Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/xc5rsx62

"DISCARD RATES OF BLOOD AND COMPONENTS AS A QUALITY METRIC: A RETROSPECTIVE ANALYSIS.

Dr. Sneha K[1*], Dr. Saniha Pb[2], Dr.Surekha K[3]

[1*]Assistant professor, Sri Devraj Urs Medical College,Tamaka,Kolar-563101Karnataka, India, Snehark93@gmail.com
[2]Assistant Professor, Siddaganga Medical College And Research Institute, Tumkur-572104, Karnataka, India, P.B.Saniha@Gmail.Com
[3]Assistant Professor East Point College Of Medical Sciences And Research Centre-560049 Karnataka, India

***Corresponding Author:** Dr. Sneha K
[*]Assistant professor, Sri Devraj Urs Medical College,Tamaka,Kolar-563101Karnataka, India
Snehark93@gmail.com

Abstract:
Introduction: Blood transfusion is a vital component of modern healthcare, and since blood is an irreplaceable resource, its judicious use with minimal wastage is crucial.
Aims and Objectives: This study aimed to analyze the causes for the discard of blood and its components, using discard rates as a quality indicator to improve transfusion practices.
Materials and Methods: A retrospective study was conducted in the Department of Immunohematology and Transfusion Medicine, Belagavi Institute of Medical Sciences, Belgaum, Karnataka**,** over a one-year period from June 2021 to July 2022.
Results: During the study period, a total of 5,504 blood units were collected, comprising 405 units of whole blood (WB), 3,654 packed red blood cells (PRBC), 3,654 units of fresh frozen plasma (FFP), and 541 platelet concentrates (PC). The overall discard rate was 7.1%, with component-wise discard rates of 3.7% for WB, 3.4% for PRBC, 73.9% for PC, and 1.28% for FFP. Platelet concentrates showed the highest discard rate, largely due to their short shelf life and limited demand.
Conclusion: Minimizing blood wastage requires strict adherence to transfusion protocols, close coordination between hospital units and the blood center, and enforcement of proper donor selection and deferral criteria. Measures such as thorough pre-donation history and counseling, use of donor screening software to detect TTI-positive cases, deferral of previously screened professional donors, enhanced phlebotomy skills; prevention of RBC contamination during component separation, and careful thawing of FFP can significantly reduce discard rates. Regular audits and maintenance of optimal storage and handling conditions further contribute to quality improvement in transfusion services.

Key words: Blood, Components and Discard.

Introduction:

Blood transfusion is a critical component of modern medical care, playing a lifesaving role in a wide range of clinical settings including surgery, trauma, obstetrics, and hematologic disorders

[1,2]. Despite advancements in transfusion practices, the collection, processing, and optimal utilization of blood remain challenging, especially in developing countries like India where blood is a scarce and irreplaceable resource [3, 4]. Ensuring the safety, availability, and rational use of blood and its components is a cornerstone of national and international blood policies, as emphasized by the World Health Organization (WHO) and the National AIDS Control Organization (NACO) [1, 2, 8].Discarding blood and its components due to avoidable causes not only strains already limited resources but also reflects inefficiencies in the blood transfusion chain. Studies from various centers across India have highlighted multiple causes for discards, including seropositivity for transfusion-transmitted infections (TTIs), low volume collections, breakage during processing, and expiry due to underutilization—particularly of short shelf-life components like platelets [4–7,10–12]. For instance, research conducted in tertiary hospitals across Central and South India has reported discard rates ranging from 2% to over 10%, with platelet concentrates frequently exhibiting the highest wastage rates [6, 10, 13–15].

In this context, discard rate serves as an important quality indicator for transfusion services, reflecting both operational efficiency and the effectiveness of donor screening and inventory management practices [6, 7, 13]. Continuous monitoring and analysis of blood wastage not only helps in identifying system gaps but also facilitates targeted interventions to improve transfusion safety and resource utilization. This study was undertaken to evaluate the discard rates and underlying causes for discarded blood and components at the Department of Immunohematology and Transfusion Medicine, Belagavi Institute of Medical Sciences, Belgaum, Karnataka, over a one-year period, with an aim to propose practical strategies for minimizing wastage and enhancing service quality.

Aim:

To identify and analyze the various causes for discarding blood and its components, with the objective of optimizing blood utilization through improved staff education, training, and implementation of effective transfusion practices.

Materials and Methods:

This retrospective observational study was conducted in the Department of Immunohematology and Transfusion Medicine (Blood Centre), Belagavi Institute of Medical Sciences, Belgaum, Karnataka, over a period of thirteen months, from June 2021 to July 2022.

All blood donors were screened in accordance with the guidelines of the National AIDS Control Organization (NACO), as provided by the National Blood Transfusion Council (NBTC) and the Directorate General of Health Services (DGHS), under the Drugs and Cosmetics Act, 1940 and Rules, 1945. The study included an analysis of discarded whole blood (WB), packed red blood cells (PRBC), fresh frozen plasma (FFP), and platelet concentrates (PC).

Data were collected retrospectively from blood bank records including the donor register, discard register, transfusion-transmitted infection (TTI) register, and component preparation register. Each discarded unit was evaluated for the reason for discard, and categorized accordingly. The discard policy followed the standard operating procedures (SOPs) established by the blood center in line with NACO guidelines.

Blood components were prepared using CPDA (citrate-phosphate-dextrose-adenine) anticoagulant blood bags for whole blood collection and SAG-M (saline-adenine-glucose-mannitol) additive solution for PRBCs. All units of blood and components were screened for transfusion-transmitted infections using the enzyme-linked immunosorbent assay (ELISA) method.

Calculation of Discard Rate:

Overall Discard Rate (%) = (Total number of blood or components discarded / Total number of blood or components prepared) × 100

TTI-related Discard Rate (%) = (Total number of blood or components discarded due to TTI positivity / Total number of whole blood units collected) × 100

Results

A total of 5,504 blood donations were collected from donors at the Department of Immunohematology and Transfusion Medicine, Belagavi Institute of Medical Sciences**,** Belgaum, Karnataka, during the study period from June 2021 to July 2022**.** From these, a total of9,321 blood and blood component unitswere prepared, comprisingwhole blood (WB), packed red blood cells (PRBC), fresh frozen plasma (FFP)**,** and platelet concentrates (PC)**.**

Out of the 9,321 prepared units, 607 units were discarded, yielding an overall discard rate of 6.5%**.** Component-wise analysis showed that:

- Whole Blood (WB) had a discard rate of 3.7% (20 out of 540 units),
- PRBCs had a discard rate of 3.4% (169 out of 4,970 units),
- FFP had a discard rate of 1.28% (63 out of 4,921 units), and
- Platelet Concentrates showed a significantly higher discard rate of 48.4% (355 out of 733units).

The detailed distribution is shown in Table 1**.**

Further analysis of the 607 discarded units revealed that the most common cause was low-volume collection, which accounted for 386 units (63.6%), followed by seropositivity for transfusion-transmitted infections (TTIs) in 148 units (24.3%). Additionally, 61 units (10%) were discarded due to expiry beyond their shelf life, and 12 units (2.1%) were lost due to breakage during handling or centrifugation. These findings highlight the importance of pre-donation screening, phlebotomy techniques, and component handling practices, as summarized in Table 2**.**

Among the 148 TTI-reactive units, the majority were found to be HIV-positive, accounting for 94 units (63.5%), indicating a higher prevalence of HIV among TTI-positive donations. Other infections included HCV in 28 units (18.9%)**,**HBsAg in 21 units (14.2%) and VDRL (Syphilis) in 5 units (3.4%). These results emphasize the ongoing need for stringent donor selection and screening protocols. The TTI-specific breakdown is presented in Table 3.

These findings collectively underline the need for enhanced donor education, improved phlebotomy and storage practices, and robust pre-donation screening to reduce preventable blood wastage and improve transfusion service efficiency.

These details are presented in Table 1 below.

Table 1: Discard Rate of Whole Blood and Its Components

Component	Total Units Prepared	Units Discarded	Discard Rate (%)
Whole Blood (WB)	540	20	3.7
Packed Red Blood Cells	4,970	169	3.4
Fresh Frozen Plasma	4,921	63	1.28
Platelet Concentrates	733	355	48.4
Total	**9,321**	**607**	**6.5**

Table 2: Causes of Discard (N = 607)

Cause	No. of Units	Percentage (%)
Low Volume	386	63.6
TTI Positivity	148	24.3
Expired Units	61	10.0
Breakage during Centrifugation	12	2.1
Total	**607**	**100**

Table 3: Discard Due to TTI Positivity (N = 148)

TTI Marker	No. of Units	Percentage (%)
HIV	94	63.5%
HCV	28	18.9%
HBsAg	21	14.2%
VDRL	5	3.4%

Total	**148**	**100%**

Discussion

Blood transfusion is a critical, life-saving component of modern healthcare, particularly in tertiary care settings. However, its efficacy relies not only on availability but also on minimizing wastage and ensuring rational use. In the present study conducted at the Belagavi Institute of Medical Sciences, Karnataka, we evaluated the discard rate of blood and blood components as an essential quality indicator to improve transfusion services.

Out of 9,321 blood components prepared from 5,504 donations, 607 units were discarded, yielding an overall discard rate of 6.5%. This rate is comparable to discard rates reported by other tertiary care centers in India, such as Thakare et al. (2011) and Kumar et al. (2014), who reported discard rates between 4% and 8%. However, discard rates can vary depending on hospital policies, donor selection criteria, storage infrastructure, and regional TTI prevalence.

In our study, platelet concentrates had the highest discard rate (48.4%), which aligns with findings from Patil et al. (2016) and Bobde et al. (2015), where platelet units showed high wastage due to their short shelf life of 5 days and stringent storage conditions. The comparatively low discard rates for PRBCs (3.4%), FFP (1.28%), and WB (3.7%) highlight better storage stability and demand-supply balance for these components.

The most common cause of discard in our setting was low-volume collection (63.6%), often resulting from donor reactions or poor phlebotomy technique. Similar findings were noted by Morish et al. (2012), emphasizing the need for skilled staff training and better pre-donation screening to ensure adequate volume collection.

Seropositivity for transfusion-transmitted infections (TTIs) was the second most frequent reason for discard, accounting for 24.3% of discarded units. Notably, HIV seropositivity was the most prevalent (63.5% of TTI-reactive units), followed by HCV (18.9%) and HBsAg (14.2%). This trend diverges from several Indian studies, where HCV or HBV typically predominate among TTI discards. The high proportion of HIV-reactive units in our study may reflect regional epidemiological patterns or limitations in donor self-exclusion practices. Suresh et al. (2015) and Sharma et al. (2015) also emphasize the significance of robust donor education and strict adherence to deferral criteria to reduce such discards.

Other minor causes such as breakage during processing (2.1%) and expiry of components (10%) further highlight areas needing process optimization and improved inventory management. Avoiding expiry-related wastage, particularly of platelet units, requires better forecasting of demand and communication between the blood bank and clinical departments.

Our findings underscore the importance of regular audits, staff training, and implementation of standard operating procedures (SOPs) as per NACO and NBTC guidelines. Additionally, integration of blood bank software for tracking donor history and seropositivity, and improving coordination between hospital wards and the blood center, can further reduce wastage.

Conclusion

This study reported a 6.5% overall discard rate of blood and components, with platelet concentrates showing the highest wastage due to their limited shelf life. Major causes of discard included low-volume collection, transfusion-transmitted infections—primarily HIV—expiry, and breakage. These findings highlight the need for stricter donor screening, enhanced phlebotomy skills, and improved storage and inventory management. Regular audits, better coordination between clinical departments and the blood center, and adherence to national guidelines (NACO, WHO) are essential. Implementing corrective measures can significantly reduce preventable discards, ensure optimal use of resources, and improve the quality and safety of transfusion services

Financial Support and Sponsorship: Nil.
Conflicts of Interest: There are no conflicts of interest.

References

1. National AIDS Control Organization. An Action Plan for Blood Safety. Ministry of Health and Family Welfare, Government of India; 2007. Available from: https://naco.gov.in/sites/default/files/An%20Action%20Plan%20for%20blood%20safety_2.pdf
2. World Health Organization. Quality systems for blood safety: Introductory module guidelines and principles for safe blood transfusion practice. Geneva: WHO; 2002.
3. Morish M, Ayob Y, Naim N, Salman H, Muhamad NA, Yusoff NM, et al. Quality indicators for discarding blood in the national blood center, Kuala Lumpur. Asian J Transfus Sci. 2012;6(1):19–23.
4. Kumar A, Sharma S, Ingole NS, Gangane N. Analysis of reasons for discarding blood and blood components in a blood bank of a tertiary care hospital in central India: A prospective study. Int J Med Public Health. 2014;4(1):72–4.
5. Thakare MM, Dixit JV, Goel NK. Reasons for discarding blood from blood bank of government medical college, Aurangabad. Asian J Transfus Sci. 2011;5(1):59–60.
6. Patil P, Bhake A, Hiwale K. Analysis of discard of whole blood and its components with suggested possible strategies to reduce it. Int J Res Med Sci. 2016;4(2):477–81.
7. Bobde V, Parate S, Kumbhalkar D. Analysis of discard of whole blood and blood components in government hospital blood bank in central India. J Evid Based Med Healthc. 2015; 2(9):1215–9.
8. Suresh B, Sreedhar Babu KV, Arun R, Chandramouli P, Jothibai DS. Reasons for discarding whole blood and its components in a tertiary care teaching hospital blood bank in South India. J Clin Sci Res. 2015;4:213–9.
9. Sharma N, Kaushik S, Kumar R. Causes of wastage of blood and blood components: A retrospective analysis. IOSR J Dent Med Sci. 2015;13(2):59–61.
10. Ghaflez MB, Omeir KH, Far JM, Saki N, Maatoghi TJ, Naderpour M. Study of rate and causes of blood components discard among Ahwaz's hospitals. Sci J Iran Blood Transfus Organ. 2014; 11(3):197–206.
11. Deb P, Swarup D, Singh MM. Two corps blood supply unit, 56 APO audit of blood requisition. Med J Armed Forces India. 2001;57(1):35–8.
12. Armstrong B. Blood collection. ISBT Sci Series. 2008; 3(1):15–20.
13. Saxena S, Weiner JM, Rabinowitz A, Fridey J, Shulman IA, Carmel R. Transfusion practice in medical patients. Arch Intern Med. 1993;153(20):2575–80.
14. Kora SA, Kulkarni K. Blood wastage in a blood bank in an analysis of donor rural Karnataka. J Clin Diagn Res. 2011;5(7):1393–6.