

		ORIGINAL RESEARCH PAPER	Obstetrics & Gynaecology
		A RETROSPECTIVE OBSERVATIONAL STUDY “TO ANALYSE THE PATTERNS OF BLOOD TRANSFUSION AND BLOOD COMPONENTS TRANSFUSION IN OBSTETRICS AT TERTIARY CARE HOSPITAL	KEY WORDS:
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ABSTRACT	Objectives: This study was carried out to analyse the indications of transfusion of blood and blood components in obstetrics at a tertiary care hospital. Material and Methods: It was a retrospective study. Medical records and blood bank data was used to identify obstetric patients requiring blood transfusion over a period of 1 year Results: 129 women were recruited in our study who received blood and or blood product transfusion. The prevalence of blood transfusion in our study was 3.9%The use of transfusion products was observed more in parturients more than 30 weeks of gestation , PCV was the most frequently used (66.7%) followed by FFP(15.6%). The Number of high risk pregnancies was 69 Conclusion: This study highlights several key patterns in blood transfusion practices among obstetric patients. The findings indicate that moderate anaemia is the most common indication for blood transfusion, predominantly managed with Packed Cell Volume (PCV)		
	INTRODUCTION Among the eight core components of the Comprehensive Emergency Obstetric Care module, blood transfusion stands out as an indispensable lifesaving intervention in obstetric practice. (1) Among direct causes of maternal death, postpartum haemorrhage accounts for nearly 38% of all maternal mortalities, underscoring its critical public health burden. (2) In developing nations, the accessibility of blood transfusion services is shaped by a complex interplay of factors — inadequate infrastructure, economic constraints, and deeply embedded social and religious beliefs. These contextual differences result in transfusion practices that diverge considerably from patterns seen in resource-rich settings. Across obstetric units, transfusion rates have been reported to range between 0.6% and 6% (3). Within India, haemorrhage — spanning a broad range of presentations and aetiologies — continues to be a leading direct driver of maternal mortality, contributing to approximately 13% of such deaths. (3) Blood transfusion, when clinically warranted, is a routinely performed and broadly accepted intervention. Yet, as with any medical procedure, it carries the potential for adverse effects. Clinicians must remain alert to this entire range — from mild febrile or allergic reactions to rare but life-threatening anaphylaxis. Although whole blood was once considered optimal for transfusion, contemporary practice relies predominantly on component therapy. Commonly used products include Packed Red Blood Cells (PRBCs), Fresh Frozen Plasma (FFP), platelet concentrates, cryoprecipitate, and individual factor concentrates, with one unit of PRBCs constituting a standard transfusion episode. (4) Maternal mortality rate (MMR) in India has declined from 130 in 2014-2016 to 88 in 2022 (SPECIAL BULLETIN ON MATERNAL MORTALITY IN INDIA2021-23 SAMPLE REGISTRATION SYSTEM released in September 2025) The leading cause is post-partum haemorrhage. Pregnancy, although a physiological state, can turn pathological suddenly and unexpectedly if not diagnosed and treated early. Common obstetric emergencies that require blood and blood component transfusions are acute blood loss in the first half of pregnancy due to conditions like complications of abortions, ectopic pregnancy rupture, and vesicular mole. In the latter half of pregnancy, there can be haemorrhage due to placenta previa or accidental haemorrhage. During labour,		
	women may present with severe anaemia and may develop third-stage haemorrhage or other complications resulting in severe blood loss and sudden deterioration in general condition. Immediate and rapid replacement of sufficient and safe blood and its components becomes essential to save the lives of women. Because of improvements in the health care structure and the availability of blood and its components, maternal mortality has been reduced. Anaemia of pregnancy is defined as haemoglobin concentration <11g/dl in the 1st and 3rd trimester and below 10.5 g/dl in the 2nd trimester (5). Early correction of anaemia avoids the need for transfusion and reduces maternal mortality. The decision of transfusion should be made on both clinical and haematological grounds. Postpartum haemorrhage and anaemia are the two major factors requiring blood transfusion. Materials and methods A retrospective observational study spanning one year was undertaken at a tertiary care hospital. Relevant data were sourced from the hospital's clinical records and blood bank documentation, following due approval from the institutional ethics committee. Duration: 1 year from October 2023 to October 2024. All Women who were transfused with Packed cell volume (PCV), whole blood, platelets, coagulation factors, and fresh frozen plasma (FFP) are included in this study, and clinical examination was added in Case record forms during pre-, intra-, and post-transfusion. Data pertaining to the prevalence of blood transfusion use, the clinical indications for transfusion, and the nature of any adverse transfusion reactions were systematically examined and analysed. Ethics approval -Institutional Ethics Committee registration number. EC/154/2023 Consent of participation was waived off due to a Retrospective type of study. Data was entered into a Microsoft Excel data sheet and was analysed using SPSS22 version software. Categorical data was represented in the form of frequencies and proportions. Chi-square was used as a test of significance. Continuous data was represented as mean and standard deviation. p-value <0.05 was considered significant. Inclusion Criteria		
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1. All the primigravidae or multigravida (2nd and 3rd trimester of pregnancy) with APH*, IPH*, and PPH.*
2. ANC * patients with anemia (moderate and severe-ICMR* CLASSIFICATION) in 2nd and 3rd trimester
3. Surgical Procedures: Caesarean section, Manual removal of placenta.

Exclusion Criteria

1. Gynaecological cases
2. Medical termination of pregnancy
3. First-trimester bleeding
4. Mild anemia (>10G-10.9/DLICMR)
5. Molar pregnancy
6. Unusual blood groups- Lutheran, Kell, Lewis, Duffy
7. Ectopic pregnancy
8. Hemoglobinopathies

RESULTS

- Amongst the 3276 obstetric admissions from outpatient and in patient department 129 women were recruited in our study who received blood and or blood product transfusion. The prevalence of blood transfusion in our study was 3.9%
- Severe anemia in our study was noted in 14% of parturient and moderate anemia 65.9% (Hb 7-10)(Table 1)
- Mean age of study participants in our study was 30.5 years, ranging from 19 to 45 years,
- This study included nearly equal proportions of primiparous (48.8%) and multiparous (51.2%) women a balanced representation of first-time and experienced mothers. (Table 2-B)
- Majority of the study participants were in the third trimester of pregnancy, with 82.2% beyond 30 weeks of gestation, reflecting a focus on third trimester. (Table 2 -C) (>35weeks)
- The high risk pregnancies which needed blood transfusion in our study were 69(53.5%) (Table-3)
- As per the categorisation of medical (n=45) and obstetric comorbidities, (n=24) the most common indication for blood transfusions among medical comorbidities was hypertensive disorders of pregnancy (n=22 i.e. 48.88%) This was followed by Gestational diabetes, elderly gravida, ART conceptions. There were 4 (8.88%) women who had DVT
- The etiology of obstetric comorbidities (n=24 i.e. 34.78%) included in our study was placental causes of blood transfusion were due to placenta previa (9) and placenta accreta (3)
- 4 cases which required blood transfusion had undergone previous Caesarean section and 1 had previous myomectomy done
- Our study suggests that patients without a prior history of blood transfusion are more likely to receive PCV and FFP, while Cryoprecipitate is rarely used. (Table 4-A)
- The majority (66.7%) received one pint of packed cell volume (PCV), followed by FFP (15.6%) The least used among the transfusion products was Cryoprecipitate. (0.8%) with varying needs for additional transfusion components, reflecting individualized transfusion practices. (Table 4-A)
- Most commonly used transfusion product was PCV (106) followed by FFP. (1)

- Further details of number of individual transfusion products with the frequency of use shown that the 1 PCV used in 86 cases, 2 PCV in 36 cases, 3 PCV in 5 and 4 PCV in 2 parturients.
- 2 FFPs were commonly used in our study The difference in the specific transfusion products in our study showed that PCV was used more than FFP and cryoprecipitate (p value <0.05)
- On analysing the transfusion details and their correlation with grades of anaemia had shown 17 PCVs, 11 Fresh Frozen Plasma (FFP) were used for parturient with severe anaemia 106 women with moderate anaemia needed PCV and none from moderate anemia group needed FFP and Cryoprecipitate. Applying chi square test, p=0.01. as p value is <0.05, which shows statistical significance. (Table 4 B)
- The table 4 B shows the proportions of different types of blood products cross tabulated with the grades of anaemia.:
- The individual proportion of transfusion products in our study had shown packed RBC transfusion rate significantly high as compared to FFP and Cryoprecipitate.
- The analysis of women who had been transfused for anemia due to haemorrhage were classified as Antepartum and postpartum haemorrhages
- The number transfusions of PCV in women due to abruption of placenta were 12 and that due to placenta previa were 11.
- postpartum haemorrhage were 15
- Number of FFP transfusions needed for APH due to abruption of placenta were 9, placenta previa were 6 and those due to postpartum haemorrhage were 3.
- The number of cryoprecipitate needed for APH patients were 3 for Abruptio of placenta, 1 for placenta previa, 3 for postpartum haemorrhage
- No adverse reactions were reported among the 129 participants, indicating the safety of transfusion practices in this study population.
- The study data shows that patients without a history of blood transfusion predominantly received Packed Cell Volume (PCV), with 101 out of 119 cases, compared to only 28 patients with a previous transfusion.
- Fresh Frozen Plasma (FFP) is also more commonly administered to those without a history of transfusion, with 13 cases versus 2 cases among those with prior transfusions.

Table 1 Hemoglobin levels cut offs

Anemia grade	ICMR Hb (gm/dl)	N Frequency in study population	WHO (Hb- gm/dl)	WHO	
				TRIMESTER OF PREGNANCY	HB
Mild	10-10.9	Not included in study	10-10.9	FIRST	<11
Moderate	7-10	85(65.9)	7-9.9	SECOND	<10.5
Severe	<7.0	14(10.9)	4-6.9	THIRD	
Very severe	<4	0	<4		

2 EPEDEMOLOGY

A) Age distribution among the study population

Age in years	Frequency	Percentage
<20	1	0.8
21 to 25	16	12.4
>25	112	86.8
Total	129	100

B) Parity distribution among the study population

Parity	Frequency	Percentage
Primipara	63	48.8
Multipara	66	51.2
Total	129	100

C) Gestational Age distribution among the study population

Gestational age in weeks	Frequency	Percentage
14-24wks	6	4.7
24.1 to 30	17	13.2
>30	106	82.2
Total	129	100

3. Comorbidities among the study population

Co morbidities	N=69	Percentage (53.5)
A Medical Comorbidities		
n=45(65.1%)		
HDP	22	48.88
Gestational Hypertension	3	6.66
Pre eclampsia	16	35.55
Chronic HTN	3	6.66
Gestational Diabetes	6	13.33
ART conceptions	6	13.33
Rh negative pregnancy	2	4.44
Elderly gravida	5	11.11
DVT	4	8.88
B OBSTETRIC Comorbidities		
n=24(34.78%)		
Twins	7	29.16
Placenta previa	9	37.5
Placenta Acreta	3	12.5
Previous LSCS	4	16.66
Previous Uterine fibroid surgery	1	4.16
Total (Medical and Obstetric comorbidities)	69(45+24)	53.5

Transfusion details among study population

A) Transfusion product and number used				
Transfusion product	Amount of product	Frequency	Percentage	Pvalue <0.05
PCV	1	86	66.7	
	2	36	27.9	
	3	5	3.9	
	4	2	1.6	
FFP	2	14	10.9	
	3	1	0.8	
	4	5	3.9	
Cryoprecipitate	2	1	0.8	
B) Transfusion product and grade of anemia				
Transfusion Product		Moderate anemia (ICMR)	Severe anemia (ICMR)	P value
PCV	106	17	<0.05	
FFP	0	11		
CRYOPRECIPITATE	0	0		
C) Anemia due to hamorrhage				
Transfusion product	APH	PPH		
	Abruptio placenta	Placenta previa		

PCV	12	11	15	
FFP	9	6	3	
CRYOPRECIPIT ATE	3	1	3	0

DISCUSSION

Anaemia continues to pose a formidable challenge to obstetricians and is widely recognised as a foremost contributor to maternal morbidity and mortality worldwide. Within the framework of Comprehensive Emergency Obstetric and Newborn Care (EmONC), blood transfusion holds a pivotal role as a key signal function in addressing direct obstetric causes of maternal death.(1)

The prevalence of anemia in pregnancy in India is 52.2%, as evident from recent data by MOHFW*(2019-2021) (6)

Acute blood loss before, during, and after pregnancy can deteriorate the woman rapidly. In India, the current contribution of obstetric hemorrhage leading to maternal mortality as a cause is around 37%.(6)

The Mortality resulting from hemorrhage is preventable, owing to many strategies to maintain adequate levels of hemoglobin in the antenatal period to combat anemia in pregnancy, and prevent blood loss in the intrapartum and postpartum periods.

However, the decision of blood and component transfusion remains a key element in the management of Obstetric emergencies like antepartum, postpartum haemorrhages, moderate and severe anemia. As per 2019 estimates, anaemia affected 29.9% of women in the reproductive age group globally, with a slightly lower rate of 29.6% among non-pregnant women. The burden was notably higher among pregnant women, at 36.5%. More recent analyses indicate that approximately 45.2% of pregnant women in low- and middle-income countries are anaemic. Addressing this, the WHO Global Nutrition Targets have set an ambitious goal of halving anaemia prevalence among women of reproductive age by 2025.(7)

Nationally representative survey data point to a meaningful decline in anaemia prevalence among pregnant women, from 52.2% to 47.1% between 2019 and 2020. Notably, the reduction in severe anaemia was most pronounced in the third trimester, where rates fell from 3.3% to 1.2%.

This study was conducted to highlight the important role of Blood and blood component transfusion. As the pregnant woman approaches the term, the need for blood transfusion increases to combat moderate and severe anemia.(8)

The antenatal care and vigilance to optimize haemoglobin levels are crucial to reduce anemia in pregnancy. The prevalence of Severe anemia in our study 14%, and Moderate anemia 65.9% (Table 1), showing the inclination towards the threshold of transfusion to guard the mother from further clinical deterioration.

The more prevalent transfusion rates for parturients with moderate anemia were observed in CDSR* 2016 as a restrictive threshold for RBC transfusion.(9)

There are varied trends (0.16% and 6%) observed in the blood transfusion practices across India (10)

Though the guidelines are being accepted, there is no single recommendation to measure the degree and rate of appropriateness for transfusion in obstetrics.(11)

The conditions during pregnancy that require blood transfusion are correction of moderate or severe anemia in a woman nearing term (37 weeks), acute blood loss due to

intrapartum and postpartum hemorrhage, preeclampsia, Abruptio of the placenta in the first trimester, causes like ruptured ectopic pregnancy, bleeding due to abortions.

The 10 commandments for the transfusion practices in medicine stringently and more specifically advise to balance the risk-to-benefit ratio. The key decision in giving the blood transfusion should not be the laboratory parameters like Hemoglobin; in fact, it should be based on a comprehensive medical assessment, clinical profile, hemodynamic instability, and risk of ongoing or recurrent bleeding.

The mean age of study participants in our study was 30.5 years, ranging from 19 to 45 years, indicating the predominance of the recruited population was in the reproductive age group (Table 2-A)

This was comparable to a study done by Gulucu et al (12) in which the study population was from a similar range. As this correlates with the childbearing age group, it justifies the need for pregnancy-related transfusions. Studies done by Chawla et al (21-30 years) (10) and Fazal et al (20-29 years) (13) had recruited participants from the same age years 13

A recent cross-sectional study done by Kumar et al. (2023) showed that the proportion of multigravida and primigravida was also similar to that observed in our study. (11)

The majority of the study participants were in the third trimester of pregnancy, beyond 30 weeks of gestation, reflecting a blood transfusion practice inclination towards the third trimester. (Table 2 -C) (>35weeks) This inclination towards the term gestation highlights the prompt anticipation and management of obstetric haemorrhages. (14)

The preexisting medical, obstetric risk factors like preeclampsia, Twin gestations, Placenta previa, placenta accreta, and abruptio of the placenta, which were observed in our study, mandated the blood transfusion strategies and protocols as a mainstay of the management. (Table 3)

The high prevalence of preeclampsia in our study encompasses its vast pathognomic spectrum from antepartum, intrapartum, and postpartum hemorrhages as well as placental abruptio. (Table 3A)

The obstetric risk factors, like the abnormal placental insertions (Placenta previa, placenta accreta, Table 3B), itself necessitate a high probability of blood and blood component transfusion. The anticipation of the need for transfusion curtails the maternal morbidity and mortality to a great extent.

The Placenta previa care bundle, which is a set of standards and protocols, highlights the importance of liaison of blood transfusion practices with the focus of anticipation, clinical monitoring, risk evaluation, and multidisciplinary care in cases of placenta previa and placenta accreta (15)

There are varying trends in transfusion (16,17) practices which have been highlighted in a study by Rashmi S et al., which showed the use of PCV transfusion been 85%.

Table 4-A

The transfusion products were used more for moderate anemia(106 PCV) as compared to the severe anemia group. This observation can highlight the clinical decision of flexibility of threshold for blood transfusion before clinical deterioration to the critical stage (Table 4B) (16)

For PPH 48.7% parturients received transfusion (33 PCV, 15FFP,1 CP) (TABLE 4-C)

The categorisation of obstetric haemorrhages into antenatal, postnatal, and the usage of blood and components has shown

more use of PCV as compared to FFP and cryoprecipitate, which signifies that volume resuscitation is the initial important step, followed by coagulopathy. (18,19)

Table 4B shows the indications for different types of blood products used:

Moderate Anaemia (WHO classification): Predominantly treated with Packed Cell Volume (PCV), with 85 cases. No use of Fresh Frozen Plasma (FFP) or Cryoprecipitate for this condition. (p=0.01, as p value is <0.05), which shows statistical significance. (20,21)

The individual proportion of transfusion products in our study showed a significantly high packed RBC transfusion rate, significantly higher than FFP and Cryoprecipitate.

In a study done by Parul et al., packed RBC was the most used transfusion product. (54%) (22)

In a study done by Parul et al., packed RBC was the most used transfusion product. (54%)

The blood transfusion services more commonly use whole blood, packed red blood cells (PRBC), and, less commonly, use products like FFP, cryoprecipitate, and platelet concentrates.

The blood transfusion protocols must be compliant with maintaining the balance between patient safety and clinical condition. (23)

The adverse reactions of blood transfusion should be promptly detected and reported with the appropriate submission of forms and blood and urine samples. (24)

Strength of the study

Because of the improvement of ANC care, we observed that moderate anaemia requiring transfusion is statistically significant(p<0.00001) compared to severe anaemic patients. This implies that practices of transfusion threshold are not letting the women deteriorate until severe anaemia develops, which is detrimental to maternal health.

The number of moderate anaemia patients who required transfusion is, which indicates early detection and individualised clinical decision for transfusion.

LIMITATIONS OF THE STUDY

Sample Size and Scope: As this investigation was carried out at a single tertiary care institution, the extent to which its findings can be extrapolated to other clinical environments or more diverse patient populations remains inherently limited.

RECOMMENDATIONS

Enhanced Monitoring and Protocols: Future studies should aim for larger, multi-centric trials to validate the findings and develop more refined transfusion protocols.

Comprehensive Data Collection: Collecting more detailed data on comorbidities, dietary habits, and clinical outcomes will help in understanding the broader implications of transfusion practices.

CONCLUSION –

This study focuses on the clinical trends of Blood transfusion practices. The threshold of transfusion is always a clinical decision. The need for curtailing the need for blood transfusion lies in the appropriate antenatal care for the prevention and treatment of anaemia at the earliest.

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