

An analytical study of discarded units of whole blood and its components in a blood bank at a tertiary-care hospital in Zalawad region of Saurashtra

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Abstract

Background: Many modern surgical procedures could not be carried out without the use of blood, and there is no alternative for human blood. Proper utilization and rationale use of blood are necessary in the blood bank, with minimal discarding of blood units.

Objective: To find out the most common reason of discard of blood units and do the steps accordingly to bring about minimal wastage of blood.

Materials and Methods: It is a study based on the analysis of discarded blood units during a period from January 2014 to September 2015 at a tertiary-care hospital blood bank in Zalawad region of Saurashtra.

Result: The total number of blood units collected during the study period was 15,084, of which 618 (4.09%) units were discarded owing to various reasons. Various reasons for the discard of the blood units from the most common to the least common were seropositivity for transfusion transmitted infections (s) ($n = 242$, 39.14%); fail tap ($n = 168$, 27.18%); expiry of blood units because of nonutilization ($n = 99$, 16.01%); other reasons ($n = 88$, 14.23%), which include hemolysis, lipemic serum, and clot formation; and rupture and leakage ($n = 21$, 3.39%).


Conclusion: The majority of the blood donors are voluntary and male subjects. Both among male and female donors, a larger proportion of the blood donors are from the younger age groups. The most common cause of discarded blood units was owing to TTIs, the majority being hepatitis B. Proper screening of blood donors, appointing expert phlebotomist, and proper transfusion management policy of issuing blood units in blood bank decrease the volume of discard, as discarded blood bags are harmful to the blood bank financially and socially.

KEY WORDS: Analysis, blood bags, discard

Introduction

Blood transfusion is an important constituent of health-care delivery system. Millions of lives are saved every year

in regular and urgent situations for medical and surgical indications by the accessibility of safe blood transfusion services. It also significantly improves the life expectancy and quality of life of patients with a variety of acute and chronic conditions.^[1] Extension in life expectancy and improvements in medical technology require more and more supply of safe blood for efficient health-care delivery. Human blood has no complete substitute till date.^[2,3] To deal with the necessity and supply of blood and blood components, more strict measures should be accessible and pursued for the right utilization of this insufficient reserve.^[4] Along with this, a protocol for minimizing the discard of blood should be formed to save energy and human and financial resources in the developing countries. Excessive

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and inappropriate use of blood products poses a burden on transfusion services. Similarly, with a proper coordination between clinicians and blood bank staff, wastage owing to expiry of blood can be minimized.^[5]

By analyzing the data and the reason for the discard, the blood transfusion services can develop plans to improve performance through education and training of staff and introduce new measures in order to minimize the number of discarded blood to a reasonable rate.^[6]

The aim of this study was to find out the reasons for discarding blood bags so that they could be utilized judiciously with minimal wasting.

Materials and Methods

This analytical study was conducted at the blood bank of a tertiary-care hospital in Zalawad region of Saurashtra over a period of 21 months from January 1, 2014, to September 30, 2015.

The inclusion criteria were all the blood donations fulfilling the World Health Organization criteria for donor selection that were collected by blood bank during the study period. The two types of donation are voluntary and replacement. Relatives or friends of patients were considered as replacement donors.

Data Analysis

We analyzed the total blood donation in the form of type of donor (whether voluntary or replacement) and in the form of sex (whether male or female). The reasons of blood units discarded include fail tap; seropositivity; leakage during handling of bags; expired because of nonutilization; and other reasons such as hemolysis, grossly lipemic serum, and clot formation.

Result

The total number of blood donations in the blood bank during the study period was 15,084 units, of which 13,324 (88.33%) were voluntary and 1,760 (11.67%) replacement donors [Table 1].

Among the total donors in blood banks, 14,797 (98.09%) were male and 287 (1.90%) female donors [Table 2].

The total blood units collected during the study period were 15,084 in number, among which, the total number of discarded blood units was 618 (4.09%). Of the 618 blood units, 242 (39.14%) were discarded because of seropositivity for transfusion transmitted infections (TTIs). Among the infectious diseases, hepatitis B infection ($n = 128$, 20.71%) was the most common cause for discarding, followed by human immunodeficiency virus (HIV) ($n = 14$, 2.26%), and hepatitis C virus (HCV) ($n = 4$, 0.64%). After seropositivity for TTIs, fail tap ($n = 168$, 27.18%) was the second most common cause of discarding blood units. Venereal Disease Research Laboratory (VDRL) reactivity ($n = 96$, 15.53%), expired because of nonutilization of blood units ($n = 99$, 16.01%), and rupture and leakage ($n = 21$, 3.39%) were also the causes for discarding

Table 1: Distribution of donors based on type of donation

Total	Voluntary, N (%)	Replacement, N (%)
15,084	13,324 (88.33)	1,760 (11.67)

Table 2: Gender-wise distribution of the blood donors

Total	Male, N (%)	Female, N (%)
15,084	14,797 (98.10)	287 (1.90)

blood units. Blood units were discarded because of some other reasons ($n = 88$, 14.23%), which include hemolysis, therapeutic phlebotomy, clot formation, etc.

The analysis of donor and discarded units of the year 2014–2015 is shown in Table 3.

The analyses of discarded blood units of the years 2014 and 2015 are shown in Tables 4 and 5, respectively.

Discussion

In this study, the total blood bags discarded were 4.09% that is nearer to that reported by Thakare *et al.*,^[7] which was 3.58% of the total collection, and the main reason for discarding these blood bags was the positivity for different TTIs (68.86%), followed by other reasons (31.13%). Among the units discarded, 49.82% were positive for hepatitis B surface antigen (HBsAg), 10% for HIV, and 8.97% for HCV, while no unit was positive for VDRL reactivity. One such study was done at Choithram Hospital and Research Center, Indore, India, by Chitnis *et al.*,^[8] in which, approximately, 8.9%–10% of blood bags were discarded because of seropositivity. In this study, it was 39.10% of total discarded units, which reflect proper screening of donor is a key factor to avoid wastage. A study done by Kumar *et al.*^[9] reported it to be 74.30%, which was higher when compared with this study (39.14%).

In this study, the second most common cause of discarding blood units was the fail tap, constituting 27.18% of total discarded units. The study done by Bobde *et al.*^[10] showed fail tap to be the main reason for discard. It reflects that a skillful phlebotomist is essential to decrease the volume of wastage. However, in a teaching hospital, less quantity bags are mostly owing to unskillful personnel involved in phlebotomy and acute donor reactions such as uneasiness during donation found in this study.

Another important reason for discarded blood units was expiry because of nonutilization of unit. It was also the second most common cause of discarding blood units in the study by Kumar *et al.*^[9] Certain protocols can reduce the rate of expiry of blood units such as not to bleed the Rh negative and rare blood groups, as their requirement is less; management has to be done in order to arrange the blood units of near expiry when informed; and maintenance of proper inventory management in blood bank.

Platelets were the main units expired, owing to the short shelf life (5 days) in our setup. Saluja *et al.*,^[11] in their study, noted that 20.83% platelets was discarded owing to nonutilization within expiry period of shelf life of 3 days. The most

Table 3: Total no. of discarded blood units in voluntary and replacement donors

Year	Voluntary donor, N (%)	Replacement donor, N (%)	Discarded, N (%)
2014 (Jan to Dec)	7,816 (58.66)	1,172 (66.59)	293 (47.41)
2015 (Jan to Sep)	5,508 (41.33)	588 (33.40)	325 (52.58)
Total	13,324	1,760	618

Table 4: Analysis of discarded blood units in the year of 2014

Month	HIV	HbsAg	HCV	VDRL	Expired	Fail tap	Rupture	Others	Total
Jan	1	3	0	4	1	5	0	9	23
Feb	1	8	0	6	4	4	0	3	26
Mar	2	9	0	7	1	9	0	1	29
Apr	0	6	0	8	2	6	0	3	25
May	1	8	0	4	0	7	0	4	24
June	0	8	1	5	4	4	0	2	24
July	0	5	0	5	1	2	0	4	17
Aug	1	7	0	7	1	4	0	5	25
Sep	2	6	0	7	1	7	0	1	24
Oct	0	6	0	3	4	2	0	3	18
Nov	0	9	1	5	3	9	0	2	29
Dec	0	6	1	1	4	10	0	7	29
Total	8	81	3	62	26	69	0	44	293

Table 5: Analysis of discarded blood units in the year of 2015

Month	HIV	HbsAg	HCV	VDRL	Expired	Fail tap	Rupture	Others	Total
Jan	2	1	0	8	12	6	0	5	34
Feb	1	2	0	2	6	7	0	2	20
Mar	1	4	0	3	7	9	0	10	34
Apr	0	13	0	2	2	8	0	10	35
May	0	4	0	3	8	9	0	3	27
June	1	6	1	2	12	16	7	0	45
July	0	6	0	3	3	11	1	6	30
Aug	1	8	0	7	11	28	6	4	65
Sep	0	3	0	4	12	5	7	4	35
Total	6	47	1	34	73	99	21	44	325

common cause of platelet discard was date expiry, followed by other reasons such as red blood cell (RBC) contamination and leakage. RBC contamination of platelet concentrate was the main cause in the study done by Morish *et al.*^[12] owing to human factor. The mean platelet discard rate varied between 6.7% and 25% during the year 2000–2002 in 17 blood centers in 10 European countries in a study done by Veihola *et al.*^[13] So, steps have to be taken for exclusive platelet transfusion instead of fresh whole blood in Zalawad region.

Each hospital must have a transfusion committee to observe the activity of blood bank and take regular audit regarding transfusion of blood and its components to reduce blood wastage and promote rationale use of blood.^[14,15]

Conclusion

By doing a comparison of our study with other studies, it was observed that lesser numbers of blood bags were discarded. In our study, the most common reason for discarding blood units was fail tap, followed by seropositivity. Among the blood components, platelets and fresh frozen plasma is the common component to discard because of expiry and leakage, respectively.

Not to bleed the rare blood group, proper screening of donors, appointing expert phlebotomist, and properly implemented blood transfusion policies will help in discarding less number of bags owing to seropositivity, fail tap, and expiration.

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