

## Pattern of Blood Donor Deferral System – In A Tertiary Care Teaching Hospital - An Evaluation and Fact Finding Analysis

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### Abstract:

**Introduction:** Blood Transfusion services (BTS) have the cumulative responsibility to collect blood only from the healthy donors who are at low risk of infection that could be transmitted through transfusion and who are unlikely to jeopardize their own health by blood donation. The reasons for deferral are always variable depending upon the rules framed by blood transfusion services and health care providers of different regions.

**Materials & Methods:** Retrospective data was collected and compiled from database at blood bank from January 2018 to December 2018. Relevant history, physical and clinical examination was gathered and donor selection was carried out as per the prescribed guidelines.

**Results:** Total number of blood donors registered was 9036. Amongst the same 7402 were males and 1634 were females. There are 8324 fit donors; from whom blood units were collected and 712 donors i.e., 7.87% were deferred. Alcohol intake was the most common cause of temporary deferral – 26.26%; Hypertension was the most common cause of permanent deferral – 4.49%.

**Conclusion:** There are various reasons and social taboos interlinked and intervened into the whole process of blood donation. The BTS and blood banks should take immense steps to promulgate the activity of blood donation with parallelly looking after the social and health related needs of the society which in turn leads to avoidance of unnecessary deferral of the eligible and fit blood donors.

**Key words:** blood transfusion; donor; deferral; permanent; temporary

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### I. Introduction

Blood Transfusion services (BTS) have the cumulative responsibility to collect blood only from the healthy donors who are at low risk of infection that could be transmitted through transfusion and who are unlikely to jeopardize their own health by blood donation. According to National Aids Control Organization (NACO) statistics, the annual rate of blood donation is about 7.4 million units; whereas, the annual requirement and demand is more than 10 million units in India<sup>1</sup>. Ensuring safe and adequate supply of blood and blood components is a challenging task for all the organizations and health care providing institutions globally. The above goal can be achieved by only means of encouraging voluntary non-remunerated blood donors<sup>2</sup>. Thus, here comes the role of blood banks to select fit donors and to curtail donation from unfit ones, for which a criteria is being followed as per the regulations provided by Drugs and Cosmetics Act 1940; which in turn is supplemented by the standards for blood banks and BTS<sup>3,4</sup>. The system explains the pattern of acceptance and deferral of blood donors based on various criteria – which holds and involves legal, ethical, political and psychological considerations<sup>5</sup>. The demographic and geographic factors also play a vital role in framing the criteria for acceptance and deferral of the donors. But, the deferral system if not implemented in a strategic and social manner, it will lead to loss of precious blood donors in a long run<sup>6,7</sup>. The reasons for deferral are always variable depending upon the rules framed by blood transfusion services and health care providers of different regions. As such, blood donor deferral is a very painful and an uncomfortable experience for the blood donor as well as the blood bank screening the donor<sup>8</sup>. Deferring the donors sometimes leaves a negative impression about self in some individuals which will lead to have a wrong or unsuitable opinion on blood donation process itself. Therefore, these individuals who are deferred once will rarely turn up for a blood donation in due course of future<sup>9</sup>. The deferral system is of two kinds – temporary and permanent. A temporary deferral for a specific period of time only, those individuals need clear and acceptable counseling and education. So that; they can

donate blood and continue to be healthy donors. Thus, it is the responsibility of blood banks to identify unfit donors and defer them as temporary / permanent; based on the clinical, personal history and evidences available<sup>10</sup>. This study is carried out to analyse the deferral of the donors so as to ensure proper follow up measures which can help to eliminate recipient and donor related issues. Therefore, a strategic path is created for safe and protected blood supply and blood collection without any compromise in quality of service of blood transfusion services.

## II. Materials & Methods

The present study was conducted in Model Blood Bank, Department of Pathology, S.V.R.R.Government General Hospital / S.V.Medical College, Tirupati. Retrospective data was collected and compiled from database at blood bank from January 2018 to December 2018. All the donors registered for blood donation (voluntary and replacement) of age between 18-55 years of both sexes were included. A mandatory registration form was filled by donors. This form includes all personal contact details, occupation, medical / surgical history etc., In case any eventful issues are present; the donors are instructed to enumerate the details. Previous transfusion / blood donation related details etc., are also gathered. Consent for blood donation is taken. Clinical examination is conducted by the medical officer of blood bank with regards to general wellbeing, weight, pulse, blood pressure, temperature, auscultation (cardiovascular and respiratory system examination), hemoglobin estimation also is done by sahli's method, which are as per the guidelines of NACO and BTS. A detailed interview is taken by the counselor regarding personal history, habit and habitat after clinical examination.

All the examined parameters should be under normal range so as to get qualified as a fit and acceptable donor. [Pule Rate – 80/minute; Blood Pressure – 120/80 +/-10 mm of Hg; Temperature – 98.4 deg Fahrenheit +/- 1 degree; Auscultation – No abnormalities; Hemoglobin - >12 gm%]. In case any of the parameters are abnormal (or) there were any other hindrances for accepting the donor; then, detailed notes on donor deferral including cause and criteria which are not fulfilled are recorded in the register. Collected data is evaluated taking into various criteria and causes based on age and sexual distribution.

## III. Results

A total of 9036 registrations were done for blood donation in Model Blood Bank, Department of Pathology, S.V.R.R.Government General Hospital/S.V.Medical College, Tirupati in 2018. Amongst the same 7402 were males and 1634 were females. There are 8324 fit donors; from whom blood units were collected and 712 donors i.e., 7.87% were deferred. The details tabulated in Table 1. Among the above 624 (87.64%) were males and 88 (12.35%) were females, as depicted in Table 2.

**Table 1:** Total number of donors – blood units & deferred

Total number of blood units collected	Total number of donors deferred	Total number of registrations
8324	712	9036
92.12 %	7.87 %	100 %

**Table 2:** Distribution of Male and Female Donors (accepted and deferred)

Donors	Male n (%)	Female n (%)	Total n (%)
Accepted	6822 (81.95)	1502 (18.04)	8324 (100)
Deferred	624 (87.64)	88 (12.35)	712 (100)

The total number of deferrals in voluntary donors was more than that of replacement donors i.e., 594 (83.42%) and 118 (16.57%) respectively as mentioned in Table 3. In the present study, the majority of donors deferred were under the age group between 18-30 years of age – 507 (71.20%). Amongst the deferred individuals in 18-30 years of age group – 423 (60.67%) were males and 75 (10.53%) were female donors. The data is tabulated in Table 4.

**Table 3:** Distribution of Male and Female donors deferred during voluntary and replacement – blood donation

Male		Female	
Voluntary n (%)	Replacement n (%)	Voluntary n (%)	Replacement n (%)
522 (73.31%)	102 (14.32%)	72 (10.11%)	16 (2.24%)
<b>Total no of Voluntary deferrals: 594 (83.42%)</b>		<b>Total no of Replacement deferrals: 118 (16.57%)</b>	

**Table 4:** Male and Female Donors deferred – distribution according to age

Age of the individual	Male n (%)	Female n (%)
18-30 years	432 (60.67%)	75 (10.53%)
31-40 years	176 (28.20%)	11 (1.54%)
41-55 years	16 (2.24%)	2 (0.28%)
<b>Total</b>	<b>624 (87.64%)</b>	<b>88 (12.35%)</b>

Distribution of deferral was classified as temporary and permanent deferral. Temporary deferral amounts to majority compared to permanent deferrals i.e., 614 (86.23%) and 98 (13.76%) respectively. Among 614 temporary deferrals – 546 (76.68%) were males and 68 (9.55%) were females. Amongst 98 permanent deferrals – 78 (10.95%) were males and 20 (2.80%) were females as enumerated in Table 5.

**Table 5:** Distribution of Temporary and Permanent deferral in Male and Female donors

Deferral type	Male n (%)	Female n (%)	Total n (%)
Temporary	546 (76.68%)	68 (9.55%)	614 (86.23%)
Permanent	78 (10.95%)	20 (2.80%)	98 (13.76%)
<b>Total</b>	<b>624 (87.64%)</b>	<b>88 (12.35%)</b>	<b>712 (100%)</b>

Alcohol intake within 24 hours before blood donation was the leading cause of temporary deferral – 187 (26.26%) and all were male donors. The second leading cause being underweight (<55 Kgs) of the individual – where 164 (23.03%) were males and 9 (1.26%) were females altogether 173 (24.29%). The least common cause of temporary deferral in female donors was abortion less than six months before blood donation – 2 (0.28%). Tooth extraction and root canal treatment were the least common cause of temporary deferral in males – 3 (0.42%). The details tabulated in Table 6.

**Table 6:** Causes of Temporary deferral in Male and Female donors

Sl.no	Temporary deferral (cause)	Male n (%)	Female n (%)	Total N (%)
1.	Alcohol Intake	187 (26.26%)	-	187 (26.26%)
2.	Underweight	164 (23.03%)	9 (1.26%)	173 (24.29%)
.	Improper sleep (the night before donation)	68 (9.55%)	3 (0.42%)	71 (9.97%)
4.	Anemia / Pallor	29 (4.07%)	26 (3.65%)	55 (7.72%)
5.	Tattooing (< 6 months)	39 (5.47%)	1 (0.14%)	40 (5.61%)
6.	Vaccination (< 6 months)	19 (2.66%)	4 (0.56%)	23 (3.23%)
7.	Jaundice (< 6 months)	12 (1.68%)	2 (0.28%)	14 (1.96%)
8.	Last Donation (< 3 months)	9 (1.26%)	5 (0.70%)	14 (1.96%)
9.	Menstrual cycle (+/- 7 days)	-	12 (1.68%)	12 (1.68%)
10.	Under age (< 18 yrs)	8 (1.12%)	2 (0.28%)	10 (1.40%)
11.	Tooth extraction & Root canal treatment (< 1 week)	3 (0.42%)	2 (0.28%)	5 (0.70%)
12.	Dog bite	4 (0.56%)	-	4 (0.56%)
13.	Typhoid fever/Enteric fever	4 (0.56%)	-	4 (0.56%)
14.	Abortion (< 6 months)	-	2 (0.28%)	2 (0.28%)
	<b>Total</b>	<b>546 (76.68%)</b>	<b>68 (9.55%)</b>	<b>614 (86.23%)</b>

Among permanent deferral causes – Hypertension happens to be most common cause – 32 (4.49%) accounting for 28 (3.93%) of male donors and 4 (0.56%) of female donors. This happens to be the most common cause in male donors. Thyroid disorder happens to be the most common cause of deferral in female donors – 8 (1.12%) which in turn was found out to be least common cause of deferral in male donors – 2 (0.28%). The least common causes for females were Asthma and High Risk of Transmission transmitted infection (TTI) which accounted for 2 (0.28%) each. The numerical values are tabulated in Table 7.

**Table 7:** Causes of Permanent deferral in Male and Female donors

Sl.no	Permanent deferral (cause)	Male n (%)	Female n (%)	Total N (%)
1.	Hypertension	28 (3.93%)	4 (0.56%)	32 (4.49%)
2.	Diabetes	24 (3.37%)	4 (0.56%)	28 (3.93%)
3.	Asthma	11 (1.54%)	2 (0.28%)	13 (1.82%)
4.	Thyroid disorder	2 (0.28%)	6 (0.84%)	8 (1.12%)
5.	High risk of TTI (Transmission transmissible infections)	5 (0.70%)	2 (0.28%)	7 (0.98%)
6.	Hypotension	4 (0.56%)	2 (0.28%)	6 (0.84%)
7.	Epilepsy	4 (0.56%)	-	4 (0.56%)
	<b>Total</b>	<b>78 (10.95%)</b>	<b>20 (2.80%)</b>	<b>98 (13.76%)</b>

#### IV. Discussion

The primary responsibility of BTS is to provide safe, sufficient and timely supply of blood and blood products. In fulfilling this responsibility BTS should ensure that the act of blood donation is safe and cause no harm to the donor. Thus, an evident and safe process of donor selection plays a vital role to establish a safe episode of blood donation and blood transfusion<sup>11</sup>. But, the deferral system if not depicted and followed in a strategic manner; will lead to loss of potential donors which will affect the maintenance of blood banks where there is and always will be shortage of blood units. This whole picture is due to less overview, awareness and information regarding blood donation in the society.

The deferral percentage in present study is 7.87% which is similar to the studies carried out by Fred John et al<sup>12</sup> – 5.12%; Unnikrishnan et al<sup>13</sup> – 5.20%; Sundar et al<sup>14</sup> – 6%; Rabeya et al<sup>15</sup> – 5.6%; whereas some studies showed a higher deferral rate, they are – Chaudhary et al<sup>16</sup> – 16.4%; Charles et al<sup>17</sup> – 35.6%. There is variable deferral rate in different studies due to differences in socioeconomic, demographic, religious and local traditional variations. The deferral rate in males is 87.64% and in female donors it is 12.35%. The figures are akin to some studies performed by Gaajreet al<sup>18</sup>, Agnihotri et al<sup>19</sup>, Taneja et al<sup>7</sup>, Sundar et al<sup>14</sup>. Thus, the female donor population and deferral both are very minimal due to a false belief that, women are unfit for blood donation due to higher incidence of anemia in them and also due to fear and lack of awareness regarding blood donation.

There are more number of voluntary donors deferred compared to replacement donors in present study which is a similar finding in studies carried out by Nagarekha Kulkarni<sup>20</sup>, Preethi Singh et al<sup>21</sup>. In present study – more number of deferrals are observed in age group 18-30 yrs – 71.20% which was also observed as the same in studies performed by Nehal Shah et al<sup>5</sup>, Sundar P et al<sup>14</sup>. As the young adults are the most eligible and acceptable donors who are readily available compared to elderly age group individuals. The deferral rate also is more in this age group.

The temporary deferral rate (86.23%) is more than that of the permanent deferral rate (13.76%) and it is observed to be the same in other studies carried out by Nagarekha Kulkarni<sup>20</sup>, Custer et al<sup>10</sup>, Fred John et al<sup>12</sup>, Rehman et al<sup>22</sup>. In a research carried out by Arsalan et al<sup>23</sup>., the deferral rate is more due to permanent ailments rather than that of the temporary ones. The most common cause of temporary deferral in present study was Alcohol intake – 26.26% in male donors and in toto, followed by underweight. In females anemia/pallor takes an upper hand with 3.65% and 7.72% in toto. In most of the studies it has been noticed that anemia happens to be the common reason for temporary deferral. The comparative analysis of various causes of deferral in different studies is tabulated in Table 8. The most common cause of permanent deferral in present study was hypertension (4.49%) with 3.93% of male donors. In females - thyroid disorders account for 1.12% [1.40% in toto]. The comparison of various studies related to permanent deferral and reasons is tabulated in Table 9.

**Table 8:** Temporary Deferral Causes – Comparative Analysis

Sl.no	Cause of Deferral	Present Study (%)	Nehal Shah et al <sup>5</sup> , (%)	Padma Malini et al <sup>24</sup> ., (%)	Fred John et al <sup>12</sup> ., (%)	Nagarekha Kulkarni <sup>20</sup> (%)
1.	Alcohol Intake (<24 hrs)	26.26	0.75	15.93	5.13	8.00
2.	Underweight (<50 Kgs)	24.29	6.55	15.93	3.61	18.66
3.	Improper sleep (<12 hrs)	9.97	-	15.93	-	-
4.	Anemia / Pallor	7.72	30.93	19.90	9.09	23.33
5.	Tattooing (<6 months)	5.61	0.79	5.97	0.47	-
6.	Vaccination (<6 months)	3.23	-	0.39	1.05	-
7.	Jaundice (<6 months)	1.96	28.2	-	4.55	-
8.	Last donation (<3 months)	1.96	4.62	-	4.55	-
9.	Menstrual cycle	1.68	0.77	3.98	1.98	2.66
10.	Under age (<18 yrs)	1.40	0.67	-	2.91	-
11.	Tooth Extraction (<6 months)	0.70	-	1.19	3.15	-
12.	Dog bite (<6 months)	0.56	0.03	-	-	-
13.	Typhoid (<6 months)	0.56	5.01	1.99	-	0.33
14.	Abortion (<6 months)	0.28	-	0.79	-	0.33

**Table 9:** Permanent Deferral Causes – Comparative Analysis

Sl.no	Present Study (%)	Nehal Shah et al <sup>5</sup> , (%)	Padma Malini et al <sup>24</sup> , (%)	Fred John et al <sup>12</sup> , (%)	NagarekhaKulkarni <sup>20</sup> (%)	Present Study (%)
1.	Hypertension	4.49	7.39	7.9	12.70	15.66
2.	Diabetes	3.93	2.14	3.98	2.68	2.33
3.	Asthma	1.82	-	-	1.98	4.00
4.	High Risk TTI (Transfusion Transmitted Infections)	1.54	0.21	3.98	22.62	1.66
5.	Thyroid disorder	1.40	0.22	1.99	-	-
6.	Epilepsy	0.56	2.19	-	0.58	2.00

Thus, a detailed history from the donor, physical examination, clinical examination and the social behavior of the individual are the pillars of foundation to achieve safe blood transfusion protocol and to ensure supply of safe blood to the individual.

## V. Conclusion

Even though, there was a minimal donor deferral rate of 7.87% in the present study, there appears to be various reasons and social taboos interlinked and intervened into the whole process of blood donation. Alcohol intake is a major cause for deferral in males and anemia seems to be most common cause in females. The above two reasons reflects the social and general health status of our locality. Thus, people have to feel the importance of blood donation and youth should take proper steps in encouraging, mobilizing and propelling the activity of blood donation. In the mean time they should also refrain from some unacceptable social evils to become an eligible blood donor. The BTS and blood banks should take immense steps to promulgate the activity of blood donation with parallely looking after the social and health related needs of the society which in turn leads to avoidance of unnecessary deferral of the eligible and fit blood donors. Community education, public awareness, social gathering etc., helps us to build a better society having better fit donor population which ensures best blood transfusion services.

## Conflicts of Interest

None

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