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Original Research Paper

Study of blood donor deferral and blood unit deferral in district blood bank in southern Maharashtra

Pathology

KEYWORDS: blood donor deferral, temporary causes, permanent causes.

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ABSTRACT

Blood transfusion services is the most important part of modern health care system and maintaining the adequate supply of safe blood is a ever challenging job for blood banks. The most important is the selection of blood donors by donor selection criteria. Blood donor deferral is a very painful and sad experience, but retaining them for future is a very challenging job. Hence we studied the current rate and various reasons and demographic pattern for donor deferral in this blood bank.

Materials and method :

Records of all potential donors attending the various blood donation camps organised by RCSM govt medical college and CPR hospital blood bank from January 2014 to December 2015 were analysed. Also blood units deferred due to various causes during this period was analysed.

Results :

During the study period from 253 camps 12155 donated blood, 1614 (13.27 %) were deferred. Maximum deferral was in January 13.63% and minimum deferral was in July 3.15%, most of the deferrals (20.0%) belonged to teaching institute camps. Causes of deferrals were classified into temporary 1299 (80.4%) and permanent 315 (19.5%). The most common temporary reason was Anaemia 556 (34.44%) and amongst permanent causes was hypertension 243 (15.05%). Anaemia was common in 21-30 yrs (34.89%) females (72.31%) in student category. Hypertension was common in 41-50 yrs (43.62%) elderly males (89.70%). The commonest cause of blood unit deferral was of HbsAg 226 units (1.58%) was noted.

Conclusion :

Since blood donation is a social activity, it is imperative in the part of health care team to take care of such temporary and permanent deferred donors, counseling for healthy life style, prompt treatment of health problem will help building the confidence and rapport with potential donors and well wishers who will in future attempt to forward the noble cause of blood donation.

INTRODUCTION

Blood transfusion is a vital and life saving procedure. Maintaining the adequate supply of safe blood is a ever challenging job for blood banks. Safe and healthy donor recruitment and retention is a very challenging job and it depends upon human factors and socio economic environment of the area of which the blood bank is catering its services.

We are emphasizing on safe blood according to National blood policy which in itself is very vocal about donor awareness program for imparting information and education and motivation, recruitment and retention of donors. Considering this and otherwise, it is the duty of blood bank to ensure that blood collection process does not harm the donor. Careful screening of donor through history taking and clinical examination at times results in deferring the donor for safety of donor and safety of recipient [1]. Similarly certain blood units are deferred in blood bank to avoid risk of transmission of transfusion transmitted infections [2] or some other factors. This is a considerable loss to blood bank and hence needs consideration. Thus study of deferral of blood donor at collection site and donor blood deferral in blood bank will be worthwhile and enlightening. It will help in taking corrective measures and improving strategies for donor motivation.

Present study is a humble attempt at documenting frequency of donor deferral and blood unit deferral and finding out their reasons.

MATERIALS AND METHODS

The present hospital based study was carried out in the blood bank of a tertiary care hospital. Data was collected from the records maintained by the blood bank. Study participants included all those who have attended and donated blood at outdoor voluntary blood donation camps as well as at our blood bank. It was carried over a period of 2 years from January 2014 to December 2015. Standard operating procedures based on the Directorate General of Health Services guidelines, Ministry of Health & Family Welfare (2003) used for donor selection and deferral. Donors were examined for their eligibility to undergo the donation, clinically and with estimation of haemoglobin. They were interviewed for major illness and for ruling out possibility of transmission transfusion infections and the data were entered in protocol forms.

Based on such examination some donors which were deferred, such donors were included in the further study, their data was analyzed to find out demographic factors such as like age and gender. The causes of deferral were classified as temporary deferral and permanent deferral using WHO criteria.

Blood samples of the donors were screened for HBsAg, HIV, HCV by 4th generation HBsAg, anti HIV 1/2, anti HCV ELISA test kit, BioRad, India respectively. Screening for malaria was done Pf/Pv antigen Bio Lab Diagnostics, and antibodies for syphilis by Rapid test kit, Meril Diagnostics. We collected information about blood units deferred during the study period and their reasons were ascertained.

The data thus collected was statistically analysed using SPSS version 20. The chi square test and paired 'T' test were applied.

RESULTS

A) BLOOD DONOR DEFERRAL

A total of 12155 blood donors were screened during 253 voluntary blood donation camps and 1164 blood donors in the blood bank. The frequency of blood donors was 91.26% in blood donation camps while that for walk in donors for blood bank is 9.57%.

Table 1: Overview of month wise distribution of blood donation camps, blood donors and donor deferral.

2014-2015						
Sr. no.	Month	Camps (n)	Donations(n)	Deferral % (n)		
				Males	Females	Total
1	January	34	15621	n=138 (62.72%)	n=82 (37.27%)	n=220 (13.63%)

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2	February	18	741	n=46 (45.09%)	n =56 (54.90%)	n=102 (06.31%)
3	March	17	881	n=70 (59.82%)	n= 47 (40.17%)	n=117 (07.24%)
4	April	30	1299	n=117 (55.98%)	n=92 (44.01%)	n=209 (12.94%)
5	May	16	773	n=57 (69.51%)	n=25 (30.48%)	n=82 (05.08%)
6	June	20	906	n=48 (77.41%)	n=14 (22.58%)	n=62 (03.84%)
7	July	12	814	n=31 (60.78%)	n=20 (39.21%)	n=51 (03.15%)
8	August	20	1076	n=95 (59.00%)	n=66 (40.99%)	n=161 (09.97%)
9	Septembe r	28	1283	n=142 (66.04%)	n=73 (33.95%)	n=215 (13.32%)
10	October	16	806	n=75 (77.31%)	n=22 (22.68%)	n=97 (06.00%)
11	November	21	945	n=81 (72.32%)	n=31 (27.67%)	n=112 (06.93%)
12	December	21	1069	n=120 (64.51%)	n=66 (35.48%)	n=186 (11.52%)

Total number of donations during the study period was 12155, of which 6050 were in year 2014 and 6105 in year 2015. These donations were received from total 253 camps. Maximum numbers of blood donations camps were in the period of April followed by September. The donor deferral was most frequent in month of January (13.63%) followed by September (13.32%) and April (12.94%). The least frequency of donor deferral was noted in month of June and July in both years. By applying statistical test it was found that there is no correlation between camps, donors and deferral percentage.

The least number of camps was seen in July with minimum donors and percentages of least deferrals were in the same month followed by May and October.

Table 2 : Distribution of camps is shown in following table.

Sr. No.	Type of blood camp	Number of camps (n) (%)	Number of donors (%)	Number of deferred donors (%)
1.	Social institution including women social institutions	n=156 (61.66%)	n=6746 (55.49%)	n=810 (12.0%)
2.	Teaching institutions	n=39 (15.41%)	n=1839 (15.12%)	n=379 (20.0%)
3.	Industrial institutions	n=13 (05.13%)	n=959 (07.88%)	n=78 (08.13%)
4.	Religious organizations	n=25 (09.88%)	n=1380 (11.35%)	n=214 (15.51%)
5.	Political background	n=18 (07.11%)	n=1174 (09.65%)	n=117 (07.24%)
6.	Subdistrict Hospital	n=2 (0.79%)	n=57 (0.46%)	n=16 (0.99%)
	Total	253	12155	1614

There are total 253 camps with 12155 blood donors out of which 1614(13.27%) blood donors were deferred. Maximum numbers of camps were from social institutions including women social institutes.

The age range for donor deferral was with mean 31 years with standard deviation 11.01197 and 95% confidence interval with lower limit 22.86224 and upper limit 40.8447. The gender distribution was as follows. There were n=1028 (63.69%) males & n=586 (36.30%) females, with male to female ratio of 1.75.

Causes of deferrals were classified into temporary and permanent with distribution of deferral as n=1299 (80.4%) and n=315 (19.5%) respectively.
Distributions of donor deferral according to temporary causes are shown in the following table.

Table 3: Causes of temporary deferral.

Deferral causes	(n)	% out of temporary deferral (n=1299) 80.4%	% out of total deferral (n=1614)
Blood donation less than 3 months	43	3.3	2.66
Under age	107	8.2	6.62
Under weight	84	14.1	11.4
Anaemia	**556**	**42.8**	**34.44**
Physiologic (menses & lactation)	35	2.6	2.16
Vaccination	23	1.77	1.42
Alcohol	36	2.7	2.23
Medications	149	11.4	9.23
jaundice	18	1.38	1.11
Procedures (dental extraction & surgery)	65	5	4.02
Excess stock of particular group	25	1.92	1.54
Hypotension	23	1.77	1.42
Fever	26	2	1.61
Miscellaneous	9	0.69	0.55

The leading cause of temporary deferral was anemia (42.8%) followed by underweight (14.1%) followed by medications(11.4%) and under age(8.2%).
The causes of permanent deferral are noted in table 4

Table 4 : Causes of permanent deferral

Permanent causes	N	% out of permanent causes (n=315)19.51%	% of total deferral(n=1614)
Hypertension	243	77.14	15.05
Diabetes	18	5.71	1.11
Overage	15	4.76	0.92
Kidney disease	17	5.39	1.05
epilepsy	11	3.49	0.68
Thyroid lesions	4	1.26	0.24
Asthma	4	1.26	0.24
High risk behavior	1	0.31	0.06
Piles	1	0.31	0.06
Polycythemia	1	0.31	0.06

The leading cause of permanent deferral was hypertension n = 243 (77.14%).
Correlation of leading causes of donor deferral with their demographic status is depicted in following table.

Table 5: Correlation of causes of donor deferral with their statusz

Sr. no.			Anaemia	Hypertension	Underweight	Medications	Underage (<17 yrs)	P value
1	Total		n=556 (34.44%)	n=243 (15.05%)	n=184 (11.4%)	n=149 (09.23%)	(n=107)	2.3315x10-95*0.00000
2	Gender	Males	n=125 (27.69)	n=218 (89.7%)	n=113 (61.41%)	n=141 (94. 63%)	n=99 (92 .52%)	
		Females	n=402 (72.31%)	n=25 (10.28%)	n=71 (38.59%)	n=08 (5.37%)	n=08 (07. 48%)	
3	Age Group	18-20	n=1250 (22.48%	-	n=85 (46.19%)	n=28 (18.79%)	-	1.3136x10-89 *0.0000
		21-30	n=194 (34.89%)	n=6 (02.46%)	n=77 (41.85%)	n=53 (35.57%)	-	
		31-40	n=143 (25.71%)	n=78 (32.09%)	n=17 (09.24%)	n=48 (32.21%)	-	

		41-50	n=83 (14.92%)	n=106 (43.62%)	n=05 (02.72%)	n=13 (08.72%)	-	
		51-60	n=11 (01.97%)	n=53 (21.81%)	-	n=07 (04.70%)	-	
4	Occupation	Student	n=173 (31.11%)	n=1(0.41%)	n=107 (58.15%)	n=37 (24.83%)	n=102 (95.32%)	2.0645X10-112
		Business	n=39 (07.01%)	n=39 (16.04%)	n=60 (3.26%)	n=26 (17.45%)	-	*0.0000
		Service	n=146 (26.25%)	n=161 (66.25%)	n=52 (28.26%)	n=64 (42.95%)	n=05 (04.67%)	
		Farmer	n=26 (04.67%)	n=29 (11.93%)	n=12 (06.52%)	n=20 (13.42%)	-	
		House wife	n=172 (30.93%)	n=13 (05.35%)	n=07 (03.80%)	n=02 (01.34%)	-	
5	Category	I Social institution	n=284 (51.08%)	n=134 (55.14%)	n=96 (52.17%)	n=80 (53.70%)	n=40 (37.38%)	1.2008x10-13
	wise camps	II Teaching institution	n=123 (22.13%)	n=23 (09.46%)	n=58 (31.52 %)	n=39 (26.17%)	n=50 (46.72)	*0.0000
		III Industrial institution	n=28 (05.04%)	n=26 (10.70%)	n=09 (04.89%)	n=12 (08.05%)	n=05 (04.67%)	
		IV Religious organisations	n=93 (16.73%)	n=36 (14.81%)	n=07 (03.80%)	n=15 (10.07%)	n=07 (06.54)	
		Vpolitical background	n=24 (04.32%)	n=20 (08.23%)	n=14 (7.61%)	n=03 (02.01%)	n=05 (04.67%)	
		VI Subdistr ct Hospital	n=03 (0.54%)	n=4 (01.65%)	-	-	-	

Note : significance of 'P' value is checked at level of significance α = 0.05

*'P' value is very much less than level of significance therefore variables are highly significant.

According to chi square test it was found that causes are dependent on age, gender, occupation and types of camps. Anaemia was seen commonly in female students of age group of 21-30 years while Hypertension was common in service going 41-50 years males.

Underweights were seen mainly in 18-20 years male students and deferral due to medications was common in males in the age group of 21-30 years mainly service by profession. All these deferrals were seen in social institution camps except underage which are seen in male students with age , 18 years and belonged to teaching institutes (category II).

B) BLOOD UNIT DEFERRAL IN BLOOD BANK

Table 6: Causes of blood unit deferral

Causes of blood unit deferral	N	% out of total blood collection (n=12155)
HIV	40	0.32
HbsAg	226	1.58
HCV	63	0.51
MP	44	0.36
VDRL	24	0.19
Expired	78	0.64
Less quantity	124	1.02
Hemolysed	0	0
Other causes	69	0.56

Discussion:

There are few studies on blood donor deferral mentioned in literature none of which are as comprehensive as this one. In present study maximum number of blood donation camps were in January, April and September organized by social institutions on event of national holidays such as Republic day, celebration of birth anniversary of national leaders and festivals such as Ganesh festival. Maximum deferrals were also observed during similar period while least deferrals were in the month of July when blood unit collection was also minimal. This could be due to monsoon period which is the prime time for farmers for sowing new crop and new batches of students in teaching institutes.

Present study showed that male donors (63.69%) were deferred more frequently than female donors (36.30%) which might be due to wide prevalence of male donors.

Donor deferral rate (13.27%) in the study was very much similar to various American, European and Asian studies. Zou et al. [3] reported a deferral rate of 12.8% in their 6 years study of American Red Cross blood service and Custer et al. [4] showed a deferral rate of 13.6%. In a European study conducted by Lawson-Ayayi and Salmi [5], 10.8% of donors were deferred. Arslan [6] reported a donor deferral rate of 14.6% in Turkish donors. Lim et al. [7] reported a deferral rate of 14.4% in Singapore (Asia) and Bahadur et al. [2] reported 9% in Delhi (India). Rabeya et al. [8] found a very low deferral rate in their study (5.6%) which could be due to different donor selection criteria.

The leading cause of temporary deferral was anemia(42.8%) followed by underweight (14.1%) followed by medications (11.4%) and under age(8.2%) which was similar to Halperin et al. [9] which showed low hemoglobin as the most common cause in 46% of the temporary deferral. The study done by Arslan [6] in Turkish donors showed low hemoglobin as the most common cause of deferral in 20.7% of overall deferral. Anemia can be cured if proper treatment of these donors is undertaken with follow up. The other causes of temporary deferral included low body weight and others which can be easily corrected. Defereral due to medications can be reduced by properly counseling the potential blood donors when the camps are arranged well in advance. A proper track of follow up of temporarily deferred donors regarding their management should be made in the blood bank so that these donors can be recruited back in donors' pool.

In our study 19.5% of donors were deferred for permanent reasons. Our findings (19.5%)

were higher than Custer et al. [4] who reported a permanent deferral rate of 10.6% and Arslan [6] who reported a rate of 10%. The most common cause of permanent deferral was Hypertension(77.14%) as similar to Bahadur et al. [2].

Table No 7 : Comparison of temporary and permanent donor deferrals in various studies.

Studies	% Deferral	temporary cause	Permanent cause
Bahadur et al[2]	9	Anaemia	Low weight
Zou et al[3]	12.8	Anaemia	Travel to malaria areas
Gujjar [10]	11.16	anaemia,low weight	Hypertension
Charles et al[12]	35.6	Anaemia	High risk sexual activity,Hypertension
Chaudhary et al [13]	16.4	Low weight	Anaemia
Present study	12.36	Anaemia	Hypertension

By studying the prominent leading causes of donor deferrals with respect to socio-economic status it was found that anaemia was seen commonly in female students of age group of 21-30 years. Hypertension was common in service going, 41-50 years males while underweights were seen mainly in 18-20 years male students. Deferral due to medications was common in males in the age group of 21-30 years mainly service by profession. Deferrals due to underage was seen in male students with age <18 years. Majority of the donor deferrals were seen in social institution camps except the underage enthusiastic donors which belonged to category II -teaching institutions.

Amongst the blood units discarded, maximum were because of

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Hepatitis B (1.58%) indicating that either the donor had a subclinical disease/acute or chronic viral infection/false positive cases and therefore for the benefit of the blood recipients these donors were permanently deferred. As Hepatitis B infection is increasing more amongst the local population with only few showing symptomatic disease, 18 donors gave the history of jaundice which were deferred from the donations, still it was observed that highest blood unit deferrals were due to hepatitis B (n=226 , 1.58%). Knowledge of routes of transmission of TTI can decrease the seroprevalence of Hepatitis B infection, further this infection can be controlled by vaccination which should be encouraged. Public awareness programs relating to routes of transmission for these infections should be encouraged.

In our study we have not only considered donor deferral but also blood unit deferral. Of the blood unit deferral we could counsel 55% donors amongst HIV Positive blood units and 45% amongst syphilis positive blood units and for other tests like HBsAg ,HCV,MP positive donors, donors were requested to repeat the tests again. This is a very fruitful activity by which we can build in confidence in our donors that we are concerned with their welfare. This helps in retaining some donors while others can motivate other prospective donors.

Conclusion

The present study showed that although different populations had similar donor deferral rates, the reasons for donor deferral differed, reflecting difference in demographic and socioeconomic status. Deferral of blood donor is disheartening for a respective donor and blood bank. In a way, it hinders the motivational factors for voluntary blood donation. Frequent awareness program for donor selection criteria might avoid inconvenience and discouragement of potential blood donor and it also calls for counseling of such deferred blood donor .Those with temporary causes of deferral need counseling to motivate them for further blood donation activity when the temporary causes is taken care off. Those with permanent causes of blood donor deferral can be motivated to help the blood donation camp organizations and blood banks in motivation of others.

Since donation of blood is social activity it should be imperative in the part of health care team involved in blood banking to take care of such temporarily and permanently deferred donors having such health problems which has caused the deferral. Here comes the role of counseling for healthy lifestyle , prompt treatment of health problem, this will help building the confidence and rapport with potential donors and well wishers who will in future attempt to forward the noble cause of blood donation. Thus counseling of deferred blood donor will be worth while and should be encouraged and emphasized.

The strength of present study lies in its comprehensive nature, in which as many factors as possible related to blood donor deferral were studied which provided immense insight in the whole process of donor deferral. This motivated us to find corrective measures to reduce donor deferral. We have also gone in the details of socio economic factors for causes of deferral. There are hardly any studies which have attempted study of this aspect.

Finally, the approach to improve safety of blood and blood products and to decrease loss of precious blood/ component we must include four steps: (1) detail history based on NACO/ WHO guidelines, (2) physical examination, (3) laboratory tests including ELISA for anti HIV, anti HCV and HBsAg and other test for malaria and syphilis and (4) public awareness programmes.

So to conclude, it is important to determine the rate and causes of blood donor deferral for the safety of blood/component transfusion and also to guide the recruitment efforts to prevent loss of precious blood/components at local, national and international levels.

Footnotes
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Conflict of Interest : None declared

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