, and donor education can help reduce temporary deferrals, whereas robust medical evaluation ensures safety in permanent deferrals. Comparisons with other tertiary centers indicate that context-specific interventions tailored to regional donor populations can optimize blood availability and safety [20].

Conclusion

Blood donor deferral at a tertiary healthcare center is influenced by multiple factors, with temporary deferrals predominating due to low hemoglobin, low body weight, and blood pressure related issues. Permanent deferrals are primarily driven by chronic medical conditions, infections, and high-risk behaviors. Understanding these patterns can inform targeted interventions, improve donor eligibility, and enhance future recruitment. Strategic pre-donation counseling, nutritional optimization, and rigorous medical evaluation are essential to maintain a safe and adequate blood supply.

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