International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Tuklia J et al. Int J Reprod Contracept Obstet Gynecol. 2025 Oct;14(10):3358-3362
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20253076

Original Research Article

Observational study to analyse transfusion practices in obstetrics at tertiary care center in adult populations

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Received: 30 July 2025
Revised: 10 September 2025
Accepted: 11 September 2025

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ABSTRACT

Background: Blood transfusion is one of the eight essential components of comprehensive emergency obstetric care and plays a critical role in reducing maternal mortality. Obstetric hemorrhage, particularly postpartum hemorrhage (PPH), remains a leading cause of maternal morbidity and mortality worldwide. Anemia and coagulation disorders further increase the risk of severe bleeding during pregnancy and delivery. The study aims at improving transfusion practices and also to deal with reactions associated with it.
Methods: A prospective observational study was conducted to evaluate obstetric patients who received transfusions. Data were collected on the type and indication of transfusion, components used, transfusion protocols followed, adverse reactions encountered, and maternal outcomes.
Results: The most common indications for transfusion were anemia, PPH, and placental causes such as placenta previa and abruption. Blood components commonly used included packed red blood cells (PRBCs), fresh frozen plasma (FFP), platelet concentrates, and cryoprecipitate. The majority of antepartum transfusions were for anemia correction, while postpartum transfusions were primarily due to hemorrhage. Adverse reactions were minimal but documented. Outcomes varied based on the condition and the promptness of transfusion.
Conclusions: Timely and appropriate transfusion of blood and its components is vital in the management of obstetric complications. Identifying high-risk patients and ensuring adequate blood component availability can significantly improve maternal outcomes and reduce mortality related to obstetric hemorrhage.

Keywords: Anemia in pregnancy, Blood transfusion, Maternal mortality, Obstetric haemorrhage, Transfusion practices

INTRODUCTION

Postpartum hemorrhage accounts for approximately 25% of all pregnancy related deaths.[1] About >80% of deaths occur post-partum responsible 25% of the estimated 358,000 maternal deaths each year.[2] Blood transfusion has been central to comprehensive emergency obstetric care, significantly reducing maternal mortality. Anemia, defined by WHO as hemoglobin ≤11 g/dL or hematocrit <32%, becomes clinically important when Hb falls below 10 g/dL, necessitating further evaluation and treatment.[3]

Obstetric conditions most commonly associated with severe bleeding include placenta previa, placental abruption, and uterine atony.[4] Study will enlighten the indications of transfusion in pregnant patients, the various components transfused, and also the transfusion reactions.

Protocols such as Massive Transfusion Protocols (e.g., PRBC:FFP:platelets ≈ 1:1:1) and fluid resuscitation are essential to avoid coagulopathy from large-volume crystalloid use.[5,6]

Studies from tertiary centers show transfusion rates ranging from ~1% to ~10% of obstetric patients, with anemia being the leading indication, followed by PPH and placental complications. Platelet transfusions are often required in cases of HELLP syndrome, preeclampsia, or obstetric hemorrhage. Transfusion in obstetrics is primarily driven by hemorrhage and anemia.

Other transfusion hazards persist including human error resulting in the inadvertent transfusion of incompatible blood, acute and delayed transfusion reactions, TRALI (transfusion related acute lung injury), TA-GVHD (transfusion associated-graft versus host disease), etc.[7]

Specific replacement therapy is possible as a result of process of fractionation. Blood should be processed for component separation within 6 hours of collection.[8]

A few common risk factors lead to tyransfusion of blood and components during pregnancy and labour, and these factors include abnormal placentation, uterine over distension, pre-eclampsia, DIC, and augmentation of labour and operative delivery including both instrumental or abdominal.[9-11]

Post-partum hemorrhage- is defined as blood loss of more than 500 ml in vaginal delivery and 1000 ml in cases of caesarean section.[12] The four leading causes of PPH are uterine atony, accounting for up to 80% of cases, as well as trauma, placental disorders, and coagulation defects, although PPH can also occur in women without any of these risk factors.The “four Ts”: tone, trauma, tissue, and thrombin.[13,14]As PPH accounts for up to one-third of maternal deaths in both developing and developed countries, it is of concern that its incidence is increasing.

METHODS

This was prospective observational study conducted in the department of obstetrics and gynecology, tertiary care center and medical college, Maharashtra, India. This study was conducted for 18 months from approval of ECARP (Ethics Committee of Academic Research Projects.

Inclusion criteria

Pregnant women ready to participate (18-40 yrs) and who will receive blood and blood product transfusion for various indications related to pregnancy during ante- natal, intrapartum/intra-operative or post-partum period.

Exclusion criteria

Women receiving blood or component transfusion for incidental or accidental causes, not related to pregnancy were excluded. Women receiving transfusion before diagnosis of pregnancy and/or before admission to hospital were also excluded. Women who received transfusion from outside and has been referred to our hospital for some reason were also excluded.

Sampling material and method

This is a prospective observational study carried out on 150 consecutive women admitted in department of obstetrics & gynecology; who received transfusion of blood and blood components at Topiwala National Medical College and BYL Nair Charitable Hospital. Ethical committee approval taken. And study period is January 2023-June 2024. Data regarding transfusion will be obtained from patient indoor sheets, ward admission record books and blood bank requisition form and records. These papers will be analysed for indications of transfusion, types of components used, number of units used, post-transfusion status or outcome of patients. Antenatal, labor, perinatal & postnatal records collected from PNC & labor wards of Dept of OBGY, Tertiary medical center & hospital.

Statistical analysis

Statistical analyses will be performed using Microsoft Excel 2021 software. Prevalence of the various variables and factors will be calculated and correlated with the incidence of blood and blood product transfusion and transfusion related reactions. Tests of significance will be applied to find out the significance factors. The level of statistical significance will be set at $p<0.05$. Appropriate statistical software, including but not restricted to MS Excel, SPSS version on 25.0 (SPSS stands for Statistical Product and Service Solutions) will be used for statistical analysis. Graphical representation will be done in MS Excel package included in Microsoft Office 365. An alpha value (p-value) of <= 0.05 will be used as the cut off for statistical significance. SPSS scale data analysis will be done by descriptive and inferential statistics using student t-test, Chi-Square test, and simple logistic regression analysis with p-value less than 0.05 as significant.

RESULTS

The study was conducted in the department of Obstetrics and Gynecology at tertiary care center. 150 women who received blood and blood product transfusion were included in the study. Indications of different component transfusion were studied and results are as follows. This was prospective observational study.

Among 150 patients in the study, majority of the patients (69) who received transfusion belonged to the age group of 21-25 years. The incidence of transfusion in the age group of <20 years was around 17.3%; in age group 26-30 years was around 25%. Only 18 patients who received transfusion were of >30 years (Table 1).

Out of the total 150 women, 53 were primigravida (35.3%) and remaining 97 were multigravida (64.7%) (Table 2).

In our study, out of total women who received transfusion, 69 (49%) had normal vaginal delivery. And around 68 (48.2%) women had undergone and LSCS. Thus,

suggesting a balanced approach between these two delivery methods in the study. And remaining 4 (2.8%) had an instrumental delivery (Table 3).

Table 1: Distribution of study subjects according to the age (n=150).

Age in years	Number	Percent
<=20	26	17.3
21-25	69	46
26-30	37	25
31-35	11	7.3
>35	7	4.6
Mean (SD)	25.26 (5.1)	
Range	16-51	

Table 2: Distribution of study subjects according to the parity (n=150).

Parity	Number	Percent
Primi	53	35.3
Multi	97	64.7

Table 3: Distribution of study subjects according to the mode of delivery (n=141).

Mode of delivery	Number	Percent
Vaginal	69	49
LSCS	68	48.2
Instrumental	4	2.8

Table 4: Distribution of study subjects according to the indication for blood transfusion (n=150).

Indication	Number (%)
Anemia	72 (48)
Nutritional anemia	60 (40)
Hemoglobinopathies	12 (8)
APH	13 (8.6)
Placenta previa	10 (6.6)
Abruption	3 (2)
PPH	19 (12.7)
Atonic	10 (6.6)
Traumatic	6 (4)
Adherent placenta	3 (2)
Ectopic pregnancy	7 (4.7)
Thrombocytopenia	30 (20)
Coagulopathy	22 (14.7)
Molar pregnancy	2 (1.3)

The most common indication for blood transfusion was anemia, accounting for nearly half of the cases (48%). Post partum hemorrhage accounted for 19 (12.7%) cases. Out of which uterine atony was the most common cause of post partum hemorrhage accounting for 10 (6.6%) cases. Traumatic PPH being the second most common cause accounting for 6 (4%) cases. Adherent placenta accounted for 3 (2%) cases. Thrombocytopenia and coagulopathy were significant indications, representing 20% and 14.7% of transfusions, respectively (Table 4).

Table 5: Distribution of study subjects according to the number of units transfused (n=150).

Number of units	PCV N (%)	FFP, N (%)	Platelet (RDP/SDP), N (%)	Cryo-precipitate
1	48 (32.0)	-	-	-
2	40 (26.7)	1 (0.7)	2 (1.3)	-
3	16 (10.7)	1 (0.7)	3 (2.7)	-
4	8 (5.3)	15 (10.0)	13 (8.7)	1 (0.7)
6	1 (0.7)	8 (5.3)	8 (5.3)	-
8	-	8 (5.3)	-	-
9	1 (0.7)	-	-	-
10	-	1 (0.7)	-	-
12	-	1 (0.7)	-	-
14	-	1 (0.7)	-	-
16	-	1 (0.7)	-	-
Total	114 (76.0)	37 (24.7)	30 (20.0)	1 (0.7)

Out of total 150 women in our study, about 114 (76%) women received PCV. Out of 150 patients, around 37 (24.7%) received FFP transfusion. Around 30 (20%) women received platelet transfusion. Only 1 (0.7%) woman received cryoprecipitate transfusion. Out of 76% women who received PCV transfusion, 32 % required 1 unit of PCV, 26.7% required 2 units of PCV, 10.7% received 3 units of PCV, 5.3% required 4 units of PCV and 0.7% required 6 units of PCV and 0.7 % received 9 units of PCV (Table 5).

The maternal outcomes of 150 women who received transfusion were as follows-majority of cases, 122 (81.3%), experienced a normal puerperium period. There were 9 cases (6%) of maternal mortality, reflecting significant adverse outcomes. 8 cases (5.3%) required an obstetric hysterectomy. Seven cases (4.7%) underwent

exploratory laparotomy, a surgical management of choice in cases of ectopic pregnancy. In 3 cases (2%), vaginal exploration was performed to diagnose or treat conditions affecting the vaginal area. The least common procedure, suction evacuation, was performed in 1 case (0.7%), which involves removing uterine contents via suction (Table 6).

Table 6: Distribution of study subjects according to the maternal outcome (n=150).

Maternal outcome	Number (%)
Normal puerperium	122 (81.3)
Mortality	9 (6)
Obstetric hysterectomy	8 (5.3)
Exploratory laparotomy	7 (4.7)
Vaginal exploration	3 (2)
Suction evacuation	1 (0.7)

Out of the total number of women who received transfusion in our study, there were nine (6%) maternal mortalities. The causes being as follows-acute blast crisis with AKI with septic shock in a known case of CML, acute liver failure, cardiogenic shock, AKI with septic shock, rupture uterus with necrotising fasciitis, DIC with septic shock, ARDS with septic shock, ARDS with asthma exacerbations, acute hepatic failure with AKI secondary to hepatitis with DIC.

Table 7: Distribution of study subjects according to transfusion reactions (n=150).

Reactions	Number (%)
None	141 (94)
Itching	4 (2.7)
Rash	2 (1.3)
Chills	2 (1.3)
Fever	1 (0.7)

The majority of transfusions were free of any adverse reaction. There were 4 cases (2.7%) where patients experienced itching as a reaction to the transfusion. Rash was reported in 2 (1.3%) cases. Chills were experienced by 2 (1.3%) cases. The least common reaction fever was observed in 1 (0.7%) case. There was no major transfusion reaction encountered in our study (Table 7).

DISCUSSION

46% of the total study population were in age group of 21-25 years while approximately 25% of them were in age group of 26-30 years, 17.3% were ≤20 years. Only 11.9% were >30 years. 35.3% were primigravidas, and 64.7% were multigravidas. 49% of the total study population had a vaginal delivery, 48.2% had LSCS, and 2.8% had instrumental deliveries. The most common indication of transfusion in study population was anemia (48%), including nutritional anemia (40%) and hemoglobinopathies (8%). Others included APH (8.6%), PPH (12.7%), thrombocytopenia (20%), and coagulopathy (14.7%). First trimester bleeding was seen in 6%, with ectopic pregnancy (4.7%) and molar pregnancy (1.3%). In our study population overall, PCV was most frequently transfused (76%) blood component. FFP was given to 24.7%, and platelets to 20%. Cryoprecipitate was used in 0.7% of cases. Out of all women who received PCV transfusion, 32% of them received single unit, 26.7% received two units, and the remainder received three or more units. 94% of transfusions had no adverse transfusion reactions. Mild reactions included itching (2.7%), rash (1.3%), chills (1.3%), and fever (0.7%). 81.3% of the study population had a normal puerperium period. Maternal mortality was 6%, with 5.3% requiring obstetric hysterectomy and 4.7% undergoing exploratory laparotomy.

Blood transfusion is a lifesaving intervention that is included in the WHO list of essential medications. The conditions requiring transfusion in obstetric patients need to be tackled very promptly to avoid maternal morbidity and mortality. The main causative factors for maternal mortality in India remain anemia, hemorrhage and sepsis.

Similar results were found in study conducted by Chahure et al most common indication of transfusion being anemia. Also similar results were seen in study by Rathod et al.[15,16]

In accordance with our study, study by Rathod et al also showed that majority of patients received PCV (47.3%). Similar results were seen in study by Renuka et al, wherein 61.6% women received PCV transfusion, 11.49% women received FFP, 18.6% women received Platelets and only 0.69% received cryoprecipitate.[16]

Study by Chawla et al, showed PCV transfusion in 79% women, FFP in 66% and platelets in 155 women. Study by Patel et al, also showed similar results, in their study 80% women received PCV transfusion whereas 20% received PCV with other components together.[17,18]

This study has few limitations. Since the study is conducted at a single tertiary care center, the findings may not be generalizable to other healthcare settings. Also availability of blood products, or institutional protocols might influence transfusion decisions and outcomes. The study may only evaluate short term maternal outcomes, without following patients longitudinally to assess long term effects of transfusion practices. The obstetric population in a tertiary center may include more high risk cases than in general settings, which may skew transfusion rates and indications.

CONCLUSION

The study highlights the critical role of blood transfusion in managing obstetric complications and its impact on maternal outcome. Majority of the patients receiving transfusion had inadequate or no antenatal care. Counselling and prevention of anemia since adolescence can reduce the prevelance of anemia in women who

become pregnant. Early and regular antenatal care, early diagnosis of anemia and its management, institutional delivery, active management of third stage of labour can reduce the rate of transfusion. Overall the study aligns with existing literature on the indications for transfusion and the demographics characteristics of patients but reveals some variations in outcomes compared to other studies. These findings stress the importance of personalized care and proactive management in obstetric settings to optimize both maternal and neonatal health. There is need for regular education and training of healthcare providers to be more stringent and prudent in recommending blood for transfusion.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Tuklia JA, Kore SJ. Observational study to analyse transfusion practices in obstetrics at tertiary care center in adult populations. Int J Reprod Contracept Obstet Gynecol 2025;14:3358-62.