Evaluation of pre-donation donor deferral of blood donors in a tertiary care hospital - A key to successful voluntary blood donation

Sreevidyalatha G M, Deepti Pruthvi, Gowda Kavita Umapathy, Shashikala P

Department of Pathology, SSIMS and RC, Davangere, Karnataka, India

Abstract

Background and aim: Blood transfusion is an essential therapeutic procedure. Donors are deferred for various reasons. Knowledge about deferral rate and causes will guide in maintenance of good donor data pool recruitment later. This study was done to analyse the donor deferral rates and to estimate the retrieval rate of temporarily deferred donors.

Materials and Methods: A cross-sectional descriptive study was conducted at our blood bank attached to tertiary care hospital for a period of one year. Donors were screened according to SOP of Blood Bank (As per donor's selection criteria laid down by Drugs and Cosmetics Act, 1999) and various deferral rates were estimated. Temporarily deferred donors were recalled back to donate later and the percentage of qualified donors was estimated.

Results : Among the 8577 registered blood donors, 376 (4.4%) were deferred and 8201 (95.6%) were eligible. Deferral rate was 4.4% (376 donors) and majority were voluntary donors 57% (214 donors) with a high female preponderance 33.75% (81 donors). Majority 70% (263 donors) were temporarily deferred for low body-weight 14.3% (54 donors) and anaemia12.5% (47 donors). Out of 263 voluntary temporarily deferred donors, 59% (156 donors) returned for donation and 71% (111 donors) successfully donated on retrieval at a later date.

Conclusion: This study upholds that voluntary non-remunerated blood donation is the source of safest blood supply in transfusion medicine. It is important to determine the rate and causes of deferral to guide the recruitment and retention of healthy donor pool. Thus **"Educate, Motivate and Treat"** forms the basis of safe and affordable blood supply to cater the growing demands.

Key words: Deferral; Voluntary donors; Replacement donors

Introduction

Anywhere in the world, transfusion of human blood is an important therapeutic procedure, as there is no other genuine substitution[1]. The World Health Organization recommends a collection rate of 10–20 whole blood units per 1000 population to address the transfusion needs[2].The National AIDS Control Organization's (NACO) statistics showed that the annual rate of blood donation in India is about 7.4 million units, against the requirement of 10 million units. The state of Karnataka contributed about 500,000 units, with 62% obtained via voluntary blood donation[3].

The main objective of transfusion system is to ensure adequate, safe, efficient and accessible blood supply at all levels[4,5]. Blood donor suitability criteria are based on science, informed medical opinion, and regulatory rules. It is the process of assessing the suitability of an individual to donate blood or blood components against different selection criteria[6]. Individuals disqualified from donating blood are known as "deferred" donors. The rate and reasons of deferral may be permanent or temporary and differ from region to region and from one centre to other centre[7].

Lack of sensitization to the deferral criteria is both the cause and effect of scarcity of literature on this topic[8]. There are only few studies in literature regarding the assessment of deferral causes and especially recruitment of temporarily deferred donors. Hence this study is undertaken to analyse the donor deferral

Address for Correspondence:

Dr. Sreevidyalatha G M

Assistant Professor, Department of Pathology
SSIMS and RC, Davangere. Karnataka, India.
Email: sreevidya.med@gmail.com

rates, various causes of deferrals and to decrease the temporary deferral rate by rectifying the cause. Thus we can increase the pool of voluntary donors without compromising on the quality of the blood and safety to the recipient and minimize the scarcity of blood in future[9].

There is dearth of indigenous studies and "informed medical opinion" on whole blood donor deferrals in India. Nodal agencies like the NACO and the State Blood Transfusion Councils (SBTCs) concentrate only on the data concerned with "quantity" of supply and deferrals with main focus on transfusion transmitted infectious marker positivity in donated units. They are more focused at recruiting more and more new donors while ignoring the retention and re-entry of those recruited previously but deferred due to various treatable rectifiable reasons[8].

Material and Methods:

This is a cross-sectional descriptive study of all registered blood donors who were deferred over a period of one year at the Blood Bank attached to our tertiary care hospital and outdoor camps conducted by the same Centre. Ethical clearance was obtained. Active pre-donation motivational programs like lectures, distribution of posters and pamphlets along with health camps focusing on appropriate referral services and advice regarding good dietary habits and use of hematinic to those with low hemoglobin value were held by blood bank to recruit donors and strengthen voluntary blood donation.

Selection criteria: All donors were screened by taking detailed history and physical examination according to selection criteria laid down by Drugs and Cosmetics Act, 1999 Directorate General of Health Services and Drugs Controller of India, Ministry of Health and Family Welfare, and those who disqualified were noted as deferred donors and considered for the study.

Detailed donor format including the demographic data, reason for donation/deferral, past history of deferral with details were noted and tabulated. Deferred donors were categorized based on age, sex, reasons for deferral(temporary and permanent), voluntary or replacement donors. Donor deferral registry was maintained. Based on the reason, deferral time duration was defined. Donors deferred due to temporary causes were recalled to donate later.

The leading causes of deferral among voluntary and replacement donors, in both male and female blood donors were analysed. The data were presented in terms of frequency, percentage and descriptive graphs.

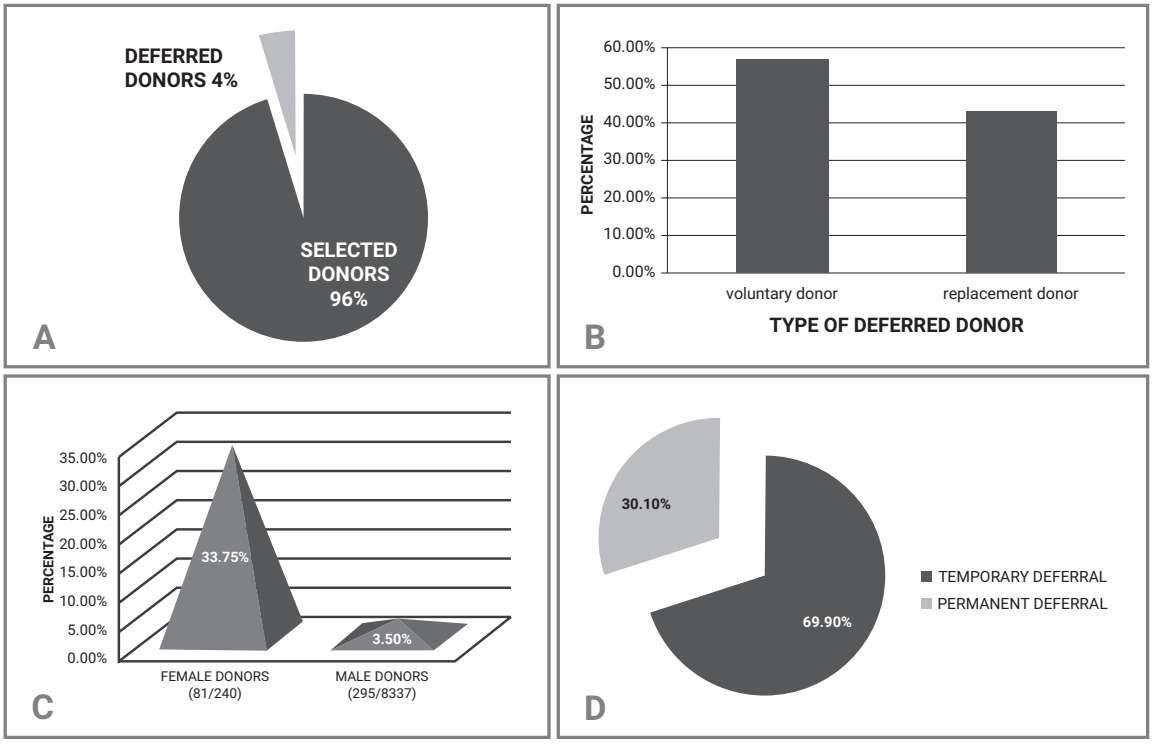

Figure 1: A to D: (A)-Donor deferral rate (376 donors / 8577 donors). (B)-Percentage of voluntary donors (57%) and replacement donors (43%). C-Sex distribution among the donors :female-33.75% (81/240 enrolled female donors), male-3.5% (295/ 8337 enrolled male donors). (D)-Percentage of temporary deferred donors (70%) and permanently deferred donors (30%)

Results:

In this study a total of 8577 people were registered for blood donation, out of which 8201 (96%) were eligible for donation and 376 (4%) were deferred due to various reasons **(Figure 1 A).** Out of 376 deferred donors, 214 (57%) were voluntary donors and 162 (43%) were replacement donors **(Figure 1 B)**. Deferral rate was more among voluntary donors. The deferral rate among male population was (295 donors out of 8337 enrolled male donors) 3.5% which was very less in comparison to deferral rate among female population (81donors out of 240 enrolled female donors) 33.75% **(Figure 1 C).** Out of 376 deferred donors, 263 (70%) donors were deferred because of temporary reasons and 113 (30%) donors were deferred due to permanent reasons **(Figure 1 D).**

The deferral rate was highest among male and female donors in 18-28 years age group with 213 (57%) donors and least of about 13 donors (3.5%) in 49 and above age group. The reasons for higher deferral rates seen in the younger age group of 18-28 years were mainly temporary causes(184 donors) however in older age group of 39 and above years permanent causes (11 donors) accounted for highest deferral rate (Table. 1).

Table 1: Age and sex distribution among voluntary and replacement donors and temporary and permanent deferral donors

Age (years)	Male donor (n=295) 8337	Female donor (n=81)/240	Voluntary donor	Replacement donor	Temporary deferral	Permanent deferral	Total(%)
18-28	160	53	108	105	184	29	213 (57%)
29-38	085	23	73	35	66	42	108 (28.7%)
39-48	039	03	24	18	11	31	42 (11.2%)
Above 49	011	02	9	4	2	11	13 (3.5%)
Total(%)	295 (78%)	81 (22%)	214 (57%)	162 (43%)	263 (70%)	113 (30%)	376 (100%)

Most common causes of deferral in this study were low body weight seen in 54 donors (14.3%), anaemia in 47 donors (12.5%), history of previous donation within 3 months in 43 donors (11.4%), history of medication in 36 donors (9.5%), uncontrolled hypertension in 31 donors (8.2%) and other causes as shown in Table 2. In the younger age group of 18-28 years, temporary causes like low weight, anaemia and history of donation within past three months were the main reasons for deferral. However in older age group of 39 and above years permanent causes like uncontrolled hypertension, diabetes mellitus and cardiac illness were the main reasons for deferral (Table 2).

Table 2: Distribution of various causes for deferral with reference to age and sex of deferred donors

Deferral cause	18-28 Yrs	29-38 Yrs	39-48 Yrs	Above 49 Yrs	Male	Female	Total(%)
Anaemia	46	0	1	0	26	21	47 (12.5%)
Low weight	53	0	1	0	37	17	54 (14.3%)
Lastdonation (<3months)	23	17	2	1	43	0	43 (11.4%)
Alcoholism	12	13	2	1	28	0	28 (7.4%)
Illness(typhoid, jaundice)	12	9	1	0	22	0	22 (5.9%)
Breast feeding	0	2	0	0	0	2	2 (0.53%)
Menstruating	1	1	1	0	0	3	3 (0.8%)
Fever	13	8	1	0	22	0	22 (5.9%)
Medication	20	14	2	0	36	0	36 (9.5%)
Tattoo	4	2	0	0	6	0	6 (1.6%)
Hypertension	0	8	14	9	23	8	31 (8.2%)
Diabetes	0	8	11	1	13	7	20 (5.3%)
Hypothyroidism	9	7	0	0	6	10	16 (4.3%)
Cardiac illness	4	8	6	1	11	8	19 (5.1%)
Asthma	6	4	0	0	7	3	10 (2.7%)
Risk behaviour	10	7	0	0	15	2	17 (4.6%)
Total	213	108	42	13	295	81	376 (100%)

Out of the 263 (70%) temporarily deferred donors, 156 (59%) donors returned for voluntary blood donation after completion of deferral period. Of which 111 donors (71%) successfully donated but 45 donors (29%) were re-

deferred. Remaining 107 (41%) donors were either lost to communication/ did not return. Thus we had a 71% successful voluntary blood donation on retrieval (Figure 2)

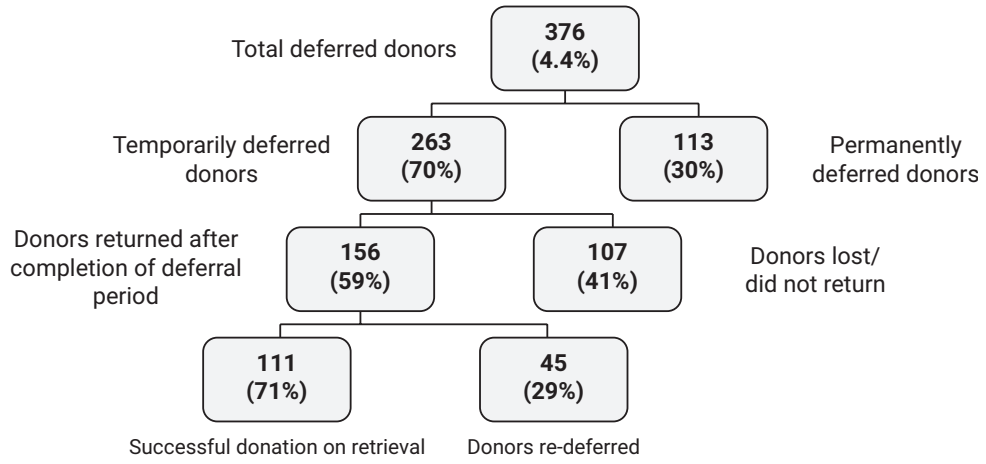

Figure 2: Deferral rates and Re-recruitment details of temporarily deferred donors

Discussion:

There is variation in deferral rate in various populations and ranges from **5.2-36%** across the world in various studies conducted in India and internationally[2,10] owing to rregional diversity, variation in eligibility criteria, endemicity of transmittable diseases and other factors[3,4].

In this study out of 8577 registered donors, 376 were deferred for various reasons constituting to a deferral rate of 4.4%. Out of 376 deferred donors, 162 (43%) were replacement donors and 214 (57%) were voluntary donors.

Deferral rate (4.4%) in this study was comparable to the study done by John et al[9] (5.12%) and Girish et al[11] (5.19%). Higher deferral rate were seen in Ekwere et al[12] (16%) and Gajjar et al[13] (11.16%). In this study, deferral rate was more among voluntary donors (57%) than replacement donors (43.1%) which was similar observation in studies done by Gajjar et al[13] and Girish et al[11]. However the deferral rate was greater in replacement donors in studies done by Bahadur et al[14] (99.4%), John et al[9] (89.7%) and Ekwere et al[12] (89.1%) (Table 3).

Table 3: Comparison of deferral rates in various studies

Study	Voluntary donors (%)	Replacement donors (%)	Total (%)
Bahadur et al[14]	0.6	99.4	9
Girish et al[11]	57.5	42.5	5.19
Ekwere et al[12]	10.9	89.1	16
Gajjar et al[13]	86.21	13.79	11.16
John et al[9]	10.3	89.7	5.12
Present study	56.9	43.1	4.4

Variation in deferral rate in various populations probably reflects the regional diversity and marked variation in whole blood donor eligibility criteria internationally. This could be due to multiple factors such as: a high incidence of detection of relatively permanent and temporary deferral causes in first time donors. Non-inclusion of compulsory blood screening for transmittable viral disease like hepatitis with consideration of past history of jaundice as exclusion criteria could be one of the reasons. Also variation in donor selection criteria like weight, age, haemoglobin percentage, donation interval, high risk sexual activities, endemicity of transmittable diseases and imposition of religious restriction on donation of human parts including blood could be other reasons for variation in deferral rates[11,13].

In studies done by John et al,[9] Girish et al,[11] Ekwere et al,[12] Gajjar et al[13] and Unnikrishnan et al[3] it was observed that deferral rate was higher in female donors. The most common cause of deferral among female donors was anaemia. Similar observations were inferred in this study with female deferral rate being 33.75% which was more than male deferral rate of 3.5% (Table 4).

Table 4: Comparison of deferral rates among male and female donors in different studies

Study	Male donor (%)	Female donor (%)	Total (%)
Girish et al[11]	4.52	29.63	5.19
Ekwere et al[12]	12.4	34.8	16
Gajjar et al[13]	10.76	25.48	11.16
John et al[9]	2.9	47.8	5.12
Present study	3.5	33.75	4.4

Female donors registered for donation were very low in this study which was similar to study done by Sunder et al,[15] Unnikrishnan et al[3] and Bahadur et

al[14]. This can be attributed to ignorance, fear, lack of awareness and motivation among female donors. The high deferral rate among female donors reflects ill health, poor nutritional status and higher prevalence of anaemia among the female population[11].

In this study majority (98.1%) of the eligible donors were male donors while only 1.9% of the eligible donors were female donors. This could be explained on the basis that Indian women have a very high incidence of anaemia, especially in the child bearing age reflecting poor nutritional status and ill health and hence are likely to face disqualification when screened for blood donation[11].

Categorization of causes for deferral among donor population into temporary and permanent causes is essential for donor re-recruitment and retention of healthy donor pool in the long run[11]. In this study the temporary deferral causes (70%) outnumbered permanent deferral causes (30%) which was similar observation in studies done by John et al[9] (58.04%), Girish et al[11] (50.1%) and Gajjar et al[13] (81.15%) **(Table 5).**

Table 5: Comparison of temporary and permanent reasons of deferral in various studies

Study	Temporary causes (%)	Permanent causes (%)
Bahadur et al[14]	91.0	9.1
Girish et al[11]	50.1	49.9
Ekwere et al[12]	47	53
Gajjar et al[13]	81.15	18.85
John et al[9]	58.04	41.96
Present study	70	30

Lower age group (18-28 years) donors were rejected mainly because of temporary causes (86.4%) and higher age group (39-60 years) donors were rejected mainly because of permanent causes (76.3%) which was similar to the study done by Girish et al[11].

Among the temporary causes for deferral in this study low weight (14.3%) and anaemia (12.5%) were most common and was comparable with the studies done by Bahadur et al,[14] Girish et al,[11] Ekwere et al[12] (Table 6).

Table 6: Causes of deferral in various studies

Study	Anaemia (%)	Low weight (%)	Hypertension (%)
Girish et al[11]	19.45	9.09	39.95
Gajjar et al[13]	48.33	7.95	11.94
Ekwere et al[12]	39.09	2.4	3.1
Present study	12.5	14.3	8.2

This highlights that a major proportion of youth are malnourished which greatly hampers blood availability. Therefore interventions like nutritional advice, nutritional supplementation, with motivation and education of donors to seek medical advice regarding evaluation of anaemia and management of anaemia so as to recruit the donors at a later date is pivotal in ensuring donor retention[3,10,13].

Most common permanent cause of deferral in this study was uncontrolled hypertension accounting for 8.2% which was in comparison with the studies done by John et al[9] (2.7%), Ekwere et al[12] (3.1%) and Gajjar et al[11] (11.94%) (Table 6). The reasons for this could be anxiety because of first-time donation, fear of phlebotomy, sight of blood, and white coat hypertension. Moreover, hypertension being a modern epidemic which often goes undiagnosed and is an incidental finding in most donors[16]. This signifies hypertension as the major under diagnosed epidemic in Indian population[11].

Recruitment of fresh donors by organising voluntary donation camp requires manpower, money, motivation of donors and precious time. All these can be curtailed by calling back the temporarily deferred donors after correction of their cause. In this study 59% of temporarily deferred donors were recalled and out of which 71% of them successfully donated which is comparable to the study done in Maidugiri[17] where nearly 70% came back at a later date and donated blood[11].

Conclusion:

The reasons for deferral vary in different locality, age group and sex. Maintenance of donor deferral data profile is of vital significance as it can help to target specific sections of the population, to increase the pool of voluntary blood donors and also to guide and provide the necessary essential database for the policy design and programme implementation.

This study has helped in providing a view about donor deferral rate in voluntary and replacement donors and highlights the importance of re-recruitment of temporarily deferred donors later, thus signifies the importance of proper maintenance of data related to all deferred donors especially temporary treatable reasons like anaemia and low weight among both male and female voluntary donors, aids easy retrieval of donors for blood donation at a later date. Health education and maintenance of eligible donor registry helps in increasing donor blood pool.

The goal of safe and affordable blood supply must meet the growing demands by coordinated optimization of each step-in transfusion chain which includes careful consideration of donor eligibility criteria, adherence to rigorous rules during donation, processing and

storage, the optimal implementation of available screening tests and vigilance of prudent physicians, who evaluate the necessity of each transfusion.

References:

1. *Fessehaye N, Naik D, Fessehaye T. Transfusion transmitted infections – A retrospective analysis from the National Blood Transfusion Service in Eritrea. Pan African Medical Journal 2011; 9:40-6.*
2. *Kouao MD, Dembele B, N'Goran LK, Konate S, Bloch E, Murphy EL et al. Reasons for blood donation deferral in sub-Saharan Africa: experience in Ivory Coast. Transfusion. 2012 July; 52(7 0 2): 1602–6.*
3. *Unnikrishnan B, Rao P, Kumar N, Ganti S, Prasad R, Amarnath N et al. Profile of blood donors and reasons for deferral in coastal South India. AMJ. 2011; 4(7): 379-85.*
4. *Pallavi P, Ganesh CK, Jayashree K, Manjunath GV. Prevalence and trends in transfusion transmitted infections among blood donors in a University hospital Blood Bank: A 5 year study. Indian J Hematol, Blood Transfus 2011; 27(1):1-6.*
5. *NACO. Standards for Blood Banks and Blood Transfusion Services. 2007; 33-4.*
6. *Shah A, Joshi P, Aghera G B, Shah K J. A study on analysis of blood donation deferral during blood donation camp at tertiary- care teaching hospital in south Gujarat region. Int J Med Sci Public Health 2016;5(5):894-7.*
7. *Pruthvi D, Shankar S, Shashikala P. The need for computerized inter blood bank, blood donor deferral registry- An evaluation. International Journal of Current Research 2012; 4(6):54-69.John F, Varkey M R. Evaluation of blood donor deferral causes in a tertiary hospital, South India. IJBAR 2015; 6(3): 253-8.*
8. *Agnihotri N. Whole blood donor deferral analysis at a centre in Western India. Asian J Transfus Sci 2010; 4(2): 116-22.*
9. *John F, Varkey M R. Evaluation of blood donor deferral causes in a tertiary hospital, South India. IJBAR 2015; 6(3): 253-8.*
10. *Pisudde P M, Shyam S, Rekha D, Gon S. Evaluation of pre-donation deferral reason among blood donors visiting ESIC hospital in Eastern India. J Blood Discord Transfus 2015; 6:255-6.*
11. *Girish C J, Chandrashekar T N, Ramesh B K, Kantikar S M. Pre- donation deferral of whole blood donors in district transfusion centre. JCDR 2012;6(1): 47-50*
12. *Ekwere T A, Ino-Ekanem M, Motilewa O O, Ibanga I a. Pattern of blood donor deferral in a tertiary hospital, South-south, Neigerai: A three- year study review. Int J Blood TransfusImmunohematol 2014;4:7-13.*
13. *Gajjar H, Shah F R, Shah N R, Shah C K. Whole blood donor deferral analysis at general hospital blood bank- A retrospective study. NHL Journal of Medical Sciences 2014; 3(2):72-6.*
14. *Bahadur S, Jain S, Goel R K, PahuJa S, Jain M. Analysis of Blood Donor Deferral Characteristic in Delhi, India. South East Asian J Trop Med Public Health 2009; 40(5):1081-91.*
15. *Sundar P, Sangeetha SK, Seema DM, Marimuthu P, Shivanna N. Pre-donation deferral of blood donors in South Indian set-up: An analysis. Asian J Transfusion Sc. 2010; 4(2):112-5.*
16. *Kagu MB, Ahmed SG, Bashir MA, Malah MB, Usoro A, Gimba I, et al., Deferral patterns of voluntary blood donors at the National Blood Transfusion Service, North East Zonal Centre, Maiduguri. Afr J Med Med Sci. 2010 Jun; 39(2):119-25.*
17. *Trembath CR, Hickner JM, Bishop SW. Incidental blood pressure elevations: a MIRNET project. J Fam Pract. 1991;32(4):378-81.*

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