

Analysis of blood donor deferral: An indicator for donor retention

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Abstract

Introduction: Process of blood donation includes ensuring safety of collected blood, health of the recipients and suitability of donors. Donor deferring has an advantage of eliminating donors with possible risk of disease. With this objective present study was undertaken with an intention to analyse donor deferral characteristics in terms of demographic profile, interval between donation, reason for deferral and whether it is permanent or temporary deferral.

Materials and Methods: Retrospective analysis of deferral profile of whole blood donors was performed with the help of data from records (January 2018 to January 2020). Records of demographic details of donors, interval between two donations, physical examination, haemoglobin percentage, along with the reasons for permanent and temporary deferrals were taken into consideration.

Observations and Results: A total of 9563 donors were registered for donation during the study period (January 2018 to January 2020), out of which 577 donors were deferred pre-donation. The incidence of deferral was 6%. The leading causes of deferral was anaemia 40.5% (234/577), history of medications 10.9% (63/577), hypertension 7.9% (46/577), infectious diseases 6.7% (39/577) and menstruation in females 1.9% (11/577). Other less common causes of deferral included skin disease, alcohol intake, fever, cough, cold, diabetes, tattooing, etc. Majority of the donors were temporary deferrals 85% (491/577). Percentage of permanent deferral was 14.9% (86/577). Most of the deferred donors belonged to the age group of 18 to 30 years.

Conclusion: Significant population of deferred donors belonged to the temporary deferral group, which can be treated and prevented. Donor deferral analysis helps us to identify the causes which can be used to promote proactive measures towards donor retention especially of the temporarily deferred donors. Education, motivation, and treatment of temporarily deferred donors are important aspects for recruiting them in future.

Keywords: Deferral, Donors, Permanent, Reasons, Temporary

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I. Introduction

As per National AIDS Control Organization's (NACO) statistics blood donation occurring in India is about 7.4 million units per year which is far less compared to its requirement i.e., 10 million units^{1,2}. To achieve this blood is obtained from voluntary non-remunerated blood donors (VNRD) which involves challenges for safe blood donation. Blood donors are either voluntary, paid or replacement donors who are commonly amongst close contacts of patient³. Process of blood donation includes ensuring safety of collected blood supply, health of the recipients, health, and suitability of donors. Donor deferral means when an individual is not eligible to donate based on the eligibility criteria given by food and drug administration's code of federal regulations and AABB standards for bloodbanks and transfusion services^{4,5}. These criteria are dependent on various variables like demography, culture, anthropometry, endemic disease patterns etc⁶. Donor deferring may leave the negative feeling to donors as well as blood banking system, but it has an advantage of eliminating donors with possible risk of disease as they have been infected for a period of 6 weeks or less⁷. Rate of donor deferral varies in various regions and sometimes in same region at different centres as well⁸. With this objective present study was undertaken with an intention to analyse donor deferral characteristics in our blood bank at tertiary care hospital, such as demographics in terms of age, gender and occupation, frequency of donation, interval between donation, reason for deferral and whether it is permanent or temporary.

II. Materials and Methods

The study was commenced following the approval of the Institutional Ethics Committee and retrospective analysis of deferral profile of whole blood donors was performed with the help of data from records (January 2018 to January 2020). Records of demographic details of donors, interval between two donations, physical examination, haemoglobin percentage, along with the reasons for permanent and temporary deferrals

were taken into consideration. Data was entered in Microsoft Excel and analyzed with descriptive statistics including mean and percentage. Chi-square χ^2 test was used wherever necessary to test statistical significance.

Inclusion Criteria

Donor History Questionnaire (DHQ) forms of voluntary, non-remunerated, whole blood donors visiting at outdoor camps and blood bank centre at our hospital.

Procedure

Analysis of donor deferral profile was performed with the help of records of donor history questionnaire forms from blood centre at MGM Hospital Aurangabad. These forms consisted of 15 clauses in which the donor was asked to tick mark correct option whichever was applicable to him/her. Demographic details of donor including age, gender, occupation; history of blood donation with frequency of visit; interval between two donations; reason/s for deferral-whether temporary or permanent were noted by studying the donor history questionnaire forms. Brief physical examination records and haemoglobin (Hb) estimation value was also taken into consideration from the data in the forms. Decision on acceptance or deferral of blood donors {made by following standard operating procedure (SOP)* for donor selection}, was noted from the forms.

*SOP: Based on Drugs and Cosmetics Act (the rules thereunder) and supplemented by the Directorate General of Health Services and National AIDS Control Organisation (NACO)^{10,11}.

III. Results

During two-year study period a total of 9563 donors were registered for donation, out of which 577 donors were deferred pre-donation. The incidence of deferral was 6 %. These 577 deferred donors were enrolled for the present study. Out of total 577 deferred donors’ males were 451 (4.8 %) and females were 126 (37.2 %) (**Table 1**). Out of total 577 deferred donors 491 (85 %) were found to have temporary deferrals and 86 (15 %) found to have permanent deferrals. Amongst causes for permanent deferrals allergic disease was found in 5 (0.8 %) cases, anticonvulsant medications in 1 (0.1 %), antithyroid medications in 2 (0.3 %), asthma on steroids 8 (1.3 %), bleeding disorder in 2 (0.3 %), diabetic in 12 (2 %), epilepsy in 4 (0.6 %), heart disease in 4 (0.6 %), hypertension in 46 (7.7 %), schizophrenia in 1 (0.1 %) and thalassemia in 1 (0.1 %) (**Table 2**). Amongst causes for temporary deferrals alcohol was present in 21 (3.6 %), Medications in 63 (10.9 %), Vaccination in 5 (0.8 %), Blood transfusion 1 (0.1 %), Infectious disease in 39 (6.7 %), Dental surgery in 7 (1.2 %), Fever/cough/cold in 20 (3.4 %), Lack of sleep in 5 (0.8 %), Donor apprehension in 2 (0.3 %), Hypotension in 4 (0.6 %), Jaundice in 21 (3.6 %), Major surgery in 11 (1.9 %), Minor surgery in 4 (0.6 %), Menstruation in 11 (1.9 %), Skin disease in 25 (4.3%), Tattoo in 13 (2.2 %), Weakness in 1 (0.1 %), Weight <45 kgs in 4 (0.6 %) and less haemoglobin in 234 (40.5 %) (**Table 3**). Out of total 451 males leading causes for deferral was less haemoglobin found in 137, Medication in 60, Hypertension in 41 and Infectious diseases in 35. Out of total 126 females leading causes for deferral was less Hemoglobin found in 97, Menstruation in 11, Hypertensive 5 and Infectious diseases in 4 (**Table 4**). Amongst total 577 deferrals, 562 deferrals were performed at blood camp (male 442 & female 120) whereas 15 performed at blood bank center (male 9 & female 6) (**Table 5**). Out of total 451 males 250 (55.4 %) were from 18 to 30 years age, 100 (22.1 %) from 31 to 40 years, 78 (17.2 %) from 41 to 50 years, 21 (4.6 %) from 51 to 60 years and 2 (0.4 %) from > 60 years. Out of total 126 females 98 (77.7 %) were from 18 to 30 years age, 19 (15 %) from 31 to 40 years, 7 (5.5 %) from 41 to 50 years, 2 (1.5 %) from 51 to 60 years and 0 (0 %) from > 60 years (**Table 6**)

The leading causes of deferral was anaemia 40.5% (234/577), history of medications 10.9% (63/577), hypertension 7.9% (46/577), infectious diseases 6.7% (39/577) and menstruation in females 1.9% (11/577). Other less common causes of deferral included skin disease, alcohol intake, fever, cough, cold, diabetes, tattooing, etc. Majority of the donors were temporary deferrals 85% (491/577). Percentage of permanent deferral was 14.9% (86/577). Most of the deferred donors belonged to the age group of 18 to 30 years.

Table 1: Demographic profile of donors

Gender	Registered donors	Number of deferrals	Total donors selected	Percentage of deferrals
Male	9225	451	8774	4.8
Female	338	126	212	37.2

Graph 1: Demographic profile of donors

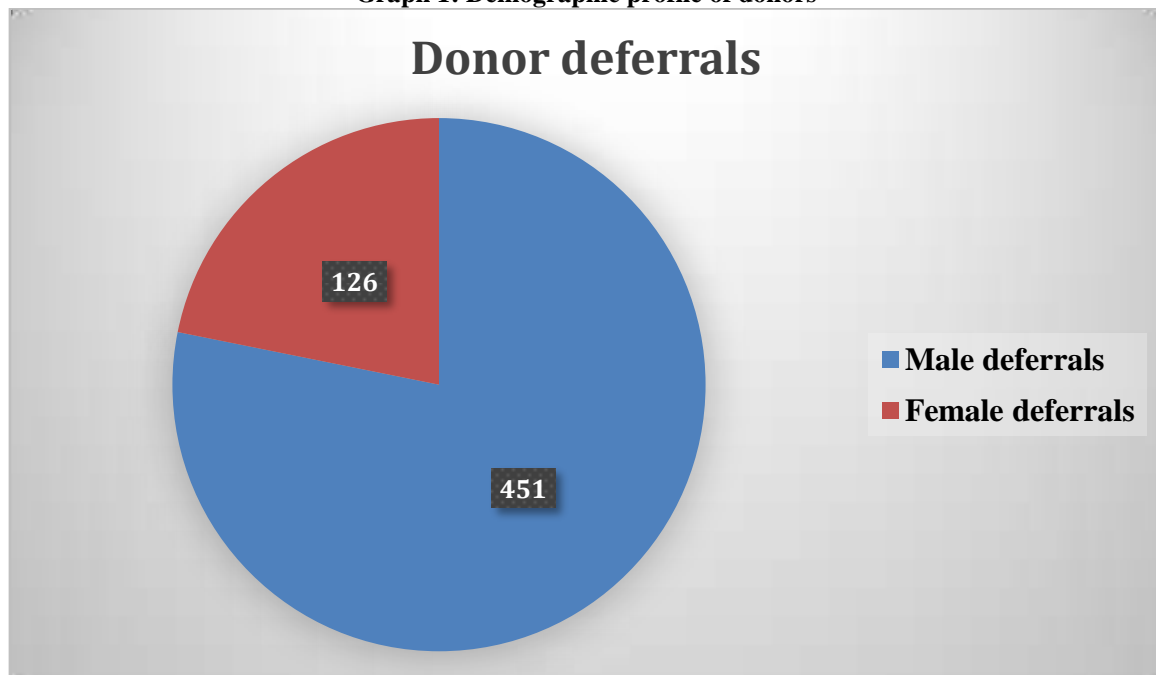


Table 2: Causes of permanent deferrals and their proportions

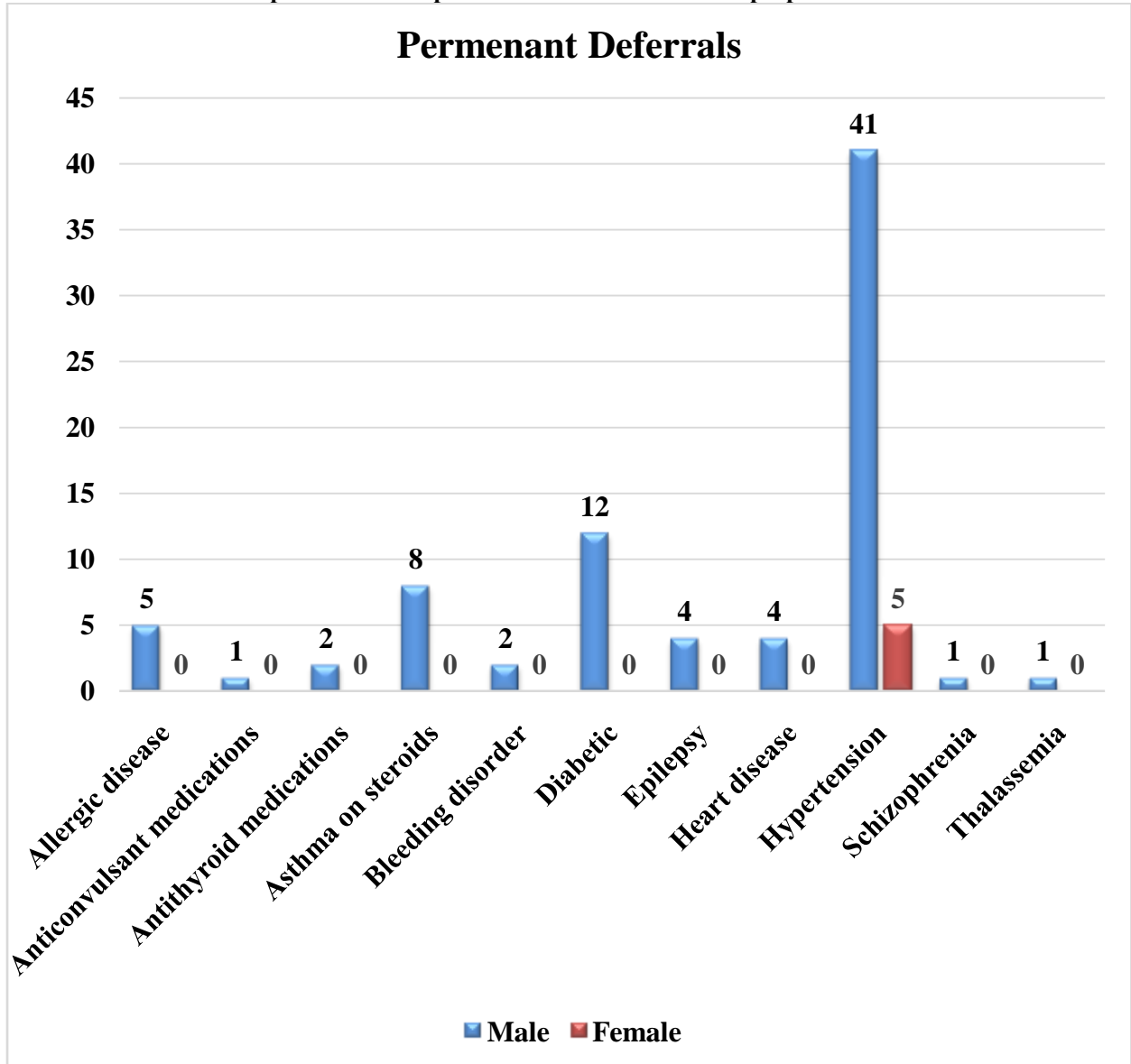
Causes	Male (n=81)	Female (n=5)	Total (n=86)	Permanent deferrals (%)
Allergic disease	5	0	5	0.8
Anticonvulsant medications	1	0	1	0.1
Antithyroid medications	2	0	2	0.3
Asthma on steroids	8	0	8	1.3
Bleeding disorder	2	0	2	0.3
Diabetic	12	0	12	2.0
Epilepsy	4	0	4	0.6
Heart disease	4	0	4	0.6
Hypertension	41	5	46	7.7
Schizophrenia	1	0	1	0.1
Thalassemia	1	0	1	0.1

Table 3: Causes of temporary deferrals and their proportions

Causes	Male (n=371)	Female (n=120)	Total (n=491)	Permanent deferrals (%)
Alcohol	21	0	21	3.6
Medications	60	3	63	10.9
Vaccination	5	0	5	0.8
Blood transfusion	1	0	1	0.1
Infectious disease	35	4	39	6.7
Dental surgery	7	0	7	1.2
Fever, cough, cold	19	1	20	3.4
Lack of sleep	5	0	5	0.8
Donor apprehension	2	0	2	0.3
Hypotension	3	1	4	0.6
Jaundice	21	0	21	3.6
Major surgery	10	1	11	1.9

Minor surgery	3	1	4	0.6
Menstruation		11	11	1.9
Skin disease	25	0	25	4.3
Tattoo	13	0	13	2.2
Weakness	1		1	0.1
Weight <45 kgs	3	1	4	0.6
Hemoglobin %	137	97	234	40.5

Graph 2: Causes of permanent deferrals and their proportions



Graph 3: Causes of temporary deferrals and their proportions

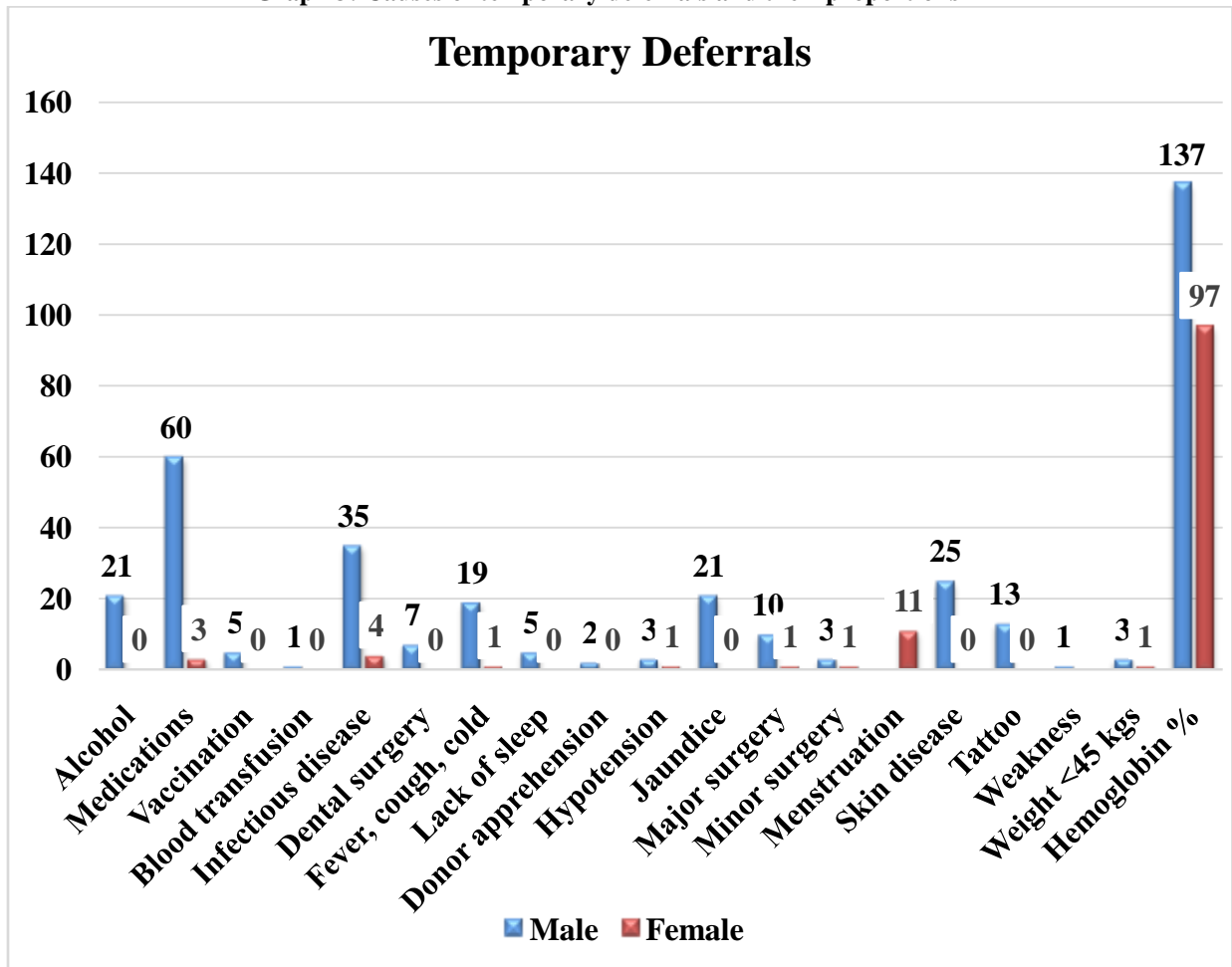


Table 4: Leading causes of deferrals among donors

Deferred males (n=451)		Deferred females (n=126)	
Cause	Number	Cause	Number
Hemoglobin	137	Hemoglobin	97
Medications	60	Menstruation	11
Hypertension	41	Hypertensive	5
Infectious diseases	35	Infectious diseases	4

Graph 4: Leading causes of deferrals among donors

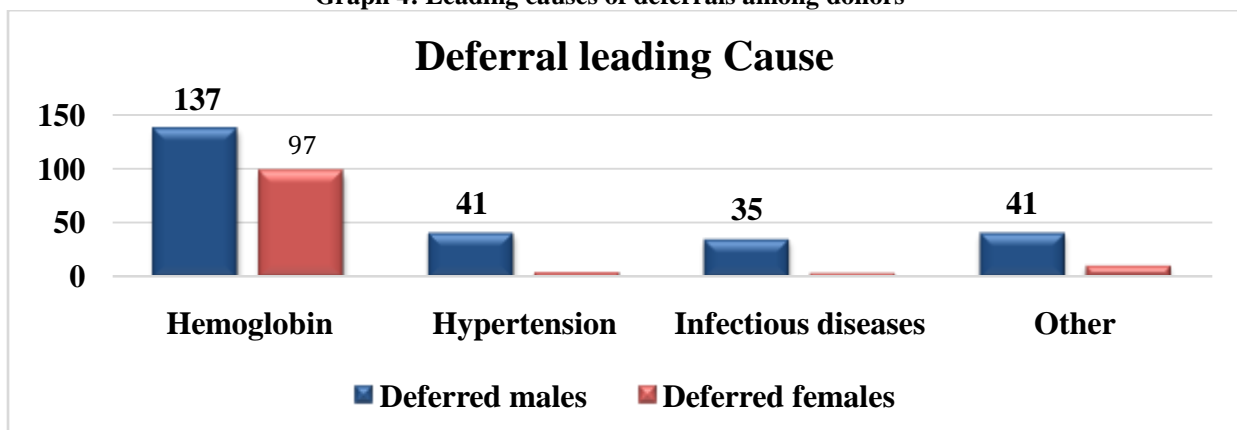


Table 5: Donation site-based deferrals

Gender	Donation Site	
	Camp	Blood center
Male	442	9
Female	120	6
Total	562	15

Table 6: Age wise distribution of deferred blood donors

Male (451)			Female (126)			Total (577)
Age in years	Number of donors	% Of deferrals	Age in years	Number of donors	% Of deferrals	
18-30	250	55.4	18-30	98	77.7	348
31-40	100	22.1	31-40	19	15	119
41-50	78	17.2	41-50	7	5.5	85
51-60	21	4.6	51-60	2	1.5	23
>60	2	0.4	>60	0	0	2

IV. Discussion

Recruiting blood donors is a vital step in transfusion process to ensure safety of recipients as well of donors. Process includes sharing of knowledge about common infections which are transmissible during transfusion through donor health questionnaire (DHQ) which is completed by donor evaluation of donors through physical and laboratory test results which helps to decide acceptance or deferral of the donors. In present study, we aimed to analyse donor deferral characteristics in terms of demographics, frequency of donation, interval between donation, reason for deferral and deferral is permanent or temporary.

In present study out of total 9563 donors 577 (6%) donors were deferred pre-donation. Out of total 577 deferred donors' males were 451 (4.8 %) and females were 126 (37.2 %). Out of total 451 males 250 (55.4 %) were from 18 to 30 years age, 100 (22.1 %) from 31 to 40 years, 78 (17.2 %) from 41 to 50 years, 21 (4.6 %) from 51 to 60 years and 2 (0.4 %) from > 60 years. Out of total 126 females 98 (77.7 %) were from 18 to 30 years age, 19 (15 %) from 31 to 40 years, 7 (5.5 %) from 41 to 50 years, 2 (1.5 %) from 51 to 60 years and 0 (0 %) from > 60 years. In similar study by **Hasan Z. et al (2017)**¹² total number of donors accepted for blood donation were 1157, out of which 81 (6.5%) donors were deferred. Among the deferred donors' males were 79 (97.5%) and females were 2 (2.5 %). **Hamid Iqbal et al (2020)**¹³ found out of 3348 individuals who came for blood donation 433 (12.9%) were deferred. Majority were males i.e., 427 (98%) and only 6 females. Mean age was 28.96 years and youngest individual was of 18 years, while the eldest was 51 years. Majority belonged to 21 to 30 years age group and 65% were of less than 30 years of age. **K L Shoba et al (2018)**¹⁴ found of the total 7319 donors 7000 (95.64%) were selected for blood donation and 319 (4.36%) were deferred. Out of the 6991 male donors, 6783 (97.02%) were selected and 208 (2.98%) were deferred and out of 328 female donors, 217 (66.15%) were selected and 111 (33.84%) were deferred.

In present study out of total 577 deferred donors, 491 (85 %) were found to have temporary deferrals and 86 (15 %) found to have permanent deferrals. Amongst causes for permanent deferrals allergic disease was found in 5 (0.8 %) cases, anticonvulsant medications in 1 (0.1 %), antithyroid medications in 2 (0.3 %), asthma on steroids 8 (1.3 %), bleeding disorder in 2 (0.3 %), diabetic in 12 (2 %), epilepsy in 4 (0.6 %), heart disease in 4 (0.6 %), hypertension in 46 (7.7 %), schizophrenia in 1 (0.1 %) and thalassemia in 1 (0.1 %). Amongst causes for temporary deferrals alcohol was present in 21 (3.6 %), Medications in 63 (10.9 %), Vaccination in 5 (0.8 %), Blood transfusion 1 (0.1 %), Infectious disease in 39 (6.7 %), Dental surgery in 7 (1.2 %), Fever/cough/cold in 20 (3.4 %), Lack of sleep in 5 (0.8 %), Donor apprehension in 2 (0.3 %), Hypotension in 4 (0.6 %), Jaundice in 21 (3.6 %), Major surgery in 11 (1.9 %), Minor surgery in 4 (0.6 %), Menstruation in 11 (1.9 %), Skin disease in 25 (4.3 %), Tattoo in 13 (2.2 %), Weakness in 1 (0.1 %), Weight <45 kgs in 4 (0.6 %) and less haemoglobin in 234 (40.5 %). Out of total 451 males leading causes for deferral was less Hemoglobin found in 137, Medication in 60, Hypertension in 41 and Infectious diseases in 35. Out of total 126 females leading causes for deferral was less Hemoglobin found in 97, Menstruation in 11, Hypertensive 5 and Infectious diseases in 4. Amongst total 577 deferrals, 562 deferrals were performed at blood camp (male 442 & female 120) whereas 15 performed at blood bank center (male 9 & female 6). In similar study by **Hasan Z. et al (2017)**¹² temporary deferrals were 50 (61%) and permanent were 31 (39%). Within the temporary deferrals most common causes were anaemia (14%), antibiotic usage (12%) and dental extraction (12%). Within permanent deferrals (39%) most common causes were hypertension (15%) and History of jaundice (15%). **Hamid Iqbal et al (2020)**¹³ found most frequent cause of deferral was low haemoglobin found in more than half of individuals (221, 50.3%). Hepatitis C virus (HCV)

infection was the second most frequent cause of deferral found in 83 (19.2%) followed by hepatitis B virus (HBV) infection (49, 11.3%), syphilis (36, 8.3%), thrombocytopenia (18, 4.2%) and active infection (14, 3.2%). Other less frequent causes included too early donation, thrombocytosis, polycythaemia, pancytopenia, malaria, allergies, insulin and tuberculosis. **K L Shoba et al (2018)¹⁴** found anaemia, medication, underweight and underage were predominant reasons for deferral among temporary deferrals whereas high blood pressure was the predominant reason for permanent deferrals (81.25%).

V. Conclusion

Donor deferral results in loss of many people from the donation pool in ensuring safety of recipients. In our study, significant population of deferred donors belonged to the temporary deferral group, which can be treated and prevented. Donor deferral analysis helps us to identify the causes which can be used to promote proactive measures towards donor retention, especially of the temporarily deferred donors.

Important aspects for recruiting the temporarily deferred donors in future include:

1. **Education**-awareness about the blood donation criteria can be created by taking help of Preventive and Social Medicine department to conduct programs/ small group teachings.
2. **Counselling**-of donors regarding their deferral reason.
3. **Motivation**- for donation in future.
4. **Treatment**-of temporarily deferred donors.

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