



STUDY OF PATTERN OF BLOOD AND BLOOD COMPONENTS UTILIZATION AT TERTIARY CARE CENTER.

Pathology

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ABSTRACT

Background: Blood component therapy has gained much of the interest in recent years because of its merits over whole blood transfusion like it reduces volume overload on patient and has greater shelf-life, better patient management. This prevents wastage of blood and one-unit of whole blood can full-fill requirement of many patients. Hence, with this hypothesis we tried to assess the pattern of blood and blood components utilization at our tertiary care center. **Methodology:** This was a facility based cross sectional study conducted at blood bank of tertiary care hospital. Information was collected on registration number, clinical diagnosis of patient, indication for transfusion, age, sex, ward, department, hemoglobin level, type of blood required, number of blood units required. **Results:** Most, 11860 (66.80%) units of the blood & blood components were issued to males. Most common indication for blood & blood component utilization was anaemia followed by fracture, thalassemia, road traffic accident, bleeding/ hemorrhage. Most utilized, (80.93%) blood component was packed red blood cells followed by platelet concentrate, (9.76%) and whole blood. **Conclusion:** Most commonly needed blood component was packed red blood cells while the least needed component was whole blood. So, blood can be used efficiently by fractionation and encouraging use of individual component.

KEYWORDS

Whole blood, Components of blood, packed red blood cells, platelet concentrate, pattern of utilization.

INTRODUCTION:

Medical science has progressed tremendously over the years but as yet, no substitute of blood has been discovered and thus, blood transfusion is an essential part of modern-day healthcare.¹ Blood transfusions have emerged as an important medical therapy in the current century.² Blood can be utilized as whole blood or as components. As blood components are a scarce and expensive resource, inappropriate blood transfusions need to be avoided.³ Appropriate use of blood components results in cost effective transfusion therapy and reduces transfusion related complications.⁴ Blood component therapy has gained much of the interest in recent years because of its merits over whole blood transfusion like it reduces volume overload on patient and has greater shelf-life, better patient management.⁵ Information on blood utilization will assist in establishing clinical practice guidelines, strategizing and new donor recruitment streamlining resources for the therapeutic benefit of the patient and conducting cost effective analysis.⁶ It is now standard practice of blood bank to manufacture different blood components from donated whole blood and supply only specific components to patient. This prevents wastage of blood and one-unit of whole blood can full-fill requirement of many patients. Hence, with this hypothesis we tried to assess the pattern of blood and blood components utilization at our tertiary care center.

OBJECTIVE:

To determine the specialty wise utilization of blood, packed red blood cells (PRBC) and platelets & to study various indications for blood and components transfusion.

MATERIALS AND METHODS:

This was a facility based cross sectional observational study, which is in compliant with all the ethical standards, protocol of which was approved by the Institutional Ethical committee of the medical college. Written informed consent have been taken from all study subjects.

Present study was conducted in Regional Blood Bank, department of Pathology, in a tertiary care Hospital, during a period of 24 months from 1st January 2021 to 31st December 2022 to see pattern of utilization of whole blood and blood components like packed red cells and platelets by different departments of hospital. Blood or Blood product supplied outside our institute (patients admitted in other hospitals) was also included in this study. Children receiving regular transfusion (thalassemic patient) were also included in this analysis. Packed red cell volume and random donor platelet were prepared by fractionation of whole blood using triple bag collection technique.

All the information of blood recipient is filled in blood requisition form which consist of columns for information like registration number,

clinical diagnosis of patient, indication for transfusion, age, sex, ward, department, hemoglobin level, type of blood required, number of blood units required. In present study, transfusion of fresh frozen plasma was not included. Data was collected in pre-structured proforma which was pilot tested and after ensuring its validity. The data collected was then analyzed by using SPSS IBM version 20.

RESULTS:

In the present study, 17754 cases of blood & blood component utilization coming to our tertiary care institute during the study period of two years were analyzed giving the response rate of 100%. Out of which, majority, 6125 (34.50%) units of blood & blood components were issued to the age group of 20-39 years followed by 3789 (21.34%) was issued to the age group of 1-11 years, 3251 (18.31%) to age group of 40-54 years, 2329 (13.12%) to the age group of >60 years, 1918 (10.80%) to 12-19 years and 342 (1.93%) to < 1 year. Most, 11860 (66.80%) units of the blood & blood components were issued to males and rest 5894 (33.20%) units to females. Maximum requirement was for O Rh positive of 5675 (31.96%) units of blood followed by B Rh positive of 5177 (29.16%) units, A Rh positive of 4132 (23.27%), AB Rh positive of 1946 (10.96%), B Rh negative of 278 (1.57%), O Rh negative of 262 (1.48%), A Rh negative of 200 (1.13%) and AB Rh negative of 84 (0.47%) units. (Table 1)

Table 1. Distribution of patients according to baseline characteristics.

Baseline characteristic		Cases	
		No.	%
Age (years)	<1	342	1.93
	1-11	3789	21.34
	12-19	1918	10.80
	20-39	6125	34.50
	40-59	3251	18.31
	60+	2329	13.12
Gender	Male	11860	66.80
	Female	5894	33.20
Required blood group	A+	4132	23.27
	A-	200	1.13
	B+	5177	29.16
	B-	278	1.57
	AB+	1946	10.96
	AB-	84	0.47
	O+	5675	31.96
	O-	262	1.48

In the present study, most common indication for blood & blood

component utilization was anaemia in 4125 (23.23%) units followed by fracture 2440 (13.74%), Thalassemia in 2350 (13.24%), road traffic accident in 1580 (8.90%), bleeding/ haemorrhage from various causes in 1050 (5.91%), post-partum haemorrhage in 1025 (5.77%), Septicaemia in 910 (5.13%), major surgeries in 869 (4.89%), leukaemia in 791 (4.46%), malignancy in 619 (3.49%), ante-partum haemorrhage in 525 (2.96%), LSCS in 340 (1.92%), dengue & coagulopathy in 277 (1.56%) each, burns in 146 (0.82%), alcoholic liver disease in 96 (0.54%), abortion in 46 (0.26%) and other least frequent causes in 300 (1.69%). (Chart 1)

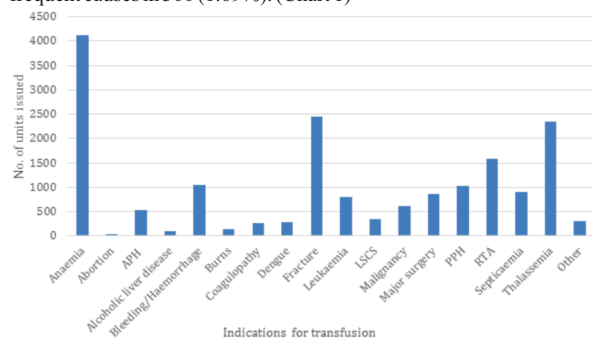


Chart 1. Indications for transfusion.

From the present study, it seems that highest blood utilization was in Medicine department, 5888 (33.16%) units followed by 4101 (23.09%) units in Surgery department, 2540 (14.31%) units to Cancer department, 1989 (11.20%) units to OBGY, 1890 (10.64%) units to Orthopaedics, 1268 (7.15%) to Paediatric department and 78 (0.45%) units to casualty. (Table 2)

Table 2: Department wise utilization of blood and blood components.

Department	No. of units of blood used	Percent
OBGY	1989	11.20
Medicine	5888	33.16
Surgery	4101	23.09
Paediatric	1268	7.15
Orthopedics	1890	10.64
Casualty	78	0.45
Cancer	2540	14.31
Total	17754	100

In the present study, among various blood & blood component, most utilized, 14368 (80.93%) units of blood issued was packed red blood cells followed by platelet concentrate, 1732 (9.76%) units and whole blood 1654 (9.31%) units. (Chart 2)

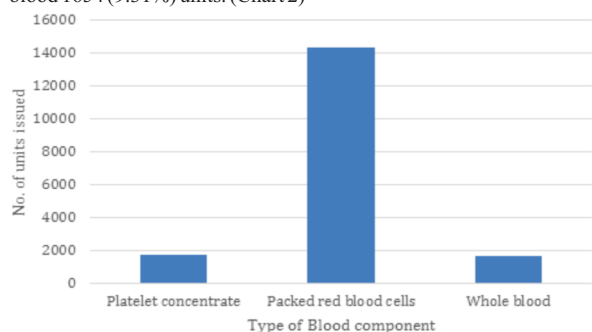


Chart 2. Type of blood and blood component utilization.

DISCUSSION:

Blood transfusion is an integral part of health services. Even today also mainly requirement is for whole blood which should be discouraged as effective use of various blood components with minimal blood wastage should be the goal so that those who are in need can get the blood. Present cross sectional observational study issued 17754 units of blood & blood components after proper cross matching and screening for utilization at tertiary care center.

In the present study, the youngest recipient of blood is 1 day old child while oldest is 98 years old. We have come across that maximum (34.50%) requirement of blood & blood component was in the young adults i.e. 20-39 years age group followed by 23.27% in the age group

of 1-11 years and in 40-59 years of older adults requirement is 18.31%. Present study findings are similar with Hulwan et al⁷ and Priyanka N Bansod⁸ et al but in Giridhar J et al⁹ maximum requirement is in the age group 40-59 years of age which is different from our study findings. Paediatric age group is second most common age group requiring blood. It consists of patients having thalassemia, paediatric surgery, anaemia. Thalassemic patients should be prioritised when blood stock is less and requirement of blood is more. In our study males (66.80% units) received more blood transfusion units than female. This is in line with Reena Sharma et al³, Hulwan et al⁷ who noted males received more transfusion units than females. But in Venkatachalapathy TS et al¹⁰ study findings show female predominance which is different from present study. This difference may be due to large sample size in our study. In our study, most common required blood group was O Rh positive in 31.96% of the cases followed by B Rh positive among 29.16% patients, A Rh positive in 23.27% patients, AB Rh positive in 10.96%, B Rh negative in 1.57%, O Rh negative in 1.48%, A Rh negative in 1.13% and AB Rh negative in 0.47% patients. Our study findings are similar with Hulwan et al⁷ and Henshaw Uchechi Okoroiwu¹¹ which also shows O positive to be the most required blood group. But findings of Reena Sharma et al¹² shows B positive to be the most required blood group which is not consistent with present study findings.

Table 3. Comparison of department wise issue of blood & blood components in various studies.

Departments	Reena Sharma et al12 (2020)	Hulwan et al7 (2019)	Venkatachalapathy TS et al10 (2012)	Present Study
Medicine	24.42	34.94	15.76	33.16
Surgery	41.49	24.31	12.28	23.09
Cancer	-	-	-	14.31
OBGY	6.61	15.12	48.91	11.20
Ortho	12.87	6.10	11.09	10.64
Paeds	1.30	9.59	3.91	7.15
Others	13.31	9.94	8.05	0.45

From the present study, it seems that highest blood utilization was in Medicine department i.e. 33.16% of the total requirement followed by 23.09% requirement in Surgery department, 14.31% in Cancer department, 11.20% in OBGY, 10.64% in Orthopaedics, 7.15% in Paediatric department and 0.45% units in other departments. Consistently Reena Sharma et al³ also noted Supply of blood was maximum to the surgical and medicine wards. Hulwan et al⁷ reported that total transfusion was maximum in medicine department followed by surgery & Obstetrics-gynaecology department. So present study findings are consistent with Consistently Reena Sharma et al¹² and Hulwan et al⁷.

In the current study, most common indication for blood & blood component utilization was anaemia followed by fracture and RTA, thalassemia, pregnancy related indications, operative, malignancy, road traffic accident, bleeding/ haemorrhage from various causes etc. This is in accordance with Reena Sharma et al¹², Hulwan et al⁷ and Singhal M et al⁹⁹ reported in their study that anaemia was the most common indication for blood utilization. So findings of Reena Sharma et al¹², Hulwan et al⁷ and Singhal M et al¹³ are consistent with present study findings.

In this study, most utilized (80.93 %) blood component was packed red blood cells followed by platelet concentrate (9.73%) and whole blood (9.31%). Anshoo et al¹⁰⁰, Reena Sharma et al³ and Hulwan, et al⁹⁵ also found similar results as our study which showed increased utilization of packed red cells among blood components followed by platelet concentrates and then whole blood. So findings of Anshoo et al¹⁴, Reena Sharma et al³ and Hulwan, et al⁷ are consistent with present study.

CONCLUSION:

Common indications for blood & blood components were anaemia, fracture, thalassemia, road traffic accidents and bleeding disorders. Most commonly needed blood component was packed red blood cells while the least needed component was whole blood. So, blood can be used efficiently by fractionation and encouraging use of individual component.

Declaration:

There was no source of funding in our study and there was no any conflict of interest.

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