

PRE DONATION DEFERRAL PATTERN AMONG BLOOD DONORS IN TERTIARY CARE HOSPITAL, AJMER, RAJASTHAN

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Received: 5 August 2022, Revised and Accepted: 15 October 2022

ABSTRACT

Objective: Analyze pattern of blood donor deferral in our hospital and provide safe and adequate blood and blood products to patients.

Methods: A cross-sectional study on analysis of deferred donors of blood from January 2021 to December 2021 over 1 year was conducted in a zonal blood center in J.L.N. hospital, Ajmer.

Results: During the study period, a total of 14104 blood donors were registered. Out of these, 13587 were males and 517 were females. Among males, 12,655 donated blood and 932 were deferred for several reasons. Among females, 341 donated blood and 176 were deferred. The total no of donors deferred was 1108. Real deferral rate was 7.85%.

Conclusion: Donors who do not meet the selection criteria should be deferred on a temporary or permanent basis. All deferred donors should be treated with respect and care in a confidential manner and should be given a clear explanation of the reason for deferral and an opportunity to ask questions. Donors are less likely to return to donate blood if unclear or unsatisfactory information is given about the reason for deferral. Counseling of deferred blood donors could enhance the compliance of donors to seek follow-up medical care.

Keywords: Blood donors, Deferral, Volunteers donors.

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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 and blood products can save a patient in need. The primary purpose of blood transfusion services is to provide safe and adequate blood and blood products. Recruitment of voluntary, safe, and healthy blood donors for the provision of quality blood products to needy patients in a timely manner is a constant challenge faced by blood transfusion services in India [1].

In India, according to a study by NACO, the quantum of blood needed to cater to the entire population encompassing all specialties is estimated at 26.5 million units of which medicine accounts for 39.9% of all the needs followed by surgery (25%), obstetrics and gynecology (13.8%), and pediatrics (21.3%). The clinical demand for the country was estimated to be 14.6 million units which would address the whole blood and component demand. Of the total demand, the demand for medicine was 6.0 million (41.2%), followed by surgery 4.1 million (27.9%), obstetrics and gynecology 3.3 million (22.4%), and pediatrics 1.2 million (8.5%). The eligible population for blood donation was estimated to be 42, 54, 48, and 160 (425 million population–42.5 crores) which is 32.2% of the total population in India. 34.3/1,000 eligible population (3.43% of eligible population) must donate blood annually to address the estimated clinical demand. In 2017, the annual collection of blood in India was 11,094,145 (11 million) [2].

Estimation of donor requirements is essential for the development of blood transfusion services. Estimates of need may be based a fixed percentage (5% recommended by the WHO) of the population. Still this, assumption ignores the disparity between the size of the population and the number of hospital beds in an area. An estimate of blood needs on the number of acute hospital beds is more realistic. The figure may vary from 5 to 15 units per bed per year. The lower ratios apply to hospitals where blood is needed to manage bleeding as a complication

of pregnancy, or trauma, or simple surgery. The higher ratios apply to hospitals with more specialized facilities such as oncology, open-heart surgery, renal dialysis/transplant or replacement therapy in thalassemia, hemophilia, leukemia, and other blood disorders [3].

The criteria for prospective blood donor selection and deferral in India are provided by the drug and cosmetic act, 1940 (and rules there under), supplemented by the standards for blood bank and blood transfusion services [4,5].

Donor recruitment is critical to the supply of safe and adequate blood and its products to meet patient's need, and the first and most crucial step to ensure blood safety is proper selection of blood donors [6,7].

The system explains the pattern of acceptance and deferral of blood donors 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 requirements for acceptance and deferral of the donors. 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. The reasons for deferral are always variable depending on the rules framed by blood transfusion services and health-care providers of different regions. As such, blood donor deferral is a very painful and an uncomfortable experience for the blood donor and the blood bank screening the donor. Deferring the donors sometimes leaves a negative impression about self in some individuals, which will lead to having of wrong or unsuitable opinion on blood donation process itself. Therefore, these individuals who are deferred once will rarely turn up for a blood donation in the future. The deferral system is of two kinds temporary and permanent. A temporary deferral for a specific period, time only; those individuals need clear and acceptable counseling and education. So that they can donate blood and continue to be healthy donors, thus it is the responsibility of blood banks to identify unfit donors and defer them as temporary/permanent; based on the clinical, personal history, and evidence available [8].

Therefore, it is crucial to understand the different causes of donor deferral so that preventive measures can be taken to reduce the deferral rate in the future. In the case of temporarily deferred donors, appropriate management can be done so that they are not deferred in the future for blood donation [9].

The purpose of this study is to provide safe and adequate blood and blood products to patients and to understand pattern of donor deferral in our demographic area.

METHODS

Study design and setting

A cross-sectional study on analysis of deferred donor of blood and blood components from January 2021 to December 2021 over 1 year was conducted in a zonal blood center in J.L.N. hospital, Ajmer.

Inclusion and exclusion criteria

Voluntary, non-remunerated, and replacement blood and blood component donors presented at blood donation outdoor camps and in house sites were included in the study. In contrast, Apheresis donors (COVID plasma and SDP donors) were excluded from this study.

Study methods

All blood donors were screened per guidelines of DGHS under the drug and cosmetic act 1940 and guidelines issued by NBTC. A mandatory registration form was filled by donors. This form includes all personal contact details, occupation, and medical/surgical history in case any eventful issues are present; the donors are instructed to enumerate the details. Previous transfusion/blood donation-related details, etc., are also gathered. Consent for the blood donation is taken. Clinical examination is conducted by the medical officer of blood bank with regards to general wellbeing, weight, pulse, blood pressure, temperature, auscultation (cardiovascular and respiratory system examination), hemoglobin estimation is done by hemocue 301 based on isobestic principle without using chemicals, absorbance measurement of whole blood at a Hb/HbO₂ isobestic point; dual wavelength (506 nm and 880 nm) for Hb measurement and turbidity compensation, which are as per the guidelines of NACO. A detailed interview is taken by the counselor regarding personal history, habits, and habitat after clinical examination. All the examined parameters should be under the normal range to get qualified as a fit and acceptable donor. Weight >45 kg, age 18–65 years, donor interval between blood donation should be 3–4 months, pulse rate– 80/min; blood pressure– 120/80±10 mm of Hg; temperature– 98.4° Fahrenheit±1°; auscultation– no abnormalities; hemoglobin >12.5 g%, h/o medication, major surgery, illness, immunization, sexual practices that may increase risk of TTI, in females h/o menstruation, abortion, pregnancy, lactation. In case any of the parameters are abnormal, there were any other hindrances for accepting the donor; then, detailed notes on donor deferral, including cause and criteria not fulfilled, are recorded in the register. Collected data is evaluated, taking into various measures and reasons based on age and sex distribution.

RESULTS

During the study for a period of 1 year, from January 2021, to December 2021 a total of 14104 blood donors were registered in the zonal blood bank, JLN hospital Ajmer. Out of these, 13587 were males and 517 were females. Out of 13,587 registered males, 12,655 donated blood and 932 were deferred for several reasons. Of 517 registered females, 341 donated blood and 176 were deferred from blood donation. The total no. of donors deferred in our study was 1108. Total deferral rate

was 7.85%. The percentage of deferral among males was 6.85% and percentage of deferral among females was 34.06% (Table 1).

Total 512 (46.21%) donors deferred in the age group 18-30 years followed by 351 (31.68%) in the age group 31-40 years (Table 2).

Total 645 (58.21%) donors deferred in first time category while 463 (41.79%) donors deferred in repeat donors category (Table 3).

Out of 1108 donors deferred, 630 (56.86%) donors were from urban area and 478 (43.14%) were from rural area (Table 4).

Deferred donors were further classified as deferral due to temporary and permanent reasons. There were about 1035 (93.41%) deferred due to temporary reasons and 73 (6.59%) deferred due to permanent reasons (Table 5).

Out of 1035 temporarily deferred donors, 254 (24.54%) were deferred due to low hemoglobin, 208 (20.10%) were deferred due to COVID vaccination in <4 weeks before donation, 181 (17.49%) were deferred due to alcohol intake in the past 24 h before blood donation (Table 6).

Out of 73 permanently deferred donors, 38(52.05%) donors were deferred due to hypertension before donation. There were 15 donors (20.54%) deferred due to diabetes (Table 7).

DISCUSSION

Blood donor selection and deferral criteria play a key role in blood transfusion safety and are designed to ensure the donor and the recipient's health. 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, including their amendments. It is a well-known fact that donor deferral harms donor return of both first and repeat donors. Hence, it is essential to understand donor deferral reasons and develop effective strategies to retain these already motivated but deferred donors because if the deferral system is not depicted and followed in a strategically manner; it will lead to the loss of potential donors, which will affect the maintenance of blood banks where there is and always will be a shortage of blood units [10,11].

The percentage of deferral donors in the present study is 7.86% which is similar to the studies carried out by Faheem *et al.* [8] (7.87%), Fred john *et al.* [12] (5.12%), Unnikrishnan *et al.* [13] (5.20%), Sundar *et al.* [14] (6%), and Rabeya *et al.* [15] (5.6%). In contrast, some studies showed a higher deferral rate, they are Chaudhary *et al.* [16] (16.4%) and Charles *et al.* [17] (35.6%). There is a variable deferral rate in different studies due to differences in donor selection criteria, endemicity of transmitted diseases and socioeconomic, demographic, religious, and local variations.

In the present study, males are more than females in total registered blood donors. Males (96.3%) and females (3.7%) constitute the total donor population, similar to other studies like C.R. Sirajunnisa begum *et al.* [9] (98.6% and 1.3%) and Vyas *et al.* [3] (95.5% and 4.5%). Thus, the female donor population is minimal due to a false belief that, women are unfit for blood donation due to a higher incidence of anemia in them and also due to fear and lack of awareness regarding blood donation.

The deferral rate in males is 6.85% and in female donors it is 34.04% which was similar to the study done by Vyas *et al.* [3] (9.66% and 56.75%) and Kandasamy *et al.* [1] (6.76% and 49.88%) *et al.* The incidence of deferral

Table 1: Gender distribution of deferral donor

Gender	Number of registered donors	Number of actual bleeds	Number of deferred donors	%of deferred donors
Male	13587 (96.3%)	12655	932	6.85
Female	517 (3.7%)	341	176	34.04
Total	14104 (100%)	12996	1108	7.85

among females is more as compared to males. The high incidence is due to the prevalence of anemia in the females of the reproductive age group, and less enthusiasm amongst females regarding blood donation. Looking at the prevailing trends, females must be encouraged to blood donation by awareness educative programs in the colleges and measures should be taken for the correction of anemia amongst them. Donor counseling

Table 2: Age distribution of deferral donors

Age group	Male	Female	Total (%)
<18 years	8	0	8 (0.7)
18-30 years	436	76	512 (46.21)
31-40 years	285	66	351 (31.68)
41-50 years	156	23	179 (16.16)
51-60 years	45	11	56 (5.05)
61-65 years	2	0	2 (0.18)
>65 years	0	0	0 (0)
Total	932	176	1108 (100)

Table 3: Frequency distribution of deferral donor

Frequency	Male	Female	Total (%)
First	497	148	645 (58.21)
Repeat	435	28	463 (41.79)
Total	932	176	1108 (100)

Table 4: Geographic distribution of deferral donor

Residence	Male	Female	Total (%)
Urban	501	129	630 (56.86)
Rural	431	47	478 (43.14)
Total	932	176	1108 (100)

Table 5: Cause wise distribution of deferral donors

Cause of deferral	Male (%)	Female (%)	Total (%)
Temporary	866 (78.16)	169 (15.25)	1035 (93.41)
Permanent	66 (5.96)	7 (0.63)	73 (6.59)
Total	932 (84.12)	176 (15.88)	1108 (100)

Table 6: Reasons for temporary deferrals with demographic distribution and proportion

S. No.	Causes of temporary deferral	Male	Female	Total	% out of temporary deferral (n=1035)	% out of total deferral (n=1108)
1	Anemia	118 (10.65%)	136 (12.27%)	254	24.54	22.92
2	COVID vaccination	203 (18.32%)	5 (0.45%)	208	20.10	18.77
3	Alcohol	180 (16.25%)	1 (0.09%)	181	17.49	16.34
4	On medication	110	5	115	11.11	10.37
5	Underweight	67	8	75	7.24	6.77
6	Medical causes	60	0	60	5.80	5.41
7	Frequent donation(<3 month)	25	0	25	2.41	2.26
8	Tattoo/ear piercing	23	2	25	2.41	2.26
9	Surgical causes	18	1	19	1.83	1.71
10	Underage	8	0	8	0.77	0.72
11	Rabies vaccine	7	0	7	0.68	0.63
12	Tb	4	0	4	0.39	0.36
13	Asthma	2	0	2	0.19	0.18
14	H/o blood transfusion	1	0	1	0.01	0.01
15	Tetanus Toxoid	1	0	1	0.01	0.01
16	Jaundice	1	0	1	0.01	0.01
17	Menstruation	0	9	9	0.87	0.81
18	Lactation	0	2	2	0.19	0.18
19	Others	38	0	38	3.67	3.4
	Total	866 (78.16%)	169 (15.25%)	1035	100	93.41

and screening through the questionnaire before a donation is a critical process to ensure blood safety and to recruit and retain voluntary non-remunerated blood donors [3].

In the present study, more deferrals are observed in the age group 18-30 years- 46.21%, which was also observed as the same in studies performed by Shah *et al.* [18], Sundar *et al.* [14], Faheem *et al.* [8] (7.87%). As young adults are the most eligible and acceptable donors who are readily available compared to the elderly age group individuals, the deferral rate is also more in this age group.

The temporary deferral rate (93.41%) is more than that of the permanent deferral rate (6.59%) and it is observed to be the same in other studies carried out by Kulkarni [19], Custer *et al.* [20], Fred John *et al.* [12], Rehman *et al.* [21], and Faheem *et al.* [8].

The most common cause of temporary deferral in the present study was anemia (22.92%). Nutritional anemia that results from inadequate intake or assimilation of materials essential for the production of red blood cells and hemoglobin is primary type of anemia. According to ICMR, anemia is classified as, severe anemia (Hb <7 g%), moderate (between 7 and 9 g%), and mild (9.1-12 g%). The prevalence of severe nutritional anemia in India among rural population is 1.3% and a country-wise study indicated a prevalence of severe nutritional anemia as 1.4%. According to NFHS-4, 1% of adult women and 1.1% of adult men have severe anemia with variation between rural, and urban populations.

The second most common cause of temporary deferral in present study was COVID vaccination (18.77%). In male donors COVID vaccination is most common cause (18.32%) followed by alcohol intake (16.25%). Alcohol and substance use remains a global social problem. There is an increasing awareness that alcoholics and substance abusers show some hematological abnormalities (e.g., hemoglobin, white blood cells count, mean corpuscular volume, mean corpuscular hemoglobin concentration, red blood cells count, and hematocrit). Consequences of these hematological abnormalities can result in serious medical complications [22]. The Economic impacts of alcohol include alcohol-related traffic accidents, increased utilization of healthcare, lowered productivity in the labor market, crime, child or partner abuse, and unsafe sexual activity [23].

In females, anemia/pallor takes the upper hand with 12.27%. In most of the studies, it has been noticed that anemia happens to be the common reason for temporary deferral.

Table 7: Reasons for permanent deferrals with demographic distribution and proportion

S. No.	Causes of permanent deferral	Male	Female	Total	% out of permanent deferral (n=73)	% out of total deferral (n=1108)
1	Hypertension	37 (3.34)	1 (0.09)	38	52.05	3.43
2	Diabetes mellitus	15	00	15	20.54	1.35
3	Cardiac causes	6	0	6	8.2	0.54
4	Thyroid	0	5 (0.45)	5	6.85	0.45
5	Neurological causes	4	0	4	5.48	0.36
6	Multiple marks	2	0	2	2.73	0.18
7	Opium intake	1	0	1	1.37	0.09
8	HIV	1	0	1	1.37	0.09
9	Polycythemia	0	1	1	1.37	0.09
	Total	66 (5.96)	7 (0.63)	73	100	6.59

Table 8: Comparative analysis of temporary deferral causes in various studies

S. No.	Cause of temporary deferral	Present study (%)	Faheem et al. [8]	Nehal shah et al. [18]	Padma Malini et al. [24]	Fred john et al. [12]	Kulkarni [19]
1	Anemia	22.92	7.72	30.93	19.90	9.09	23.33
2	Covid vaccination	18.77	-	-	-	-	-
3	Alcohol	16.34	26.26	0.75	15.93	5.13	8.0
4	Underweight	6.77	24.29	6.55	15.93	3.61	18.66
5	Frequent donation (<3 month)	2.26	1.96	4.62	-	4.55	-
6	Tattoo/ear piercing	2.26	5.61	0.79	5.97	0.47	-
7	Menstruation	0.81	1.68	0.77	3.98	1.98	2.66
8	Underage	0.72	1.40	0.67	-	2.91	-
9	Other vaccines (rabies and tetanus toxoid)	0.72	3.23	-	0.39	1.05	-

Table 9: Comparative analysis of permanent deferral causes in various studies

S. No.	Permanent deferral	Present study	Faheem et al. [12]	Nehal shah et al. [18]	Padma Malini et al. [24]	Fred john et al. [13]	Kulkarni [19]
	Hypertension	3.43	15.66	4.49	7.39	7.9	12.70
	Diabetes mellitus	1.35	2.33	3.93	2.14	3.98	2.68
	HIV	0.09	1.66	1.54	0.21	3.98	22.62
	Cardiac causes	0.54	-	-	-	-	-
	Neurological causes	0.36	2.0	0.56	2.19	-	0.58
	Thyroid	0.45	-	1.40	0.22	1.99	-

The comparative analysis of various causes of deferral in different studies is tabulated in Table 8.

The most common cause of permanent deferral in the present study was hypertension (3.43%) with 3.34% of male donors. In females - thyroid disorders account for 0.45% (Table 9).

CONCLUSION

Donors who do not meet the selection criteria should be deferred on a temporary or permanent basis. All deferred donors should be treated with respect and care in a confidentially manner and should be given a clear explanation of the reason for deferral and an opportunity to ask questions. They should be informed whether the deferral is to safeguard their health and that of the recipient. It is the responsibility of the blood transfusion services to ensure that donors who are deferred due to medical conditions are referred for further investigations and management, as appropriate. Studies have found that deferral harms future donor return, particularly by 1st-time donors and those deferred for more than a year. Temporarily deferred donors should be advised on when they could donate and encouraged to return. Donors are less likely to return to donate blood if unclear or unsatisfactory information is given about the reason for deferral. Many temporarily deferred donors do not spontaneously return to donate blood and may need to be recalled after the deferral period is over. Counseling of deferred blood donors could enhance the compliance of donors to seek follow-

up medical care. A system should be in place for donor counseling and referral if any further investigations, treatment, and care are indicated.

AUTHORS' CONTRIBUTIONS

Dr. Dinesh Beelwal and Dr. Ravi Kant Sunaria have contributed to the preparation of this review and drafting of the manuscript Dr. Gokul Chand Meena and Dr. Shashi Bhushan Tailor contributed equally in the revisions and finalization of manuscript.

CONFLICT OF INTEREST

There is no conflict of interest.

AUTHORS FUNDING

The study was not supported by any grants and funds.

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