Original Research Article

Evaluation of different criteria for blood donor deferral in a hospital affiliated with teaching institute

Kokani M.J.[1], Menapara C.B.[2]

[1]Dr. Mayur J Kokani, [2]Dr. Chiragkumar B. Menapara; both authors are Assistant Professors affiliated with Department of Pathology, GMERS Medical College & Hospital, Junagadh, Gujarat, India.

Corresponding Author: Dr. Chiragkumar B. Menapara, Assistant Professors, Department of Pathology, GMERS Medical College & Hospital, Junagadh, Gujarat, India. Email: chirmen123@gmail.com

Abstract

Objective: The only objective of our present study is evaluation of the rate and major reasons of blood donor deferrals in our institute. **Materials and Methods:** A retrospective study was done at the blood bank, GMERS Medical College & Hospital, Junagadh (Gujarat) over a period of 4 years from January 2015 to December 2018. Donor eligibility criteria were followed according to the National guidelines for blood donation. Donors deferred were analysed according to their age, sex, type of donor, type of deferral, and reasons for deferral. **Result:** Of 26610 blood donors, 98.07% were eligible for donation and 1.93% were deferred. The deferral rates among male population and female population were 1.32% and11.92% respectively. Temporary deferral was more common than permanent one (52.92% vs 47.08%). Leading causes of deferral were hypertension (40.08% cases), anemia (21.98% cases) and hypotension (14.40% cases). Anemia was the commonest cause for temporary deferral, whereas hypertension was the commonest for permanent deferral. Maximum number of deferrals were observed in the age group of 36–50 years (41.25% cases). **Conclusion:** Rejection or Deferral play a pivot role in good and healthy donor selection. Both temporary and permanent criteria must be kept in mind while pre-transfusion screening of a blood donor. Inappropriate selection and unnecessary deferral are always hazardous in transfusion medicine, because both of them reduce the availability of healthy blood donors.

Key words: Deferral, Temporary, Permanent, Anemia, Hypertension.

Introduction

Blood transfusion service plays a vital part of modern health-care system without which efficient medical care is not possible. The main goal of blood transfusion services globally is to ensure the availability of safe and adequate supply of blood and blood products.

Availability of safe blood and blood products is a critical component in improving health care [1]. It is reported that donation by 1% of the population is usually the minimum requirement to meet a country's most basic need for blood. The needs are higher in countries with more advanced health-care systems [2]. The National AIDS Control Organization (NACO) statistics reveal that the annual rate of blood donation in India is about 7.4 million units against the need of 10 million units per year [3]. According to the WHO, over 81 million units of blood are collected annually worldwide, but only 39% are collected in developing countries, which have 82% of the world's population [4].

Manuscript received: 4th April 2019
Reviewed: 14th April 2019
Author Corrected: 20th April 2019
Accepted for Publication: 26th April 2019

The paucity of healthy, safe blood donors has always been a serious problem for the blood banks worldwide. While it is important to ensure that there is an adequate supply of blood, it is also essential that the blood collection and transfusion process does not harm either the donor or the recipient. To protect donor and recipient, stringent blood screening criteria are necessary [5]. 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 the Drugs and Cosmetic Act 1940 [6]. Blood donor deferral is a painful and sad experience for the blood donors and for the centre screening the blood donors. Deferral leads to loss of precious blood donors and blood units available for transfusion purposes.

These deferrals often leave the donor with negative feeling about themselves and blood donation process also [7]. In addition, these donors are less likely to return for blood donation in future. Voluntary nonremunerated blood donors are the foundation of a

safe, sustainable blood supply. A transfusion service should therefore rely as far as possible on voluntary repeat donors in accordance with the recommendations by the WHO [8]. Knowledge of rate and causes of donor deferral can guide the recruitment strategy.

The only objective of our present study is evaluation of the rate and major reasons of blood donor deferrals in our institute. The target or motto of this study is "healthy donor, safe blood and appropriate transfusion".

Blood donors generally arrive from local population of a particular geographical region, so such kind of study on deferral of blood donors may shed light on the health status of the general population.

Materials and Methods

The present retrospective study was conducted at the blood bank, GMERS Medical College & Hospital, Junagadh (Gujarat, India) over a period of 4 years from January 2015 to December 2018.

All blood donors of both voluntary and replacement types were studied. Each donor was selected by the blood transfusion medical officer based on the detailed medical history and brief physical examination of donor with regard to hemoglobin, blood pressure (BP), temperature and pulse regularity, and rate.

Criteria laid down by the Directorate General Health Services and Drug Controller of India were strictly followed for donor selection and deferral.

Hemoglobin level not less than 12.5 g/dL, weight not less than 45 kg, age limit between 18 and 60 years, systolic blood pressure between 110 and 140 mm of Hg, diastolic blood pressure between 80 and 90 mm of Hg, and temperature not more than 37ºC were the preset standards used for donor selection.

Hemoglobin estimation was done initially by using specific gravity method with copper sulphate solution having a specific gravity value of 1.053.Next method used was Hemocue method for the same.

The data taken from the donor registers and blood donor questionnaire forms were compiled and analyzed.

Deferred donor data were analyzed with respect to age, gender, type of donor, cause of deferral, and duration of deferral. Inclusion criteria and Exclusion criteria for the present study are as mentioned below:

Inclusion Criteria

- Apparently healthy individuals having no significant history of any medical or surgical illness
- Age should be between 18 and 65 years
- Body weight should be more than45kg
- Hemoglobin level more than 12.5 g/dl

Exclusion Criteria

- Patients with history of major diseases
- High risk individuals like professional blood donors, drug abusers, patients treated in sexually transmitted disease (STD) clinics, sex workers, etc.
- Dialysis patients, pregnant ladies, patients treated in thallasemia clinics, etc.

Results

Out of total 26610 blood donors, 19918 (74.85%) were voluntary donors while 6692 (25.15%) were replacement donors. 25067 donors (94.20%) were males while 1543 donors (5.80%) were females. Voluntary and male donors outnumbered replacement and female donors significantly and respectively.

Out of 26610 blood donors, 98.07% were eligible and 1.93% (514 out of 26610) were deferred. The deferral rate among male donors was 1.32% (330 out of 25067). Among female donors, it was 11.92% (184 out of 1543).

Thus, the prevalence of deferral was significantly higher among female donors than among male donors.

Temporary deferral was found to be more common than permanent one (52.92% vs 47.08%). Leading causes of deferral were hypertension (206 cases, 40.08%), anemia (113 cases, 21.98%) and hypotension (74 cases, 14.40%).

Anemia was the commonest cause of temporary deferral, whereas hypertension was the primary reason of permanent deferral. Maximum deferrals were seen in the age group of 36–50 years (212/514 cases, 41.25%).

Table no. 1 shows distribution of various causes for temporary deferrals across all age groups & both genders and Table no. 2 shows distribution of various causes for permanent deferrals across all age groups & both genders.

Original Research Article

Table No.-1: Distribution of various causes for temporary deferrals across all age groups & both 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	26	21	9	20	8	26	1	2	44	69	113
Underweight	5	2	2	0	0	0	0	0	7	2	9
Allergic disorders	0	0	1	0	1	0	0	0	2	0	2
Fever	1	1	4	0	2	1	0	0	7	2	9
Miscellaneous: (History of: Dog bite / Rabiesvaccine Major surgery, Unwillingness, No vein detected, Donation within 3 months)	4	0	5	1	2	0	1	0	12	1	13
Menstruation	0	1	0	3	0	4	0	0	0	8	8
Alcohol consumption	1	0	6	0	5	0	0	0	12	0	12
Tooth extraction	1	0	0	0	1	0	0	0	2	0	2
Medications	7	0	8	7	3	3	1	1	19	11	30
Hypotension	24	10	21	7	8	4	0	0	53	21	74
Total	**69**	**35**	**56**	**38**	**30**	**38**	**3**	**3**	**158**	**114**	**272**

Table No.-2: Distribution of various causes for permanent deferrals across all age groups & both genders

Causes	18-25 years		26-35 years		36-50 years		51 years and above		Total		Grand Total
	M	F	F	M	F	M	F	M	F	F	
	1	0	14	6	76	50	49	10	140	66	206
Cardiac disorders	0	0	1	0	3	1	2	0	6	1	7
Diabetes	0	0	2	0	6	0	7	0	15	0	15
Asthma	1	0	0	0	2	2	0	0	3	2	5
Epilepsy	0	0	0	0	1	0	1	0	2	0	2
Thyroid disease	0	0	0	0	2	1	0	0	2	1	3
Renal (nephritic syndrome)	0	0	1	0	0	0	0	0	1	0	1
Thalassemia minor	0	0	0	0	0	0	0	0	0	0	0
High risk	2	0	1	0	0	0	0	0	3	0	3
Total	**4**	**0**	**19**	**6**	**90**	**54**	**59**	**10**	**172**	**70**	**242**

Gender wise frequency of temporary and permanent deferrals is mentioned below in table no. 3. Frequency distribution and percentage of temporary and permanent deferrals according to different age groups is mentioned below in table no. 4. Distribution of deferrals according to both age & gender is mentioned below in table no. 5.

Table-3: Gender wise frequency of temporary and permanent whole blood donor deferrals.

Type of Deferral	Female (%)	Male (%)	Total (%)
Permanent	70	172	242
Temporary	114	158	272
Total	184	330	514

Table-4: Frequency distribution and percentage of temporary and permanent deferrals according to different age groups.

Age groups	Temporary deferrals	Permanent deferrals	Total	%
18-25	104	4	108	21.01
26-35	94	25	119	23.15
36-50	68	144	212	41.25
>50	06	69	75	14.59
	272	242	514	100

Table-5: Distribution and percentage of deferrals according to both age & gender.

Age groups	Male deferrals	%	Female deferrals	%
18-25	73	14.20	35	6.81
26-35	75	14.59	44	8.56
36-50	120	23.35	92	17.90
>50	62	12.06	13	2.53
	330	64.20	184	35.80

Discussion

Donor selection has vital importance in blood banking and transfusion medicine. The aim of our study was to device a protocol that could prevent the loss of blood donors and donations to be safe for the donors and recipients. In our study, most of the donors were men (94.20%) when compared with women (5.80%). This finding was similar to various other studies. Birjandi [9] reported 95.6% male and 4.4% female donors. Unnikrishnan et al[10] reported 95.13% male and 4.8% female donors. Female gender contributing very less to the donor pool can be attributed to ignorance, fear, lack of motivation and awareness, socio cultural factors, and lesser opportunities among women for blood donation.

Voluntary donation was significantly higher than the replacement donation (74.85% vs. 25.15%). Kulkarni [11] reported voluntary donation of 83%, whereas Kate et al [12] reported voluntary donation of 87.26%. Thus, our finding was similar to other studies. Large number of voluntary donation was possible owing to regular blood donation camps, donor sensitization, and awareness campaign.

The deferral rate in our study was 1.93 %. Rathod et al[13] reported deferral rate of 3.55% and Agrawat et al[14] reported 3.72% deferral rate in their studies. Few studies like that of Agnihotri [5] and Gajjar et al. [15] reported higher deferral rates of 11.6% and 11.16%, respectively. Variation in the deferral rate can be attributed to multiple factors such as type of donor, variation in donor selection criteria, and high-risk sexual behavior. Our study showed that women donors had higher deferral rate (11.92%) when compared with men (1.32%), which might be owing to higher prevalence of anemia and hypertension in female subjects. Sundar et al [16]also reported higher deferral rate in women (19.85%) than in men (4.06%) in their study. Similar finding was reported by Patil et al [17] (17.88% vs. 2.4%)

Temporary deferrals were significantly more than the permanent deferrals (52.92.48% vs. 47.08%) signifying that most of the deferred donors can be recruited back to the donor pool if they are properly counseled and managed regarding their cause of deferral. This finding was similar to those mentioned in literatures as by Shah et al[18](87.55% vs. 12.45%) and Sundar et al[16](84% vs. 16%).

The number of deferred males was higher than the females because most of the donor pool was formed by the male subjects. Girish et al [19] and Kulkarni [11] also stated similar findings in their respective studies. The leading cause of deferral among males and female subjects was hypertension and anemia, similar to that reported by Awasthi et al[20] and Rathod [13].

The most common reasons for temporary deferral were anemia (21.94%), followed by hypotension (14.40%) and medication (5.84%). The primary cause of permanent deferral was hypertension (40.08%). Shah et al [18] and Bahadur et al[21] also reported anemia and hypertension as the leading cause of temporary and permanent deferral, respectively, in their studies.

Comparison between various studies showed that there were different sets of leading causes of deferral in various categories such as temporary and permanent deferral, male and female gender depending on the type of donor population, donor selection criteria sociocultural practices, and endemicity of infections.

The high prevalence of anemia reflects light on poor nutritional health status. Higher prevalence of anemia in female subjects can be explained by the fact that this group of population is more prone to depleted iron store because of poor nutrition, tropical diseases, and menstrual blood loss. Low weight was also an important reason of deferral which again reflects poor nutritional status of the population. Because both anemia and low weight are curable, a large number of temporary deferred donors can be recruited back into the donor pool on proper management.

The probable reasons for high BP can be sight of blood, first-time donation, fear of phlebotomy, and white coat hypertension. There were few donors who were diagnosed with high BP for the first time while majority of them being patient of uncontrolled hypertension. Owing to ignorance among people, hypertension often goes undiagnosed and usually is incidental finding.

This signifies hypertension as the common modern day epidemic in health sector. Such donors should be counseled and guided to change their lifestyle and to further take the treatment from a physician.Among the replacement donors, last donation < 3 months was one of the major reasons of deferral underlying the fact that they were forced to donate the blood by the situation rather than their own willingness for the same.

These further strengthen our aim of absolute voluntary donation, as the quality of blood if had been donated by these short inter-donation replacement donors might not have been up to the standard.

On the basis of age groups, the maximum deferral in various categories such as temporary–permanent deferral, male–female donors were seen in 18–30 years, followed by 31–40 years, 41–50 years, and 51–60 years. Similar findings were reported by different authors such as Shah et al. [18], Girish et al.[19], Rathod et al., [13] and Gajjar et al[15].

It is apparent from these findings that sizeable proportion of youth in India is malnourished reflecting the impact of low socioeconomic status on the health. There is a need to address the cause of deferral among them as they are the ones who are going to be prospective regular blood donors.

Conclusion

Rejection or Deferral play a pivot role in good and healthy donor selection. Both temporary and permanent criteria must be kept in mind while pre-transfusion screening of a blood donor. Temporarily deferred donors must be followed up further and managed appropriately in order to maintain a pool of healthy blood donors while permanently deferred ones must always be kept away from future blood donation process in order to ensure the patient's safety. Inappropriate selection and unnecessary deferral are always hazardous in transfusion medicine, because both of them reduce the availability of healthy blood donors. Voluntary blood donation should always be promoted, as it gives a pool of healthy blood donors and minimizes the risk of transfusion transmissible diseases.

Contribution from the author

- Dr. Mayur J. Kokani: Data collection, analysis and preparation of manuscript.
- Dr. Chirag B. Menapara: Analysis and preparation of manuscript & critical revision.

Findings: Nil; **Conflict of Interest**: None initiated
Permission from IRB: Yes

References

1. Newman B. Blood donor suitability and allogeneic whole blood donation. Transfus Med Rev. 2001 Jul;15 (3):234-44.DOI:10.1053/tmrv.2001.24593

2. World Health Organization. Media centre, Blood safety and availability, facts and figures from 2007 Blood Safety Survey. Fact sheet N 279. Geneva: WHO, 2009.

3. National AIDS Control Organization. Annual Report 2008–2009. Department of AIDS Control, Ministry of Health and Family Welfare: Government of India.

4. Baxi A. Misconceptions over blood donation causing shortage in India. The Economic Times. February 10, 2008. Last accessed on December 12, 2015.

5. Agnihotri N. Whole blood donor deferral analysis at a center in Western India. Asian J Transfus Sci. 2010 Jul; 4 (2):116-22. doi: 10.4103/0973-6247. 67035.

6. 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 May;22(3):326-31.

7. Brecher ME (Ed). AABB Technical Manual, 15th edn, 2005. Bethesda, MD: AABB. pp. 98–103.

8. Dhingra N. Blood safety in the developing world and WHO initiatives. Vox Sang. 2002 Aug;83 Suppl 1:173-7.

9. Birjandi F, Gharehbaghian A, Delavari A, et al. Blood donor deferral pattern in Iran. Arch Iran Med. 2013 Nov; 16 (11):657-60. doi: 0131611/ AIM.009.

10. Unnikrishnan B, Rao P, Kumar N, et al. Profile of blood donors and reasons for deferral in coastal South India. Australas Med J. 2011;4(7):379-85. doi: 10.4066/AMJ.2011.641. Epub 2011 Jul 31.

11. Kulkarni N. Analysis of donor deferral in blood donors. J Evol Med Dental Sci 2012; 1(6):1081–7.

12. Kate MS, Jain P, Patil CK. An audit of deferral of blood donors at a tertiary care hospital. Res J Pharmaceut Biol Chem Sci 2013; 4(3):1556–63.

13. Rathod K, Gupta M, Shah M. Analysis of blood donor deferral characteristics in a blood bank at a tertiary care hospital attached to Medical College in Gujarat. Palm online ISSN 2229-4074.

14. Agravat AH, Gharia AA, Pujara KM, Dhruva GA. Profile of blood donors and analysis of deferral pattern in a tertiary care hospital of Gujarat, India. Int J Biomedical Adv Res 2013; 4(9):623–8.

15. Gajjar H, Shah FR, Shah NR, Shah CK. Whole blood donor deferral analysis at General hospital blood bank—a retrospective study. NHL J Med Sci 2014; 3(2):72–6.

16. Sundar P, Sangeetha SK, Seema DM, et al. Pre-donation deferral of blood donors in South Indian set-up: An analysis. Asian J Transfus Sci. 2010 Jul;4 (2) :112-5. doi: 10.4103/0973-6247.67037.

17. Patil RS, Mhetre S, Rayate M, Karache AG. Analysis of blood donor deferral causes in Solapur district. Int J Biol Med Res 2014; 5(3):4227–30.

18. Shah SD, Shah MC, Bhatnagar NM, Gajjar MD, Soni SA, Patel TA. Analysis of blood donor deferral characteristics in a tertiary care hospital in a blood bank—a review. SEAJCRR 2013; 2(5):389–95.

19. Girish CJ, Chandrashekhar TN, Ramesh BK, Kantikar SM. Pre-donation deferral of whole blood donors in District Transfusion Centre. J Clinic Diagn Res 2012; 6(1):47–50.

20. Awasthi S, Dutta S, Haritwal A, Ansari M, Arathi N, Agarwal D. Evaluation of the reasons for pre-donation deferral of prospective blood donors in a tertiary teaching hospital in North India. Internet J Publ Health 2009; 1(1):2155–6733.

21. Bahadur S, Jain S, Goel RK, Pahuja S, Jain M. Analysis of blood donor deferral characteristics in Delhi, India. Southeast Asian J Trop Med Public Health 2009; 40(5):1087–91.

.....

How to cite this article?

Kokani M.J, Menapara C.B. Evaluation of different criteria for blood donor deferral in a hospital affiliated with teaching institute. Trop J Path Micro 2019;5(4):227-232.doi:10.17511/jopm.2019.i04.08.

.....