



RETROSPECTIVE ANALYSIS OF DEFERRAL RATE AMONG VOLUNTARY BLOOD DONORS AT A TERTIARY CARE HOSPITAL IN UTTARA KANNADA DISTRICT

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ABSTRACT

Background: Blood transfusion is a life-sustaining procedure in several medical and surgical conditions. Blood safety is a major issue world-wide in transfusion medicine. Donor selection criteria are essential in blood donation assessment, prioritizing both recipient and donor safety. Temporary causes for deferral should be counseled while permanent causes deferred for a life time. It is important to analyze the varied reasons of deferrals in order to lessen the deferrals in the future.

OBJECTIVES: 1.To analyze and categorize the reasons for donor deferral among blood donors (temporary / permanent) 2.To implement possible recommendations for reducing preventable donor deferrals among blood donors

Methods: Retrospective analysis was done in blood center, tertiary care hospital from April 2023 to March 2025. Sample size is calculated by universal sampling. Data was collected from the blood donor's standard questionnaire forms and rejection register. Criteria for donor rejection was followed with Drug and Cosmetics act 1940, last amended March 2020. Rate of rejection= Number of deferral/ Total number of donors x 100. Statistical analysis was done by descriptive analysis.

Results: A total of 4937 blood donors were registered during the study period in which 4590(92.96%) were males and 357(7.23%) were females. A total of 217(4.39%) donors were deferred due to various reasons. Among these, 206(94.93%) were temporary and 11(5.07%) were permanent deferrals. The main reason for temporary deferral is recent alcohol intake 42(20.39%), high blood pressure 25(12.14%) and low hemoglobin 24(11.65%); while for permanent deferral was cardiac disease 3(27.27%),hypothyroidism 3(27.27%), and uncontrolled diabetes 3(27.27%). The donor deferral rate in our study is 4.3%.

Conclusion: Blood donor deferrals lead to loss of precious blood/blood components available for transfusion in emergency situation. To avoid such problems, we should be aware about its reasons and frequency. To improve donor eligibility and retention, targeted strategies including enhanced

education and community engagement with pre donation awareness programs are essential to strengthen blood transfusion services.

Keywords: Blood donor, Deferral, Temporary, Permanent.

INTRODUCTION

Blood transfusion is a life-sustaining procedure in several medical and surgical conditions. Although blood is universally essential for healthcare, timely access to safe blood remains inadequate for many patients resulting in marked inequalities in the availability of blood and its components between developed and developing countries¹. To ensure an uninterrupted blood demands, active participation of blood donors is essential².

Blood donors may be voluntary or replacement donors. Voluntary donors give blood altruistically while, replacement donors are often family members or friends of the patient donate blood to replenish used units. All blood donors undergo mandatory pre-donation screening to assess eligibility and to ensure the safety of both donor and the recipient. This screening verifies donors fitness for donation and excludes those with transfusion transmissible infections.

Based on donor screening results, many donors are rejected temporarily or permanently and are referred to as deferred donors³. Temporary deferrals are more common than permanent deferral³. Temporary blood donors can be recruited back after their deferral period and treatment. Permanent blood donors can be counseled for their disease condition and treatment plan to stop disease progression early.² Donor selection and deferral criteria are provided by the Drug and Cosmetic Act 1940, supplemented by the manual (Director-General of Health Services MOH and FW, Govt. of India).²

According to National AIDS control organization's statistics, the annual rate of blood donation is about 7.4 million units against the requirement of 10 million units in India⁴. Donor deferrals can discourage donors and hinder recruitment, so identifying and addressing deferral causes is vital. The pattern of blood donor deferral varies across regions due to differences in disease endemicity and socio cultural factors². The present study is taken to determine the rate of donor deferral and analyze the patterns and reasons of blood donor deferrals in our blood centre in order to guide them in the treatment plan and deferral duration for their recruitment back in blood donor pool in the future.

MATERIALS AND METHODS

A retrospective study was conducted at the blood centre, tertiary care hospital, Karwar for a period of two years from April 2023 to March 2025. Donors were either voluntary or replacement donors. All donors were included in the initial screening. Donors found ineligible for blood donation based on standard criteria were categorized as deferred donors. The data of all deferred blood donors was collected from the blood donor standard questionnaire form and donor rejection registers. Criteria for donor rejection was followed with Drug and Cosmetics act 1940, last amended March 2020. Data were entered into a structured data collection form. Calculation of rate of deferral was done using the following: **Rate of Deferral= Number of deferral/ Total number of donors x 100**. Various reasons of deferral were noted and was categorized into temporary or permanent deferral. Data was entered into Microsoft excel data sheet and analyzed using descriptive statistical method to calculate the frequency and percentage of variables, such as age, gender, types of deferrals, and specific deferral reasons. Ethical clearance was obtained from the Institutional Ethics Committee prior to the commencement of the study.

Inclusion Criteria

All blood donors with the age group of 18-60 years who came forward for donation to our blood Centre or voluntary blood donation camps were included.

Exclusion Criteria

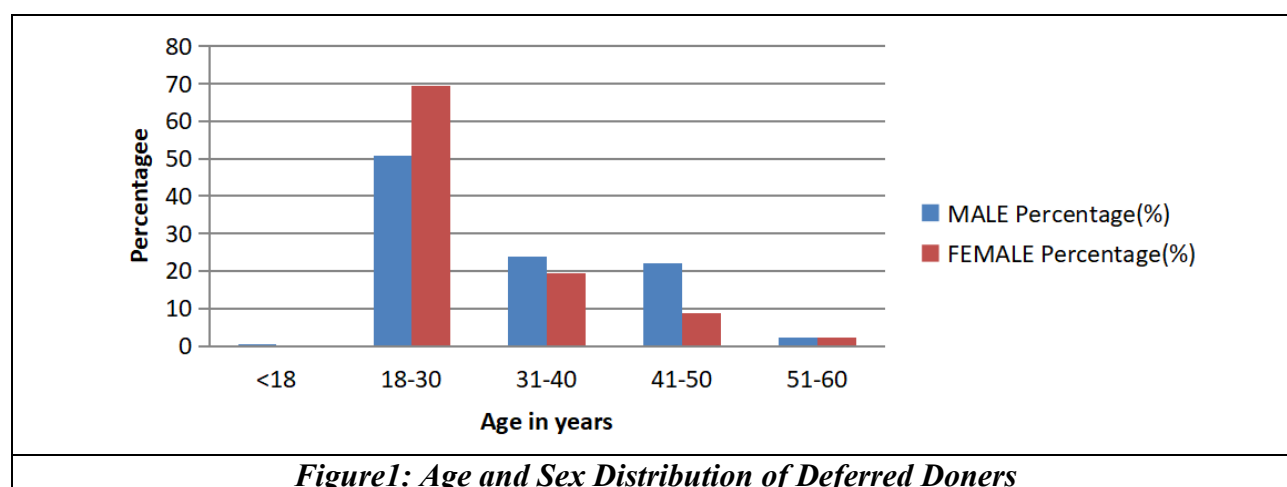
Donors with incomplete or missing data in their medical records. Donors who failed to comply with standard donation procedures or were deemed non-compliant with blood center protocols.

RESULTS

A total of 4937 blood donors were registered during the study period in which 4590(92.96%) were males and 357(7.23%) were females. A total of 217 donors were deferred due to various reasons. Majority of the deferred donors were males 171 (78.8%) and 46 (21.2%) were females. The age of the deferred donors ranged from 17 to 54 years with mean age of 30 years. Most of the deferred donors were in their 2nd to 3rd decade of life. Age of one male donor was below the age limit for donating blood, which was the reason for deferral of the same (Table 1 &Figure 1).

Age in years	MALE		FEMALE		Total (%)
	Number(n)	Percentage (%)	Number(n)	Percentage (%)	
<18	1	0.58	0	0	1(0.46)
18-30	87	50.88	32	69.56	119 (54.8)
31-40	41	23.98	9	19.5	50(23.04)
41-50	38	22.22	4	8.69	42 (19.35)
51-60	4	2.34	1	2.17	5(2.30)
Total	171	100	46	100	217

Table 1: Age and sex distribution of deferred donors



Blood groups	No. Of donors	Percentage (%)
O Positive	73	33.64
O Negative	4	1.84
A Positive	47	21.66
A Negative	11	5.07
B Positive	59	27.19
B Negative	8	3.69
AB Positive	13	5.99
AB Negative	2	0.92
TOTAL	217	100

Table 2: Blood groups of deferred donors

The ABO blood group of the deferred blood donors were in the order O > B > A > AB (Table 2).

Out of 4937 blood donors, 217(4.39%) donors were deferred. Deferred donors were categorized into pre-donation temporary and pre-donation permanent based on the reason for deferral. Among these, 206(94.93%) were temporary and 11(5.07%) were permanent deferrals (Table 3). The main reason for temporary deferral is recent alcohol intake 42(20.39%), high blood pressure 25(12.14%) and low hemoglobin 24(11.65%); while for permanent deferral was cardiac disease 3(27.27%), hypothyroidism 3(27.27%), and uncontrolled diabetes 3(27.27%)(Table 4). The donor deferral rate in our study is 4.39%.

Type of deferral	Male	Female	Total
Temporary	161	45	206
Permanent	10	1	11
Total	171	46	217

Table 3: Distribution of permanent and temporary deferral

Among blood donors, alcohol consumption within the past 72 hours was the most common reason for deferral, accounting for 42 cases, or 20.38% of all deferrals. High blood pressure was the next leading cause, affecting 25 donors (12.13%), followed by low hemoglobin levels in 24 individuals (11.6%). Antibiotic use within the last two weeks led to the deferral of 15 donors (7.28%), while tattooing or ear piercing and being on medication each resulted in 14 deferrals (6.79%). Menstruation was cited in 12 cases (5.82%), and recent dental extraction in 11 (5.33%). Smoking and a history of allergies each accounted for 6 deferrals (2.91%). Recent surgery, recent vaccination, and being underweight were each responsible for 5 deferrals (2.42%). Low blood pressure, a donation interval of less than three months, and inadequate sleep the previous night each affected 4 donors (1.94%). Less frequent reasons included dengue fever (3 cases, 1.45%), high hemoglobin (2 cases, 0.9%), and single instances of dog bite, age under 18 years, chicken pox, and breathing difficulty (each at 0.48%). There were 11(5.07%) permanently deferred donors who had Cardiac disease, uncontrolled diabetes, and hypothyroidism were each reported as reasons for deferral in three cases, together accounting for approximately 27.27% of deferrals for these categories. In addition, epilepsy and jaundice of unknown cause each led to one deferral, representing 9.09% of cases for these specific reasons.(Table 4)

Temporary deferral reasons	Number of donors (%)
Alcohol consumption in 72 hours	42(20.38)
High blood pressure	25(12.13)
Low haemoglobin	24(11.6)
Antibiotic intake < 2 weeks	15(7.28)
Tattoo/ear piercing	14(6.79)
On medication	14(6.79)
Menstruation	12(5.82)
Dental extraction	11(5.33)
Smoker	6(2.91)
Allergy history	6(2.91)
Recent surgery	5(2.42)
Recent vaccination	5(2.42)
Under weight	5(2.42)
Low blood pressure	4(1.94)
Donation interval < 3 months	4(1.94)
Inadequate sleep previous night	4(1.94)
Dengue fever	3(1.45)
High haemoglobin	2(0.9)

Dog bite	1(0.48)
Age <18yrs	1(0.48)
Chicken pox	1(0.48)
Breathing difficulty	1(0.48)
Table 4: Causes of temporary deferrals	

Permanent deferral reasons	No. of donors (%)
Cardiac disease	3(27.27)
Uncontrolled diabetes	3(27.27)
Hypothyroidism	3(27.27)
Epilepsy	1(9.09)
Jaundice unknown cause	1(9.09)
Table 5: Causes of permanent deferrals	

DISCUSSION

Blood donor selection is an essential step for safe and healthy blood transfusion. During the proper selection process, some donors get deferred because of various causes. A continuous and well-regulated blood supply is essential, as temporary or permanent donor deferrals can lead to the loss of motivated, voluntary, non-remunerated donors, ultimately reducing the availability of blood for patients. Understanding the underlying causes of both temporary and permanent deferrals provides insight into regional disease patterns and reducing the financial burden on health care system⁽⁵⁾. Educating donors about blood deferral criteria encourages self-screening and promotes development of a safer, more reliable pool. Furthermore, in cases of permanent deferral, timely communication, counseling and medical management are crucial to prevent progression of underlying conditions to chronic stages^(6,7).

In our study majority of the deferred cases 119 (54.84%) were in the age group of 18 to 30 years which is similar to the study done by Sanjana S.K. et al⁸ and Shoba et al⁹ (Table 6)

Age in years	Present study (%)	Sanjana SK et al ⁽⁸⁾ (%)	Shoba et al ⁽⁹⁾ (%)
<18	1(0.46)	1 (0.4)	32 (10.03)
18-30	119(54.8)	143 (57.2)	208 (65.20)
31-40	50(23.04)	74 (29.6)	53 (16.61)
41-50	42(19.35)	29 (11.6)	20 (6.26)
51-60	5(2.30)	5 (2.0)	04 (1.25)
>60	0 (0.0)	0 (0.0)	02 (0.62)
Total	217	252	319
Table 6: Age distribution of deferred donors with comparative studies			

Our study observed higher number of deferrals in male donors (78.80%) than female donor (21.2%) which is similar to studies done by Dipak Kumar RP et al¹⁰, Pandey et al¹¹ & Rehman et al¹². The lower rates of female donors might be because of prevalence of anemia among rural female population, socio-cultural & socio-economic factors, ignorance, un documentation, lack of awareness & motivation for blood donation. Studies by Das S et al¹³, E. Sabari Priya¹⁴, Chauhan DN et al¹⁵ and Patel S et al¹⁶ have shown higher number of deferrals in female donor than male donor. The variation in deferral rates may be associated with disease endemicity, socio cultural norms, and myths about blood donation.²

Deferred blood group in our study was O 77 (35.48%) followed by B 67 (30.88%), A 58 (26.73%) and AB 15(6.91%), whereas in study done by Sanjana SK et al⁸ it was B 91 (36.4%) followed by O 83 (33.2%), A 56 (22.4%) and AB 22 (8.8%).

In our study, total number of temporary deferrals 242 (96.8%) were more than permanent deferrals 10 (4.0%) which is similar to study done by Singh JR et al², Chenna et al¹⁷ and Shobha et al⁹ (Table 7).

Type of deferral	No. of donors (%)	Singh JR et al ²	Chenna et al (%) ¹⁷	Shoba et al (%) ⁹
Temporary	206 (94.93%)	2016(98.8%)	2878 (98.1)	271 (84.9)
Permanent	11 (5.07%)	23(1.2%)	57 (1.9)	48 (15.04)
Total	217	2039	2935	319

Table 7: Deferral types with comparative studies

The most common cause for temporary donor deferral in our study was alcohol consumption within 72 hours prior to donation, accounting for 20.38% of all deferrals. This was followed by high blood pressure in 12.13% of cases and low hemoglobin in 11.6% of cases. Studies by Singh JR et al²(51.63%) & Sanjana SK et al⁸ (23.01%) have shown high blood pressure was the most common cause. Das S et al¹³ (54.58%) and Agnihotri N et al¹⁸ (55.8%) , Srivastava et al¹⁹ (54.7%) had low hemoglobin as most common cause. Studies by Das S et al¹³, E. Sabari Priya¹⁴ Chauhan DN et al¹⁵ have shown alcohol consumption in last 24 hours prior to donation of blood was the second most common cause. Other notable causes in our study were varied across studies. This variation may be attributed to underlying differences in population health status, nutritional deficiencies, study location, and donor screening protocols. Interestingly, certain factors such as smoking history, allergy history, and recent vaccination contributed to smaller proportions of deferrals in our study (around 2–3%), but were either absent or less frequently observed in other studies.

Public awareness programme and adequate information regarding ill effects of alcohol intake, importance of blood donation and eligibility criteria should be given to the people which can minimize the donor deferral due to alcohol consumption.¹³ High blood pressure needs to be determined whether they are true hypertensive by recording their blood pressure on three different occasions after adequate rest or their blood pressure was elevated due to anxiety of phlebotomy/ white coat hypertension. In any case there is need to exert concentrated efforts to organize mass screening for hypertension in the general population so that they get adequate treatment and can be motivated to become regular donors once their blood pressure. The donors deferred due to anemia should be given advice on proper nutritious diet, iron supplements and antihelminthic drugs along with awareness health programmes in the community level. Also to reduce the loss of precious donor, regular health check-up, proper management and follow up can be carried out especially for temporarily deferred donors so that they can be reverted back to donor pool. For this, blood centre staffs including medical officer, counsellor and nurse can be trained properly¹³.

Most common cause of permanent deferral in our study was cardiac disease which was similar to study by Singh JR et al² whereas Das S et al¹³ have shown hepatitis b was the most common cause with 11.58% permanent deferrals. Patil O et al²⁰ had hypertension and Shaikh M et al²¹ had diabetes as most common cause.

Donor deferral rates in various blood centers vary from 5 to 24% leading to huge losses in terms of available units for transfusion in the nation every year²². The donor deferral rate in our study was 4.39% which was consistent with studies done by Vijayvergiya G²³ (3.29%), Kulkarni et al²⁴ (4.27%), Sharma et al²⁵ (5.1%) , Sundar et al²⁶ (5.84%), Unnikrishnan et al²⁷ (5.2%) and Rabeya et al²⁸ (5.6%). Higher deferral rate was found in Agnihotri N et al¹⁸ (11.6%), Patil O et al²⁰ (14.86%), Shaikh M et al²¹ (19.7%) and Charles et al²⁹ (35.6%). This variation in deferral may be due to many reasons like geographical variation in health problems, socioeconomic status and different donor selection criteria.

CONCLUSION

Blood donor deferrals have led to loss of precious blood/blood components available for transfusion in emergency situation. This study will help us to know the number of preventable causes of deferred blood donors, who can be followed up and retain them as eligible donors in order to meet the demand

especially in rare or reduced number of blood group specific donors in particular regions. To avoid such problems, we should be aware about its reasons and frequency. To improve donor eligibility and retention, targeted strategies including enhanced education and community engagement with pre donation awareness programs are essential to strengthen blood transfusion services.

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