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Research Article

THE EVALUATION OF PATTERN OF WHOLE BLOOD DONOR DEFERRALS IN A TERTIARY CARE CENTER OF NORTH INDIA

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ABSTRACT

Objectives: Donor recruitment is critical to the supply of safe and adequate blood/blood components to meet patient's need; the first and most crucial step to provide safe blood is proper selection of blood donors. Blood donor selection criteria are designed to ensure the donor as well as the recipient's health. The objective of this study is to analyze the various causes of donor deferral, study their frequency pattern and to suggest changes to retain and retrieve donors in future.

Methods: A retrospective study on analysis of deferred donors of whole blood was conducted in a blood center at tertiary care hospital in North India. The study included blood donors deferred from January 2022 to December 2022.

Results: A total of 27,121 donors were registered for whole blood donation and 4534 (16.71%) were deferred. Female deferral (41.67%) was more as compared to male deferral (15.11%). Temporary deferrals (n=4238 [93.47%]) were significantly higher than permanent deferrals (n=296 [6.5%]). The most common reason for temporary deferral was anemia (n = 940 [20.7%]) while that for permanent deferral was jaundice (n=179 [3.94%]).

Conclusion: Analyzing the causes, frequency and deferral pattern of blood donors will help to guide the recruitment and retention efforts to maintain a healthy donor pool at large.

Keywords: Donor deferral, Safe blood transfusion, Donor recruitment, Temporary cause, Permanent cause.

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INTRODUCTION

Safe and adequate blood transfusion services are a significant need of modern health-care system as even a unit of blood/blood components can save a patient in need. Donor recruitment is critical to the supply of safe and adequate blood/blood components and the first and most crucial step to provide safe blood is proper selection of blood donors [1]. Blood donor selection criteria are designed to ensure the donor as well as the recipient's health [2]. The pattern of acceptance and deferral of blood donors is based on various criteria which hold and involve legal, ethical, political, and psychological considerations. The demographic and geographic factors also play a key role in framing the guidelines for the selection of donors [3]. The reasons for deferral are always variable depending on the rules framed by blood transfusion services and health-care providers of different regions. However, the deferral system, if not implemented in a strategic and social manner, will lead to loss of precious blood donors in the long run.

Blood donor deferral can be either temporary or permanent. It is the responsibility of the blood center to identify unfit donors and defer them as temporary/permanent based on the clinical, personal history, and evidence available [4]. A temporary deferral is for a specific time period only; a substantial number of temporarily deferred donors can be recruited back to the donor pool if managed actively. As such, blood donor deferral is an uncomfortable experience for the donors leaving a negative impression about self as well as about the blood donation process [5]. Hence, strategies must be prepared to judiciously defer blood donors, recruit and retain the first time donors by doing critical appraisal of existing deferral policies [2], and creating public awareness by educating the various causes of donor deferral.

The present study was undertaken to analyze the various causes of donor deferral, study their frequency pattern, to evaluate donor deferral rate in both temporary and permanent deferrals and to apply the relevant findings and suggest remedial measures to retain and retrieve donors in future.

METHODS

A retrospective study on analysis of deferred donors of blood and blood components was conducted in a blood center at tertiary care hospital in North India. The study included blood donors deferred from January 2022 to December 2022. Whole blood donors who presented at outdoor voluntary blood donation camps (VBD) and in blood center (in house) were included in the study. In contrast, apheresis donors were excluded from this study. The selection of blood donors was done as per Drug and Cosmetic Act of 1940 and the Rules of 1945 (amended time to time) [6].

A mandatory registration form was filled by donors. This form included all personal details and medical history; consent for the blood donation was taken. Limited physical examination was conducted by the medical officer of blood center. Hemoglobin estimation was done by hemocue 301 based on isobestic principle, which was as per the guidelines of NACO. A separate register for donor deferral was maintained containing detailed notes including cause and criteria not fulfilled. Collected data were evaluated and analyzed to know the reasons and rate of deferral with respect to gender, first time/repeat donors, and temporary/permanent deferral.

Descriptive statistics have been used and variables in different categories have been presented as values, proportions, frequencies, and percentages. p value was calculated and value <0.05 was considered

statistically significant. Odd ratio was calculated to determine the probability of deferral among males and females, first time versus repeat donors, and outdoor versus in house collection.

RESULTS AND DISCUSSION

In the present study, all the donors were voluntary. A total of 27,121 donors were registered, out of which 4534 (16.71%) donors were deferred. Males (n=25487 [93.97%]) were registered more as compared to females (n=1634 [6.02%]).

Female deferral (41.67%) was more as compared to male deferral (15.11%) as shown in Fig. 1. An odds ratio for deferral in male was 0.25 implying that deferral in the male group was one-fourth than in the female group, (p<0.0001, highly significant).

Maximum donors (n=2170 [48%]) deferred were in age group of 18–30 years, followed by age group of 31–40 years (n=1174 [26%]). One hundred and five (2%) donors were deferred due to underage as shown in Fig. 2.

In the present study, donors who were temporarily deferred (n=4238 [93.47%]) were significantly higher than those who were permanently deferred (n=296 [6.5%]) as depicted in Fig. 3.

Deferral was more amongst those potential donors who came to blood center (in house) for donation (19.4%) than those who visited outdoor VBD camps (14.6%) as depicted in Fig. 4. An odds ratio was 0.7, indicating that deferral occurring in the outdoor camp collection was 0.7 times that of in-house collection group (p<0.0001, highly significant).

Deferral was higher in first time donors (22.53%) than repeat donors (14.41%) as depicted in Fig. 5. An odds ratio was 1.7, meaning that the odds of the deferral occurring in the first time donors was 1.7 times that in the repeat donors' group (p<0.001, highly significant).

The most common cause for temporary donor deferral was anemia followed by recent medication, medical causes, tattooing/ear piercing, and alcohol consumption as depicted in Table 1. Anemia was the most common cause of deferral among female donors (n=513 [75.33%]). Antibiotic intake (n=781 [84.89%]) was the most common reason of donor deferral among those who were temporarily on medication. Hypertension (n=415 [9.79%]) was the most common reason among medical causes of temporary deferral followed by diabetes mellitus (n=55 [1.29%]). Temporary deferral due to medication, medical causes, tattoo/ear piercing, and alcohol intake were significantly higher in males as compared to females (n=2136 [59.88%] vs. n=13 [1.9%]).

Among the causes of permanent donor deferral (Table 2), most common reason was history of jaundice (n=179 [3.94%]).

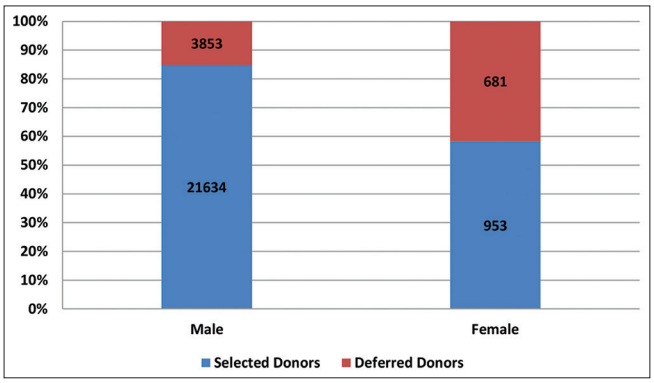

Fig. 1: Gender distribution of deferred donors

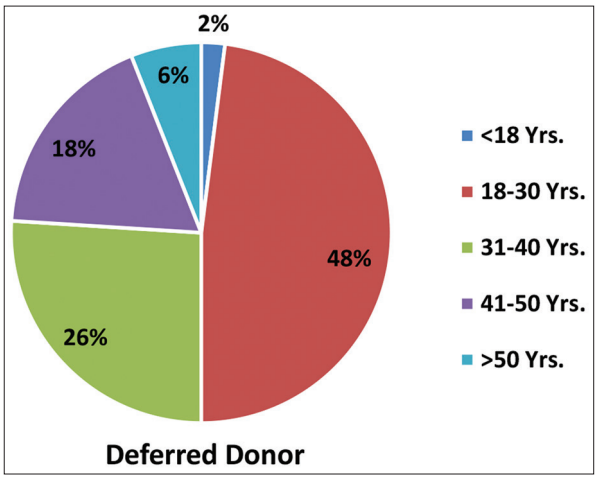

Fig. 2: Age distribution of deferred donors

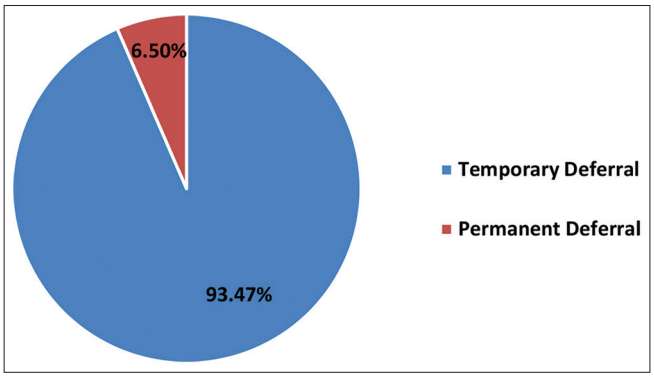

Fig. 3: Temporary/Permanent deferral of donors

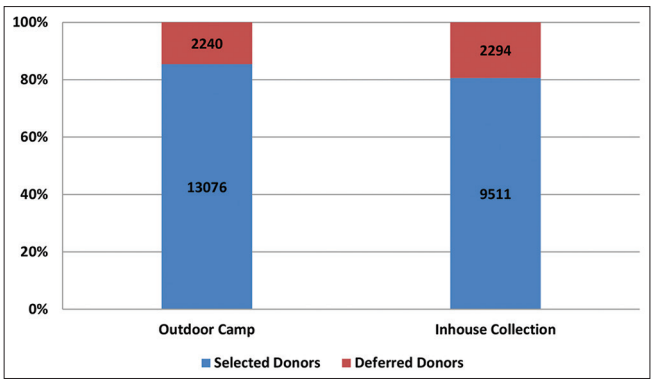

Fig. 4: Outdoor camps deferral versus in house collection deferral

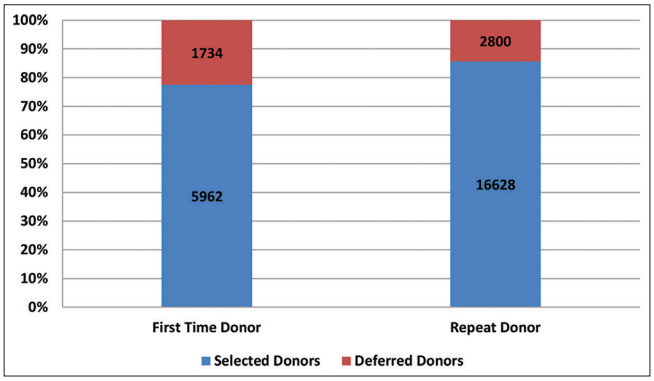

Fig. 5: First time donor deferral versus repeat donor deferral

Donor deferral results in loss of potential, motivated blood donors, and thereby, availability of blood for needy patients [7]. It is a challenge for blood transfusion services to balance between donor acceptability and management of adequate blood inventory by conforming to regulatory rules and guidelines, amended time to time. Hence, it is essential to understand donor deferral reasons and develop effective strategies to retain these already motivated but deferred donors [8,9].

The overall percentage of donor deferral in the present study was 16.71%. There is a variable deferral rate in different studies due to differences in donor selection criteria, endemicity of transfusion-transmitted diseases, and socioeconomic, demographic, regional, and local variations as shown in Table 3.

The deferral rate in the present study is comparable to the study by Lamba *et al.* and Malhotra and Negi [2,14]. This could be because of the demographical similarities as both the studies are from Northern India. Moreover, high rate of donor deferral in the present study is because of strict adherence to donor selection criteria as ours is a teaching institute.

Table 1: Causes of temporary donor deferrals

Sr. No.	Reasons	Male	Female	Deferred donors, n (%)
1	Anemia	427	513	940 (20.7)
2	On medication	911	9	920 (20.29)
3	Medical causes	468	2	470 (10.36)
4	Tattoo/ear piercing	404	2	406 (8.95)
5	Alcohol	353	0	353 (7.78)
6	Tooth extraction and dental surgery	251	0	251 (5.53)
7	Underweight (<45 Kg)	156	74	230 (5.07)
8	Dengue/typhoid/malaria/ chikungunya	113	1	114 (2.51)
9	COVID vaccination	101	5	106 (2.3)
10	Underage (<18 years)	94	11	105 (2.3)
11	Surgical causes	76	1	77 (1.69)
12	Frequent donation (<3 months)	55	1	56 (1.23)
13	Infection	38	2	40(.88)
14	Rabies vaccine/tetanus toxoid	38	0	38 (0.83)
15	Inadequate sleep	37	0	37(.82)
16	Menstruation	0	33	33 (0.72)
17	Poor venous assess	13	7	20(.44)
18	Tuberculosis	13	4	17 (0.37)
19	Not willing to donate	15	0	15(.33)
20	Fasting	4	1	5 (0.11)
21	Lactation	0	5	5 (0.11)
	Total	3567	671	4238 (93.47)

Table 2: Causes of permanent donor deferrals

	Reasons	Male	Female	Deferred donors n (%)
1	Jaundice	175	4	179 (3.94%)
2	Hypertension	39	3	42 (0.92%)
3	Drugs	26	2	28 (0.61%)
4	High-risk behavior	13	1	14 (0.30%)
5	Diabetes Mellitus	10	0	10 (0.22%)
6	Cardiac causes	9	0	9 (0.19%)
7	Asthma	8	0	8 (0.17%)
8	Thyroid	5	0	5 (0.11%)
9	Neurological causes	1	0	1 (0.02%)
	Total	286	10	296 (6.52%)

The present study showed the deferral rate to be higher in females (41.67%) as compared to males (15.11%). This is comparable to the study by Vyasrao and Adinarayan [15] where the deferral rate was 40.7% in females as compared to 8.2% in males. Anemia and underweight were responsible for 86.19% deferral among potential female donors. Poor venous access and higher frequency of vasovagal reactions also significantly contributed to deferral in females.

This issue can be tackled by educating and creating awareness regarding healthy diet especially during pregnancy and post-partum to tackle anemia and low weight and psychological support to address the issue of vasovagal reactions.

Regular counseling sessions to educate the females, especially in rural areas where outdoor camps are held will go a long way in decreasing deferral in females and increasing the potential donor pool.

The present study showed maximum number of donors deferred in the age group of 18–30 years. (49%) which is similar to the study by Shrivastava *et al.* [3]. This could be due to the fact that reasons accounting for temporary deferral like anemia, recent intake of antibiotics, tattoo and alcohol intake are more prevalent in this age group. The donor registration in this age group was also maximum which could also account for more deferral. Since this group accounts for a sizable proportion of our donor pool, it becomes all the more important to make them aware of the relevant causes of temporary deferral and then following them up to bring them back to the healthy donor pool.

The present study showed that donors deferred due to temporary reasons were much more as compared to permanent reasons (93.47% vs. 6.5%) which is similar to a study by Malhotra and Negi (88% vs. 12%), Thaker *et al.* (98.51% vs. 4.9%) and Bahadur *et al.* (91% vs. 9%) [14,16,17]. These donors should be followed up and recruited back on the expiration of deferral period; otherwise, it can lead to permanent deferral in willing donors. Regular telephonic calls and messages will motivate them to return after the expiration of temporary deferral period.

In house donations showed a higher deferral rate as compared to outdoor VBD camps (19.4% vs. 14.6%). This is because majority of the outdoor VBD camps are held in urban educational institutions where awareness lectures along with distribution of IEC material is done. Furthermore, these well-educated donors have a better health profile.

In the present study, the deferral rate of first time donors was higher than repeat donors (22.53% vs.14.41%) and is similar to study done by Malhotra and Negi [14]. This is because repeat donors are well aware of the criteria for donor selection which results in decreased incidence of deferral.

Our study showed that the most common cause of temporary deferral was anemia accounting for 20.7% of the total deferrals, and it was much more common in females (75.33%) as compared to males

Table 3: Comparison of deferral rate in various studies

Study	Deferral rate (%)
Agnihotri, 2010 [5]	11.6
John and Varkey, 2015 [10]	5.12
Shrivastava *et al.*, 2016 [3]	11.5
Okoroiwu and Asemota, 2019 [11]	8.7
Vyas *et al.*, 2020 [12]	11.78
Kandasamy *et al.*, 2020 [7]	10.6
Meena *et al.*, 2021 [13]	7.85
Lamba *et al.*, 2023 [2]	14.6
Malhotra and Negi, 2023 [14]	16
Present study	16.71

(11.08%). This is comparable to the study by Agnihotri [5], where the most common cause of temporary deferral was anemia (55.8%) and significantly higher number of females were deferred due to this reason (77.9% vs. 37% in males). This highlights the greater prevalence of anemia in female population due to poor nutritional status apart from physiological factors such as pregnancy and menstruation. It is important to address this issue as it is easily treatable and temporarily deferred, motivated female donors can be recruited back to the healthy donor pool. Anemia prophylaxis by holding educational sessions for an iron-rich diet and treatment sessions by distributing iron tablets, especially in educational institutions can be done to target the adolescents and youth. Information regarding the prevention of anemia can be regularly included in motivational lectures before organizing blood donation camps.

In 2018 Government of India launched "The Anemia Mukt Bharat" strategy to reduce prevalence of anemia in females, children, and adolescents which focuses on six beneficiary groups to achieve the envisaged target under "Poshan Abhiyan" [18]. Efforts at the regional level along with government-aided programs will go a long way to decrease the prevalence of anemia which is the main cause of deferral in females.

The second common cause of temporary deferral was medication (20.29%). This is comparable to the study by Thaker *et al.* [16] where the deferral due to medication was second only to anemia and was 18.8%. Antibiotic intake (84.89%) was the most common reason of donor deferral among those who were temporarily on medication. This could probably be due to increase in deferral period after antibiotic consumption from 3 days to 2 weeks as per the second amendment of drugs and cosmetics act, 2020. Nonetheless, this is an issue which can be easily handled by making the public aware of the new guidelines. The blood center can make a regular practice to educate the donors few days before the blood donation camps regarding deferral from medication/antibiotic usage.

The most common cause of permanent deferral in the present study was a history of jaundice (3.94%). This is in comparison to the study by Lamba *et al.* (9%) [2] but significantly higher than reported by Agnihotri (1.8%) and Kandasamy *et al.* (1.2%) [5,7] and lower than Shrivastava *et al.* (28.2%) [3]. This could be due to demographical and regional differences where the study by Lamba *et al.* [2] is from a demographically similar region of Northern India. Public awareness about the routes of transmission of Hepatitis B and C infections should be done by lectures and distributing IEC material. Furthermore, vaccination to control this infection should be encouraged. Government of India launched a National Viral Hepatitis Control Program on July 28, 2018 [19]. The aim of program is to achieve country-wide elimination of hepatitis C by 2030 and achieve a significant reduction in morbidity and mortality associated with hepatitis B and C. Such government-sponsored dedicated programs will go a long way to have an impact on blood safety.

CONCLUSION

The study concluded that majority of the blood donor deferrals were temporary. These donors should be followed up pro-actively and encouraged to return. Creating awareness about duration and reasons of temporary deferral is of prime importance.

Special attention should be paid to tackle anemia in females so that they can contribute to the healthy donor pool.

Further, periodic review of the deferral system needs to be done to make changes based on the evidence and information gathered in the review process. Critical appraisal of the existing policies according to the regionally prevalent donor demographics to recruit and retain the willing donors needs to be done.

AUTHORS' CONTRIBUTIONS

Dr. Rajni Bassi - Data collection and compilation of result and writing of manuscript. Dr. Poonam Singal - Analysis of data, draft preparation, and reviewing. Dr. Livleen Kaur –Proofreading and reviewing. Dr. Urvashi Kapoor – Draft preparation and statistical analysis. Sukriti Bansal –Data collection and statistical analysis.

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