

## Evaluation of blood donor deferral causes in a tertiary hospital, South India

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### Abstract

**Aims:** Transfusion of blood saves millions of life all over the world every year. Paucity of donors has always been a problem faced worldwide. Potential blood donors are deferred for several reasons. The rate and reasons of deferral differs from region to region and center to center. To ensure safe blood and blood products are provided by the blood bank, donors and recipients undergo stringent donor screening. All the donors are screened to ensure the blood drawn is safe for transfusion. Thus keeps the recipients protected from transmissible diseases and other problems. This study aims to analyze the donor deferral rates, various causes of deferrals and to take proper referral and follow up measures to decrease the temporary deferral rate by which we could increase the pool of voluntary donors without compromising on the quality of the blood and safety to the recipient.

**Methods:** A two year retrospective study of donors, carried out in a tertiary hospital in south India, and also includes voluntary donors from outdoor camps conducted by blood bank during the period January 2012 to December 2013.

**Results:** A total of 16,805 people came to donate during the period of study. Male constituted around (95.08%) of the donors who came to donate blood. A major proportion (89.70%) were replacement donors. 858 (5.12%) of the entire donor population were deferred due various reason. The major causes of deferral in this study were hypertension 12.70%, followed by anemia 9.09%, tissue transmissible diseases. Those who were deferred were categorized into temporary constituting (58.04%) and permanent (41.96%). The Leading cause of permanent deferral was hypertension 30.3%, where as the leading cause among temporary deferral was anemia 15.66%. One of the major cause of deferral among males were hypertension whereas anemia was the major cause of deferral among females.

**Conclusion:** Donor deferral rate of 5.12% was found in this study, similar rates have been reported by other studies. The major proportions were replacement donors. Females coming forward for blood donation were found to be significantly low. The major causes of deferral in our study were hypertension and anemia.

**Keywords:** Deferral, Blood donation, Donor

### 1. Introduction

Blood transfusion is life saving procedure in many situation specially in trauma cases. Therefore the importance of availability of blood and blood products in an emergency situation cannot be emphasized. Safe and adequate supply of blood and products is major public health issue faced globally. According to National AIDS control organization's statistics, the annual rate of blood donation is about 7.4 million units against the requirement of 10 million units in India [1].

The rate and reasons of deferral differs from region to region and center to center. A voluntary donor is one who donates without any rewards or compulsion whereas a replacement donor is one who donates blood upon request of specific patient or patient's family which intended to be used specifically for the treatment of that a patient. Potential blood donors may not be able to donate for several reasons. All the donors will be screened properly to ensure the blood drawn is safe for transfusion. There are large number of healthy individuals are not suitable to



### 3. Results

A total of 16,805 people came to donate during the period of study, of whom 15978 (95.08%) were males and the rest 827 (4.92%) were females. Of the total 16,805 donors registered, about 858 (5.12%) were deferred due various reason. Among the deferred donors 463 were males and 395 were females. Percentage of deferral among total no of registered males and females were (2.9%) and (47.8%) respectively. (Table 1) shows the demographic profile of donors.

A major portion of donors were those who donated in the hospital (90.57%) and the remaining (9.43%) were from camps conducted near by. (Table 2) shows the donor distribution based on site of blood collection and the type replacement and voluntary donors. Of the 16805 donors registered, 15,074 (89.70%) were replacement donors and only a few were voluntary donors 1731(10.30%).

The deferred 858 cases were categorized into temporary constituting (58.04%) with 95% CI: 54.66%-61.37% and permanent (41.96%) with 95% CI: 38.63%-45.34% in (Table 3, 4,5). Among the 498 temporarily deferral cases, anemia was the number one cause of deferral constituting (15.66%), followed by medications (11.65%), fever (9.44%) as shown in (Table3). Where as out of 360 permanent deferred cases the leading cause was hypertension constituting (30.3%), followed by HIV (18.9%), HBsAg (17.2%), HCV (17.8%) as shown in (Table 4).

One of the major cause of deferral among males were hypertension whereas anemia was the major cause of deferral among females. (Table 6) Leading causes of deferrals among males were hypertension followed by HIV positive cases, alcohol consumption. Among females they were anemia followed by medication, HBsAg positive cases. (Table 7) shows the distribution based on transfusion transmissible infection among deferred donors. (Table 8) shows the number of male deferral due high bp were almost thrice that of female deferral and number of females deferred due to lo Hb were almost six times than the no of deferred males. (Table 9) shows the age sex wise distribution among donors, majority of donors among males (45.4%) were young in 18-30 age group where as in females majority falls (66.7%) between 30-40 age range.

**Table 1: Demographic profile of donors**

	No of registered	No of deferred	% of deferrals of total Registration
Male	15978	463	2.9%
Female	827	395	47.8%
Total	16805	858	5.1%

**Table 2: Donor distribution based on site of blood collection and type replacement and voluntary**

	No of donors	% of total donors (16805)
In-hospital	15221	90.57%
Camp	1584	9.43%
Replacement	15074	89.70%
Voluntary	1731	10.30%

**Table 3: Showing causes of temporary deferrals and their proportions.**

	Male	Female	Total	% Temporary Deferral	% of total Deferral
Hemoglobin	11	67	78	15.66	9.09
Medication	24	34	58	11.65	6.76
Fever	25	22	47	9.44	5.48
Alcohol	44	0	44	8.84	5.13
Low BP	12	29	41	8.23	4.78
Recent donor	29	10	39	7.83	4.55
Jaundice	17	19	36	7.23	4.19
Low weight	5	26	31	6.22	3.61
Dental procedure	11	16	27	5.42	3.15
Under age	6	19	25	5.03	2.91
Recent surgery	14	5	19	3.82	2.21
Menstruation	0	17	17	3.41	1.98
Recent Vaccine	7	2	9	1.81	1.05
Tuberculosis	8	0	8	1.61	0.93
Skin lesions	2	4	6	1.20	0.70
Tattoo	4	0	4	0.80	0.47
Ear pierce	0	3	3	0.60	0.35
Malaria	1	2	3	0.60	0.35
Brest feeding	0	2	2	0.40	0.23
Allergy	0	1	1	0.20	0.12
Total			498	100%	58.04%

**Table 4: Showing causes of permanent deferrals and their proportions**

	Male	Female	Total	% Permanent Deferral	% of total Deferral
Hypertension	85	24	109	30.3	12.70
HIV positive	47	21	68	18.9	7.93
HBsAg positive	30	32	62	17.2	7.23
HCV positive	45	19	64	17.8	7.46
Uncontrolled Diabetes Mellitus	16	7	23	6.4	2.68
Cirrhosis	3	0	3	.8	.35
Asthma	10	7	17	4.7	1.98
Heart disease	3	6	9	2.5	1.05
Epilepsy	4	1	5	1.4	.58
Total			360	100%	41.96%

**Table 5: Distribution of temporary and permanent deferrals**

	No of deferrals	% of total deferrals	Statistical indices
Temporary	498	58.04%	95% CI: 54.66%-61.37% Z statistic: 759.837 P < 0.0001
Permanent	360	41.96%	95% CI: 38.63%-45.34% Z statistic: 549.142 P < 0.0001
Total	858	100%	

**Table 6: Leading causes of deferrals among male and female**

Deferred Males 463		Deferred Females 395	
Cause	No	Cause	No
Hypertension	85	Hemoglobin	67
HIV	47	Medications	34
HCV	45	HBsAg	32
Alcohol	44	Low blood Pressure	29
HBsAg	30	Low weight	26

**Table 7: Distribution based on transfusion transmissible infection among deferred donors**

	No of deferred	% of total deferred
HIV	68	7.93%
HBsAg	62	7.23%
HCV	64	7.46%
Total	194	22.62%

**Table 8: Blood pressure and Hemoglobin level distribution among donors**

	Males 15978	Female 827	Total 16805	Statistical indices
Deferred cases due to high blood pressure	85	24	109	Chi-squared 68.541
Normal blood pressure range	15893	803	16696	DF 2 Significance level P<0.0001
Deferred cases due to low hemoglobin <12.5	11	67	78	Chi-squared 1098.196
Normal hemoglobin	15967	760	16727	DF 2 Significance level P<0.0001

**Table 9: age wise distribution of blood donors**

Age	Male 15978	Female 827	Total 16805	Statistical indices
18-30	7249 (45.4)	264 (31.9)	7513	Chi-squared 645.335
30-40	4396 (27.5)	552 (66.7)	4948	DF 6
40-50	3848 (24.1)	8 (1.0)	3856	Significance level P<0.0001
50-60	485 (3.0)	3 (.4)	488	

#### 4. Discussion

Total of 16,805 donors who came forward for blood donation, of which about 858 cases 5.12% were deferred due various reasons. Several studies have reported a similar deferral rate (5.20%) by Unnikrishnan *et al* [3], (6%) by Sundar *et al* [4], and (5.6%) by Rabeya *et al* [5]. Some studies have even had a higher deferral rate of (16.4%) Chaudhary *et al* [6], (35.6%) Charles *et al* [7]. Even though deferral rate were found to be similar, the major reasons for deferral varies reflecting disparity in socioeconomic status. The deferral rate differs from region to region and center to center. These varied differences in the rate could be due to different donor selection criteria. Male constituted around 95.08% of the donors who came to donate blood. Which shows that the number of females volunteering for the donation were few only 4.92% similar rate has been reported by Pandey *et al*[8]. This is because of prevalence of false belief that females cannot donate. Although, due to physiological factors, women may be more prone to conditions such as anemia, but a pre-donation counseling will help decide whether one should or shouldn't donate.

The major causes of deferral in this study were hypertension 12.70%, followed by anemia 9.09%, tissue transmissible diseases (HIV, HBsAg, HCV), on medication, fever. Those who were deferred were categorized into temporary constituting 58.04% (95% CI: 54.66%-61.37%) and permanent 41.96% (95% CI: 38.63%-45.34%). A similar rate have been found in study by Rehman *et al* with temporary (63.73%) and permanent (36.3%) [9]. Whereas Arslan *et al* have reported a rate of 10% and 90% among permanent and temporary deferrals respectively [10]. The Leading cause of permanent deferral was hypertension 30.3%. Hypertension often goes undetected and could be an incidental finding while screening, at the same time hypertension could be due to fears of phlebotomy, white-coat hypertension, exercise, stress, etc... Tissue transmissible diseases (HIV, HBsAg, HCV) accounted for the second most leading cause of permanent deferral. Transmissible diseases together constituted 1.15% of the donor population, a similar rate of (1.58%) came up in the study by Unnikrishnan *et al* [3], where as much a higher rate of (8.7%) have been reported by Ekwere *et al* [11]. In the study

0.4% of the sample was found to be positive for HIV, and was much lower than other reported studies (0.8%) Singh *et al* [12], (0.6%) Kaur *et al* [13]. Withdrawal of blood from these people pose potential threat to recipient by transfusion. Therefore more detailed history has to be elicited while screening, history of tattooing, piercing, high risk sexual practice etc. cause in some rare occasions even a screening test can turn as false negative.

The leading cause among temporary deferral was anemia 15.66%, a similar rate of (17.95%) has been reported by Rehman *et al* [9], while a much higher rate of (46%) has been reported by Halperin *et al*[14]. The other causes were medications, followed by fever, alcohol consumption and low blood pressure. Most of these temporary deferrals could be reduced for the next visit by taking proper measures. Those with anemia have to be referred of further evaluation and treatment. Studies have show by lowering hemoglobin standard levels and offering iron treatment for pre-menopausal woman could increase female eligibility Newman *et al*[15]. People in the community should informed regarding some of common causes of temporary deferrals like abstaining from smoking and alcohol prior to visit, age limit, menstruation, breastfeeding women, drugs that cannot be consumed prior to donation etc..may help pre-screen them self. The major problem faced is that, most of the deferred donors are less likely to return in future for donation thinking they have been deferred for life time. Zou *et al* have reported potential donor loss after a deferral [16]. Therefore all deferred individuals must informed about the cause and period deferral and proper counseling to help them overcome the problem before the next visit.

A major portion of donors were those who donated in the hospital 90.57% and the remaining 9.43% were from camps conducted nearby. Majority of the donors who donated in the hospital were replacement donors. The study shows, of the 16805 donors registered, 89.70% were replacement donors and only a few were voluntary donors 10.30%. Therefore more number of awareness programs regarding importance of blood donation and outdoor camps has to be conducted to increase the voluntary donors. In the study by Shahshahani *et al*, free pre-donation medical checkups, free blood investigations could also help motivate people to donate blood [17]. Help them clear misconception about donating blood, blood donation is safe and there is no risk of contracting a blood borne infection, within 24 hours

of a blood donation, body replaces the lost fluids and the lost red blood cells in a few weeks.

## 5. Conclusion

The donor deferral rate obtained in this retrospective study is 5.12% similar rate rates has been reported by some study. However some have reported much higher rates which could be due to different donor selection criteria. Females constituted only 4.92% of the total no of people who came forward for voluntary blood donation. This could be because of a prevalent false belief that being a female hampers her ability to donate blood. A major portion of the donors were replacement group 89.70%. The major cause of deferral among males and females were hypertension and anemia respectively. Anemic individuals should referred for further workup and treatment. The Leading causes of permanent and temporary deferrals were hypertension and anemia respectively. Temporarily deferred individuals must inform about the reason as well as the period of deferral. They must encourage and given counseling to help them overcome the problem before the next visit, thus we could reduce huge percent of temporary deferral. Educating the people in the community a week prior to the scheduled camp regarding some of common causes of deferrals like abstaining from smoking and alcohol prior to visit, age limit, menstruation, breastfeeding women etc. may help pre- screen them self and avoid unnecessary deferrals.

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## References

- [1] Department of AIDS Control Ministry of Health and Family Welfare Government of India Annual report 2008-2009; 27.
- [2] Lim JC, Tien SL, Ong YW. Main causes of pre-donation deferral of prospective blood donors in the Singapore blood transfusion service. *Ann Acad Med Singapore* 1993; 22:326–31.
- [3] Unnikrishnan B, Rao P, Kumar N,Ganti S, Prasad R, Amarnath A, Reshmi B, Kaur V,Kesharwani P, Seetha M, Nautiyal A, Goel P, Aggarwal A.Profile of blood donors and reasons for deferral in coastal South India. *AMJ* 2011; 4 (7): 379-385.
- [4] 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.
- [5] Rabeya Y, Rapiaah M, Rosline H, Ahmed SA, Zaidah WA, Roshan TM. Blood pre-donation deferrals-a teaching hospital experience. *Southeast Asian J Trop Med Public Health* 2008; 39(3):571-4.
- [6] Chaudhary RK, Gupta D, Gupta RK. Analysis of donor-deferral pattern in a voluntary blood donor population. *Transfus Med* 1995; 5:209-12.
- [7] Charles KS, Hughes P, Gadd R, Bodkyn CJ, Rodriguez M. Evaluation of blood donor deferral causes in the Trinidad and Tobago National Blood Transfusion Service. *Transfus Med* 2010; 20:11-4.
- [8] Evaluation of individuals deferred from blood donation for medical reasons Pandey HC, Chaudhary R, Elhence P, Verma A, Agarwal P, Sonkar A, Katharia R. Abstract of 37<sup>th</sup> Annual Conference of Indian Society of Blood Transfusion and Immunohematology (ISBTI). *Asian J Transfus Sci* 2011;5:63-109
- [9] Rehman S, Arif SH, Mehdi G, Mirza S, Saeed N, et al. (2012) The Evaluation of Blood Donor Deferral Causes: A Tertiary Care Centre-based Study. *J Blood Disorders Transf* 3:131.
- [10] Arslan O (2007) Whole blood donor deferral rate and characteristics of the Turkish population. *Transfus Med* 17: 379-383.
- [11] Ekwere TA, Ino-Ekanem M, Motilewa OO, Iquo Augustine Ibanga. Pattern of blood donor deferral in a tertiary hospital, South-south, Nigeria: A three-year study review. *Int J Blood Transfus Immunohematol* 2014; 4:7-13.
- [12] Singh B, Kataria SP, Gupta R. Infectious markers in blood donors of East Delhi: prevalence and trends. *Indian J Pathol Microbiol* 2004; 47(4):477-9.
- [13] Kaur G, Basu S, Kaur R, Kaur P, Garg S. Patterns of infections among blood donors in a tertiary care centre: A retrospective study. *Natl Med J India* 2010; 23(3):147-9.
- [14] Halperin D, Baetens J, Newman B (1998) The effect of short-term, temporary deferral on future blood donation. *Transfusion* 38: 181-183.
- [15] Newman BH. Adjusting our management of female blood donors: the key to an adequate blood supply. *Transfusion* 2004; 44:591-6.
- [16] Zou S, Masavi F, Noyary EP, Rios JA, Trouern-Trend J, Fang CT. Donor deferral and resulting donor loss at the American Red Cross Blood Services, 2001 through 2006. *Transfusion* 2008; 48: 2531-9.
- [17] Shahshahani HJ, Yavari MT, Attar M, Ahmadiyeh MH. Knowledge, attitude and practice study about blood donation in the urban population of Yazd, Iran. *Transfus Med* 2006; 16:403-9.