ANALYSIS OF PRE-DONATION DEFERRAL REASONS AMONGST BLOOD DONORS IN VADODARA, GUJARAT.

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Abstract

Background: Blood transfusion saves lives and improves health, but many patients requiring transfusion do not have timely access to safe blood. Providing safe and adequate blood should be an integral part of every country's national health care policy and infrastructure.

Aim: The main aim of the study was to analyze the reasons for pre-donation deferral amongst blood donors attending our blood bank and outdoor camp organized by our blood bank and to evaluate and categorize the reasons into temporary and permanent deferral.

Materials and methods: It is a Record based Retrospective Study conducted in Department of Immunohematology and blood transfusion over a period of two years from July 2015 to July 2017. The reasons of deferral were analyzed after classification into following categories, namely, temporary- permanent deferral, in-house –camp blood donors, gender-based (male -female), and various age group categories.

Results: A total of 30,022 prospective blood donors registered for blood donation out of which 2241 blood donors were deferred (7.46%) with low hemoglobin level, medication and hypertension as top three causes. The majority of deferral was seen in 18-25 years of age group which mainly comprises the youth population. The female donors were rejected eight times the male donors.

Conclusion: The knowledge of the deferral incidences and their causes in a particular region helps in deciding the magnitude and the direction of the blood donor recruitment efforts. This knowledge also helps in calculating the eligible and the potential blood donor pool.

Keywords: Blood Donors, Pre-Donation, Deferral, Temporary, Permanent.

Introduction

A well organized Blood Transfusion Service (BTS) is a vital component of any health care delivery system. An integrated strategy for Blood Safety is required for elimination of transfusion transmitted infections and for provision of safe and adequate blood transfusion services to the people. The main component of an integrated strategy include collection of blood only from voluntary, non-remunerated blood donors, screening for all transfusion transmitted infections and reduction of unnecessary transfusion. Blood donor suitability criteria are based on science, informed medical opinion, and regulatory rules.^[1]

Blood donors are deferred for various reasons. Individuals disqualified from donating blood are

known as “deferred” donors. Blood safety is ensured through selection of appropriate donor population, screening of donors, testing of donated blood units, and efficient blood transfusion practices as per drug and cosmetic act 1940.^[2]

AIMS:

The main aim of the study was to analyze the reasons for pre-donation deferral amongst blood donors attending our blood bank and outdoor camp organized by our blood bank and to evaluate and categorize the reasons into temporary and permanent deferral and compare the reasons amongst various age groups, sex, and in-house and camp donations.

MATERIALS AND METHODS:

The record based retrospective study was conducted at Department of Immunohematology and Blood Transfusion in Government Medical College and S.S.G Hospital, Baroda, Gujarat for a period of two years from July 2015 to July 2017. The data was collected from donor deferral records. The reasons of deferral were analyzed after classification into following categories, namely, temporary- permanent deferral, in-house –camp blood donors, gender-based (male -female), and various age group categories. For simplicity of analysis the donors were categorized into three categories based on reasons for deferral. The deferral criteria used for classifying the causes of deferral in categories 1, 2 and 3 were as follows:

Category -1: Donors whose own health might be affected by donating.

Category -2: Donors with risk of transfusion transmissible infections.

Category -3: Donors with the condition were transmissibility by blood is unknown or donor with diseases or a condition not suitable for blood donation.

RESULT:

A total of 30,022 blood donors registered for blood donation in which 1,309 (4.36%) were females and 28,713 (95.64%) were males. The deferral rate of 7.46% (2,241/30,022) represents whole blood donors deferred under the three categories and the evaluation is summarized in [Table-1].

Table 1: Donor deferral according to 3 categories of donor deferral

Category of Donor Deferral	Total No. of Donors Deferred	% Deferral Out of (30,022)	Total No. of Temporary Deferral	% Temporary Deferral	Total No. of Permanent Deferral	% Permanent Deferral
Category 1	1,409	4.69%	1,296/1,409	91.98%	113/1,409	8.01%
Category 2	183	0.61%	179/183	97.81%	4/183	2.19%
Category 3	649	2.16%	648/649	99.85%	1/649	0.15%
Total	2,241	7.46%	2,123/2,241	94.73%	118/2,241	5.27%

As seen in [Table-1] the rate of donor deferral was 4.69%, 0.61% and 2.16% in category-1, category-2 and category-3 respectively. About 94.73% (2,123/2,241) donors were deferred temporarily while 5.27% (118/2,241) were permanently deferred. Among the deferred donors who could have risk their health (Category-1), 8.01% were deferred permanently and while 91.99% were deferred temporarily. In donors at high risk of transmitting transfusion transmissible infections (Category-2), 2.19% were deferred permanently major cause being known sero-reactive status. Temporary deferral was done in 97.81% with main causes being history of malaria, tattoo, jaundice and high risk behavior. All the donors with other risk conditions (Category-3), 99.85% were deferred temporarily and the main reason were acute infections, donors on antibiotics, donors who have undergone surgeries, alcohol intake, dengue etc. 0.15% were deferred permanently main reason being polycythemia vera.

Table 2: Comparison of donor deferral in males and females

Category of donor deferral	Temporary donor deferral		Permanent donor deferral		Total donor deferral	
	Male	Female	Male	Female	Male	female
Category-1	850 (52.79%)	446 (86.94%)	60 (92.31%)	53 (100%)	910 (54.33%)	499 (88.16%)
Category-2	173 (10.75%)	6 (1.17%)	4 (6.15%)	0 (0%)	177 (10.57%)	6 (1.06%)
Category-3	587 (36.46%)	61 (11.89%)	1 (1.54%)	0 (0%)	588 (35.10%)	61 (10.78%)
Total no of Deferral	1,610 (71.84%)	513 (22.89%)	65 (2.90%)	53 (2.37%)	1,675 (74.74%)	566 (25.26%)

Among the donors deferred 74.74% were males and 25.26% were females [Table-2]. The temporary deferral among males in Category-1, Category-2 and Category-3 is 52.79%, 10.75% and 36.46% respectively; while

temporary deferral among females is 86.94%, 1.17% and 11.89% in Category-1, Category-2 and Category-3 respectively. On the other hand the permanent deferral in Category-1, Category-2 and Category-3 among males is 92.31%, 6.15% and 1.54% respectively; while permanent deferral among females is 100% in category-1 and 0% in Category-2 and Category-3. [Table-2]

Table 3: Comparison of donor deferral in camp and in-house donation

Donor deferral in	Male	Female	Total
Camp	910	411	1,321
In-house	765	155	920
Total	1,675	566	2,241

Among the total donors registered for blood donation 20,579 were camp donors while 9,443 were in-house donors. The total camp deferral donors comprise of 1,321 among which 910 are males and 411 are females. In-house deferral comprises of 920 deferral blood donors; in which 765 are males and 155 are females. [Table-3]

Table 4: Percentage donor deferral in camp and in-house donations

Donors in	Total no. of donors	Total no. of deferred donors	% of deferral donors
Camp	20,579	1,321	6.42%
In-house	9,443	920	9.74%
Total	30,022	2,241	7.46%

So the deferral percentage is high among the in-house donations as compared to camp donations that is 9.74% and 6.41% respectively. [Table-4]

Table 5: Comparison of donor deferral according to age-group and gender

Age-group in years	Temporary Deferral			Permanent Deferral			Total Deferral (Out of 2241)
	Male	Female	Total	Male	Female	Total	
< 18 years	28	2	30 (1.41%)	0	0	0 (0%)	30 (1.34%)
18-25 years	516	252	768 (36.16%)	14	12	26 (22.03%)	794 (35.43%)
26-35 years	612	112	724 (34.10%)	22	15	37 (31.36%)	761 (33.96%)
36-45 years	282	101	383 (18.04%)	22	11	33 (27.97%)	416 (18.56%)
46-55 years	142	44	186 (8.76%)	4	5	9 (7.63%)	195 (8.70%)
56-65 years	30	2	32 (1.51%)	3	10	13 (11.02%)	45 (2%)
> 65 years	0	0	0 (0%)	0	0	0 (0%)	0 (0%)
Total	1,610	513	2,123 (94.73%)	65	53	118 (5.27%)	2,241 (100%)

Among the donors who came to donate blood 30 were underage, as per the regulations and criteria, they did not qualify to donate blood. Maximum donors deferred were among the age group of 18-25 years (35.43%) next common age group being 26-35 years (33.96%) followed by age group 36-45 years (18.56%), followed by 46-55 years (8.70%), followed by age-group 56-65 years (2%) and lastly age-group < 18 years (1.34%) donors getting rejected. Age-group 18-25 years shows higher rate of temporary deferral while age-group of 26-35 years shows higher rates of permanent deferral. [Table-5]

The analysis of causes of temporary deferral in three categories is presented in [Table-6]. The maximum number of donor deferral was in category-1 followed by category-3 and least being in category-2. The most common cause of temporary deferral in category-1 is low hemoglobin (65.66%) followed by hypertension (8.02%) and hypotension (6.94%) and least being female with ongoing breast feeding (0.94%) and anxiety (0.94%) among

deferred donors. The most common cause of temporary deferral in category-2 is tattoo (51.40%) followed by jaundice (24.02%) and malaria (23.46%) least being high risk behavior (1.12%).

Table 6: Causes of temporary deferral in different categories

Category and causes	Total no. of donors deferral			% of donors deferred Out of	
	Male	Female	Total	2123	2241
Category-1: Donors whose own health might be affected by donating.					
Hypotension	64	26	90 (6.94%)	4.24%	4.02%
<18 years	28	2	30 (2.31%)	1.41%	1.34%
<45 Kg	28	9	37 (2.85%)	1.74%	1.65%
Low hemoglobin	556	295	851 (65.66%)	40.08%	37.97%
Hypertension	101	3	104 (8.02%)	4.90%	4.64%
Generalized weakness	24	0	24 (1.85%)	1.13%	1.07%
Donation <3 months	47	2	49 (3.78%)	2.31%	2.18%
Menstruation	0	87	87 (6.71%)	4.10%	3.88%
Female with ongoing breast feeding	0	12	12 (0.94%)	0.57%	0.54%
Anxiety	2	10	12 (0.94%)	0.57%	0.54%
Total	850	446	1,296 (100%)	61.05%	57.83%
Category -2: Donors with risk of transfusion transmissible infections.					
Tattoo	88	4	92 (51.40%)	4.33%	4.11%
Malaria	40	2	42 (23.46%)	1.98%	1.87%
High risk behavior	2	0	2 (1.12%)	0.09%	0.09%
Jaundice	43	0	43 (24.02%)	2.03%	1.92%
Total	173	6	179 (100%)	8.43%	7.99%
Category-3: Donors with the condition were transmissibility by blood is unknown or donor with diseases or a condition not suitable for blood donation.					
Skin lesion on phlebotomy site	23	0	23 (3.55%)	1.08%	1.03%
Fungal infection	7	0	7 (1.08%)	0.33%	0.31%
Minor surgery	8	0	8 (1.23%)	0.38%	0.36%
Typhoid	6	2	8 (1.23%)	0.38%	0.36%
Acute infection	47	12	59 (9.10%)	2.77%	2.63%
Donor on medication	319	10	329 (50.77%)	15.50%	14.68%
Major surgery	38	3	41(6.33%)	1.93%	1.83%
Dental extraction	7	6	13 (2.01%)	0.61%	0.58%
Dengue	28	21	49 (7.56%)	2.31%	2.19%
Alcohol intake	98	6	104 (16.05%)	4.90%	4.64%
Open wound	1	0	1 (0.15%)	0.05%	0.04%
Vaccination	6	0	6 (0.93%)	0.28%	0.27%
Total	587	61	648 (100%)	30.52%	28.92%

The most common cause of temporary deferral in category-3 is donor on medication (50.77%) followed by alcohol intake (16.05%), dengue (7.56%) and acute infection (9.10%) and least being open wound (0.15%)(Table-6).

Table 7: Causes of permanent deferral in different categories

Category and causes	Total no. of donors deferred			Percentage of donors deferred Out of	
	Male	Female	Total	118	2241
Category-1: Donors whose own health might be affected by donating.					
Diabetics on insulin	16	5	21 (18.58%)	17.80%	0.94%
Heart diseases	10	10	20 (17.70%)	16.95%	0.89%
Epilepsy	4	10	14 (12.39%)	11.86%	0.62%
Bleeding disorder	2	6	8 (7.08%)	6.78%	0.37%
Endocrinal disorder	21	17	38 (33.63%)	32.20%	1.70%
Tuberculosis	7	5	12 (10.62%)	10.17%	0.54%
Total	60	53	113 (100%)	95.76%	5.06%
Category -2: Donors with risk of transfusion transmissible infections					
Known sero- reactive	4	0	4 (100%)	3.39%	0.18%
Total	4	0	4 (100%)	3.39%	0.18%
Category-3: Donors with the condition were transmissibility by blood is unknown or donor with diseases or a condition not suitable for blood donation					
Polycythemia vera	1	0	1 (100%)	0.85%	0.04%
Total	1	0	1(100%)	0.85%	0.04%

As [Table-7] shows, the most common cause of permanent deferral in category-1 is endocrinal disorders (33.63%) followed by diabetics on insulin (18.58%) and least being bleeding disorders (7.08%). The one and only cause of permanent deferral in category-2 in our study is known sero-reactive donors. The one and only cause for permanent donor deferral in category-3 is polycythemia vera. Overall among permanent donor deferral most common cause was endocrinal disorders (33.63%) followed by diabetics on insulin (18.58%) and least being polycythemia vera. (0.85%). Thus in our study the temporary deferral rate 94.73% (2,123/2,241) was high compared to permanent deferral 5.27% (118/2,241). The temporary deferral and the permanent deferral is highest seen in category- 1.

The overall most common donor deferral cause is low hemoglobin (<12.5gm %) followed by donor on medication (14.68%) and least being open wound and polycythemia vera (0.04%). The maximum deferral is seen in age group of 18-25 years followed by 26-35 years which again denotes majority of youth. Thus this shows that this part of youth can be better counseled for temporary deferral to return back for increasing the donor pool.

DISCUSSION:

Blood transfusion is an essential part of the medical care system due to its importance in the

management of many diseases and conditions. [3] Blood is transfused to patients as red cells, whole blood, platelets or plasma products. [4, 5] The basic goal of any blood facility is to improve the safety of blood donor and blood recipient. Blood donor selection criteria policies are modeled to protect both the donor and the recipient. This is attained by continual and consistent efforts to upgrade the standards of blood transfusion services. Although, blood services aim to supply safe blood products, it is not possible to have a transfusion that is totally free from risk of transfusion transmissible diseases. [6] Blood donor deferral criteria are designed to protect both the blood donor and recipient. Some deferrals protect the donors from the risk of blood donation, some like those related to infectious diseases protect the recipient and some deferrals protect both. [7]

Deferral rates ranged from 5.6-35.6% across the world. [8] Out of total donors willing for donation that is 30,022 blood donors, 2,241 were deferred (7.46%). Similar study done by Sushant et al in Jammu reported deferral rate of 7.1% and by Madhuri S Kate et al. (2013) which was done in Mumbai reported deferral rate of 7.55%. [9,10] Similar deferral rates were observed by Sunder P et al. (6%), Unnikrishnan B et al. (5.2%), Rabeya et al. (5.6%) & Bahadur S et al. (9%). [11-14] Higher deferral rates were observed by Agnihotri N (11.6%), Lim JC et al.(14.4%), Choudhary R K et al. (16.4%), Layla AM Bashawri (19.2%) , Charles et al, Di Lorenzo

Oliveira et al and Madan et al (20-35.6%) which could be due to different donor selection criteria.^[7,15-20] [Table-13] In the present study the overall deferral rate was 7.46% and the overall number of deferral was higher in males (74.74%) compared to females (25.26%). This is similar to that observed by Nagarekha Kulkarni (2012) where deferred males and females were 65.33% and 34.67% respectively.^[21] Shushant et al (2016) also observed similar finding in males (72.12%) and females (27.88%).^[9]

In our study deferral rate was highest among 18-25 years age group (794, 35.43%) followed by 26-35 years (761, 33.96%), 36-45 years (416, 18.56%), 46-55 years (195, 8.70%), 56-65 years (45, 2%) and < 18 years (30, 1.34%). Most of these deferred donors (87.95%) were in the age group of 18-45 years which is comparable to the studies of Bahadur S et al. (89.7%), Shushant et al (83.30%), Girish CJ et al. (84.98%), Unnikrishnan B et al. (80.12%), Nagarekha Kulkarni (74.33%).^[8,9,12,14,21] This highlights the fact that a sizeable proportion of youth in this part of the world are malnourished, reflecting the impact of low socio economic status on health of Indian youth.

The deferral rate among male population 5.83% (1675/28,713) and female population 43.23% (566/1,309) were observed. Deferral rate in our study among female population was 8 times higher than the male population. Our study is comparable to the study conducted by Shushant et al. who observed deferral rate about 6 times higher for females (315/964cases, 32.70%) as compared to males (815/15,051cases, 5.40%), Madhuri S Kate et al. (2013) also observed deferral rate about 6 times more for females (62/187 cases, 33.15%) as compared to males (101/1,985, 5.09%).^[9, 10] The reason of high deferral rate among female donors in above studies may be due to the wide prevalence of anemia in female donors.

In our study, the causes of deferral were broadly classified into temporary and permanent. There was more number of temporary deferrals constituting 2,123 (94.73%) donors than permanent deferrals which makes 118 (5.27%) donors. Bahadur S et al. (2009) reported 91% temporary deferrals and 9% permanent deferrals which is almost similar to the present study.^[14] Shushant et al also

reported 90.1% of temporary deferral and 9.9% of permanent deferral which is also almost similar to present study.^[9] On the other hand, Madhuri S Kate (2013), Nagarekha Kulkarni (2012) observed high number of permanent deferrals.^[10,21]

In our study the most common cause of deferral in male donors was low hemoglobin is 556 (33.19%) donors followed by donors on medication in 319 (19.04%) donors, hypertension in 101 (6.03%) donors, alcohol intake in 98 (5.85%) donors, tattoo in 88 (5.25%) donors, hypotension in 64 (3.82%) donors and the other causes which comprised 449 (26.81%) donors. Bahadur S et al. (2009) observed the leading cause of deferral in male was low hemoglobin (28.7%) followed by weight (27.8%), jaundice (8.9%), alcohol (7.7%) and TB (4%).^[14] Shushant et al also observed leading cause of deferral in male was low hemoglobin (31%) followed by donor on medication (18%), past blood donation in 72 hours (8.8%),hypertension in (7.9%), alcohol intake in (4.7%) underweight in (3.9%) and other causes (25.6%) which is almost comparable to our study.^[9]

In our study, the most common cause of deferral in female donors was low hemoglobin in 295 (52.12%) donors followed by menstruation in 87 (15.37%) donors, hypotension in 26 (4.59%), dengue in 21 (3.71%) donors, endocrinal disorders in 17 (3%) donors, acute infection in 12 (2.12%) donors and other causes which comprises 108 (19.08%) donors. Shushant et al (2016) the most common cause of deferral in female donors was low hemoglobin in 206 (65.4%) donors followed by underweight in 44 (14%) donors, medication in 20 (6.3%) donors. Hypertension in 9 (2.9%) donors, fever and recent surgery in 6 (1.9%) donors each and other causes which comprises 24 (7.6%) donors.^[9] Bahadur S et al. (2009) in a similar study observed that the most common cause of deferral in female donors was low hemoglobin (74.1%) followed by underweight (14.4%), lactation (6.5%), menstruation (1.4%) and fever, cough (1.4%).^[14]

In our study the most common cause of permanent deferral was endocrinal disorder 38/118 (32.20%) followed by diabetes on insulin 21/118 (17.80%). Nagarekha Kulkarni (2012) in a study found hypertension in 48.96% donors as the most common cause of permanent deferral.^[21]

CONCLUSION:

The deferral data is not widely recorded and reported till date. If collected and studied in a systematic way it will definitely improve the collection of blood from prospective blood donors. It is important to determine the rates and the causes of the donor deferrals to guide the recruitment and the retention efforts at the local, regional, and the national levels.

In present study, the incidence of donor deferral was 7.46% with low hemoglobin level, medication and hypertension as top three causes. The knowledge of the deferral incidences and their causes in a particular region helps in deciding the magnitude and the direction of the blood donor recruitment effort.

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