

Wastage of Blood Component at Rural Blood Center of India

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ABSTRACT

Introduction: Blood component wastage is an important issue reported in hospital. The discard rate of blood component is one of the essential elements of quality management system. This study was designed to evaluate rate of blood and blood component wastages at Rural Blood Center of India.

Material and methods: The study of analysis of waste (blood product) data was carried out retrospectively from Jan2018 to Dec 2021 at the newly hospital based rural blood center. Blood product discarded in the pre lockdown and lockdown phases were collected from documented registers. The reasons for PRBC discard analysed.

Result: In the study a total of 4273 blood bags were collected in the study period of 4 year, of which 3987(93.30%) donors were males and 286(6.69%) were females. Out of 4273 blood units collected, 410 were whole blood (WB), of the remaining blood units following components such as 1490 packed red blood cells (PRBC), 1356 fresh frozen plasma (FFP) and 1017 platelet concentrate (PC) were prepared. The overall most common reason for utilization of blood and components was anemia and least common was Sickle cell anaemia. In the year 2018, 1606 bags were collected, total discard rate was 2.9%, in the year 2019 1005 bags were collected and discard rate was 6.4%. In the year 2020, 884 bags were collected, total discard rate was 13.3% and in the year 2021, 778 bags were collected discard rate was 10.7%. Maximum discard rate was in the year 2020.

Conclusion: There is need to closely monitor the blood product inventory and demand throughout COVID -19 pandemic. Wastages of PRBC can be reduced by implementing sharing net-work. The current study reflects high rate of discard progressively indicating non-utilization of single unit of blood components for non-emergency patients.

Keywords: Wastage of Blood Component, PRBC, Blood Transfusion Service

INTRODUCTION

The blood center collects safe blood from eligible, voluntary, nonremunerated healthy donors. The blood units are carried and stored properly following the standard norms and regulations laid down by the Government of India.¹ To overcome the demand and supply, each unit of blood is to be considered precious and should be used judiciously to avoid wastage.² Wastages of blood can occur by many reasons mainly expiry of blood components, leakage or breakdown, red cell contamination, and seropositivity for transfusion transmitted infections.³ The Packed red blood cells (PRBC), with additive solutions, have a shelf life of 42 days. Transfusion of PRBC is useful in chronic symptomatic anemia and conditions of sever blood loss. Wastages due to non-utilization of different blood components mainly PRBC

is a serious issue. Other studies show infectious cause (TTI) to discard.⁴ Blood transfusion service can develop a plan to avoid the wastage of blood through proper education and by training of the blood center staffs. This can be done properly by analyzing the data as well as reasons for blood discard and thus finally having measures to minimize the number of discarded blood to a lower rate. Every blood center should formulate the guidelines for donor selection in a proper way, proper storage, etc., to protect financial and human resources.² This present study was designed to evaluate the reasons of blood units discard as well as the steps to be taken to maintain the numbers of discard.

MATERIAL AND METHODS

A retrospective cross sectional study was conducted at rural Blood center. The data studied from Jan2018 to Dec 2021, was 1 year precovid era and 3 years pandemic phase. Before the commencement of the study ethical approval was taken from the ethical committee of the institute. Data was obtained from discard register and and monthly report during the period of total 3 years and analysed. The usage and wastage of blood components data was collected and scrutinized. It involved analysis of various factors responsible for discarding of blood and blood components. This study included the discarding of blood and PRBC due to mainly outdated PRBC (expired unit), transfusion-transmissible infections (TTI) as well as insufficient quantity (IQ). The discard rate year-wise was calculated using the following formula^{5,6}:

$(\text{Total number of WB discarded} / \text{Total number of blood units collected}) \times 100$

Moreover, the discard of the Blood component was observed more due to expired PRBC, and the discard rate for expired PRBC unit was calculated as:^{5,6}

$(\text{Total number of PRBC discarded due to expiry} / \text{Total number of blood units collected}) \times 100$

In this study calculation of discard of FFP and Platelet concentrate (PC) not included. Demand of FFP by clinician was less so it is handed over at time. PC was prepared as per demand because of its shelf-life is 5days only.

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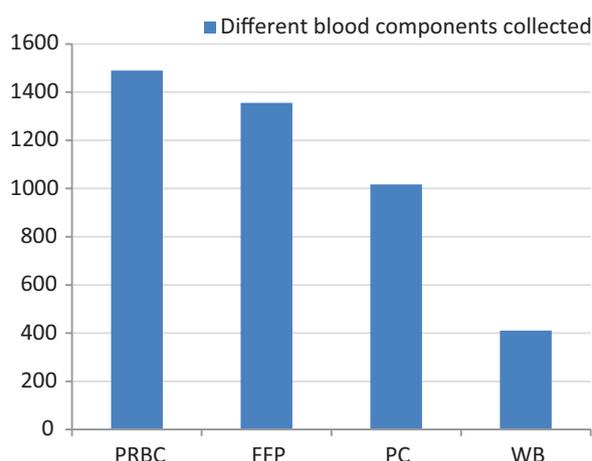
The data was gathered and the collected data were then analyzed using descriptive statistical methods and SPSS 11.5.

RESULTS

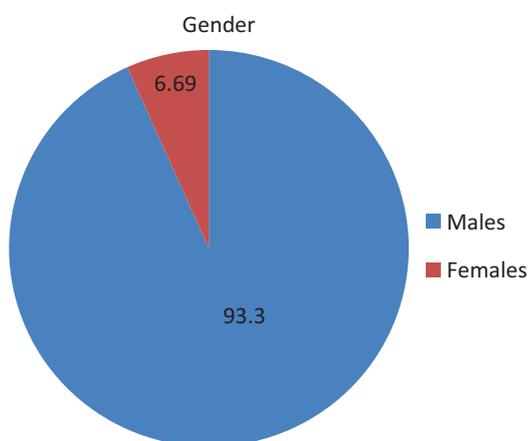
In the study a total of 4273 blood bags were collected in the study period of 4 year, of which 3987(93.30%) donors were males and 286(6.69%) were females.

Out of 4273 blood units collected, 410 were whole blood (WB), of the remaining blood units following components such as 1490 packed red blood cells (PRBC), 1356 fresh frozen plasma (FFP) and 1017 platelet concentrate (PC) were prepared.

The overall most common reason for utilization of blood and components was anemia and least common was Sickle cell



Graph-1: Different blood components collected



Pie chart-1: Gender wise distribution blood collection

Reasons of usage	Total
Anaemia	1380
Accident	120
Thalasemia	80
Thrombocytopenia	349
Dialysis	340
Surgery	334
Cancer	480
Bleeding	85
Sickle cell anaemia	15
Hepatitis	85
Rta	450
Not recorded	45
Others	510
Total	4273

Table-1: Reasons for utilization of blood components.

anaemia.

In the year 2018, 1606 bags were collected, total discard rate was 2.9%, in the year 2019 1005 bags were collected and discard rate was 6.4%. In the year 2020, 884 bags were collected, total discard rate was 13.3% and in the year 2021, 778 bags were collected discard rate was 10.7%. Maximum discard rate was in the year 2020.

DISCUSSION

Blood transfusion is an essential element of modern-day health-care system. Blood collection is most important and essential function of BTS. Blood component therapy has facilitated optimum role in BTSs. By this means, optimal use of every blood donation can be managed. At the same time, need for blood and its component is presently increasing due to improved and accurate diagnosis of complex diseases and various transplantation procedures requiring transfusion. Proper blood inventory management in blood bank can be managed by reduction in unnecessary wastage of blood and its components.⁷

In the study a total of 4273 blood bags were collected in the study period of 4 year, of which 3987(93.30%) donors were males and 286(6.69%) were females. Out of 4273 blood units collected, 410 were whole blood (WB), of the remaining blood units following components such as 1490 packed red blood cells (PRBC), 1356 fresh frozen plasma (FFP) and 1017 platelet concentrate (PC) were prepared. In the year 2018, 1606 bags were collected, total discard rate was 2.9%, in the year 2019 1005 bags were collected and discard rate was 6.4%. In the year 2020, 884 bags were collected, total discard rate was 13.3% and in the year 2021,

Year	Total collection	Discard of Blood and PRBC				Total Discard	% Discard Rate
		Expired reason	TTI	IQ	Other		
2018	1606	26	13	03	04	46	2.9%
2019	1005	49	07	07	01	64	6.4%
2020	884	85	05	12	16	118	13.3%
2021	778	66	08	08	01	83	10.7%
Total	4273	226	33	30	22	311	7.27%

Table-2: The year-wise discard of total PRBC due to Expiry, Transfusion Transmissible Infection (TTI) and Insufficient quantity (IQ).

778 bags were collected discard rate was 10.7%. Maximum discard rate was in the year 2020.

In present study, predominance of male donors was noted compared to female donors, which was comparable to other studies.^{8,9}

Highest issued blood component noted in present study was FFP followed by PRBC, PC and WB. Similar observation was made by Ambroise MM et al.¹⁰

The discard rate for whole blood quoted by Suresh *et al.*¹¹ was 5.7%, Bobde *et al.*¹² was 6.63%, and Sharma *et al.*¹³ was 4.46%. All the three units were discarded due to expiry. The study done by Jariwala *et al.*¹⁴ and Kurup *et al.* (87.7%–96.6%)¹⁵, who showed outdated to be the most common cause of discarding.

Arora *et al* showed TTI positivity was the reason for discarding which is 14.8%.¹⁶

Goel NM et al aim to find out reasons of utilization of different blood component and main causes for discarding whole blood or components. Total 3584 blood bags were collected, of which 3304 components were prepared. Packed red blood cells (PRBC) and fresh frozen plasma (FFP) were most frequently collected blood component. Highest issued blood component was FFP (40%) followed by PRBC (36%), platelet concentrate (PC) (17%) and whole blood (WB) (7%). Most common reason for issue of WB and all blood components was found to be anemia (39.15%). while for PC it was thrombocytopenia. Overall discard rate of blood/blood components was 15.9%. Most common component discarded was PC with average discard rate of 37.3%. Expiry was the most common reason for discard of overall all components while for FFP, it was leakage.¹⁷

CONCLUSION

Covid -19 showed negative impact on blood transfusion services. We need to plan small and consistent flow of donors rather than being dependent on donation camps. Wastage of blood and blood product mainly Packed cell component can be reduced by implementing sharing network. The current study showed high rate of PRBC waste due to expiry date during lockdown phases. Awareness about ‘Single unit’ of blood for non-emergency patients is emphasised.

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