ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 05 | May - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A RETROSPECTIVE STUDY OF ANALYSIS OF DISCARD RATES OF BLOOD AND BLOOD COMPONENTS AS A QUALITY INDICATOR TO IMPROVE THE TRANSFUSION SERVICES OF A TERTIARY CARE HOSPITAL IN NORTH KASHMIR, INDIA

Transfusion Medicine

Dr Saadat Nazir Shah* Department of Immunohematology & Transfusion Medicine, Government Medical College, Baramulla *Corresponding Author

Dr Saqib Yousuf Junior Resident, Department of Immunohematology & Transfusion Medicine, Government Medical College, Baramulla

Mr Masroor Mustafa Technical Supervisor, Department of Immunohematology & Transfusion Medicine, Government Medical College, Baramulla

Dr Rabiya Bashir Senior Resident, Government Medical College, Baramulla

Dr Roumissa Rahat Nabi Lone Senior Resident, Government Medical College, Baramulla

ABSTRACT

Blood transfusion is an essential element in modern healthcare. Blood being an irreplaceable resource needs to be properly utilized with ideally minimal wastage. **Aims and Objectives:** This study analyses the causes for discard of blood and its components. **Materials and Methods:** This is a retrospective study of various causes of discard of blood and blood components carried out in department of immunohematology and transfusion medicine Government Medical College, Baramulla over a period of one year from April 2023 to March 2024 **Results:** A total of 4059 blood units were collected during the study period of one year. Out of 4059 blood units collected, 405 units were whole blood (WB), 3654 components were packed red blood cells, 3654 were FFP and 541 platelet concentrates. Average discard rate of the present study was 7.1%. Discard rate for WB, PRBC, PC, FFP was 3.7%, 3.4%,73.9% and 1.28%, respectively. **Conclusion:** To minimize wastage of blood, there should be proper implementation of blood transfusion policies and coordination between hospital and blood centre staff. Strict adherence to donor selection and deferral criteria, taking proper predonation history and counseling, software to identify transfusion transmitted infection (TTI) positive donors, and deferring suspected professional donors who have been screened previously may help in reducing discard due to TTI positivity. Process improvements such as technical expertise in phlebotomy, prevent red blood cells (RBC) contamination during platelet and FFP preparation, precaution during thawing of FFP to prevent leakage. Self-regular audits, proper storage and handling of blood units, will help minimise the wastage of blood or its components.

KEYWORDS

Blood transfusion services, audit, discard rate.

INTRODUCTION

Human blood is an essential element of human life and there is no artificial substitute for blood that has been discovered yet. As its availability is limited, blood transfusion services (BTS) play a vital role in any national health service delivery system. Thus, the availability of safe and adequate blood saves lives and prevents the wastage of this valuable resource. Human blood is categorised as a "drug" under section 3(b) of the Drugs and Cosmetics Act 1940 in India [1]. Blood donation is one of the most noble gestures a human can make to save life. It has been estimated that every two seconds someone needs blood; [2] one-third of all patients admitted to intensive care units (ICUs) in the developed world receive a blood transfusion. [3] Each unit of blood is precious and need to be utilized properly with minimal wastage. The rate of discarded blood components or "wastage rate" is one of the 10 quality indicators recommended by the National Accreditation Board for Hospitals & Healthcare Providers (NABH), India [4, 5]. By analyzing the data and the reasons for discard, the blood transfusion services (BTS) can develop plans to improve performance through education and training of staff and introducing new measures to minimize the number of discarded blood to a reasonable rate. [6] This can help in formulating proper guidelines for donor screening, component preparation, and storage. Protocols for minimizing the wastage of blood and it's components should be made in each blood center to save human and financial resources.

Aim

To figure out the various causes of discarding blood and its components, so that the usage of blood can be optimized through proper education and training of the staff.

MATERIALS AND METHODS

The study was carried out in the department of immunohematology and transfusion medicine (blood centre) associated hospital Government Medical College, Baramulla, Jammu and Kashmir over a period of one year from April 2023 to March 2024.

All blood donors were screened as per guidelines of the National AIDS Control Organization (NACO) provided in national blood transfusion council (NBTC) and DGHS (Director General of Health and Services) under the Drugs and cosmetic act 1940. This study included the reasons of discard of whole blood (WB), packed red blood cells (PRBC), fresh frozen plasma (FFP), and platelet concentrate (PC). Data were retrieved from various registers like the donor register, discard register, transfusion-transmitted diseases (TTDs) register, and components preparation register. The rationale for discarding blood and its components was analysed.

The discard policy was followed as per the norms mentioned in standard operating procedures made by blood bank under NACO guidelines.

The components were prepared as per drugs and cosmetic act 1940 and rules 1945. Citrate-phosphate-dextrose- adenine(CPDA) anticoagulant blood bag was used for whole blood collection and saline-adenine glucose— mannitol (sag-m) additive solution was used as preservative in PRBC. All the blood and blood components were screened for TTI by Enzyme linked immunosorbent assay (Elisa).

How We Calculate Discard Rate;

- Discard rate = total number of blood or components discarded/total number of blood or components prepared × 100.
- Discard rate for TTI positive units = total number of blood or components discarded due to TTI positivity/total number of units collected (for WB) × 100.

RESULTS

A total of 4059 blood donations were collected of which 1383 (34.1%) were from replacement donors and 2676 (65.9%) were voluntary donors.

Out of 4059 blood units collected 405 were whole blood (WB), 3654 were packed red blood cells (PRBC), 3654 were fresh frozen plasma (FFP), and 541 platelet concentrate (PC) were prepared making a total of 8254 blood and blood components, of which 587 units of blood /blood components were discarded with an overall discard rate of 7.1%, as shown in Table-1 and Figure no 1.

Table:1- Discard Rate Of Whole Blood And Its Components

Blood components	Total units	Discarded	Discard rate%
WHOLE BLOOD	405	15	3.7%
PACKED RED CELLS	3654	125	3.4%
FRESH FROZEN PLASMA	3654	47	1.28%
PLATELET CONCENTRATES	541	400	73.9%
TOTAL	8254	587	7.1%

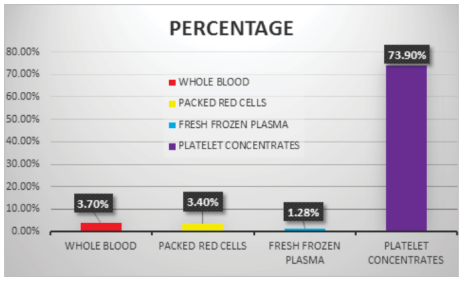

Fig No:1 Discard Rate Of Whole Blood And Its Components

Total discarded units – 587; overall average discard rate 587/8254×100 (7.1%). Discard rate for WB, PRC, FFP and Platelets were 3.7%, 3.4%, 1.28% and 73.9% respectively, as shown in Table-1.

Table:2- Causes of Discard

S.NO	Wastage causes	No. of units (N=)	Percentage (%)
1.	Expiry	14	10%
2.	Breakage during centrifugation	03	2.1%
3.	Seropositivity for transfusion-transmitted diseases	34	24.3%
4.	Low volume	89	63.6%
5.	Total	140	100%

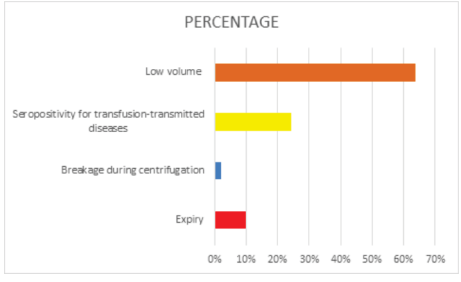

Fig No 2: Causes of Discard

Table: 3- Discard Rate Due To Transfusion Transmitted Diseases

Causes	No. of units discarded (N=)	Percentage (%)
HIV	01	2.94%
HBsAg	08	23.5%
HCV	24	70.62%
VDRL	01	2.94%

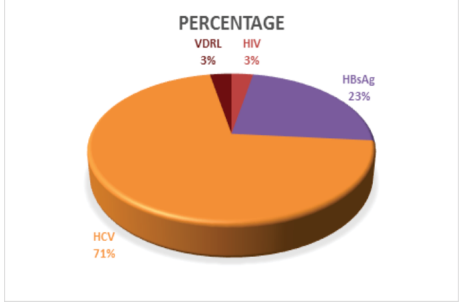

Figure-3: Discard Rate Due To Transfusion Transmitted Diseases

Out of the 140 total discarded units, the most common reason for discard of blood /blood components was non utilization due to low volume 63.6%(89/140), followed by TTI positive constituting 24.3% (34/140), expired 10%(14/140) and breakage 2.1% (03/140), as shown in Table-2 and figure- 2.

A total of 34 bags out of 140 were discarded due to seropositivity due to TTI constituting 70.62% with HCV(hepatitis C Virus) being highest in number, followed by hepatitis B Surface antigen (HBsAg) infection at 23.5%, as shown in Table-3. 2.94% reactive for human immunodeficiency virus (HIV) and 2.94% for VDRL(venereal disease research laboratory test).

DISCUSSION

Blood transfusion is an essential part of modern-day health care. The need for blood and blood components is presently increasing due to improved and accurate diagnosis of complex diseases requiring transfusion, emergence of newer treatment modalities, and due to increased number of aging population with increased blood needs.[7] Demand of blood and its components always out space its supply. This emphasizes the need for proper utilization of blood and its components with preferably minimal wastage. The self-audit of WB and blood components discarded over a period of time gives an idea about various reasons of discard. [8]

The present study showed that average 7.1% (140/8254) blood units were discarded. The average discard rate in the studies by Morish et al.,[9] Kora et al.,[10] Kumar et al.,[11] Thakare et al.,[12] Suresh et al.,[13] Patil et al.,[14] Bobde et al.,[15] Sharma et al.,[16] Ghaflez et al.,[17] and Deb et al.[18] were 2.3%, 4.3%, 8.4%, 3.6%, 7.0%, 22.45%, 6.63%, 8.69%, 12.0%, and 14.61%, respectively.

Discard rate for WB in the present study was 3.7 %(15/405) which is lower than quoted by Suresh et al. [13] (5.7%), Bobde et al. [15] (6.63%), and Sharma et al. [16] (4.46%). Discard rate for PRBC in the present study was 3.4% (125/3654) which was higher than quoted by Suresh et al.[13] (3.3%), Sharma et al.[16] (3.2%). The reason for the discard of PRBC's was low volume and Seropositivity of the donors.

The reason for 73.9% of platelet discard rate is due to short shelf life and nonutilization in time as demand cannot be predicted.

Average discard rate for FFP in the present study was 1.28% (47/3654) very much lower than Bobde et al.[15] (7.6%) and Sharma et al.[16] (6.2%). This shows the judicious use of FFP'S in our blood centre.

Quality of the product was essential element in blood transfusion service. In present study discard of the blood products was carried out as per the quality criteria laid down in National Accreditation Board for Hospitals and Healthcare Providers (NABH). In the present study discard rate due to less volume was 63.6%.Anticoagulant is a major factor in blood transfusion. Low volume collected units would be unsuitable for transfusion as well as component preparation. So the ratio between volume of blood collection and volume of anticoagulant in blood bag should be corrected.[19] We mostly used Citrate-Phosphate-Dextrose-Adenine (CPDA) anticoagulant blood bags which contain 14ml of anticoagulant solution per each 100ml of blood collection. The reason behind low volume collection of blood included discontinuation of donation because of donor reaction and the blood flow from small vein during phlebotomy. This can be reduced by selection of healthy donor with proper history taking, counselling of donors and a trained nurse as phlebotomist.

The improvement of blood transfusion services (BTS) is the need of hour.

CONCLUSION

Blood is a valuable irreplaceable resource therefore appropriate hospital specific transfusion protocol guidelines need to be laid down by the blood centre so that there is ideally minimal wastage. Common causes for discard of blood and blood components were Non utilization due to Date expiry, Seropositivity for TTI and other causes like hemolysis and less volume. As storage time remains the only quality indicator, a First- in- First- out (FIFO) inventory management approach with the oldest units in the front of the shelves is ideal. Self-regular internal audits, coordination between hospital and blood centre staff, proper storage and handling of blood units, strict donor selection and deferral criteria, will help minimize the wastage of blood and its components.

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

REFERENCES

1. An Action Plan for Blood Safety. National AIDS Control Organization, New Delhi,

India; 2007. http://naco.gov.in/sites/default/files An%20Action%20Plan%20for%20blood%20safety_2.pdf.
2. Blood transfusion safety. Available at URL: http://www.who.int/bloodsafety/en/Blood_Transfusion_Safety.pdf. Accessed on June 16,2015.
3. Saxena S, Weiner JM, Rabinowitz A, Fridey J, Shulman IA, Carmel R. Transfusion practice in medical patients. Arch Intern Med 1993;153:2575- 80.
4. Kumar A, Sharma S, Ingole NS, Gangane N: Analysis of reasons for discarding blood and blood components in a blood bank of tertiary care hospital in central India: a prospective study. Int J Med Pub Health. 2014, 4:72-4. 10.4103/2230-8598.127161.
5. Thakare MM, Dixit JV, Goel NK: Reasons for discarding blood from blood bank of government medical college,Aurangabad.AsianJTransfusSci.2011,5:59-60. 10.4103/0973-6247.76009.
6. 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;6:19-23.
7. 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;4:477-81.
8. World Health Organization. Quality systems for blood safety: Introductory module guidelines and principles for safe blood transfusion practice. Geneva: World Health Organization; 2002. p. 65-75.
9. 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;6:19-23.
10. Kora SA, Kulkarni K. Blood wastage in a blood bank in an analysis of donor rural Karnataka. J Clin Diagn Res 2011;5:1393-6.
11. Kumar A, Sharma SM, Ingole NS, Gangane N. Analysis of reasons for discarding blood and blood components in a blood bank of tertiary care hospital in central India: A prospective study. Int J Med Public Health 2014;4:72-4.
12. Thakare MM, Dixit JV, Goel NK. Reasons for discarding blood from blood bank of government medical college, Aurangabad. Asian J Transfus Sci 2011;5:59-60.
13. 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.
14. 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;4:477-81.
15. 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;2:1215-9.
16. Sharma N, Kaushik S, Kumar R. Causes of wastage of blood and blood components: A retrospective analysis. IOSR J Dent Med Sci 2015:13:59-61.
17. Ghaflez MB, Omeir KH, Far JM, Saki N, Maatoghi TJ, Naderpour M. Study of rate and causes of blood components discard among Ahwaz's hospital. Sci J Iran Blood Transfus Organ 2014;11:197-206.
18. Deb P, Swarup D, Singh MM. Two corps blood supply unit, 56 APO audit of blood requisition. Med J Armed Forces India 2001:57:35-8.
19. Armstrong B. Blood collection. ISBT Sci Series, 2008; 3: 123–36.