

# Study of Utilization of Blood and Blood Components in a Tertiary Care Hospital

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## Abstract

**Introduction:** Blood is essential for life. It contains cellular component and plasma which supplies oxygen, nutrients to different parts of the body. Transfusion of blood and blood components is an integral part of health care practice. Many a times there will be injudicious use of blood and its products among patients which causes unnecessary burden to the patients as well to blood bank. Main aim of this study is to evaluate the pattern utilization of blood and blood components in Karnataka institute of medical sciences.

**Materials and methods:** This was retrospective study carried out over a period of 1 year from January 2015 to December 2015. Necessary data were collected from blood bank registers.

**Results:** Total blood units collections were 13,378. Units utilized were 12,555. Whole blood was the most utilized product followed by PRBC, FFP and least utilized product was platelet concentrates. Gynaecological wards were the Major benefited from the blood supply in this study.

**Conclusion:** Formulation of strict guidelines for transfusion practices will improve the appropriate use of precious resource. Periodic evaluation of utilization pattern, demand for different blood products also helps to maintain the blood stock.

**Keywords:** Blood transfusion; Blood components; PRBC; FFP; Platelets

## Introduction

Blood is a specialized bodily fluid that supplies essential substances and nutrients and removes metabolic waste products from the cells. It is composed of cells and plasma. The cellular components include red blood cells, white blood cells and platelets. Plasma contains coagulation factors. Blood is essential for human survival [1-8]. Until now there is no effective substitute for blood. Hence, transfusion of donated blood is the main stay of treatment in variety of medical/clinical conditions [1]. Blood transfusion was first performed successfully by James Blundell in 1818 [1]. 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 [7]. Component therapy was introduced between 1950 and 1960s [7] to maximize the benefits of all components present in the whole blood [8-16]. Inappropriate transfusion practices can lead to serious consequences for recipients including transmission of infectious agents [16]. In developing countries there are limited resources of blood and increasing demand, hence it is necessary to make an efficient use of blood [17]. As blood is a scarce resource, clinician should weigh the risks of transfusion against risks of not transfusing [5]. Data on the use of blood products are limited, studies have revealed high proportion of inappropriate use of blood transfusion often in both developed and developing countries [6,7]. Evaluation of pattern of blood component usage, its demand and good audit management is needed to ensure appropriate utilization of precious resource.

## Objective

To study the trend of utilization of blood and blood components in Karnataka institute of medical sciences, Hubballi.

## Materials and Methods

Present study was a retrospective study carried out in our blood bank, Karnataka institute of medical sciences, Hubballi over a period

of 1 year from January 2015 to December 2015. We collected data of monthly collection and utilization of blood and blood components from the record books in the blood bank. It included cross matched and issued blood units. We also studied utilization of blood and its products by department of surgery, orthopaedics, ENT and gynaecological specialities and non-surgical specialities like medicine, nephrology and neurology. Data also included age, gender and diagnoses of transfusion recipients.

## Results

In this study, we noted total of 13,378 units of blood collection. This included 6742 (50.4%) units of whole blood, 2695(20.1%) packed red cells and 2524 (18.9%) units of fresh frozen plasma and 1417 (10.6%) units of platelet concentrates. Among collected blood units, 12,555 units were utilized. Whole blood constituted 6424 (51.2%) units and red cells were 2684 (21.4%) units, FFP and Platelets constituted 2250 (17.9%) and 1197 (9.5%) units respectively. Remaining 823 (6.2%) blood units were discarded due to transfusion transmitted infections like HBsAg, HIV and HCV, VDRL positivity. Other causes were sub optimal collection of blood because of donor disapproval and expiry of the shelf life (Figures 1 and 2). Majority of the blood units were supplied to the department of Gynaecology which accounted for 2575 (20.5%) units, followed by department of medicine which received 2085 (16.6%) units. Supply to the surgical wards was 2011 (16.0%) units. Demand from the labour room was 1751 (13.9%) units which were

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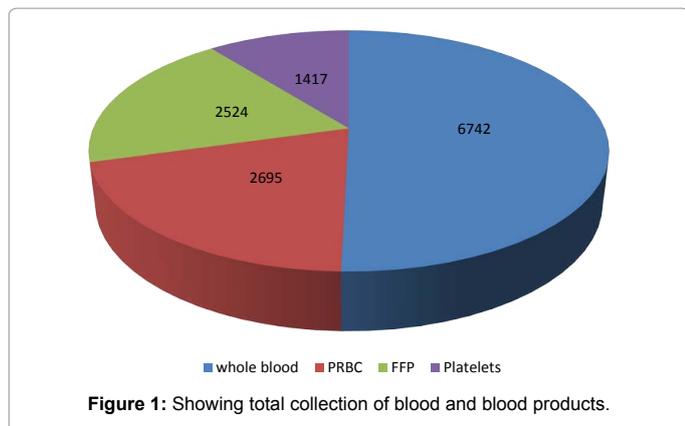


Figure 1: Showing total collection of blood and blood products.

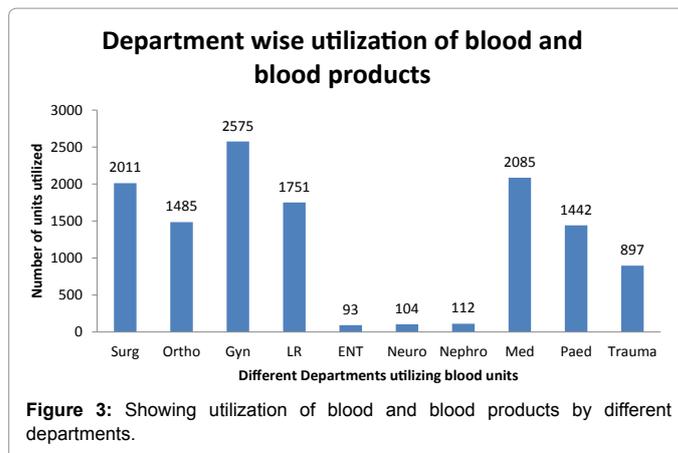


Figure 3: Showing utilization of blood and blood products by different departments.

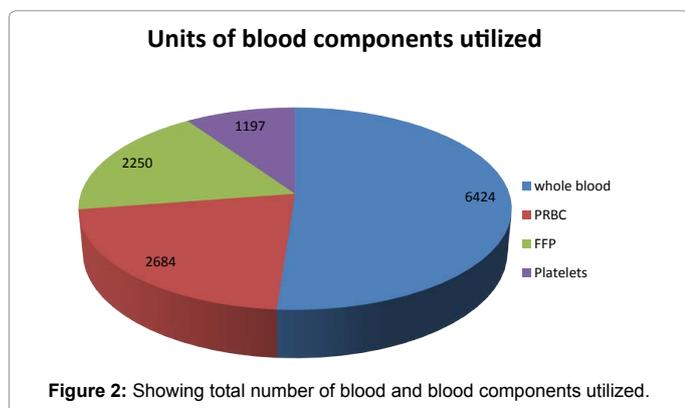


Figure 2: Showing total number of blood and blood components utilized.

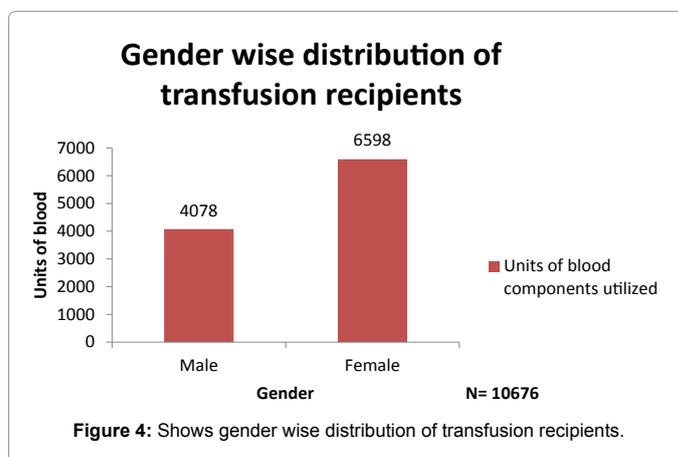


Figure 4: Shows gender wise distribution of transfusion recipients.

met. In our hospital least requirement for blood units (0.7%, n=93) was from department of ENT during the study period (Figure 3 and Table 1). In the present study, most common diagnosis requiring blood unit (n=2741, 21.8%) was elective surgery. Second most common diagnosis was gynaecological disorders which used 2575 (20.5%) units of blood. Least utilization 112 (0.9%) was by renal disorders (Table 2). Majority of transfusion recipients were females (6598), followed by males (4078) (Figure 4). Majority (9082, 85.1%) of the recipients in the present study were between 11 and 59 years of age. Elderly aged patients received 630 units of blood which constituted 5.9% of total requests. Youngest recipient of blood in the present study was 1 day old baby, indication being septicaemia with thrombocytopenia. Oldest recipient was 89 years. old male who received blood for correction of anaemia.

## Discussion

Blood transfusion services are vital and integral part of modern health care. Effective use of blood and its components with high quality and minimum waste are important goals of blood utilization management system [9]. Request for single unit of blood is a common practice in India which has been an act of thoughtlessness [17]. Single unit transfusion should be strongly discouraged to conserve this essential commodity for use in other needy patients. Even in present study also many recipients were transfused with single unit of blood. This requires proper knowledge about the availability and importance of blood and blood products among clinicians.

There is considerable variation in the pattern of utilization of blood and its components between different hospitals and various clinical specialities. In the present study, 13,378 units of blood were collected. We received 10,676 requests and 12,555 units were issued after proper

Department	Number of units	Percentage
Surgery	2011	16.0
Orthopaedics	1485	11.8
Gynaecology	2575	20.5
Labour room	1751	13.9
ENT	93	0.7
Neurology	104	0.8
Nephrology	112	0.9
Medicine	2085	16.6
Paediatrics	1442	11.5
Trauma	897	7.1
	12555	100.0

Table 1: Showing number and percentage of blood units utilized by different specialities.

cross matching and screening. Requests were lesser than the number of blood units issued; this is because many patients were transfused with more than one unit of blood. In our study females (61.8%) received more blood transfusion units than male (38.2%), this is in contrary to the studies done by Mathew et al. [1], Bansod et al. [10]. They noted males as major recipients receiving transfusions. We noted 6424 units of whole blood utilized among total 12,555 blood units. Joshi et al. also found increased number of whole blood utilization compared to other components. In western countries, there is decline in the usage of whole blood [4]. Anshoo et al. [15] and Venkatachalapathy and Subhashish [3] documented increased distribution of packed red cells among blood components which is correlating with our findings. Ambrose et al. [4] showed increased issue of FFP and Platelets in

Diagnoses	Number	Percentage
Malignancy	1105	8.8
Elective surgery	2741	21.8
Hepatic disorders	901	7.2
Renal disorders	112	0.9
Gynaecological disorders	2575	20.5
LR/Child birth	1751	13.9
Bleeding	1017	8.1
Infections	1456	11.6
Trauma	897	7.1
	12555	100.0

**Table 2:** Showing Different diagnoses receiving blood transfusion.

relation to PRBC, this is in contrary to our study. Ahmaed and Save [13] noted increased utilization of PRBC (74.9%) among paediatric patients. In the present study, majority of the blood units were issued to gynaecologic department which constituted 2575 units among total 12,555 units. This was followed by medicine and surgery which showed nearly equal distribution of blood units (2085 and 2011, respectively). Venkatachalapathy and Subhashish [3] noted highest utilization of blood units by gynaecologic department which is similar to the present study. Alcantara et al. [6] found medicine department utilizing maximum number of blood units. There is no uniformity in distribution of blood and its components according to clinical specialities. In surgical cases blood and components are often ordered due to anticipated loss than actual one. This leads to overuse of blood products, wastage and unnecessary exposure of patients to various haematological antigens and infections. This also increases workload on blood bank staff, which could be utilized for processing blood for more needy patients. Hence, inappropriate use of blood and blood components should be avoided.

## Conclusion

This research study provides information of pattern of usage of blood and blood components in our tertiary care hospital. This also enables internal quality control for better functioning of blood bank. This also shows the importance of formulation and implementation of strict guidelines for transfusion practices in the hospital. This should be agreed upon by the clinicians and blood bank in-charge. Thereby unnecessary usage of blood units can be controlled and effective management of blood stock can be achieved.

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