

# Blood Donors Deferral Pattern in a Rural Teaching Hospital

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## ABSTRACT

**Introduction:** Blood transfusion services are a vital part of the national health delivery system. The responsibility for ensuring a continuous supply of blood rests with health administrators, who need to galvanize entire community towards regular and non-remunerated blood donation. Blood donor deferral, either temporarily or permanently is an important step in improving the safety of blood transfusion.

**Objectives:** This retrospective study quantifies and analyzed the rate and reasons of donor deferral in a teaching hospital.

**Materials and Methods:** A total of 12,000 donors were taken up for study. All pre-donation deferral for the prospective blood donors over a period of 2 years were analyzed.

**Results:** 8.33% were deferred from donation and among

these deferrals, majority (82.5%) were temporarily deferred and (17.05%) were permanently deferred. The most common reason for deferral was low haemoglobin count (23.7%) followed by abnormal blood pressure (12.7%).

**Conclusion:** It is important to determine the rate and causes of donors deferral to guide the recruitment and retention efforts at local, regional, and national level. Analysis of rejection patterns may help medical personnel to be more focused in donor screening. This will not only help in improving the donor and recipient safety but also in maintaining a healthy donor pool in the long run, which provided the potential donors are appropriately counseled and managed to improve the efficiency of the donor program. Temporary donor deferrals need to be actively and aggressively managed so as not to lead to a diminished supply of future donors.

**Key Words:** Blood donation, Donor recruitment, Donor deferral, Deferral criteria, Donor rejection

## INTRODUCTION

The paucity of healthy, safe blood donors has always been a serious problem for blood banks worldwide. The donors are deferred for several reasons which are related to the safety of the donors and for the potential threat to the recipients. The blood donor's suitability criteria are based on science, the informed medical opinion and the regulatory rules [1]. Blood Transfusion Services (BTS) is a vital part of the health care services. Advancement in the field of transfusion medicine and technology have made it necessary to enforce measures to ensure the quality of blood and blood products [2]. The BTS does not exist in isolation. It is an integral and indispensable part of the National Health Service. Without blood transfusion, the effective management of severe trauma, major elective surgeries, and serious obstetric complications is not possible, as it is an essential part of the infrastructure [3]. To meet the ever increasing demand for blood and blood components and to attain self-sufficiency, continuous efforts are needed to make sure that the donor recruitment campaigns are successful [4] in achieving their targets [4]. For the past three de-

ades, various studies had been undertaken for probing the attitude and the motivations of the blood donors [4]. A recent article that reviewed the studies on the factors that would influence the recruitment and the retention of blood donors, has identified a range of socio-demographic, organizational, physiological and psychological factors that influenced the people willingness to donate the blood [4].

The BTS in rural India is unsatisfactory and poorly regulated and it is basically a hospital based blood banking system where blood banks are responsible for the entire services which ranges from the recruitment of the donors and the undertaking of serological tests for the donated blood to the preparation, storage and the distribution of blood and blood components. The reporting of adverse events after the transfusion is poor and no stringent donor deferral system exists [5]. The criteria for the prospective blood donor selection and the deferral in India are provided by the Drugs and Cosmetic Act 1940 (and its rules there under) which is supplemented by the Technical Manual (Directorate General of Health Services, MOH and FW, Govt. of India).

The present study was undertaken to analyze the deferral incidence and pattern among the blood donors in a teaching hospital of rural, southern India. This was done to identify the temporarily deferred donors with corrective reasons, to inform them properly, to take suitable remedial measures and to later recruit them as regular non-remunerative, voluntary blood donors.

## MATERIALS AND METHODS

The study involved both the voluntary and the replacement donors who had donated blood to our centre during the period from January 2010 to December 2011. Ours is the licenced 900 bedded, tertiary care, teaching hospital based blood bank which is attached to a post graduate medical institute with facilities for the collection, preparation, storage and distribution of blood and blood components. In addition to the routine hospital demand, our blood bank caters to the demands of the neighbouring districts of Chikkaballapura in the Chittoor district of Andhra Pradesh and also to the Hosur and the Krishnagiri districts of Tamil Nadu, India.

We collected blood from donors, both at the hospital based blood bank, which involved both the voluntary and the related donors; and at the out door camps which involved only voluntary donors. A majority of the donors were people from in and around Kolar, within a radius of 80km from Kolar. The quantity of blood which was collected was 350ml or 450ml, depending on the weight of the donor: 350ml was collected from the donors who weighed 45-60 kg and 450ml was collected from the donors who weighed above 60kg.

Each donor was selected by a medical officer, based on the detailed medical history and a brief physical examination of the donors with regards to haemoglobin, blood pressure, temperature and the pulse rate and its regularity. The detailed information on the donor deferral, including the cause of the deferral, was recorded in the deferral register. The donors who were deferred were differentiated according to their sex and age group, and on the basis of whether the deferral was temporary or permanent. The criteria which were laid down by the Director of General Health Services (DHGS) and the Drug Controller of India were strictly followed. The deferral by self was not considered, as it was difficult in our setup. An ethical clearance was obtained for our study and our findings were compared with those of other similar studies.

Standard Operating Procedures (SOPs) which were based on the national guidelines were used for the donor selection and deferral. The cutoff for haemoglobin (Hb) was 12.5 gm/dl by the finger prick method. Donors with a systolic blood pressure (B.P.) as measured by a fully automatic blood pressure monitor (Accumam, Morepen Laboratories) between 100mm and 180

mm of Hg and a diastolic blood pressure between 50mm and 100 mm of Hg alone were accepted for the blood donation; an average of three measurements of B.P was taken for those who did not fall within this range for the systolic and/ or diastolic B.P.

The related donors were not labeled as "replacement", as there was no compulsion to donate blood. The blood and blood components were almost always issued to the patients before any related donors were requested to donate blood. Thus, the related donors were not replacement donors in a conventional sense and they were under no obligation to replace the blood which was supplied to their patients.

The descriptive statistics of all the variables were noted. The qualitative data were summarized as number of cases and percentages, while the quantitative data were presented as number of cases, mean, median, range and standard deviation (SD), and as a 95% confidence interval (CI) for the difference. The significance limit was set at 0.05 and the Chi-square test was used to determine the statistical significance.

## RESULTS

[Table/Fig-1] shows the distribution of the blood donation and the deferral according to the gender. [Table/Fig-2] shows the distribution of the donor deferral according to the voluntary and the relative categories in both the genders, with 77% in the voluntary category and 23% in the relative category respectively. [Table/Fig-3] shows the distribution of the temporary deferral across various age groups in both the genders. Anaemia was the commonest reason for the deferral amongst the females ( $p < 0.001$ ), whereas upper respiratory tract infection of varied aetiologies was the commonest reason for the deferral amongst the males ( $p < 0.001$ ). [Table/Fig-4] shows the distribution of the permanent deferral across various age groups in both the genders. Hypertension was the commonest reason for the permanent deferral amongst the males ( $p < .0001$ ), whereas bronchial asthma was the commonest reason amongst the females ( $p < .0001$ ). [Table/Fig-5] shows the analysis of the deferral reasons in both the genders. Anaemia (low haemoglobin) was found to be the most common reason for the donor deferral amongst both the genders and this was statistically significant ( $p < 0.001$ ). Abnormal blood pressure was found to affect a significant

	Males	Females	Total
Number of donors	10,000	2,000	1.0902
Number deferred	600	400	1.0902
% deferred	6%	20%	8.33%

**[Table/Fig-1]:** Distribution of Blood Donation and Deferral according to gender.

Sl.NO	D. Criteria	Male (%)	Female (%)	Total
1.	Voluntary	8,000 (67)	1,200 (10)	9,200 ( 77)
2.	Relative	2,000 (17)	800 (6)	2,800 (23)
3.	Total	10,000 (84)	2000 (16)	12000 (100)

**[Table/Fig-2]:** Distribution of donor deferral according to voluntary and relative categories in both the genders

Causes	18-25 years		26-35 years		36-50 years		51 years and above		Total		Grand Total
	M	F	M	F	M	F	M	F	M	F	
Anaemia	15	250	05	85	25	60	05	05	50	400	450
Underweight	34	62	10	38	06	00	05	05	55	105	160
Allergic disorders	50	09	20	03	16	02	05	05	91	19	110
Fever	45	10	10	04	05	01	05	05	65	20	85
02.	24	10	08	02	00	00	02	04	34	16	50
Miscellaneous: (History of : Dog bite / Rabies vaccine Major surgery, Unwillingness, No vein detected, Donation within 3 months)									295	560	855

**[Table/Fig-3]:** Distribution of Temporary Deferral across various age group in both the genders.

Causes	18-25 years		26-35 years		36-50 years		51 years and above		Total		Grand Total
	M	F	M	F	M	F	M	F	M	F	
Hypertension	10	00	10	0	60	04	20	06	100	10	110
Cardiac disorders	08	00	06	03	00	01	00	02	14	06	20
Diabetes	09	00	02	03	02	00	00	00	13	03	16
Asthma	04	02	03	04	01	00	00	00	08	06	14
Skin disorders	02	00	04	00	00	04	00	00	06	04	10
Epilepsy	01	00	01	00	00	00	00	00	02	00	02
Thyroid disease	00	00	00	00	00	00	00	00	00	10	10
Renal (nephritic syndrome)	00	01	00	04	00	00	00	00	00	01	01
Thalasaemia minor	01	00	00	02	00	00	00	00	01	00	01
<b>Total</b>									<b>144</b>	<b>40</b>	<b>184</b>

**[Table/Fig-4]:** Distribution of Permanent deferral across various age group in both the genders

proportion of the male blood donors and this was also statistically significant (12.7%) .

## DISCUSSION

Blood donor deferral is a painful and sad experience for the blood donors as well as for the blood donation centres which screen the donors. These deferrals “bleed” the donor-recruiting efforts of a blood donation centre, thus necessitating more efforts to be diverted for new recruitments. Moreover, defer-

ring prospective donors often leaves them with negative feelings about themselves and about the blood donation process [2]. Additionally, these donors are less likely to return for blood donation in future. Nonetheless, the criteria for these deferrals and their implementation strongly influence the quality of blood supply in a population. Thus, every blood centre has to balance the fulcrum between the acceptable quality and the desired quantity of blood [3].

Deferral Reason	% (n) of Deferred female Donors	% (n) of Deferred male Donors
Low Hemoglobin	70.0 (400)	23.7 (100)
Abnormal Blood Pressure	7.0 (40)	12.7 (54)
Under weight	10.4 (60)	11.8 (50)
Antibiotics and other Medications	2.4 (14)	14.1 (60)
Menstrual cycle	3.4 (20)	NA
Age- over or under	0.8 (5)	16.4 (70)
Donation within 3 months	0.3 (2)	11.7 (50)
Surgical causes	0.6 (4)	1.4 (6)
H/O Jaundice	0.3 (2)	1.4 (6)
Others	4.8 (28)	6.8 (29)
<b>Total</b>	<b>100 (575)</b>	<b>100 (425)</b>

**[Table/Fig-5]:** Deferral reasons in both the genders.

The blood donor suitability criteria which are based on science, the informed medical opinion, and the regulatory rules influence the donor demographics and this can lead to specific deferral patterns. These criteria are designed to protect both the blood donors and the recipients from harm [4]. The donor selection process results in the deferral or the rejection of the potential blood donors who may not particularly like this feeling of being rejected and they may thus refrain from returning for future donations. Nodal agencies like the National AIDS Control Organization (NACO) and the State Blood Transfusion Councils (SBTCs) do not actively collect data on the donor deferrals. Their formats for the data collection are more inclined towards the “quantity” of the supply and towards the deferrals, solely due to infectious diseases in the donated units [5]. As a result, most of the efforts at the government, community and the individual levels are focused at recruiting more and more new donors while ignoring the retention and the re-entry of those who have been recruited but have been deferred due to various causes. This can be achieved by analyzing the reasons for these deferrals amongst the blood donors by addressing the issue and by ameliorating the causes if possible [5].

There is no doubt that the problems which surround the donor recruitment, differ in different countries and in rural or urban areas within the same country, and that they are determined by cultural, social, educational and other factors. Thus, in the developed countries where the donors are voluntarily non-remunerated, a decline in the blood supply [6] is a main concern, while in most of the developing countries where the shortage of blood is still a serious problem [7] the blood donation is still predominantly voluntary, in which the relatives,

friends and the workmates of the patients give a significant contribution of blood, leaving only a small proportion to the voluntary non-remunerated donors. In both the situations, there is a need to analyze the donor behaviour and attitude, to make sure that the blood supply is sustained by recruiting new donors and by retaining those who have donated, especially the voluntary donors [7].

The social behaviours have frequently been explained by two theories: “The theory of reasoned action” [8] and its extension. “The theory of planned behaviour” [9]. The former proposes that most of the behaviours are under a volitional control and that they are determined by the attitude towards the action, while the latter proposes that individuals who do not have complete control over their behaviour or when their behaviour is not totally based on their decision, they could be influenced by others. These two theories have repeatedly been tested and confirmed in blood donation and these have fostered the understanding as to why some individuals donate and continue to donate blood, while others do not. Indeed, the consistent information that emerged from many studies on the beliefs, attitudes and the motivations that influence the behaviour of the blood donors, is that the donors have a highly positive attitude and beliefs toward blood donation. The significance and the application of such information is vital, not only for those who have donated blood before, but also to get them to continue donating blood regularly, and hopefully to get them to keep this as a habit.

The information is equally important for non-donors in the hope that their beliefs and attitudes can be influenced and modified and that they can be motivated and moved to start donating blood. Education plays a major role in influencing the attitude towards blood donation; in encompassing both the level of education of the donors and also in health educating the public about blood donation. In a report from USA, [10] an education videotape on blood donation which was shown to high school children was proven to be useful as a motivational tool for the recruitment of high school blood donors, as it resulted in an increase in the donations by 18.7% and also the students showed a more positive attitude towards blood donation and they developed a greater desire to donate blood. Similarly a study in India [11] found a medically oriented population (medical and nursing students); both the donors and the non-donors did not differ in their attitude towards blood donation, leaving other social variables to account for the donor behaviour. The benefit of donor education was also highlighted in a Spanish study which found that the less favourable attitude of the non-donors to the blood donation could be changed with appropriate education campaigns [12]. In order to improve the standard of the blood banks and the BTS in our country, the National AIDS Control

Organization (NACO), through the Technical Resources Group on Blood Safety, has formulated comprehensive standards to ensure a better quality control in the collection, storage, testing and the distribution of blood and its components [11]. Before the donation, the prospective donors are screened with a medical history and a short physical examination to make sure that the donation is not hazardous to the donor's own health and by testing for transfusion transmitted infections (TTI) in the donated blood [12]. The donor deferral rates in the blood donation centres vary from 5% to 24%, leading to huge losses in terms of the available blood units for transfusion in the nationality every year. The deferral incidence in our study was 26%, which was similar to the observations of a Brazilian study which was conducted by Di Lorenzo Oliveria et al., [13]. However, the studies by Custer et al., [14] showed a much lower incidence of donor deferral, which probably reflected the regional diversity and the marked variations in the whole blood donor eligibility criteria internationally.

Although the most common reason for the deferral in both the genders was a low Hb concentration, a significantly higher number of females were deferred due to this reason alone (70% females vs 23.3% males;). As in our study, Arsalan et al., [15] and Halperin et al., [16] also reported anaemia as the most common reason of the deferral in their respective studies (20.7%, and 46% respectively).

More efforts are needed to address the issue of anaemia in the prospective blood donors at the regional, state, and the national levels and more efforts are warranted on the lines of the National Anemia Action Council (NAAC), Blood Centre of Wisconsin [17] NAAC showed that the health of the blood donors could be improved by educating and motivating them to seek medical attention for anaemia and by thus improving the eligibility of the prospective blood donors in the long run [17] Similarly, Madan et al., [18] has shown that an association can be established with the programmes which are currently running in India for alleviating the problem of iron deficiency anaemia like the "National Anemia Control Programme" which targets anaemia eradication during adolescence, for further improvement in the potential donor pool.

The second and the third most common reasons for the deferral which were found in our study were abnormal blood pressure (almost all due to high B.P) and donors who were on medication who warranted a deferral, respectively, which were similar to the observations which were made by Halperin et al., [16]. A total of 94 donors were deferred due to abnormal B.P. readings on repeated testing on the day of their presentation for the blood donation. Out of this, 86 were deferred for high BP and 8 for low systolic and/or diastolic readings. There was no significant difference in the mean systolic B.P values for the deferred and the selected donors ( $p>0.05$ ), whereas a

significant difference was found in the mean diastolic blood pressure values between the two groups ( $p<0.05$ ), which was mainly due to a wide standard deviation among the deferred donors.

In this study, 17.5% of the donors were deferred for permanent reasons and the most common reason for the permanent deferral was hypertension, whereas Arsalan et al., [15] reported a permanent deferral rate of 10% and Custer et al., [14] reported a rate of 10.6% respectively in their studies. The studies which were conducted by De Lorenzo Oliveria et al., [13] also found hypertension as the most common cause for the permanent donor deferral. Hypertension can lead to the deferral of a significant percentage of prospective blood donors, as was evident in our study. However, any of the blood donors who suffer from a marked degree of hypertension have to be bled with care, as in such cases, the sudden removal of 350ml or 450ml of blood may precipitate a cerebral catastrophe [11]. This could be tragic for the donors as well as for the blood centres who bleed such donors. Thus, we need to find a "cut-off" after doing careful studies in our population, so that we do not lose the donors either ways. The available cut off data needs to be validated in the light of recent studies, as more and more potential donors can be presumed to reach this cut-off soon.

## CONCLUSION

Blood banking is one of the pillars of modern medicine, but simultaneously, it carries the potential risk of transmitting lethal infectious diseases. Hence, a proper pre-screening of the blood donors is essential, to ensure the quality of the donors and to avoid the risk of transmission of transfusion transmitted diseases to the recipients [16]. 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 [11]. There is also a need for building the loyalty of the voluntary blood donors, through well-planned donor education programmes can be planned, which are aimed at dispelling any myths, fears and wrong concepts about the dangers of donating blood [19]. This should be coupled with a special personal care which is directed towards the blood donors, by listening to their complaints, worries and suggestions and by attending to the same. Extra effects should be incorporated for reducing any inconveniences with regards to the location or the timing of the voluntary donation collection drives [20].

The information, education, and communication (IEC) system must be strengthened [11]. Advertisements to motivate the general public for voluntary blood donation are necessary. The advertisement must address the fear factor, which is often the reason behind the reluctance to donate blood, and it

must also focus on clearing the myths and the misconceptions about the blood donations [11]. The people must be informed about the importance of saving lives through blood donations [11].

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. The eligible donor pool may drastically vary from the potential donor pool, which is usually calculated on the basis of the age alone- ranging in a population which is between 18 and 60 years of age [11]. The state blood transfusion councils and the regional blood centres can act as a nodal centres for collecting and collating such data for the respective regions, which can then be merged at a national level to obtain the complete picture [11].

The deferral donors can be considered somewhere in between the chain of the un-sensitized donor –the first time donors – the regular donors as far as the recruitment strategies are concerned, as they are much better than the uninitiated prospective donors, but a little behind the regular repeated donors [21].

The knowledge of the deferral incidence and its causes in a particular region help in estimating the eligible and the prospective donor potential for which the regional blood centres like ours can play a vital role. Hence, common “Donor Deferral Registers” may be valuable at the local and the regional levels to prevent the deferred donors from donating at any other centres, in order to prevent any adverse donor reactions [22].

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