

Evaluation and Perusal of Reasons for wastage of blood and blood components in a tertiary care hospital – A 5 year retrospective studyAishwarya S Patil¹, Chandana G², Chada Tejaswi³, Abdul Hakeem Attar⁴¹Assistant Professor, Department of Pathology, ESIC MCH, Kalaburagi²Assistant Professor, Department of Pathology, Dr Patnam Mahendar Reddy Institute of Medical Sciences, Chevella³Assistant Professor, Department of Transfusion Medicine, ESIC MCH, Sanath Nagar, Hyderabad⁴Professor, Department of Pathology, ESIC MCH, Kalaburagi

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Abstract:

Background: Transfusion of blood and its components plays an important role in modern medicine and managing emergencies. So, blood is collected with utmost care, under strict aseptic precautions, components are prepared and subjected to rigorous testing, to make sure they are safe for transfusion. In the due process, few of the blood products get discarded due to various reasons, which, ideally should not happen. This study aims to evaluate the various reasons for the discard of blood products, so as to find ways to minimise the wastage of these blood and blood components.

Methods: This is a retrospective, observational study conducted at the blood centre of a tertiary care hospital, ESIC MCH, Kalaburagi from 2019 to 2024.

Results: Out of the 10811 total blood bags collected, 200 were whole blood, 5283 were packed red blood cells, 5283 were fresh frozen plasma and 45 were platelet concentrate. Among these, highest discard rate was observed with fresh frozen plasma and the most common reason was shelf-life expiry.

Conclusion: As blood is a lifesaving resource, it should be judiciously utilised to minimise wastage. The most common reason for discard in this study and also few other studies, is shelf-life expiry. So, blood products transfer facility should be arranged for every blood centre.

Keywords: Blood components, Discard, Shelf-life expiry, Transfusion transmitted infections (TTI).

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Introduction

Blood and its components are very significant for human life and therefore, blood transfusion can be a lifesaving intervention [1]. The transfusion of blood and blood components has become an integral part of patient management in modern medicine [2]. Many of the surgical procedures depend on blood transfusion for the better recovery of the patients. Blood transfusion includes transfusion of whole blood (WB) and blood components like packed red blood cells (PRBC), fresh frozen plasma (FFP), platelet concentrate and cryoprecipitate. By analysing the data collected and the reasons for the discard, blood transfusion services and centres can develop plans to improve performances through education, training their staff and introduce new measures in order to minimise the number of discarded bloods to a reasonable rate [2].

Methods

This is a retrospective, observational study conducted at the blood centre of a tertiary care hospital, ESIC MCH, Kalaburagi from 2019 to 2024. Blood

components were prepared from healthy donors as per the criteria laid down by the Drugs and Cosmetic Act, 1940 and Rules 1945 [3]. After collection, blood components which were prepared under all strict aseptic conditions according to Food and Drug Administration (FDA) guidelines [4] were considered into the study. The data is retrieved from the medical records after obtaining approval from the Institutional Ethics Committee, analysed and results interpreted.

Results

Total number of units collected during 2019 to 2024 were 10811, out of which 2441 units were discarded, owing to a total of 22.5% discard rate, as shown in Table 1. Majority of the discarded units are FFP, followed by PRBC. Discard percentage is highest during COVID-19 pandemic in the year 2020. Year wise data regarding blood collection and discard rate is shown below in Table 2. Blood bags are discarded for various reasons and the most common reason being shelf-life expiry, followed by broken / leakage

of bags and TTIs. Other reasons are listed below in Table 3.

Table 1: Distribution of total collection and discarded units of blood and blood components from 2019 to 2024

Blood component	Total number of units collected	Total number of units discarded	Percentage of units discarded
Whole blood	200	90	45
PRBC	5283	372	7
FFP	5283	1979	37.4
Platelet concentrate	45	9	20
Total	10811	2441	22.5

Table 2: Year wise distribution of total collections (C) and discarded units (D) of blood and blood components from 2019 to 2024

Blood component	2019 C	2019 D	2020 C	2020 D	2021 C	2021 D	2022 C	2022 D	2023 C	2023 D	2024 C	2024 D
WB	30	13	56	23	10	2	20	8	54	28	30	16
PRBC	86	14	166	36	591	47	1299	58	1755	107	1386	110
FFP	86	14	166	77	591	124	1299	365	1755	890	1386	509
Platelet Concentrate	0	0	0	0	5	0	20	5	12	4	8	0
Total	202	41	388	136	1197	173	2638	436	3576	1029	2810	635
Discard Rate (%)		20.2%		35%		14.4%		16.5%		28.7%		22.5%

C- no. of collected units. D – no. of discarded units

Table 3: Analysis of reasons for discard of blood and blood components

Reason	WB	PRBC	FFP	PLT Conc	Total	%
Shelf-life expiry	24	166	1134	9	1333	54.6
Broken/ Leakage	4	9	245	-	258	10.5
TTI positive	13	135	135	-	283	11.5
Under collection	49	5	10	-	64	2
Hemolysis	-	37	10	-	47	1.9
DCT positive	-	13	9	-	22	0.9
Colour change/ Contamination	-	2	172	-	174	7.1
Clot	-	5	6	-	11	0.4
Lipemic serum	-	-	131	-	131	5.3
Transfusion cancelled after thawing / delayed transfusion after issue	-	-	127	-	127	5.2
Total	90	372	1979	9	2441	

Discussion

The need for blood and blood components is rapidly increasing due to improved and accurate diagnosis of complex diseases requiring transfusion [7]. Proper management of blood and blood components at the blood centre will reduce unnecessary wastage & enhance its judicious usage.

Major reasons for the wastage of blood and its components are found to be dependent on the patterns of utilisation and storage. In our present study, during the period from 2019 to 2024, 90 out of 200 whole

bloods were discarded, the reason being under collection as the most common reason. Also, 372 out of 5283 PRBC were discarded, the reason for discard being shelf life expiry. 1979 out of 5283 FFP were discarded, the reason being shelf-life expiry. Other important reasons for expiry are sero positivity, broken / leakshelf-life, TTI positivity, lipemic serum and cancelled transfusion after thawing of FFP/ delayed transfusion. Our present study, in comparison with few other studies, have similar reasons for discard.

One such study conducted by Sumedha P et al., shows discard percentage of 21.5%, which very much correlates with our present study, along with the top reasons being the same as ours for discard. In another study, conducted by Navyashree N et al., it showed discard rate of 8.9%, but the reasons for

discard were in concordance with our present study. These two above mentioned studies were conducted for a period of 5 years and 7 years respectively, which are comparable to our present study, which is conducted for a period of 5 years.

Table 4: Comparison of reasons for discard with various other studies

S. No.	Study	Study Period & Duration	Place of study	No. of total blood components prepared	No. Of bags discarded	Most common reason for discard
1.	Navyashree N et al	2013 – 2019 (6 years)	Karnataka	26,831	2389	Shelf-life expiry. Seropositivity. Under collection
2.	Sumedha P Shinde et al	2018 – 2022 (4 years)	Maharashtra	23,277	5025	Shelf-life expiry. Seropositivity. Under collection
3.	Present study	2019 – 2024 (5 years)	Karnataka	10,811	2441	Shelf-life expiry. Breakage/ Leakage (FFP). Lipemic serum (FFP). Seropositivity
4.	Anitha M et al	2018 – 2019 (1 year)	Andhra Pradesh	16,277	759	Seropositivity. Shelf-life expiry. Breakage/ Leakage
5.	Sukhwant singh Hayer et al	2016 – 2017 (1 year)	Maharashtra	5,209	511	Shelf-life expiry. Seropositivity. Leakage/ Breakage

Many other studies were conducted to analyse reasons for discard during a period of one year. As we have shown in the table above, last two studies were conducted for a period of one year, but the major reasons for discard still remained the same, i.e., shelf-life expiry and Seropositivity.

Conclusion

Blood & Blood products are lifesaving resource, and hence, they need to be utilised judiciously to minimise wastage. The most commonly observed reason for wastage in this study and also few other studies is shelf-life expiry and Transfusion transmitted infections (TTI).

Our study proposes few recommendations to minimise wastage of blood and its components:

1. Every blood centre should have transfer/transport facility to other blood centres or hospitals for better utilisation and to reduce wastage due to shelf-life expiry.

2. Proper counselling and screening need to be conducted before accepting any donor.
3. Information about TTI positive donors should be recorded and communicated across all blood centres in the region confidentially.
4. Focus on better quality of staff training and strict implementation of recent / latest guidelines is recommended.

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