



## ANALYSIS OF DISCARDED BLOOD UNITS IN A TERTIARY CARE INSTITUTE –A RETROSPECTIVE STUDY

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### Abstract:

**Introduction:** Blood is a valuable resource & Ideally in a good set up, wastage of blood and blood products should never occur. But to maintain balance between demand and supply of blood and blood products blood banks have to keep adequate and satisfactory stock of blood all the time, still a very small amount of blood wasting in blood bank can occur.

**Aims & objectives:** Present study was undertaken to analyse the causes of discarded whole blood units, discard rate and the measures to reduce number of discard in blood bank attached to tertiary care institute.

**Material and Methods:** In present study yearly data of whole blood discarded units & yearly collection of 10 years from 2010-2019 was collected from the discard registers & yearly reports of blood bank, govt. medical college, akola and analysed.

**Results & Conclusion:** It has been found that out of total 77514 whole blood units which were collected, 2276 (2.93%) whole blood units were discarded. Of the total discarded whole blood units, 966 (42.44%) were discarded due to seropositivity for TTI, 801 (35.19%) due to insufficient quantity, 378 (16.61%) due to expiry, 112 (4.92%) due to other causes & 19 whole blood units were hemolysed.

Blood stock and quality management system, Trained, dedicated & adequate staff, properly functioning blood transfusion committee to monitor activities of blood transfusion service and timely implementation of guidelines are the pre-requisites to provide safe and effective blood and to minimize discard of blood.

Keywords: Blood, valuable resource, discard, TTI, quality management system

### Introduction:

Functioning of Blood Transfusion Services in India is monitored by the Drug controller of India, NBTC and NACO. To provide safe and quality blood and blood products a well equipped and organized Blood Transfusion Service (BTS) is a vital component of any health care delivery system.<sup>1</sup>

The blood bank collects safe blood from eligible, voluntary, non remunerated healthy donors after careful screening with the help of qualified physician in clean and comfortable environment in blood bank as well as outdoor blood donation camps. The blood units are tested for TTI and stored properly following the standard norms and regulations laid down by the Government of India.<sup>2</sup>

Implementation of quality management system is essential for the effective functioning of BTS.<sup>3</sup>

Blood is a valuable resource & wastage of blood and blood products should never occur. But to maintain balance between demand and supply of blood and blood products blood banks have to keep adequate and satisfactory blood

all the time, still a very small amount of blood wasting in blood bank can occur.<sup>4,5</sup>

According to NBTC chief reasons for discard of blood all across the world includes:

- Reactivity for infections (Malaria, Syphilis, HIV, Hepatitis B, Hepatitis C)
- Expiry due to outdated, specially for platelets which have a very short half life of only 5 days
- Deterioration during storage in the form of discoloration, haemolysis, bacterial contamination.
- Not meeting quality parameters after collection and production.
- Non-completion of blood collection in requisite quantities due to donor reactions.

There are no defined national and international norms for acceptable levels of discard of blood and blood components. According to global status report on blood safety and availability WHO 2016, the information on discard of blood across 150 countries has been collated & detailed as below :<sup>6</sup>

Income group of country	Median % of total donations discarded	Median % of discard due to TTI	Median % of discard due to outdate or expiry
Low income	9.0	7.4	1.3
Lower middle income	10.9	5.1	3.1
<b>Higher middle income (India)</b>	<b>6.7</b>	<b>3.9</b>	<b>4.7</b>
High income	5.7	1.1	2.7

Present study was undertaken to analyse the causes of discarded whole blood units, discard rate and the measures to reduce number of discard in blood bank attached to tertiary care institute.

#### Aims & Objectives

To analyse the discard rate

To analyse causes of discarded whole blood

To establish strategies to reduce discard of whole blood

#### Material And Methods

This is a retrospective study conducted in the Blood Bank, Department of Pathology, Government Medical College, Akola. In this study, yearly data of whole blood discarded units of 10 years from 2010-2019 was collected from the discard registers of blood bank and analysed. This study included the discarding of whole blood (WB) due to various causes as per the guidelines laid down by NBTC.

The discard rate as a whole or due to various causes was calculated using the following formula:<sup>[2,7]</sup>  

$$\text{Discard Rate} = \left( \frac{\text{Total number of WB units discarded}}{\text{Total number of blood units collected}} \right) \times 100$$

Number of blood units collected) × 100

#### Results

Retrospectively data of 10 years from 2010-2019 was collected and analysed. Total collection was 77514 whole blood units. Due to increased public awareness, blood donation awareness drives by SBTC, increased demand of blood and blood products & utilization of blood for saving lives of patients there is increase in the yearly collection which was 5378 whole blood units in 2010 which is doubled in 2016. Though there is increase in total blood collection, discard rate is gradually declining which was 4.33% in 2011 and 2.15% in 2015 (Table 1). All the blood units were collected from healthy voluntary donors according to the guidelines of National blood transfusion council.

Out of total blood units 77514 which were collected during study period, 2276 (2.93%) whole blood units were discarded due to various causes as per the NBTC norms (Table 1).

**Table 1:** showing discard rate due to various causes with reference to total blood collection

Year	Total Collection	Blood Units Expired	Blood Units With Less Quantity	Blood Units Hemolysed	Other Causes	TTI	Total	Discard rate
2010	5378	28	54	0	3	124	209	3.88
2011	5888	65	61	3	10	116	255	4.33
2012	5882	32	63	5	13	131	244	4.14
2013	5744	45	65	0	7	97	214	3.72
2014	6421	24	40	0	10	79	153	2.38
2015	7468	20	53	1	5	82	161	2.15
2016	10260	37	109	8	37	87	278	2.7
2017	10035	33	91	2	15	84	225	2.24
2018	11008	60	128	0	10	87	285	2.58
2019	9430	34	137	0	2	79	252	2.67
Total	77514	378	801	19	112	966	2276	<b>2.93%</b>
% Of Total Collection		0.48%	1.03%	0.02%	0.14%	1.24%		

**Table 2:** showing yearwise and total blood collection and discard rate due to TTI with reference to total blood collection.

Year	Total Collection	TTI					Total discard
		HBsAg	HIV	HCV	VDRL	MP	
2010	5378	81	30	13			124
2011	5888	94	17	5			116
2012	5882	89	21	19	2		131
2013	5744	74	7	15	1		97
2014	6421	66	9	4			79
2015	7468	74	7	1			82
2016	10260	83	2	2			87
2017	10035	77	6	1			84
2018	11008	81	5	1			87
2019	9430	68	11	0			79
Total	77514	787	115	61	3		966
Percentage		1.01%	0.14%	0.07%	0.003%		1.24 %

**Table 3:** showing discard rate due to various causes with reference to total discarded units.

Total discarded units	Blood units expired	Blood units with less quantity	Blood units hemolysed	Other causes	TTI				
					HBV	HCV	HIV	VDRL	MP
2276	378 (16.61%)	801 (35.19%)	19 (0.84%)	112 (4.92%)	787	61	115	03	--
					<b>(34.57%)</b>	(2.68%)	(5.05%)	(0.13%)	
					<b>966 (42.44%)</b>				

Of the total 2276 discarded whole blood units, 966 (42.44%) blood units were discarded due to seropositivity for TTI which was the most common cause for discard of blood units found during present study. There is a gradual declining trend in the prevalence of TTIs among blood donors during the last 10 years. Discard of blood units due to less quantity 801 (35.19%) was the second most common cause whereas discarding of hemolysed blood units 19 (0.83%) was least common (Table 3).

378 (16.61%) whole blood units were discarded due to expiry, 112 (4.92%) due to other causes & 19 whole blood units were hemolysed and discarded. Among the 966 (42.44%) whole blood units discarded due to seropositive for TTI, 787 (34.57%) whole blood units were discarded due to seropositive for Hepatitis B (Table 3).

In present study 03 units were discarded due to seropositive for VDRL (Table 2).

During present study period discard rate was 2.93% which is below the standard norms for India given by NBTC.

### Discussion

It has been realized that blood is essential for life and blood bank is a center where blood collected as a result of

blood donation is stored, processed and preserved appropriately for later use in blood transfusion. The term "blood bank" refers to a division of a hospital where the storage of blood product occurs and proper testing is performed to reduce the risk of transfusion related adverse events and is utilized for patient care in elective as well as emergency situation. Every unit of blood and blood product is screened in terms of quality and quantity to provide safe and quality blood to the patient. But still due to some unavoidable reasons blood bank has to discard some units of blood and blood products. It is the duty of all blood bank personnel to minimize wastage of precious blood by proper implementation of guidelines laid down by the NBTC from time to time.

Present study has been undertaken to analyse discard rate and measures to minimize it. Discard rate in present study is 2.93% which is lower as compared to studies done by Mukherjee G et al <sup>2</sup>, Arora I et al <sup>4</sup>, Kumar A et al <sup>8</sup>, Lakum NR et al <sup>9</sup> i.e. 3.76%, 3.52%, 3.25% and 4.09% respectively and is below the NBTC norms and is a good quality indicator.

**Table 4:** showing comparison of present study with various other studies.

	Discard rate as per NBTC Norms <sup>6</sup>	Present study	Mukherjee G et al <sup>2</sup>	Arora I et al <sup>4</sup>	Patil P, Bhake A, Hiwala K <sup>7</sup>	Kumar A et al <sup>8</sup>	Lakum NR et al <sup>9</sup>
Period of study	--	10 years	08 years	01 year	30 months	19 months	21 months
Total collection	--	77514	86971	992	9785	10582	15084
Total units discarded	--	2276	3273	35	754	346	618
Discard rate (%)	6.7	2.93	3.76	3.52	07.70	3.25	4.09
Discard due to TTI (%)	3.9	1.24%	2.22	--	4.71	2.43	1.60
IQ	--	1.03	1.54	--	--	--	1.55

Most common cause of discard in current study is seropositivity due to TTI 1.24% of total collection and is lower than the studies done by Mukherjee G et al<sup>2</sup>, Patil P et al<sup>7</sup>, Kumar A et al<sup>8</sup>, Lakum NR et al<sup>9</sup> i.e. 2.22%, 4.71%, 2.43% and 1.60 % respectively and is below the NBTC norms.

801 (1.03%) blood units of total blood collection were discarded due to insufficient quantity of blood collected and is comparable to studies done by Mukherjee G et al<sup>2</sup>, Lakum NR et al<sup>9</sup> which is 1.54% and 1.55 % respectively.

Minimum amount of discard indicates effective functioning of a BTS & it can be minimized by proper and careful screening of donors by a well qualified and trained personnel, collection of blood in a pleasant & comfortable environment, by regular donor awareness drives through mass media, by following single venepuncture method with continuous flow of blood to avoid insufficient collection, proper storage and transportation with cold chain, careful handling of blood, arrangement of periodical training programmes for the staff.

TTI positive donor counselling should be done by a trained staff to motivate donor not to donate blood in future to avoid unnecessary wastage of blood.

Outdoor blood donation camps should be organized in a safe environment with proper counselling of blood donation camp organizer.

There should be adequate and trained manpower and a good infrastructure of blood bank as per the guidelines given by NBTC which is the most common problem.

### Conclusion

Blood bank and blood transfusion is a vital component of any healthcare delivery system and every single blood unit is a valuable source to save the lives of patients in emergency. To maintain adequate, safe and constant supply of blood to the patients, there should be proper implementation of blood stock & quality management system. It's the responsibility of blood transfusion committee to regularly monitor blood transfusion services, timely implementation of guidelines given by FDA, NBTC, NACO and arrange training programmes for the blood bank staff to improve quality of blood as well as for clinicians and newcomers in the field for the rational use of blood. This will definitely help in proper utilization of blood. Finally it's the teamwork & duty of all the personnel working in blood bank and healthcare system to carefully monitor every single step involved in the blood transfusion service to minimize discard of blood.

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