

# Role of Blood Transfusion in Obstetric Cases in a Tertiary Care Hospital

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**Abstract:** *Background:* Blood transfusion is an integral part of patient management in obstetrics and gynecology. Blood transfusion can be a life saving intervention and is used routinely by Obstetricians and gynaecologists so they need to be aware of the potential complications of blood transfusion and the appropriate use of blood transfusion in their practice. *Methods:* This was a prospective observational study conducted between April 2019 to March 2020 in department of obstetrics and gynecology, Government Medical College, Tertiary care centre, Punjab. The obstetric patients given transfusion were analysed in respect of their demographic profile, dietary habits, indications of blood transfusion, amount of blood transfused and transfusion reaction. *Results:* During this period, total of 8404 obstetric patient were admitted, of which total of 2224 patients (26.46%) were transfused with 6866 units of blood and blood components. During the study period there was 4925 deliveries (2939 vaginal deliveries, 1986 cesarean deliveries). 75.45% of Patients requiring blood transfusion were in 21-30 years age group and 72.30% of women were of gestational age 30-40 weeks. Patients requiring blood transfusion were rural (74.82%), vegetarian (59.13%), illiterate (52.43%), upper lower socioeconomic class (43.12%), unbooked (58.99%), multi gravida (74.82 %). Maximum (37.95%) of antenatal patients who required blood component were of anaemia. Patients with severe anemia requiring blood transfusion were 46.99%. Early pregnancy haemorrhage (24.55%), late pregnancy haemorrhage (12.99%), HELLP Syndrome with thrombocytopenia (5.17%) and Pre-eclampsia (0.67%) were other indications. Intrapartumtraumatic indications included cervical tear (4.90%), vaginal laceration (3.82%) rupture uterus (1.35%), vulval hematoma (0.63%). Indications during postnatal period requiring transfusion included anemia (7.42%), Postnatal uterine Atony haemorrhage (1.17%) and puerperal sepsis (1.08%). Patients transfused with PRBC were 93.75%, 23.70 % patients received FFP, 20.17% received Platelet Concentrate, and 0.45% received Cryoprecipitate. 1.89% Patients developed adverse transfusion reaction. *Conclusions:* Therefore this study concludes that Anaemia still persists to be a major cause for blood and blood product transfusion. These results show that inadequate antenatal care of woman, poor nutrition and lack of awareness of importance of hematinic therapy are major factors. Blood transfusion though a lifesaving procedure, still possess and finite risk of adverse transfusion reactions.

**Keywords:** Blood transfusion, Anaemia, Obstetric haemorrhage, Blood components, Adverse transfusion reaction

## 1. Introduction

Blood Transfusion is one of the eight important components of comprehensive emergency obstetric care which has been shown to reduce the maternal mortality. [3] Improper use of blood components has led to significant morbidity and mortality. The right decision for transfusion is the use of the right product, for the right patient in the right dose at the right time for the right indication. [4]

### Most common indications of Blood Transfusion in Obstetrics

- 1) Anaemia of pregnancy and haemoglobinopathies.
- 2) Obstetric haemorrhage.
- 3) Surgeries where significant blood loss is expected.

Anemia of pregnancy is defined as hemoglobin concentration below 11gm/dl in first and third trimester and below 10.5 gm/dl in second trimester. Pre-existing anemia worsens as pregnancy advances, leading to CHF and complications including mortality of the patient. [5]

### Blood Transfusion for Anaemia in Pregnancy. [8, 9]

- If Hb < 6 g/dl and there are < 4 weeks for delivery.
- When Hb is < 7 g/dl then either in labour or in immediate postpartum period, blood transfusion is only indicated if

previous history of bleeding or patient is prone for bleeding due to some medical illness.

- If Hb is 7 g/dl, for women with continued bleeding or at risk of further significant haemorrhage or for those presenting with severe symptoms that need immediate correction (cardiac decompensation). [8, 9]

Blood transfusion is done in surgeries, where patient needs emergency operation, Hb less than 10 gm/dl and anticipated surgical blood loss more than 1000 gm/dl. [10]

Obstetrical haemorrhage is bleeding in pregnancy that occurs before, during, or after childbirth. Antepartum haemorrhage or prepartum haemorrhage, is genital bleeding occurs during pregnancy after the 28th week of pregnancy up to delivery. [7] Bleeding which occurs during pregnancy before 24 weeks is known as early pregnancy bleeding.

### Blood and its Components

Blood components used in clinical practice are red blood cells, plasma components, platelets, which are derived from whole blood. Plasma components which are commonly used are fresh frozen plasma and cryoprecipitate

### Blood products commonly transfused in obstetrical hemorrhage [20]

Product	Volume per unit	Contents per unit	Effect on hemorrhage
Whole blood	About 500mL; Hct~40 percent	RBCs, plasma, 600-700mg fibrinogen and some platelets	Restores blood volume and fibrinogen, increases Hct 3-4 volume percent per unit
Packed RBCs	250-300mL; Hct~55-80 percent	RBCs, minimal fibrinogen, some platelets	Increases Hct 3-4 volume percent per unit
Fresh-frozen plasma (FFP)	About 250mL; 30-minute thaw	Colloid, 600-700mg fibrinogen, no platelets	Restores circulating volume and fibrinogen
Cryoprecipitate	About 15mL, frozen	One unit~200mg fibrinogen, other clotting factors (factor VIII, vonwillebrand's factor XIII)	15-20 units or 3-4 g will increase baseline fibrinogen~150 mg/dL
Platelets	About 50 mL, stored at room temperature in platelet agitation	One unit random donor platelets raises platelet count about 5000/ $\mu$ L; single-donor apheresis preferable	6-10 units random donor platelets transfused; single-donor apheresis preferable to raise platelets~30, 000/ $\mu$ L

Transfusion is a life saving procedure, but approximately 1% of all transfusions can cause acute and delayed adverse reactions. Acute hemolysis can result from transfusion of incompatible blood component. If severe this can cause DIC, acute renal injury and death. In transfusion related mortality, transfusion related acute lung injury (TRALI) is the most common cause. This syndrome is characterized by severe dyspnea, hypoxia and non cardiogenic pulmonary edema that develop within six hours of transfusion. [28]

**Aims and Objectives**

- 1) To study the indication of blood and blood component transfusion in various obstetric patients.
- 2) To study adverse effects of transfusion.

**2. Method**

This is a prospective observational study to evaluate indications of blood and blood components and their adverse effects in obstetric patients conducted between April 2019 to March 2020 in Department of Obstetrics and Gynaecology in collaboration with Department of Transfusion medicine of Government Medical College and Tertiary care centre, Punjab. 2224 blood transfusions had been given in obstetric patients in department of obstetrics and gynaecology.

**Inclusion Criteria-**

All obstetrics patients requiring transfusion of blood or its components during study period were included.

**Investigations**

All the routine investigations like complete blood count, bleeding time, clotting time, complete urine examination, blood grouping and Rh typing, HIV, HBsAg, HCV, PTI/INR, Renal function test, Liver function test were done as per the proforma.

Age, Parity, gestational age, socioeconomic status, indications of blood product transfusion, types of blood product, data of hemoglobin (Hb) concentration and blood transfusion reactions were evaluated.

**3. Results**

Total of 8404 obstetric patient were admitted during the study period, of which total of 2224 patients (26.46%) transfused with 6866 units of blood and blood components.

During the study period there were 4925 deliveries (2939 vaginal deliveries, 1986 cesarean deliveries).

Females in age group 21-30 years constituted 75.45% of patients and maximum transfusions were done in this group While age group  $\leq 20$  years constituted 12.46% of cases and 12.10% were in 31-40 years.

52.43% patients requiring blood transfusion were illiterate followed by 24.19% high school, 14.39% primary school, 5.71% graduates, 2.92% middle school and 0.36% intermediate.

**Distribution of patients according to booking status**

Booked/Unbooked	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Unbooked	1312	58.99%	55.80%	59.91%
Booked	912	41.01%	40.09%	44.20%
Total	2224	100.00%		

Among 2224 patients requiring blood transfusion, 58.99% cases were unbooked and 41.01% were booked cases to our obstetric and gynaecology department.

**Distribution of Patients according to Gravida**

Gravida	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Multigravida	1664	74.82%	72.97%	76.58%
Primigravida	560	25.18%	23.42%	27.03%
Total	2224	100.00%		

This table shows, majority of patients requiring blood transfusion were multi gravida (74.82 %) and of rest were primigravida (25.18%).

**Distribution of Patients according to Gestational Age**

Gestational Age in weeks	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
$\leq 10$ weeks	152	6.83%	5.86%	7.96%
10-20 weeks	386	17.36%	15.84%	18.99%
20-30 weeks	26	1.17%	0.80%	1.71%
30-40 weeks	1608	72.30%	70.41%	74.12%
>40 weeks	52	2.34%	1.79%	3.05%
TOTAL	2224	100.00%		

In the study, women of gestational age between 30-40 weeks constitute 72.30%, 10-20 weeks constitute 17.36%,  $\leq 10$  weeks constitute 6.83%, >40 weeks constitute 2.34% and 20-30 weeks constitute 1.17%.

**Distribution of Patients According to Stage of Pregnancy**

Stage of pregnancy when Blood components were Given	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Antenatal period	1561	70.19%	68.25%	72.05%
Intranatal period	425	19.11%	17.53%	20.80%
Postnatal period	160	7.19%	6.19%	8.34%
Antenatal and Intranatal period	23	1.03%	0.69%	1.55%
Antenatal and postnatal period	11	0.49%	0.28%	0.88%
Intranatal and postnatal period	44	1.99%	1.48%	2.65%
TOTAL	2224	100.00%		

This table shows, majority of women who required transfusion were in Antenatal period (70.19%). 19.11% patients received in Intranatal period and 7.19% patients received in postnatal period.

1.03% patients received blood both during Antenatal and Intranatal period, 0.49% patients received blood both during Antenatal and postnatal period, 1.99% patients received blood both during Intranatal and postnatal period.

**Indications for blood and blood product during antenatal period**

ANC Causes	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Anaemia	844	37.95%	35.96%	39.99%
Early pregnancy haemorrhage	546	24.55%	22.81%	26.38%
Late pregnancy haemorrhage	289	12.99%	11.66%	14.46%
HELLP Syndrome with thrombocytopenia	115	5.17%	4.33%	6.17%
Pre-eclampsia	15	0.67%	0.41%	1.11%

This table shows that maximum (37.95%) of antenatal patients were of anaemia who required blood component administration. This is followed by Early pregnancy haemorrhage (546 cases; 24.55%), Late pregnancy

haemorrhage (289 cases; 12.99%), HELLP Syndrome with thrombocytopenia (115 cases; 5.17%) and Pre-eclampsia (15 cases; 0.67%). Many patients had more than one indication for transfusion of blood and blood components.

**Intrapartum Indications for Blood Transfusions**

Intrapartum Causes	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Intrapartum Atonic PPH	196	8.81%	7.70%	10.06%
Traumatic	238	10.70%	9.48%	12.05%
Retained Placenta	40	1.80%	0.48%	1.22%
MROP	17	0.76%	1.32%	2.44%
Morbid Adherent Placenta	2	0.09%	0.02%	0.33%

This table shows the obstetric conditions which required blood component during intrapartum Include Traumatic PPH (238 cases; 10.70%), Atonic PPH (196 cases; 8.81%)

Retained Placenta (40 cases; 1.80%), MROP (17 cases; 0.76%) and Morbid Adherent Placenta (2 cases; 0.09%)

**Postnatal Indications for Blood Transfusions**

Postnatal Causes	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Anaemia	165	7.42%	6.40%	8.58%
Postnatal uterine Atonyhaemorrhage	26	1.17%	0.80%	1.71%
Puerperal Sepsis	24	1.08%	0.73%	1.60%

This table shows, 7.42% patients requiring blood transfusion were of postnatal anaemia, 1.17% were of postnatal due to

uterine Atony haemorrhage and 1.08% were of puerperal sepsis

**Blood Transfusion according to Hemoglobin Level**

Haemoglobin Class	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Mild Anemia (Hb 8.1-11 GM/DL)	643	28.91%	27.07%	30.83%
Moderate Anemia (Hb7.1-8 GM/DL)	536	24.10%	22.37%	25.92%
Severe Anemia (Hb<7 GM/DL)	1045	46.99%	44.92%	49.07%
Total	2224	100.00%		

In this study, 46.99% of patients were of severe anemia, 24.10% of patients were of moderate anemia and 28.91% of patients were of mild anemia.

**Total Blood and Blood Products Transfused.**

Blood Component used	No. of Patients received	Percent	Wilson 95% LCL	Wilson 95% UCL
PRBC	2085	93.75%	92.67%	94.68%
FPP	527	23.70%	21.98%	25.51%
Platelet Concentrate (RDP&SDAP)	404	18.17%	16.62%	19.82%
1. Random Donor Platelet Concentrate	388	17.45%	15.93%	19.08%
2. Single donor Platelet Concentrate	16	0.72%	0.44%	1.17%
Cryoprecipitate	10	0.45%	0.24%	0.83%

It was observed that 93.75% patients were transfused with PRBC. 23.70% patients received FFP, 18.17% received Platelet Concentrate, and 0.45% received Cryoprecipitate.

**Adverse Transfusion Reactions**

Symptoms of adverse transfusion reactions	Number of patients	Percent	Wilson 95% LCL	Wilson 95% UCL
Rigors	3	0.13%	0.05%	0.40%
Chills	14	0.63%	0.38%	1.05%
Fever	16	0.72%	0.44%	1.17%
Chest Pain	1	0.04%	0.01%	0.25%
Breathlessness	2	0.09%	0.02%	0.33%
Urticaria	7	0.31%	0.15%	0.65%
Total	42	1.89%		

In the present study, 1.89% patients had a transfusion reaction and 98.11% had no reaction

This table shows 0.72% patients had transfusion reaction in the form of fever. While remaining had chills (0.63%) and urticarial rash (0.31%), rigors (0.13%), breathlessness (0.09%) and chest pain (0.04%).

**Obstetric usage of blood Components**

Blood Component	Total units Issued	Units used in Obstetric Care	Obstetric usage
PRBC	17760	3871	21.80%
FPP	3468	1440	41.52%
Platelet Concentrate	3791	1517	40.02%
Cryoprecipitate	62	38	61.29%

This table shows among 17760 units PRBC issued by blood Bank 3871 (21.80%) used in obstetric care. Out of 3468 units FFP issued 1440 (41.52%) used in obstetric care. Out of 3791 units platelet concentrate issued 1517 (40.02%) used in obstetric care. Out of 62 units cryoprecipitate issued 38 (61.29%) used in obstetric care

was made by Renuka et al<sup>[56]</sup> (71.45%). Maximum incidence of anemia and complications requiring blood transfusion are in this group.

**4. Discussion**

Total 8404 obstetric patient admitted in Indoor during the study period, of which total of 2224 patients (26.46%) transfused with 6866 units of blood components during the period received blood transfusion.

In our study, it was observed that severe anaemia either during pregnancy or during postpartum period was the most common indication (37.95%) for transfusion. The results of our study are comparable to study done by Singh et al<sup>[46]</sup>, Akingbola et al<sup>[45]</sup> and Renuka et al<sup>[56]</sup>.

Among 2224 transfusions most common age group for transfusion is between 21-30 years (75.45%). This is similar to study done by Manisha Gupta et al<sup>[52]</sup> (2019), 58.9%. This is due to that maximum number of deliveries occurs in this age group and hence the absolute number of complications is also higher in this group

In present study 46.99% of patients having Hb less than 7 gm/dl required blood transfusion. The results of our study are comparable to study done by Patel VP et al (2014)<sup>[41]</sup>, Pandya et al<sup>[48]</sup> (2015) and in their study 53%, 48% respectively. A total of 24.10% transfusions were done for patients having Haemoglobin 7.1 to 8 gm/dl and most of them were unbooked who are at risk of further significant haemorrhage or previous history of bleeding disorders. 28.91% transfusions were done for patients having haemoglobin 8.1gm/dl to 11gm/dl who required surgeries where significant blood loss was expected and patient needs emergency operation, prone for bleeding due to any other medical disorders. In this study that 93.75% patients were transfused with PRBC It was observed in Deshpande et al<sup>[49]</sup> study that 88.25% patients were transfused with PRBC. whole blood is not transfused to obstetric patients to reduce incidence of adverse transfusion reactions. To further reduce the incidence of reaction, maximum patients were transfused

In this study Majority of patients requiring blood transfusion were rural (74.82%), illiterate (52.43%), belong to upper lower, socioeconomic class (43.12%), vegetarian (59.13%). unbooked (58.99%), multi gravida (74.82%) and most of them were referred from other health facilities. In present study majority of transfusions were done for patients of gestational age 31-40 weeks (72.30%). Similar observation



with leuco depleted packed red blood cells. In present study Transfusion rate was 26.46%. The results of our study are comparable to study done by Patel VP et al<sup>[41]</sup> (2014). Transfusion rate was higher as comparable to other studies. This could be due to being a tertiary care hospital almost 80% of patients was referred patients and most of the patients transfused were unbooked cases. In present study adverse transfusion reaction rate was 1.89% whereas in studies by Deshpande et al<sup>[49]</sup> (2018) and Renuka et al<sup>[56]</sup> (2019) adverse transfusion reaction rate 4.41% and 5.34 % respectively. Adverse transfusion reaction rate is less compared to other studies

## 5. Conclusion

In developing countries, two main causes and contributors of maternal mortality and morbidity are;

- Anaemia of pregnancy
- Massive obstetric haemorrhage.

Anaemia still persists to be a major indication for transfusion of blood and blood products. Haemoglobin less than 7gm/dl is an indication for transfusing blood in pregnancy.

The decision of blood transfusion should be made both on clinical and haematological grounds. These results show that inadequate antenatal care of woman, poor nutrition and lack of awareness of importance of hematinic therapy is major factor. Acute transfusion reactions are resulting from many factors such as physiology of pregnancy, high incidence of obstetric complications requiring recurrent and multiple transfusions. Blood transfusion though a lifesaving procedure, still possess and finite risk of adverse transfusion reactions.

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