EVALUATION OF DEFERRAL CAUSES IN BLOOD DONORS IN A TERTIARY CARE HOSPITAL, TIRUCHIRAPPALLI, TAMILNADU

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ABSTRACT

BACKGROUND

Transfusion of blood and blood derived products saves millions of life all over the world. Hence, proper screening becomes mandatory to ensure quality of donors and to avoid the risk of transfusion associated diseases to the recipients. It is very important to analyse the causes of deferral among the donors and to decrease the temporary deferral rates. By this we can increase the total number of voluntary donors with good quality of blood products and safety to the recipients. The objective of this study is to assess the donor deferral rates, various causes of deferrals and to take proper measures to decrease temporary deferral rate.

MATERIALS AND METHODS

A retrospective study of pre-donation deferral of blood donors at a blood bank in a tertiary care hospital is conducted. The donors include voluntary donors from the outdoor camps conducted by the blood bank during the period of January 2014 to December 2016. The prospective blood donors were screened according to the criteria laid down by the Drugs and Cosmetic Act of India.^[1] Deferral records over the period of 2 years were analysed to quantify the deferral rate and reasons. The deferral donors were also analysed according to gender and age.

RESULTS

A total of 20,195 voluntary donors were registered in the mentioned study period of two years. Of this, males (92.6%) constituted the predominant donor population. The females constituted only minor proportion of 7.4%. The male-female donor ratio was (12.4:1). The deferral donors were classified into temporary constituting (82.2%) and permanent (17.71%). The leading cause of permanent deferral was hypertension (13.6%), whereas the leading cause of temporary deferral was anaemia (33.07%). The major cause of deferral among males was hypertension, whereas anaemia was the major cause of deferral among females.

CONCLUSION

Donor deferral rate of 6.5% was recorded in this study. The deferral rate coincides with other studies. Voluntary donors constituted the bulk of donor population. The major causes of deferral in our study were anaemia and hypertension.

KEYWORDS

Deferral, Voluntary Donors, Anaemia, Hypertension.

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BACKGROUND

Blood donation is one of the most significant contributions that a person can make towards the society. There is a constant need for blood to save life of individuals who have lost blood due to various clinical reasons. As blood can be stored for only a limited time before use, regular blood donation is a necessity. The WHO recommends a collection rate of 10 – 20 whole blood units/1000 inhabitants to address transfusion needs.

A voluntary donor is one who donates without any rewards or compulsion, whereas replacement donor is one who donates blood upon request, specifically for the treatment of that patient. All donors should be screened properly to ensure safe blood transfusion.

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Eligible donors are encouraged to donate their blood, while at risk donors are encouraged to self-defer from blood donation. Initiative over the past two decades to reduce the risk of transfusion of transmitted disease and to protect donor safety has created a corresponding reduction in donor population.

Donor deferral is defined as an individual who presents to a blood collection centre and is deferred. Blood donors are deferred either permanently or temporarily.

A person's suitability to donate blood depends on two criteria that the donation will not be injurious to the donor and the donated blood will not be unnecessarily hazardous to the recipient. A donor must be free from any blood transmissible diseases as far as it can be determined by health history and medical examination as per the Drugs and Cosmetic Act, which governs the blood transfusion services in India (Annexure-1). A shortage of safe blood donor is frequent and it is important to understand the causes of deferrals of potential donors to improve recruitment campaigns aiming at the quality and availability of donors.

A deferral study in the blood donor candidates also sheds light on the health status of the general population that affect the blood supply.

MATERIALS AND METHODS

This study includes voluntary donor in blood camps and in blood bank, Mahatma Gandhi Memorial Govt. Hospital attached to K. A. P. Viswanatham Govt. Medical College for a period of two years (January 2014 to December 2015).

Eligible donor criteria laid by Director, General Health Services and Drug Controller of India were followed. Haemoglobin of 12.5 gms/dL, weight not less than 45 kg, age limit between 18-60 years, Systolic Blood Pressure 100-150 and Diastolic Blood Pressure 60-100 were preset standards. The deferred donors were analysed on the basis of sex, age, cause of deferral.

The study aims to analyse the donor deferral rates, various causes and followup measures to decrease the temporary deferral rate. By this we can increase the number of voluntary donors without compromising the quality of blood products.

RESULTS

A total of 20,195 voluntary donors came to donate during the period of study of whom 18,698 (92.6%) were males and the rest 1497 (7.4%) were females [Table: 1] of the total donors; 1315 donors were deferred due to various reasons. Among the deferred donors, 759 were males and 556 were females. Percentage of deferral among male and female were 759 (57.7%) and 556 (42.3%) respectively [Table: 2 and Table: 5].

The deferred 1513 donors were categorised into temporary constituting 1082 (82.3%) and permanent deferrals constituting 233 (17.7%) [Table: 4]. The various causes of temporary and permanent deferral are enlisted in [Table: 3]. Among the temporary deferrals, anaemia (435 cases) constitutes the most common cause [Table: 6].

The major cause of deferral among females was anaemia most commonly occurring in the age group of (18-30 yrs.), 304 cases (69.8%). One of the leading causes of deferral among males was hypertension, most commonly occurring in the age group of 18-30 yrs.

Year	Male	Female	Total
2014	8723	698	9421
2015	9975	799	1077
Total	18,698	1497	20195
%	92.6%	7.4%	

Table 1: Demographic Profile of Donors

Year	Male	Female	Total
2014	377	322	699
2015	382	234	616
Total	759	556	1315

Table 2: Total Deferral

Deferral % - 6.5%.

Sl. No.	Causes of Temporary Deferral	18-30 Years		31-40 Years		41-50 Years		> 50 Years		Total
		M	F	M	F	M	F	M	F	435
1.	Anaemia	56	304	7	30	5	19	6	8	435
2.	Alcohol	15		12						27
3.	Low Weight/Low BP	223	102	6	6	3	-	1	-	341
4.	Tuberculosis	2		2						4
5.	Jaundice/Hepatitis	8		1						9
6.	Medications	35	15	12	8	9	2	5	1	87
7.	Fever/Cold/dyspnoea	18	1							19
8.	Previous donation	11	7	6	1	1				26
9.	Menstruation		31		3		1			35
10.	Malaria	4	4	2		1				11
11.	Dental Extraction	1		1						2
12.	Accidents	2		2						5
13.	Skin lesion	1	1					1		3
14.	Allergy		2							2
15.	Typhoid	6	4							10
16.	Lactation		2							2
17.	Miscellaneous (Tattoo Vaccine & Smoking)	51	1	11		1				64
Sl. No.	Causes of Permanent Deferral	18-30 Years		31-40 Years		41-50 Years		> 50 Years		Total
		M	F	M	F	M	F	M	F	
1.	Hypertension	79	7	42	4	30	6	12	-	180
2.	Age									
3.	Diabetes Mellitus	1		1		4	2	5	2	15
4.	Asthma	6		2						8
5.	High Risk Behaviour	4	1	3		1				9
6.	Heart Disease	6	1							7
7.	Epilepsy	1	1			1				3
8.	Surgery	6			1		1			8

Table 3

Total temporary donor deferral – 1082.

Total Permanent donor deferral – 233.

Total – 1315.

Type of Deferral	No. of Deferrals	% of Total Deferrals
Temporary	1082	82.3%
Permanent	233	17.7%

Table 4: Distribution of Temporary and Permanent Deferrals

	No. of Donors	No. of Deferral	%
Male	18698	759	57.7%
Female	1497	556	42.3%
Total	20,195	1315	6.5%

Table 5: Distribution of Deferral Donor Based on Sex

Cause	18-30 Yrs.		31-40 Yrs.		41-50 Yrs.		> 50 Yrs.		Total
	M	F	M	F	M	F	M	F	
Anaemia	56	304	7	30	5	19	6	8	435
Hypertension	79	7	42	4	30	6	12	-	180

Table 6: Anaemia and Hypertension Distribution among the Deferral Donors with Reference to Age and Sex Distribution in the Study Period of Jan 2014 – Dec 2016

Sl. No.	Deferral Male: 759		Deferral Female: 556	
	Cause	No. of Deferral	Cause	No. of Deferral
1.	Hypertension	163	Anaemia	358
2.	Anaemia	77	Hypertension	17
3.	Other Causes	519	Other Causes	181
	Total	759	Total	556

Table 7: Leading Causes of Deferral Among Male and Female Donors

DISCUSSION

Safe and adequate supply of blood and blood products is a major public health issue faced globally. In the recent National AIDS control organisation statistics, the annual blood donation rate is 7.4 million units, but the requirement is around 10 million units in India.

Stringent and critical donor selection is very important for ultimate objective of blood safety. The suitability of a donor for blood donation is determined by medical history, physical examination and few preliminary Laboratory tests.

Total of 20,195 voluntary donors were recorded in our retrospective study period of two years, of which 1315 donors were deferred due to various reasons.

The deferral rate is 6.5%; several studies have reported a similar deferral rate of 5.2% by Unnikrishnan et al,^[2] 6% by Sunder et al^[3] and 5.6% by Rebeya et al.^[4] Some studies have reported a higher deferral rate (16.4%), Chaudhary et al.^[5] Thus deferral rate varied from region to region and centre to centre. The above disparity may be due to donors of different socio-economic status and also different donor selection criteria.

The predominant donor population was males constituting 92.6% and thus females volunteering blood donation were only 7.4%. This may be due to the prevalence of misconception that females cannot donate blood. Physiological factors like menstruation, lactation, pregnancy and also increased risk of prevalence of anaemia among the

female donors might all be one of the reasons. This can be overcome by efficient pre-donation counselling.

Deferrals can be characterised as temporary short term (1-56 days), long term (57-365 days) and multiple/permanent (more than 365 days). Rehman et al^[6] in his study has reported temporary (63.73%) and permanent deferral donor rate (36.3%).

The most common cause of deferral in our study was anaemia (33%) followed by (low weight, low BP) 25.9% and hypertension (13.6%). S. Aswathi et al,^[7] Rebeya et al^[4] and Helperin et al^[8] also reported anaemia as the most common reason of deferral in their study. Newmann et al^[9] in his study has reported that by lowering haemoglobin standard levels and offering iron treatment for premenopausal woman we could increase female eligibility.

Haemoglobin assessment is an important criterion for blood donor selection. The minimum haemoglobin cut off is set at 12.5 gms%, which is done to ensure both donor safety and appropriate haemoglobin content in the donation unit.^[10] Three tests that are commonly used for primary screening are copper sulphate method, HemoCue and microhematocrit method. In our centre, we used copper sulphate and HemoCue as primary screening methods, but the results were ultimately confirmed by running the EDTA venous sample of the subject on an automated analyser.

Other major causes of temporary deferral were alcohol intake, low weight/low BP, medications, fever due to various infections and tattooing in the youngsters which has been on the rising trends. The above cause may be rectified by proper pre-donation counselling.

The leading cause of permanent deferral is hypertension (13.6%). Hypertension often goes undetected in the younger age group and could be an incidental finding while screening. Also hypertension could be due to fears of phlebotomy, white coat hypertension, exercise and stress. This could be avoided by proper pre-donation counselling.

Other causes of permanent deferral being diabetes, asthma, heart diseases and epilepsy.

Thus insight into the reasons of donor deferral is very important to avoid permanent loss of the donor as the blood donation is the life force of any blood bank and hospital. The donors should be informed prior regarding the reasons for common deferrals like abstaining from smoking and alcohol prior to donation, age limit, menstruation, breastfeeding women, drugs that cannot be consumed prior to donation, etc. These preventive measures will help to prescreen the donors themselves. 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 lifetime. Zou et al^[11] have reported potential donor's loss after a temporary deferral. Thus the donors must be made aware of the period of deferral and must be given proper counselling to overcome the problems before the next visit. In the study by Shahshahani et al,^[12] it has been reported that free blood donation medical check-ups, free blood investigations could also motivate people to donate blood.

CONCLUSION

The donor deferral rate in our study is 6.5%. The major cause of deferral among male and female were hypertension and anaemia respectively. Deferred anaemic donors should be informed and referred for further workup, so that they can be

appropriately treated. This shall be a major contribution towards improving public health and also motivating donors to return for blood donation. Temporary deferral donors must be encouraged and given counselling to help them overcome the problem before next visit, thus we could reduce huge percent of temporary deferral. Also, more number of awareness programmes regarding importance of blood donation and outdoor camps has to be conducted to increase the voluntary donors. We have to help them clear the misconception about blood donation. We have to stress that blood donation is safe and there is no risk of contracting a blood-borne infection and the body replaces the lost fluids and the lost red cells in few weeks.

Annexure 1

Donor Selection (NBTC – National Blood Transfusion Council)
Donor Recruitment and Retention

1. Blood should be accepted only from voluntary, non-remunerated, low risk, safe and healthy donors.
2. Efforts should be directed towards encouraging and retaining adequate numbers of repeat donors. Donors should be appropriately recognised and felicitated for their contribution.
3. The blood bank should educate donors prior to collection of blood regarding the risk of transfusion transmissible infections.

Donor Selection

1. Pre-donation counselling by trained staff should be made available maintaining privacy and confidentiality. Pre-donation information should include: Modes of transmission leading to risk behaviour and self-exclusion for patient's safety, alternative testing site, tests carried out on donated blood, confidentiality of test results and need for honest answers in view of window period.
2. A questionnaire should be prepared in English and local languages, which is simple and easy to understand to be answered by the donor.
3. For donors who are illiterate, assistance should be given by donor registration staff.
4. Medical officer with MBBS qualification should be responsible for reviewing the donor's health conditions and performing physical examination of the donor.
5. Demographic details such as name and address of donor, date and time of donor selection and donation should be registered.
6. Consent should be obtained in writing from the donors after explaining the procedure, potential adverse reactions as well as the tests carried out on the donated blood.

Criteria for Selection of Donors

Following guidelines should be observed in order to determine that the blood donation will not be detrimental to the donors/recipients.

1. Physical Examination: A medical officer should certify the donor fit for blood donation.
2. General Appearance: The prospective donor should appear to be in good health.
3. Age: Donors should be between the age of 18 and 65 years.
4. Haemoglobin or packed Cell Volume (Haematocrit): The haemoglobin should be not less than 12.0 gm/dL or the packed cell volume (haematocrit) should be not less than

36%. The screening should be carried out by using any appropriate and validated methodology. A more sensitive method of haemoglobin testing should be available as a reference or control.

5. Weight: Blood collection from donors weighing 45-55 kg should be 350 mL blood and from those weighing 55 kg and above should be 450 mL.
6. Blood Pressure: The systolic blood pressure should be between 100 and 160 mm of mercury and the diastolic pressure should be between 60-90 mm of mercury.
7. Temperature: Temperature should not exceed 37.5°C/99.5°F.
8. Pulse: Pulse should be between 60 to 100 beats per minute and regular.
9. Donor Skin: The skin at the venipuncture site should be free of any skin lesion.
10. Examination of respiratory system, cardiovascular system and abdomen should be carried out if necessary.

Medical History

1. Conditions that affect safety of donors: Before each donation, questions should be asked to determine that the donor is in normal health and has not suffered or is not suffering from any serious illness. E.g. Malignant disease, epilepsy, bronchial asthma, diabetes, excessive menstrual bleeding, cardiovascular conditions, renal disease, allergic diseases, abnormal bleeding tendency.
2. Pregnancy: Prospective donor should not be accepted during period of pregnancy and till 12 months after full term delivery and also during lactation. Donors who have abortions should be deferred till 6 months after 2nd and 3rd trimester abortion. Menstruation in itself should not be a cause for deferral.
3. Any donor who appears to be under the influence of alcohol or any drug abuse and who does not appear to be providing reliable answers to questions on their medical history should not be accepted.
4. Conditions that affect safety of recipients.
5. Any donor on antibiotic therapy or other medications should be deferred after evaluating his/her suitability as donor.
6. Infectious disease.
7. Donors having history of malaria should be accepted after 3 months.
8. Donors having history of jaundice should be deferred up to 1 year.
9. Donors having history of being HIV, HBsAg/HCV antibody positive should be permanently deferred.
10. Donors having intimate contact with HIV, HBsAg/HCV antibody positive individual should be deferred for 1 year.
11. Donors having history of measles/mumps/chickenpox should be deferred for 8 weeks.
12. Donors having history of influenza and URTI (Upper Respiratory Tract Infections) should be deferred till 1 week after treatment.
13. For emerging potential transfusion transmissible infections, the guidelines published from central health authorities should be followed.
14. Private interview of each donor is essential to assess the risk of HIV infection due to high risk sexual behaviour and unsafe sexual practice.

15. Donors who give history suggestive of HIV infection such as swollen glands, persistent cough, unexplained weight loss, night sweats/fever skin rashes and skin infections and prolonged diarrhoea should be deferred permanently.
16. Vaccinations.
17. Individuals who have taken vaccination against TAB/TT/Cholera/Hepatitis-A - should be accepted if free of symptoms. Those who have received Hepatitis B vaccination should be accepted after 7 days of vaccination.
18. Yellow fever/measles/polio - should be deferred for 2 weeks.
19. Rabies vaccination - should be deferred for 1 year. Those bitten by any animal should be deferred for one year.
20. Hepatitis B Immunoglobulin - should be deferred for 1 year.
21. Aspirin ingestion.
22. Ingestion of Aspirin or any related medicine within three days prior to donation should preclude use of donor as a source of platelet preparation.
23. Surgical procedures.
24. Donors should be accepted one year after the recovery from major operations and six months after recovery from minor operations including acupuncture, tattooing and scarification.
25. Donors having history of receiving transfusion of blood or blood products should be deferred for 12 months.

Donation Interval

The interval between two blood donations should be at least 12 weeks. At least 48 hours must elapse after plasmapheresis or Cytapheresis before whole blood is collected from a donor. Apheresis should be done only after 90 days of whole blood collection or in an event when red cells are not returned at the end of pheresis.

Information Provided to the Donors

1. Requirement of consent prior to blood donation, the consent of the donor should be obtained in writing with donor's signature or thumb impression after the procedure is explained and the donor is informed regarding testing of blood for all mandatory tests for safety of recipients. The donor should be provided an opportunity to ask questions and refuse consent.
2. Post-phlebotomy advice. Donors should be given advice regarding post-phlebotomy care and cautioned as to possible adverse reactions. This should also be displayed in the blood collection/observation room.
3. Information of test results. The medical officer of blood bank should inform the donor about any sero-reactive result of Transfusion Transmitted Infection (TTI). Donors who are HIV sero-reactive should be referred to an Integrated Counselling and Testing Centre (ICTC) for post-donation confirmation and counselling.

4. Counselling and Referral
5. For ensuring blood safety, the blood banks should provide pre- and post-donation counselling services.
6. All blood banks should train their donor organisers/medical officers to undertake counselling besides appointing a donor counsellor.
7. Donors should be referred to appropriate medical services for followup and treatment whenever necessary.
8. For post-donation counselling on HIV, blood banks should have facilities of counselling in Major Blood Banks, while other District level Blood Banks will avail the service of ICTC in their area. All blood banks should procure a list of ICTC from their respective State AIDS Control Societies.

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