



**Research Article**

**UTILIZATION OF BLOOD AND BLOOD COMPONENTS IN TERTIARY CARE HOSPITAL IN SOUTHERN RAJASTHAN**

**Bhag Chand Regar., Sanjay Prakash., Vandana Chhabra., Kailash Kumar and Prerna Sing Dhakar**

138, B block, Meera Nagar, Bhulana, Udaipur

**ARTICLE INFO**

**Article History:**

Received 17<sup>th</sup> January, 2018

Received in revised form 26<sup>th</sup>

February, 2018 Accepted 9<sup>th</sup> March, 2018

Published online 28<sup>th</sup> April, 2018

**Key words:**

Whole blood, blood components, audit

**ABSTRACT**

**Introduction:** Blood transfusion services in the hospital is responsible to provide safe and adequate blood and blood components to the patients. For assuring the adequate use of blood and blood components audit of blood usage patterns in the hospital is necessary. So, in this study we randomly selected the blood and blood component request forms to evaluate the indications of transfusion and we studied the usage pattern of blood and blood component therapy by various departments.

**Material and Method:** This was prospective observational study conducted in tertiary level hospital of Southern Rajasthan for a period of one year from January 2014 to December 2014. To study utilisation pattern of blood and blood components, we collected data for all the departments (or clinical wards) who had been issued whole blood, packed red blood cells (PRBCs), fresh frozen plasma (FFP), and platelets. For evaluation of indications of transfusion 600 randomly selected forms - 200 Whole Blood (WB), 200 Packed Red Blood Cells (PRBCs), 100 Random Donor Platelets (RDP), 100 Fresh Frozen Plasma (FFP) in all patients from different clinical departments was reviewed.

**Results:** A total of 18382 transfusions were done in various departments during year 2014, out of which 3585 were whole blood transfusions and rest 14802 transfusions were component transfusions. We used 4.12 times more blood components used as compared to whole blood. We found that 19.5% whole blood, 64.61% packed red blood cells, 8.03% random donor platelets and 7.84% fresh frozen plasma were used by various departments.

**Discussion and Conclusion:** We observed that still clinicians not following the guidelines for transfusion of blood and blood components. We recommended that for judicious usage of blood and blood components regular audit of transfusion policies of the hospital are required along with that continuous education of clinicians is also required.

*Copyright©2018 Bhag Chand Regar et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*

**INTRODUCTION**

Blood transfusion services in the hospital is responsible to provide safe and adequate blood and blood components to the patients. Blood should be effectively managed and stocked because it's obtained from precious donors. Pattern of blood usage changes from past to now a days(1). Previously, there was more usage of whole blood but now a days its shifted to blood component therapy(2). For assuring the adequate use of blood and blood components audit of blood usage patterns in the hospital is necessary. Audit is an important part of the quality assurance program, which provides patient's information for improving transfusion medicine practice(3). By demanding excessive blood units in routine for elective surgeries, of which little is ultimately used, results in consumption of valuable supplies, resources, time, and manpower.

\*Corresponding author: **Bhag Chand Regar**  
138, B block, Meera Nagar, Bhulana, Udaipur

Along with that clinicians should have knowledge about blood and blood component transfusion risk to the patients. So, in this study we randomly selected the blood and blood component request forms to evaluate the indications of transfusion and we studied the usage pattern of blood and blood component therapy by various departments.

**MATERIALS AND METHODS**

The study was conducted in tertiary level hospital of Southern Rajasthan for a period of one year from January 2014 to December 2014. This was prospective observational study. Ethical committee permission for the study was taken from institutional ethical committee. The study focussed on current practice of blood components indication for transfusion and utilization pattern among various departments of our associated group of hospitals.

For evaluation of indications of transfusion, a prospective analysis of blood and its component requisitions forms. Total 600 randomly selected forms - 200 Whole Blood (WB), 200 Packed Red Blood Cells (PRBCs), 100 Random Donor

Platelets (RDP), 100 Fresh Frozen Plasma (FFP) in all patients from different clinical departments was reviewed.

To study utilisation pattern of blood and blood components, we collected data for all the departments (or clinical wards) who had been issued whole blood, packed red blood cells (PRBCs), fresh frozen plasma (FFP), and platelets. We included all units issued for use. All transfusions included in the study were allogenic. No autologous transfusion was performed.

**RESULTS**

Total 18382 transfusions were done in various departments during year 2014, out of which 3585 were whole blood transfusions and rest 14802 transfusions were component transfusions as mentioned in table 1.

**Table 1** Distribution of blood products transfused in year 2014

S.No.	Type of blood product	Total no. Of transfusions	Percentage distribution of transfusion
1.	Whole blood	3585	19.50%
2.	PRBC	11879	64.61%
3.	RDP	1477	8.03%
4.	FFP	1441	7.84%
	Total	18382	100.00%

On departmental wise distribution general medicine was the largest consumer of blood and blood components as mentioned in table 2. Along with that we also analyse the distribution of blood and blood component in different ICUs (table 3).

**Table 2** Departmental wise distribution of blood and blood components

S. No	Department	No. of transfusions				Total no. of transfusions	Percentage
		Whole blood	PRBC	RDP	FFP		
	Gen. Medicine	584	3458	453	140	4635	25.21%
	Surgery	1104	1350	178	189	2821	15.35%
	Obs.& Gynae	477	2595	211	303	3586	19.51%
	Paediatric	46	1999	97	40	2182	11.87%
	Ortho & Trauma	330	360	15	07	712	3.87%
	Nephrology	291	308	4	00	603	3.28%
	Burn	50	48	11	05	114	0.62%
	Oncology/Radiot herapy	38	111	12	21	182	0.99%
	ICU Patients	665	1650	496	736	3547	19.30%
	TOTAL	3585	11879	1477	1441	18382	100%

We observed the blood request forms for whole blood (n=200), PRBC (n=200), PC (n=100), and FFP (n=100) and analysed them for indications for transfusion mentioned in them (table 4).

**Table 3** Distribution of blood and blood components in different ICUs

S.No.	Type of ICU	Whole Blood	PRBC	PC	FFP	Total
1.	MICU	141	146	182	436	905
2.	PICU	51	677	101	136	965
3.	PTICU	157	311	174	105	747
4.	SICU	125	129	32	54	340
5.	NICU	191	387	7	5	590
	Total	665	1650	496	736	3547

**Table 4** Indication of various blood components

S.No.	Predominant reason for Indication	WB (n=200)	PRBC (n=200)	PC (n=100)	FFP (n=100)
1	Anaemia	86	152		
2	Non-surgical bleeding	34	12	6	
3	Surgical bleeding	68	18	7	14
4	Exchange transfusion in neonates	2			
5	Haemodialysis	10			
6	Thalassemia		18		
7	Thrombocytopenia			87	
8	Infections & septicemia				44
9	Pregnancy & labour				11
10	DIC & other coagulopathies				10
11	Liver disease				6
12	Other medical conditions				15

We compared the whole blood and blood component therapy in various departments and found that blood component was 4012 times more used as compared to whole blood (table 5).

**Table 5** Comparative study of whole blood v/s component therapy

S.No.	Name of the department or category	Comparison (No. of transfused units)		Modern / conventional (PRBC+RDP+FFP / W.B.) Ratio
		Conventional Whole blood therapy	Modern component therapy (PRBC+RDP+FFP)	
1.	Gen. Medicine	584	4051	4051/584 6.93
2.	Surgery	1104	1717	1717/1104 1.55
3.	Obs.& Gynae	477	3109	3109/477 6.51
4.	Paediatric	46	2136	2136/46 46.4
5.	Ortho & Trauma	330	382	382/330 1.15
6.	Nephrology	291	312	312/291 1.07
7.	Burn	50	64	64/50 1.28
8.	Oncology/Radiot herapy	38	144	144/38 3.78
9.	ICU Patients	665	2882	2882/665 4.33
	TOTAL	3585	14797	14797/3585 4.12

**DISCUSSION**

Continuous audit of blood usage by various departments is required to maintain blood and blood component inventory in blood bank(4). A more comprehensive prospective audit is required to observe that the transfusion services is properly used for indication of blood transfusion. So, in this study we prospectively analysed the blood request forms and usage of blood and blood component by various departments in our hospital.

In this study, we found that there were more PRBC(64.61%) usage as compare to whole blood(19.50%), RDP(8.03%) and FFP(7.89%). Now a day very less indications of whole blood usage similarly in our study whole blood usage is lower than PRBCs. MacLennan *et al*(5) did survey of whole blood transfusion in Europe and concluded that whole blood were used only in paediatric blood exchange and in massive bleeding. In our study whole blood used for non-surgical and surgical bleedings (51%), anaemia (43%), exchange transfusion (1%) and haemodialysis (5%). Here, we observed that still few clinicians using whole blood for anaemia.

Blood utilization in sub-Saharan countries by Butler *et al*(6) found that in their countries whole blood (69%) is more used as compared to PRBCs (32%), Platelets (6%) and Plasma

(2%). As compared to them we utilized more blood components than whole blood.

PRBCs were used for anaemia (76%), non-surgical and surgical bleedings (15%) and in thalassemia patients (9%). PRBCs are mostly indicated to increase the oxygen carrying in anaemic patients and in thalassaemic patients. A. S. Mathew *et al* (7) also concluded in their study is that anaemia was the most common indication of red cell transfusion. Limitation of this study is that we not assessed the haemoglobin values of the anaemic patients. So, we cannot comment that our clinicians followed the transfusion guidelines to the medical and surgical patients in case of anaemia.

Most common indication of platelets transfusion in our study was thrombocytopenia (87%). But the reason for thrombocytopenia and the platelet counts of the patients were not assessed in this study, so this is another limitation in this study. After thrombocytopenia 13% of platelet transfusion was in surgical and non-surgical bleedings. Study by Ambroise, *et al.*(8) found that most common indication for platelet transfusion was Infectious and parasitic diseases (54.2%) followed by circulatory diseases (18.0%), injury and poisoning (7.3%), disorders of blood (4.1%) and neoplasms (3.8%).

Fresh frozen plasma was mostly transfused in infection and septicaemia (44%), followed by pregnancy (11%), DIC & other coagulopathies (10%), surgical bleedings (14%) and other medical conditions(15%). Prinja *et al*(9) found in their study that FFP was most commonly indicated in deranged coagulation profile (49.3%) followed by bleeding patients (37.6%) and DIC (3.3%). They concluded that FFP is the most inappropriately used blood components. Similar observation also found in our study.

On department wise distribution we found that general medicine department had maximum consumption (25%) of blood and blood component followed by obstetrics and gynaecology (19.51%), ICUs (19.30%), surgery (15.35%) and paediatric departments (11.87%) etc. Butler *et al*(6) also found that two third of blood consumption by obstetrics and gynaecology, general medicine and ICUs departments.

In comparative study between utilization of whole blood and component therapy we found that 4.12 times more blood component were used in our hospital as compared to whole blood. Mostly 46.4 times blood component used as compared to whole blood in paediatric departments.

Limitations of the study are that we did not access the transfusion triggers of the various blood components. In conclusion we assessed the utilization of whole blood and blood components in our hospital and we observed that our blood component usage was more as compared to previous studies. We also observed that still clinicians not following the guidelines for transfusion of blood and blood components. We recommended that for judicious usage of blood and blood components regular audit of transfusion policies of the hospital are required along with that continuous education of clinicians is also required.

## Bibliography

1. Surgenor DM, Wallace EL, Hale SG, Gilpatrick MW. Changing patterns of blood transfusions in four sets of United States hospitals, 1980 to 1985. *Transfusion*. 1988;28(6):513-8.
2. Zimmermann R, Buscher M, Linhardt C, Handtrack D, Zingsem J, Weisbach V, *et al.* A survey of blood component use in a German university hospital. *Transfusion*. 1997;37(10):1075-83.
3. Tuckfield A, Haeusler MN, Grigg AP, Metz J. Reduction of inappropriate use of blood products by prospective monitoring of transfusion request forms. *Med J Aust*. 1997;167(9):473-6.
4. Dosunmu AO, Dada MO. Principles of blood transfusion service audit. *Afr J Med Med Sci*. 2005;34(4):349-53.
5. MacLennan S, National Blood Service Transfusion Medicine Clinical Policies Group NBS, Leeds, UK, Murphy MF, National Blood Service Transfusion Medicine Clinical Policies Group NBS, Leeds, UK. Survey of the use of whole blood in current blood transfusion practice. *International Journal of Laboratory Hematology*. 2018;23(6):391-6.
6. Butler EK, Hume H, Birungi I, Ainomugisha B, Namazzi R, Ddungu H, *et al.* Blood utilization at a national referral hospital in sub-Saharan Africa. *Transfusion*. 2015;55(5):1058-66.
7. Mathew AS, Kurian SS, Sundaresan N, Jayalekshmi B, Prema FR, John A, *et al.* Pattern of Blood Component Utilization in a Teaching Hospital in South Kerala. *Academic medical journal of india*. 2014.
8. Ambroise MM, Ravichandran K, Ramdas A, Sekhar G. A study of blood utilization in a tertiary care hospital in South India. *J Nat Sci Biol Med*. 2015;6(1):106-10.
9. Prinja N, Sharma S, Narain R. Fresh frozen plasma utilization pattern in tertiary care hospital of North Western India. *International Journal of Research in Medical Sciences*. 2017;5(12):5372-5.

### How to cite this article:

Bhag Chand Regar *et al* (2018) 'Utilization of Blood And Blood Components in Tertiary Care Hospital in Southern Rajasthan', *International Journal of Current Advanced Research*, 07(4), pp. 11998-12000.  
DOI: <http://dx.doi.org/10.24327/ijcar.2018.12000.2098>

\*\*\*\*\*