Original Article

Analysis of reasons for discarding blood and blood components in a blood bank of tertiary care hospital in central India: A prospective study

Abstract

Background: Many modern surgical procedures could not be carried out without the use of blood. There are no substitutes for human blood. Thus, proper utilization of blood is necessary with minimal wasting. **Materials and Methods:** A total of 10,582 donors donated blood during the study period of 19 months in blood bank of a tertiary care hospital, central India from 1st of November 2009 to 31st May 2011, which were screened. **Results:** A total of 346 whole blood bags were discarded. Out of these 346 blood bags, 257 (74.30%) were discarded because of seropositivity for transfusion transmissible infectious diseases. A total of 542 blood components were discarded against 3702 blood components prepared during the study period. Among blood components discarded, most common units were platelets. The most common cause of discarding the blood components was expiry of date due to non-utilization (87.00%). **Conclusion:** A properly conducted donor interview, notification of permanently deferred donors will help in discarding less number of bags from collected units. Similarly, properly implemented blood transfusion policies will also help in discarding less number of blood bags due to expiry. These discarded bags, because they are unutilized are both financially as well as socially harmful to the blood bank.

Key words: Blood bags, discard, expired blood and blood components

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Access this article online

Website: www.ijmedph.org

DOI: 10.4103/2230-8598.127161

Quick response code:

INTRODUCTION

Today, many modern surgical procedures could not be carried out without the use of blood and there is no substitutes for human blood.[1,2] It has been estimated that one-third of all patients admitted to intensive care units in the developed world receive a blood transfusion.[3] So each unit of blood is precious and utilized judiciously with minimal wasting. By analyzing the data and the reason for the discards, the blood transfusion services can develop plans to improve performance through education and training of staff and introducing new measures in order to minimize the number of discarded blood to a reasonable rate.[4] 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

Study design

The study was carried out in the blood bank of a tertiary care hospital in central India over a period of 19 months from 1st of November 2009 to 31st May 2011.

Type of study

It was a prospective study.

Inclusion criteria

Blood donors, fulfilling World Health Organization criteria for donor selection, were included in this study after medical history, brief clinical examination by the medical officer. The donors were either voluntary or replacement. Replacement donors were either relatives or friends of the patients.

Data analysis

Blood bags included during this period, were screened for transfusion transmissible infections (TTIs). The blood bags, which were seroreactive (seropositive) were discarded. The blood bags, which were expired because of non-utilization, were discarded. Less amount of blood collected from the donors because of any reasons, including donor's reactions was discarded. Blood showing any changes of either hemolysis or turbidity were also discarded.

RESULTS

Among total donors in the blood bank, 97.05% were male and 2.95% were female. Almost 78% were voluntary donors and 22% were replacement donors. Among voluntary donors 96.24% were male and 3.76% were female donors as shown in Table 1.

Out of total 10,582 blood bags which were collected from donors during the study period, 346 (3.25%) of whole blood bags were discarded. Out of these 346 bags, approximately 74.30% were discarded because of seropositivity for TTIs. Among infectious diseases, hepatitis B infection was the most common cause for discarding as shown in [Table 2].

Amongst whole blood bags discarded, seropositivity for TTIs were the most common cause followed by expiry of date due to non-utilization (11.84%), others cause include yellowish discoloration of plasma, signs of hemolysis noted in blood bags, issued blood bags to the patients but not used as shown in Table 3.

A total of 542 blood components were discarded against 3702 blood components prepared during the study period. The most common blood components were discarded were platelets followed by fresh frozen plasma (FFP)-as mentioned in Table 4.

A total of 542 blood components were discarded in which the most common cause was expiry of blood components, constituted 87.00% followed by seropositive for transfusion transmitted diseases, constituted 8.00% as shown in Table 5.

Table 1: Source of blood bags as per sex and type of donors

Types of donors	Male (%)	Female (%)	Total donors (%)
Voluntary donors	7922 (96.24)	310 (3.76)	8232 (77.79)
Replacement donors	2347 (99.9)	03 (0.10)	2350 (22.21)
Total	10269 (97.05)	313 (2.95)	10582 (100)

Table 2: Analysis of discarded whole blood bags (due to seroreactive cases)

Total discarded (%)	HIV (%)	HBs Ag (%)	HCV (%)	VDRL (%)
257 (100)	51 (19.84)	179 (69.64)	21 (8.18)	6 (2.34)

HIV = Human immunodeficiency virus, HBs Ag = Hepatitis B surface antigen; HCV = Hepatitis C virus, VDRL = Venereal Disease Research Laboratory

Table 3: Analysis of discarded blood bags (whole blood)

Total discarded bags (%)	Seropositive (%)	Date expired (%)	Less volume (%)	Others (%)
346 (100)	257 (74.30)	41 (11.84)	18 (5.20)	30 (8.66)

Table 4: Analysis of discarded units of blood components against total prepared components

Blood components	No. of blood components prepared	No. of units discarded	Discarded rate (%)
Packed red cells	1296	36	2.78
Platelets	1110	412	37.11
Fresh frozen plasma	1296	94	7.25
Total	3702	542	14.64

Table 5: Analysis of reasons for discarding blood components

Blood components	Reasons for discarding blood components		
	Expired	Leakage	Seropositive for TTIs
Platelets	401	–	11
Packed red cells	20	–	16
Fresh frozen plasma	51	27	16
Total (542)	472	27	43

TTIs = Transfusion transmissible infections

DISCUSSION

In a study done by Thakare *et al.*[5] it was observed that 3.58% of blood bags were discarded. The main reason of the discarding these blood bags was the positivity for different transmissible diseases (TTIs) constituting 68.86% followed by other reasons (31.13%). Among the units discarded, 49.82% were positive for hepatitis B surface antigen (HBs Ag), 10% for human immunodeficiency virus (HIV) and 8.97% for hepatitis C virus (HCV) while no unit was positive for Venereal Disease Research Laboratory.

In a study done by Deb *et al.*[6] it was observed that an average 292 (14.61%) bags from the total collection were discarded. Of the 292 units discarded, 242 units were due to non-utilization.

In another study done at Choithram Hospital and Research Center, Indore, India by Chitnis *et al.*[7] it was observed that approximately (8.9-10%) of blood bags were discarded (approximately 80 blood bags were discarded monthly against a total of 800-900 units collection) as reactive for HIV/HBs Ag/HCV or contamination/ reactions to recipients and expired units.

In a study done by Gauravi *et al.*[8] in Saurashtra region of Gujarat, it was found that in 2008, 226 blood bags were discarded against 7882 blood bags collected due to seropositive for TTIs diseases. In 2009, 178 blood bags were discarded due to seropositive for infectious diseases against total 8141 blood bags collected and in 2010, 212 blood bags were discarded against 9441 blood bags collected due to seropositive for TTIs diseases.

In a study done by Morish *et al.*[4] in National blood center, Kuala Lumpur, a total of 390,634 whole blood and blood components units were prepared in 2007 in National Blood Center. Of these 8968 (2.3%) units were discarded. Platelet concentrate scored the highest at 6% when compared with the other blood components. The discarded rates of whole blood and packed red blood cells (RBCs) were 3.7% and 0.6%, respectively. The reasons behind the discard of whole blood can be attributed to procedures carried out during the collection process. The leakage was the second cause of discarded blood and its components, which represented 26% of discarded blood. The frozen blood components that consist of 43% and 27% of discarded FFP and cryoprecipitate, respectively, were due to the leakage. 25% (2208) of discarded blood were wasted because of gross lipemic blood components.

A large-scale study conducted in 17 blood centers in 10 European countries from 2000 to 2002 reported that the mean platelet discard rates for the 3 years were between 6.7% and 25%. However, the annual mean discard rates from 2000 to 2004 remains at 13%. The discarded platelets included all platelet units, which were damaged during processing regardless of the preparation method as well as those that expired.[9]

In the same European centers, the mean for packed RBC discard rate was 4.5%, varying annually from 0.2% to 7.7%.[10]

The current study showed that the FFP and RBC discard rates were comparable with the Novis *et al.* study in USA, which reported that the discard rates of FFP ranged from 2% to 2.5% and RBC ranged from 0.1% to 0.7% in 1639 hospitals.[9,11]

CONCLUSION

As compared with these studies, it was observed that lesser number of blood bags was discarded in our blood bank. It was mostly because of positivity for different transmissible diseases (TTIs). Among blood components discarded, most commonly units were platelets. The most common cause of discarding the blood components was expiry of date due to non-utilization.

A properly conducted donor interview, notification of permanently deferred donors will help in discarding less number of bags from collected units.

Similarly, properly implemented blood transfusion policies will also help in discarding less number of blood bags due to expiry. These discarded bags, because they are unutilized are both financially as well as socially harmful to the blood bank.

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How to cite this article: 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.

Source of Support: Nil, **Conflict of Interest:** None declared.