

ANALYSIS OF DISCARD OF WHOLE BLOOD AND BLOOD COMPONENTS IN GOVERNMENT HOSPITAL BLOOD BANK IN CENTRAL INDIA

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ABSTRACT: BACKGROUND: Transfusion requests are always more than the supply due to advances in health care delivery. Injudicious use of whole blood and blood components strains the transfusion services. This mandates the proper analysis of real need of transfusion and the discard of this scarce resource. **MATERIALS & METHODS:** Total 31143 voluntary and replacement donors donated blood during January 2012 to December 2014 in blood bank of tertiary care Government hospital in Central India. The donors record, transfusion transmitted infections (TTI) testing record, component preparation record & discard record during the same period were screened for analysis. **RESULT:** Out of total 31143 blood collection during study period TTI positive blood were 377 (1.21%) comprising of 13.4% of total discarded blood bags. Components prepared 19545 and discarded 1610 (8.2%). Among components discarded most common units were platelets due to date expiry followed by FFP discarded due to leakage of bag. **CONCLUSION:** Analysis of reasons of discard of whole blood and blood components helps in forming policies to reduce the gap between demand and supply at local as well as national level. **KEYWORDS:** Whole blood, blood components, discard.

INTRODUCTION: Blood transfusion is essential part of modern health care.¹ Increase in life expectancy and advances in medical technology demand more and more provision of safe blood for efficient health care delivery. Human blood has no complete substitute till date.^{2,3} To tackle with the demand and supply of blood and blood components more stringent criteria should be available and followed for proper utilization of this limited resource.⁴ Along with this protocol for minimizing discard of blood should be formed to save energy, human and financial resources in developing countries.⁵ Excessive and inappropriate use of blood products poses a burden on transfusion services. Similarly with proper coordination between clinicians and blood bank staff wastage due to expiry of blood can be minimized.⁵

The present study was designed to analyze the reason for the discard of whole blood and blood components [packed RBC (PRC), Fresh Frozen Plasma (FFP), Platelet concentrate] in a government hospital blood bank in central India.

It may provide insight into various strategies that can be formed for optimum use of blood and reduction of wastage. Preparation of components is also not optimum in resource poor setting in developing countries. This again emphasizes on proper use of available infrastructure, manpower and reduction of wastage.

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The efficiency of blood transfusion services can be increased through the implementation of the quality management system in all phases of the collection, processing and storage of the blood.⁶

MATERIALS & METHODS: A retrospective study of discard of blood & blood components was done from January 2012 to December 2014 using records available in Model blood bank, Government Medical College, Nagpur. The data analysis from donor record, TTI testing record, component preparation record and discard record were taken into consideration.

Blood donations were taken from voluntary and replacement donors according to the selection criteria defined by WHO.⁷

Blood components packed RBC (PRC), Fresh Frozen Plasma (FFP), Platelet concentrate were prepared from the 450ml blood bags under all aseptic precautions according to FDA guidelines as per demand and as per manpower available.⁷ As there is manpower scarcity in our setup preparation of blood components was not possible on voluntary blood donation camp days. The blood bags were discarded according to standard operating procedures laid down by the local authority and according to the NACO guidelines. The TTI positive blood bags (HIV, HBV, HCV, syphilis, malaria) were autoclaved and then sent for incineration.⁷

The outdated, less quantity or over weight blood bags, blood bags showing signs of hemolysis, clotting, turbidity, leakage were also discarded.^{6,8}

Rate of discard - The rate of discard is derived when the number of whole blood, packed RBC (PRC), platelets, Fresh Frozen Plasma (FFP) is divided by the number of whole blood, PRC, Platelet, FFP prepared respectively multiplied by 100.^{6,9}

RESULT: It was observed that total 31143 blood bags collected during the study period from both voluntary and replacement donors from males 29125 and 2018 females.

Year	Voluntary	Replacement	Male	Female	Total
2012	6291	3759	9361	689	10050
2013	5884	4186	9512	558	10070
2014	6613	4410	10252	771	11023
Total	18788 (60.3%)	12355 (39.7%)	29125 (93.5%)	2018 (6.5%)	31143

Table 1: Total blood collection

Sero positive donors were 377 (1.21%). 1 donor was positive for both HBV & HCV

Year	HIV	HBC	HCV	Syphilis	Malaria	Total
2012	26	87	7	0	0	120
2013	30	113	9	0	0	152
2014	14	87	5	0	0	106
Total	70	287	21	0	0	378

Table 2: TTI positive blood bags

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Out of total 31143 donations, 8232 blood bags were subjected for components preparation. Total components prepared were 19545 thus 42456 total blood bags were available on inventory. Total 2815 (6.6%) blood bags were discarded during study period.

Year		Whole blood	PRC	FFP	Platelet Concentrate	Total
2012	Components prepared	7070	2980	2980	830	13860
	Discarded	445	46	218	172	881
2013	Components prepared	7659	2411	2411	976	13457
	Discarded	415	77	172	370	1034
2014	Components prepared	8182	2841	2841	1275	15139
	Discarded	345	48	241	266	900
Total	Components prepared	22911	8232	8232	3081	42456
	Discarded	1205	171	631	808	2815
	Rate of discard	5.2%	2%	7.6%	26.2%	

Table 3: Components prepared and discarded blood bags out of total available blood bags on inventory

Various reasons for discard of whole blood & blood components were noted.

Year	Whole blood discard	Seropositive for TTI	date expiry	Less quantity	Leakage	Hemolysed	Clotted
2012	445	88	37	268	49	1	2
2013	415	118	115	147	27	8	0
2014	345	84	66	164	24	7	0
Total	1205	290	218	579	100	16	2

Table 4: Whole blood discard

Components	Date Expiry	Leakages	Seropositive	Hemolysed/RBC Contamination	Total
Platelets	761 (94)	7 (0.9)	33 (4)	7 (0.9)	808
PRC	67 (39)	11 (6.4)	92 (54)	1 (0.6)	171
FFP	1 (0.16)	538 (85.26)	92(14.6)	0	631
Total	829 (51.4)	556 (34.5)	217 (19.5)	8 (0.5)	1610

Table 5: Component discard

Figures in brackets indicate percentage discard out of that respective component discarded.

DISCUSSION: Self audit of whole blood and blood components discarded over a period of time gives an idea about various reasons of discards. It suggests alterations and corrections to be done to reduce it. Present study showed that average 6.6% of blood bags were discarded which comprised of rate of discard of whole blood 5.2%, PRC 2%, FFP 7.6% & Platelets 26.2% due to various reasons. Rate of discard of whole blood (5.2%) was higher than quoted by Morish M (3.7% who excluded TTI sero positive cases),⁶ Nikita Sharma (4.46%),⁴ Minal Thakare (3.58%)¹⁰ and A Kumar (3.25%).¹¹ Main reasons for discard of whole blood bags were due to less quantity followed by TTI seropositive, date expiry, leakage, hemolysed and clotted. In a teaching hospital less quantity bags are mostly due to unskillful personnel involved in phlebotomy and acute donor reactions such as uneasiness during donation found in present study.¹² 1.21% of donations were seropositive for TTI as previously stated in our own study.¹³ No unit was positive for VDRL and Malaria during the study period similar to Minal Thakare.¹⁰ Average prevalence of HIV, HBsAg & HCV were 0.2%, 0.9% & 0.06% in the study period.¹³

A Total of 1610 (8.2%) components were discarded which is lower than A Kumar (14.6%)¹¹ & comparable to Nikita Sharma (8.7%).⁴ The most common components discarded were platelets (26.2%) similar to A Kumar (37.11%),¹⁰ Morish M (6.7-25%),⁶ Nikita Sharma (43.6%)⁴ found to be due to short shelf life (5days) in our setup. Saluja k noted 20.83% platelets discarded due to non-utilization within expiry period of shelf life 3 days.¹⁴ Commonest cause of platelet discard was date expiry followed by other reason such as RBC contamination and leakage etc. RBC contamination of platelet concentrate was main cause in study done by Morish M due to human factor.⁶ Mean platelet discard rate varied between 6.7 to 25% during year 2000 to 2002 in 17 blood centers in 10 European countries in a study done by Veihola M.⁹ The number of date expired units of components is one of the indicator for monitoring blood transfusion services.¹⁵

Next followed FFP having discard rate of 7.6% most commonly due to leakage of the bag during handling. In A Kumar study total 27 FFP bags were discarded due to leakage out of 542 components discarded.¹¹ 43% FFP discarded due to leakage in Morish M study.⁶ Leakage of FFP bags can be minimized by putting the FFP bag in a cardboard or polystyrene protective container that minimizes the risk of breakage of brittle frozen product during storage, handling, and transportation.^{3,6} Discard rate of 6.2% of FFP was also quoted by Nikita Sharma.⁴ Packed RBC discard rate of 2% was comparable with other studies.^{4, 11}

CONCLUSION: Present study revealed the discard rate of whole blood bags 5.2% and blood components 8.2%. Platelets are most commonly discarded due to short shelf life and non-utilization in time as demand cannot be predicted.

Proper implementation of blood transfusion policies with coordination between intra hospital staff can minimize the discard of blood due to non-utilization. Introduction of aphaeresis platelet can reduce the rate of discard of platelet due to expiry and RBC contamination if elective transfusion requests are considered. Discard due to seropositivity can further be reduced by 100% voluntary donation and strict donor selection criteria. Discard due to less quantity can be reduced by proper blood collection technique, skillful phlebotomist and minimizing acute donor reactions. Judicious use of blood has to be done for effective transfusion services.

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