

## PROPORTION OF BLOOD DONOR DEFERRAL AND ITS ASSOCIATED CAUSES- A CROSS SECTIONAL STUDY IN A TERTIARY CARE CENTRE

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### Abstract

**Background:** Blood transfusion is lifesaving procedure and requires adequate supply of safe blood. For provision of quality blood and blood products the important prerequisite is donor selection. Through donor selection some of the donors are unable to donate blood either temporarily or permanently. The aim is to study the proportion of blood donor deferral and to analyze the various deferral factors in a tertiary care center blood bank. **Materials and Methods:** This is a cross sectional study which was conducted in a tertiary care centre in Kerala during the period from January 2022 to December 2022. The study involved donors who have donated blood at the blood bank and at outdoor blood donation camps. Donors were evaluated by the medical officer in-charge and were deferred during different stages of donor evaluation. Stage 1- history taking, Stage 2- physical examination, Stage 3- haemoglobin analysis. Individuals who did not meet the criteria were deferred and the reason for deferral was documented and tabulated. **Result:** Out of 3935 blood donors, 349 were deferred with a deferral rate of 8.87%. There were 96.5% temporary deferrals and 3.5% permanent deferrals. The most common cause for temporary and short-term deferral was high blood pressure 32%, followed by taking medications 19%, low haemoglobin 8.8%. High blood pressure was observed in 65% of donors above 40 years of age. Low haemoglobin was the commonest cause of deferral in females. The commonest cause for permanent deferral was medications like antiepileptic, ayurvedic drugs and insulin. **Conclusion:** Identifying the cause and rate of donor deferral helps in preventing loss of precious blood by identifying and retaining the donor pool. Proper donor education can improve future donation among donors who are temporarily rejected.

## INTRODUCTION

Safe blood transfusion is ensured through selection of healthy donors from the population, for the provision of quality blood and blood products. Around 11 million blood donations are collected in India every year against the 13.5 million requirements in the country.<sup>[1]</sup> In India, 84 percent of these blood donations are collected through voluntary non-remunerated donors, yet many of the voluntary donors are deferred during the screening process.

Blood donor deferral refers to a donor who is not eligible to donate blood based on the criteria for blood donor selection where the donors are selected as per guidelines of Drug and Cosmetic Act 1940 and supplemented by Guidelines issued by NACO.<sup>[2]</sup> The blood donor criteria are a set of

regulatory rules to protect the health of both blood donors and blood recipients, to identify factors that make an individual unsuitable for donation due to temporary or permanent causes, and to minimize the wastage of resources resulting from collection of unwanted donations. Donor deferrals can either be temporary or permanent. Temporary deferral is only for a specific period and these donors are subsequently asked to follow up after the deferral time period.<sup>[3]</sup> Permanently deferred means the donor is not eligible to donate blood for others permanently. All individuals with a history of transfusion-transmissible infection like HIV, Hepatitis B, Hepatitis C, and syphilis are deferred permanently.<sup>[2]</sup> Donor deferral leads to loss of potential and motivated donors who are willing to provide blood for the needy. The reasons for deferral have varying prevalence in different

regions. Knowledge on the prevalence of different causes of deferral in a population would make the selection process more focused and thus helps to develop a safe pool of blood donors. Hence this study is undertaken to find the major reasons for deferral in our hospital setting to implement effective counseling to the patients thereby retaining motivated blood donors to come back for donation after the deferral period and to educate prospective donors.

## MATERIALS AND METHODS

**Study Design:** Cross sectional study.

**Study Period:** 1 year (January 2022 to December 2022).

**Study Setting:** This study was carried out in the blood bank of a tertiary care center.

**Selection Criteria:**

- Inclusion criteria:** Donors who donated blood at blood bank or at blood donation camps held by the hospital
- Exclusion criteria:** Participants who did not fill out the questionnaire form and who did not wish to proceed with blood donation

The institutional ethical clearance was sought from the Institutional ethics committee. Participants willing for donation were registered and the demographic details were entered in the register. The participants were given pre-donation counseling, and the medical officer in-charge assessed the following: (1) Evaluate and review the donor questionnaire (2) physical examination of the donor (3) analysis of hemoglobin levels. Those who met the criteria were accepted for blood donation. Individuals who did not meet the donor criteria were deferred and the reasons for deferral were documented. Statistical analysis was done by estimating frequencies and proportions with 95% confidence interval for the variables.

## RESULTS

A total of 3935 blood donors, including voluntary, relative and replacement donors were registered during the study period. Out of which 97% were males, and 3% were female donors. Amongst them 349 were deferred with a deferral rate of 8.87%. Male deferrals comprised 88% whereas female deferrals accounted for 12%. [Figure 1]

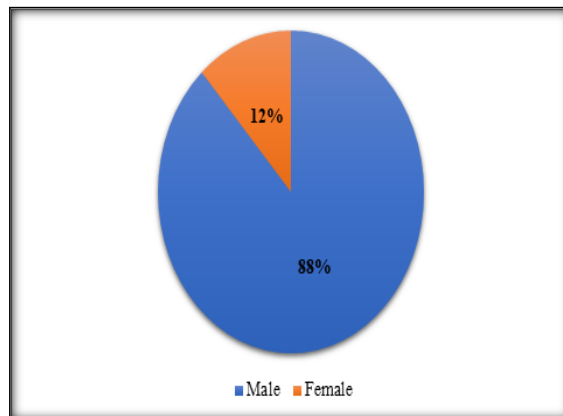
The deferral reasons were classified as temporary and permanent deferrals and the stage at which they were deferred were also noted. 49.8% (n=174) deferred during history taking, 40.6% deferred

during physical examination and 9.45% deferrals after analysis of hemoglobin levels.

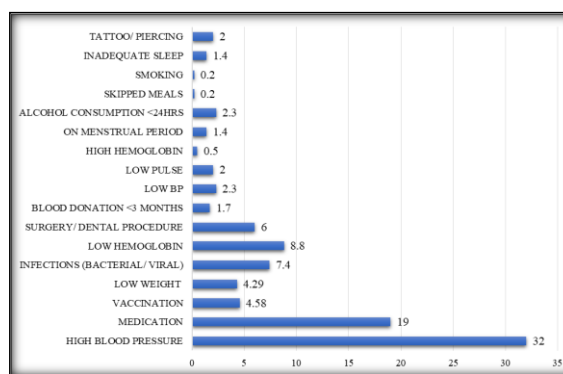
There were 337 cases (96.5%) temporary and 12 cases (3.5%) permanent deferrals. The most common cause for temporary and short-term deferral was high blood pressure 32%, followed by taking medications like NSAIDs, oral hypoglycaemic agents, antibiotics, anti-fungal and clopidogrel. [Figure 2]

The commonest cause for male deferral was high blood pressure and was observed in 65% of donors who were above 40 years of age. Low hemoglobin was the commonest cause of deferral in females. Low weight was observed in 15 cases, all below 30 years of age. Alcohol consumption within 24 hours prior to donation was observed in males comprising 2.3% of deferral. [Table 1 and 2]

There were 3.5% permanent deferrals; the commonest cause was medications like antiepileptic, ayurvedic drugs and insulin followed by chronic medical illness. One case with history of hepatitis B infection and another case of Hepatitis B in spouse was encountered.



**Figure 1:** Bar chart showing the sex distribution of deferred cases (n=349)



**Figure 2:** Bar chart showing the frequency distribution of temporary deferral causes (n=337)

**Table 1: Gender wise frequency distribution of temporary and permanent deferral causes (n = 349)**

Deferral causes	Sex				Total	
	Males		Females			
	n	%	n	%	n	%
High blood pressure	110	31.5	2	0.6	112	32.1
Medication	66	18.9	0	0.0	66	18.9
Vaccination	14	4.0	2	0.6	16	4.6

Low weight	13	3.7	2	0.6	15	4.3
Infection	24	6.9	2	0.6	26	7.4
Low hemoglobin	11	3.2	20	5.7	31	8.9
Surgery/ dental procedure	18	5.2	3	0.9	21	6.0
Blood donation within 3 months	6	1.7	0	0.0	6	1.7
Low blood pressure	8	2.3	0	0.0	8	2.3
Low pulse	7	2.0	0	0.0	7	2.0
High hemoglobin	2	0.6	0	0.0	2	0.6
Menstruation	0	0.0	5	1.4	5	1.4
Alcohol consumption within 24hrs	8	2.3	0	0.0	8	2.3
Skipped meal	1	0.3	0	0.0	1	0.3
Smoking	1	0.3	0	0.0	1	0.3
Inadequate sleep	5	1.4	0	0.0	5	1.4
Tattoo	6	1.7	1	0.3	7	2.0
Medication (Antiepileptic/ Insulin/ Ayurvedic)	6	1.7	1	0.3	7	2.0
Hepatitis B Positive in spouse	0	0.0	1	0.3	1	0.3
H/O Hepatitis B Infection	1	0.3	0	0.0	1	0.3
Age >65 Years	1	0.3	0	0.0	1	0.3
Hypothyroidism	0	0.0	2	0.6	2	0.6
Total	308	88.3	41	11.7	349	100.0

**Table 2: Frequency distribution and percentage of temporary and permanent deferrals in various age groups**

Deferral causes	18-25 years	26-40 years	41-50 years	>50 years
High blood pressure	10	29	49	24
Medication	8	13	26	19
Vaccination	2	8	4	2
Low weight	9	6	0	0
Infection	3	11	8	4
Low hemoglobin	12	19	0	0
Surgery/ dental procedure	6	7	5	3
Blood donation within 3 months	0	2	4	0
Low bp	0	3	3	2
Low pulse	2	1	3	1
High hemoglobin	0	1	1	0
Menstruation	2	3	0	0
Alcohol consumption <24hrs	2	3	2	1
Skipped meal	0	1	0	0
Smoking	1	0	0	0
Inadequate sleep	1	2	1	1
Tattoo	4	3	0	0
Medication (antiepileptic/ insulin/ ayurvedic drugs)	0	2	3	2
Hepatitis B positive in spouse	0	1	0	0
H/o hepatitis B infection	0	1	0	0
Age >65 years	0	0	0	1
Hypothyroidism	0	2	0	0
Total	62	118	109	60

**Table 3: Comparison of deferral rate with different studies**

Study	Deferral rate	Temporary deferral	Permanent deferral
Sheetal malhotra	16%	88%	12%
Basavarajendra	9.74%	83.1%	16.9%
Shrivastava	11.5%	62.8%	37.2%
Sundar et al	5.8%	84%	16%
Present study	8.87%	96.5%	3.5%

## DISCUSSION

Blood donor deferral refers to a donor who is not eligible to donate blood and these deferrals can be either temporary or permanent. In our study, most of the donors were males (97 %) compared to female donors (3%). This finding was similar to studies conducted by Kokani MJ,<sup>[13]</sup> who reported 94.2% male and 5.8% female donors, Unnikrishnan et al,<sup>[14]</sup> who reported 95.13% males and 4.8% female donors. In our study the deferral rate is 8.87% and is comparable with studies conducted by other centres in our country. In our study the temporary deferral constituted 96.5% and permanent deferrals were

3.5%. The most common cause for temporary and short-term deferral was high blood pressure, followed by taking medications and low hemoglobin. Our deferral rate was similar to study conducted by Basavarajegowda A, where the deferral rate was 9.7%. But in their study the most common causes for temporary and short-term deferral were alcohol consumption, low hemoglobin level and low body weight,<sup>[4]</sup> and causes for permanent deferral included chronic medical conditions like asthma and allergic conditions. Comparing with the study conducted by Shrivastava et al., the donor deferral rate was 11.5%. Anemia was the major reason for temporary

deferral and history of jaundice and high-risk behaviour were the major causes for permanent deferral.<sup>[5]</sup> Study conducted by Sheetal Malhotra in north India showed a 16% deferral rate.<sup>[6]</sup> Anemia was the major cause for temporary deferral, followed by infections and drug intake, while history of jaundice was the commonest permanent cause for deferral. Study from southern part of India by Sundar et al have reported the deferral rate of around 5.8% and observed that the common reasons for deferral were low haemoglobin levels, low body weight, and respiratory infections.<sup>[7]</sup> [Table 3]

Hypertension was a leading deferral cause in our study with a significant percentage of 32%. Among the 112 cases, 65% of high blood pressure was observed in males more than 40 years of age. This was similar to another study by Agnihotri N which observed that high blood pressure was a common cause for deferral in donors more than 40 years of age.<sup>[8]</sup> Most of the donors in our study were not previously diagnosed with hypertension and they were incidental findings during donor evaluation. Other causes for high BP in donors were fear of phlebotomy, fear of blood and white coat hypertension. In our study only 8.8% of the deferral was due to low haemoglobin. Compared to other studies where the deferral rate for anemia was higher, our study showed much lower incidence of low haemoglobin deferral. This may be due to lesser voluntary females who came forward for donation. Out of the 41 female donors, 20 cases were deferred due to low haemoglobin. Other studies which had significantly higher deferral rate for anemia of 52.45%, 54.6% and 25.6% was observed by Kandasamy et al, Kumar et al and Mangwanarespectively.<sup>[9-11]</sup> Elsafi SH observed 14.8% deferral due to low haemoglobin in a study conducted in Saudi Arabia.<sup>[15]</sup>

Other common causes of temporary rejection in our study were due to recent vaccination, low weight, infections, surgical/ dental procedures, and alcohol consumption. Low weight was observed in 15 cases, out of which 13 were males below 30 years of age. Alcohol was the second most common cause of rejection in the study conducted by Bhosale et al,<sup>[12]</sup> and another study by Basavarajendra,<sup>[4]</sup> showed 16.7% deferral. The reason for this variation may be attributed to regional and cultural differences. Creating awareness among public about the negative effects of alcohol can increase the number of prospective blood donors. In India, deferral period of 12 months is mandatory after tattooing as a precautionary measure against transfusion transmissible infections by blood donation. These associations are of higher magnitude for individuals having tattoos done by non-professionals. In our region tattooing is not very common and hence constituted 2% of deferral.

## CONCLUSION

This study gives an insight into the various deferral reasons in our region. It helps in promoting steps to retain blood donors by calling back temporary deferred donors. This analysis is beneficial in helping us in refining our donor screening methods and donor criteria which will provide efficient blood transfusion services and create a safe pool of blood donors. Current findings also suggest the need to educate the public about the practices that can be avoided before blood donation and to motivate the female donors.

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