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Original Research Article

A retrospective study of blood transfusion practices in obstetrics at Hassan Institute of Medical Sciences

Poornima H. N., Nayanashree V.*, Ranjitha G. V.

Department of Obstetrics and Gynaecology, Hassan Institute of Medical Sciences, Hassan, Karnataka, India

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***Correspondence:**

Dr. Nayanashree V.,

E-mail: nayanashreev@gmail.com

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ABSTRACT

Background: Blood transfusion is an integral component of obstetric care and an important indicator of maternal morbidity management. Obstetric hemorrhage remains a leading cause of maternal mortality worldwide. Common causes of transfusion in obstetrics include postpartum hemorrhage, antepartum hemorrhage, abortion, ectopic pregnancy, anemia, and coagulation disorders. Evaluating transfusion practices helps assess institutional quality of care.

Methods: A retrospective analysis was conducted of obstetric patients admitted to the OBG Department at Hassan Institute of Medical Sciences from 2021–2022. Data were obtained from blood transfusion registers, ICU and HDU admission records, anemia registers, and complication registers to evaluate transfusion indications and patterns.

Results: A total of 475 patients in 2021 and 435 in 2022 required blood transfusion, showing an 8.4% reduction in 2022. Anemia in pregnancy was the leading indication (39.8% in 2021; 36.8% in 2022), followed by abortion (22.9% and 25.3%). Postpartum hemorrhage accounted for 10.7% and 10.1% of cases, respectively. Overall, 706 units of blood products were transfused in 2021 compared to 649 units in 2022. Packed red blood cells constituted the majority of transfusions (78.7%), followed by platelet concentrates (10.2%) and fresh frozen plasma (8.6%).

Conclusions: Maternal anemia and obstetric hemorrhage remain the predominant indications for transfusion. Strengthening antenatal anemia management, early risk identification, and appropriate blood component therapy are essential to further reduce transfusion requirements and improve maternal outcomes.

Keywords: Blood transfusion, Postpartum hemorrhage, Anemia, Ruptured ectopic

INTRODUCTION

Blood transfusion remains a cornerstone of modern obstetric care, particularly in the prevention and management of maternal morbidity and mortality associated with obstetric hemorrhage.¹ Despite significant advances in antenatal surveillance, surgical techniques, and critical care, obstetric hemorrhage continues to be one of the leading causes of maternal death worldwide.² According to the World Health Organization, postpartum hemorrhage accounts for a substantial proportion of maternal deaths, especially in low- and middle-income countries.³ Timely and appropriate blood transfusion can be life-saving in such scenarios; however, inappropriate

use carries its own risks, including transfusion reactions, transmission of infections, alloimmunization, volume overload, and increased healthcare costs. Therefore, understanding transfusion practices and evaluating their outcomes is critical for improving maternal care.

In obstetrics, blood transfusions are commonly indicated in conditions such as postpartum hemorrhage, antepartum hemorrhage, placenta previa, placental abruption, ruptured ectopic pregnancy, uterine rupture, and severe anemia complicating pregnancy.⁴ Blood transfusion decisions depend on several factors such as the patient's hemodynamic condition, hemoglobin level, ongoing blood loss, comorbidities, and institutional guidelines. However, differences in clinical judgment and the lack of clear

transfusion thresholds in some settings may result in variable practices.

The shift from whole blood transfusion to component therapy—such as packed red blood cells, fresh frozen plasma, platelets, and cryoprecipitate—has significantly improved targeted management of obstetric hemorrhage.⁵ Evidence-based protocols, including massive transfusion protocols and patient blood management strategies, have further optimized outcomes by promoting rational use of blood products.⁶ Evaluating real-world practices at tertiary care centers helps identify gaps in current management, limitations in available resources, and areas where patient care can be improved. Studying blood transfusion practices in obstetrics is important to understand how transfusions are used in clinical settings and whether they follow recommended guidelines. Such studies can also help promote rational use of blood, improve maternal outcomes, and support better planning of blood bank resources.

Hassan Institute of Medical Sciences is a tertiary care teaching hospital that serves a large population from both urban and rural regions. Being a referral center, it frequently manages high-risk pregnancies and obstetric emergencies, making it a suitable place to evaluate blood transfusion practices in obstetrics.

A retrospective study conducted at this institution can provide valuable information on how often transfusions are given, the common indications for transfusion, the types and amounts of blood components used, and the clinical thresholds that prompt transfusion. It can also help assess the related maternal and perinatal outcomes. Collecting and analyzing such data is important to determine whether transfusions are being used appropriately and to understand their effect on maternal morbidity and mortality.

This study aims to retrospectively evaluate blood transfusion practices in obstetric patients at Hassan Institute of Medical Sciences and to analyze their clinical outcomes. The findings of this study are expected to contribute to the growing body of evidence on obstetric transfusion practices. Ultimately, optimizing transfusion practices through regular audits and evidence-based protocols can enhance patient safety, improve resource utilization, and reduce preventable maternal morbidity and mortality.⁷

METHODS

Study type, place and duration

Current study was a retrospective analytical study conducted at department of Obstetrics and Gynaecology, Sri Chamarajendra hospital, Hassan Institute of medical sciences, Hassan, Karnataka from January 2021 to December 2022.

Inclusion criteria

All the pregnant patients who received blood and blood products therapy in the Department of Obstetrics and Gynaecology, Sri Chamarajendra Hospital, Hassan Institute of Medical Sciences, Hassan, Karnataka from January 2021 to December 2022.

Exclusion criteria

Severe cardiac disease patients and patients with contraindications for blood and blood products transfusion.

Procedure

Retrospective analysis of data of obstetrics patients admitted at Hassan Institute of Medical Sciences Obstetrics and Gynaecology Department with details available in the blood transfusion register, ICU and HDU admission register, anaemia register and complication register from January 2021 to December 2022, to study the blood transfusion practices.

Statistical analysis

Data will be collected and it will be exported to Microsoft Excel sheet version 16.2.

For statistics analysis, statistical package for the social sciences (SPSS) software version 20.0 will be used.

Results will be tabulated using graphs, pie charts and bar diagrams. Results will be calculated in percentages.

RESULTS

A total of 475 cases in 2021 and 435 cases in 2022 required blood and blood product transfusion, representing an overall decrease of 8.4% in 2022. Majority of patients who received transfusion were 20-30years of age with about 62.5% of the total in 2021 and 69.1% in 2022 as shown in Table 1. Anemia in pregnancy was the leading indication in both years, accounting for 189 cases (39.8%) in 2021 and 160 cases (36.8%) in 2022, although a reduction was observed in the second year as shown in Table 2. Abortion was the second most common indication, with 109 cases (22.9%) in 2021 and 110 cases (25.3%) in 2022, showing a slight increase. Postpartum hemorrhage accounted for 51 cases (10.7%) in 2021 and 44 cases (10.1%) in 2022, while ruptured ectopic pregnancy contributed 44 cases (9.3%) in 2021 and 38 cases (8.7%) in 2022. Antepartum hemorrhage increased slightly from 38 cases (8.0%) in 2021 to 41 cases (9.4%) in 2022. Molar pregnancy cases rose from 22 (4.6%) in 2021 to 26 (6.0%) in 2022, and haematoma cases increased from 6 (1.3%) to 8 (1.8%). Conversely, cases of ruptured uterus declined from 4 (0.8%) to 2 (0.5%), HELLP syndrome from 4 (0.8%) to 2 (0.5%), and thrombocytopenia in pregnancy from 8 (1.7%) to 4 (0.9%) as shown in Figure 1.

Table 1: Age wise distribution of patients who received blood transfusion in 2021 and 2022.

Age group (years)	Year 2021	Year 2022
<20	12	21
20-30	297	301
30-40	161	109
>40	5	3
Total	475	435

Table 2: Comparison of indications for blood and blood products transfusion in the year 2021 and 2022.

Indication for blood and blood products transfusion	Year 2021 (cases)	Year 2022 (cases)
Abortion	109	110
Rupture uterus	4	2
Antepartum hemorrhage	38	41
Ruptured ectopic	44	38
Postpartum hemorrhage	51	44
Molar pregnancy	22	26
Haematoma	6	8
Anemia in pregnancy	189	160
HELLP syndrome	4	2
Thrombocytopenia in pregnancy	8	4
Total	475	435

Overall, anemia in pregnancy and abortion together accounted for more than half of all transfusion cases in both years, highlighting obstetric-related conditions—particularly anemia and hemorrhagic complications—as the predominant indications for blood and blood product transfusion.

A total of 706 units of blood products were transfused in 2021 compared to 649 units in 2022 as shown in Table 3. Packed red blood cells constituted the majority of transfusions in both years, with 587 units in 2021 and 479 units in 2022, accounting for 78.7% of all transfused products overall. Platelet concentrates were the second most commonly transfused component, increasing from 61 units in 2021 to 76 units in 2022 (10.2%) as shown in Figure 2. The use of fresh frozen plasma also increased from 54 units in 2021 to 92 units in 2022 (8.6%). Whole blood was the least utilized component, with only 4 units transfused in 2021 and 2 units in 2022 (0.5%). Overall, component therapy—particularly packed red blood cells—was the predominant type of transfusion in both years.

A total of 706 units of blood products were received in 2021 compared to 649 units in 2022, indicating a decline in overall supply in 2022. In 2021, the highest number of units was recorded in May (76 units), followed by November (70 units) and August (68 units), while the lowest was in April (26 units). In 2022, the peak occurred in March (72 units) and September (71 units), with the lowest number recorded in February (29 units). Although monthly fluctuations were observed in both years, the overall trend shows a modest reduction in total units received in 2022 compared to 2021 as shown in Table 4.

Table 3: Units of blood and blood products transfused.

Type of blood product transfused	Units		Percentage
	2021	2022	
Whole blood	4	2	0.5
Packed red blood cells	587	479	78.7
Platelet concentrate	61	76	10.2
Fresh frozen plasma	54	92	8.6
Total	706	649	100

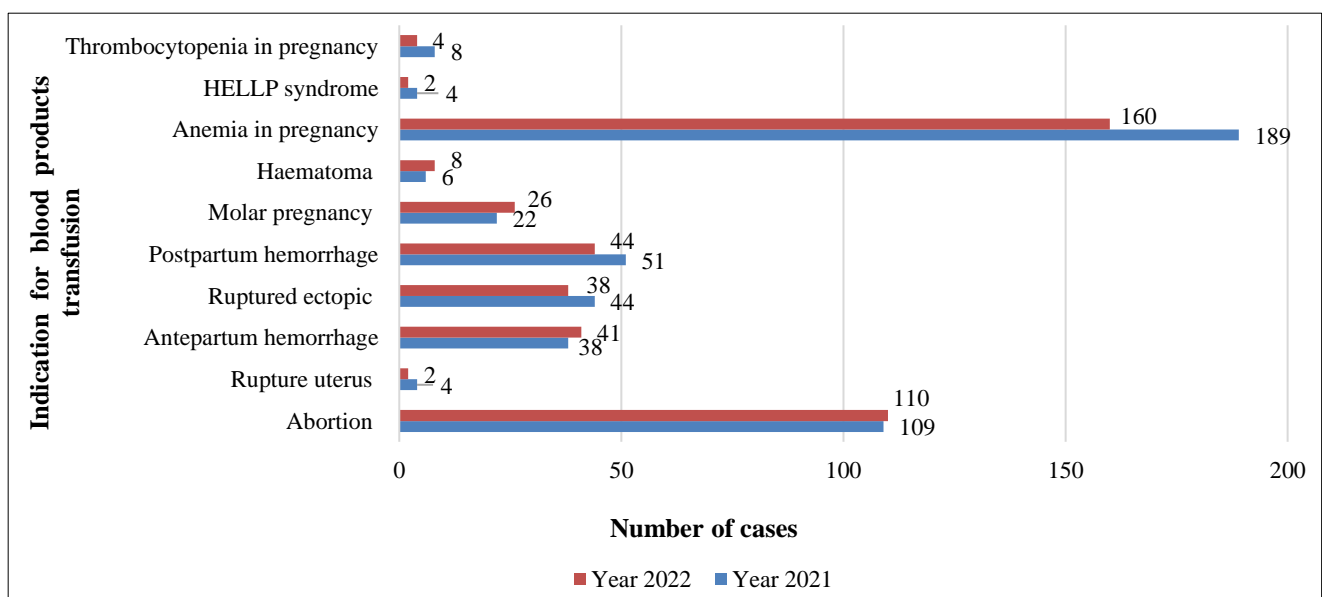


Figure 1: Comparison of indications for blood and blood products transfusion in the year 2021 and 2022.

Table 4: Comparison of total units of blood and blood products transfused in 2021 and 2022.

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total units of blood products received	2021	58	49	63	26	76	65	64	68	57	64	70	35	706
	2022	49	29	72	35	58	53	60	49	71	59	64	50	649

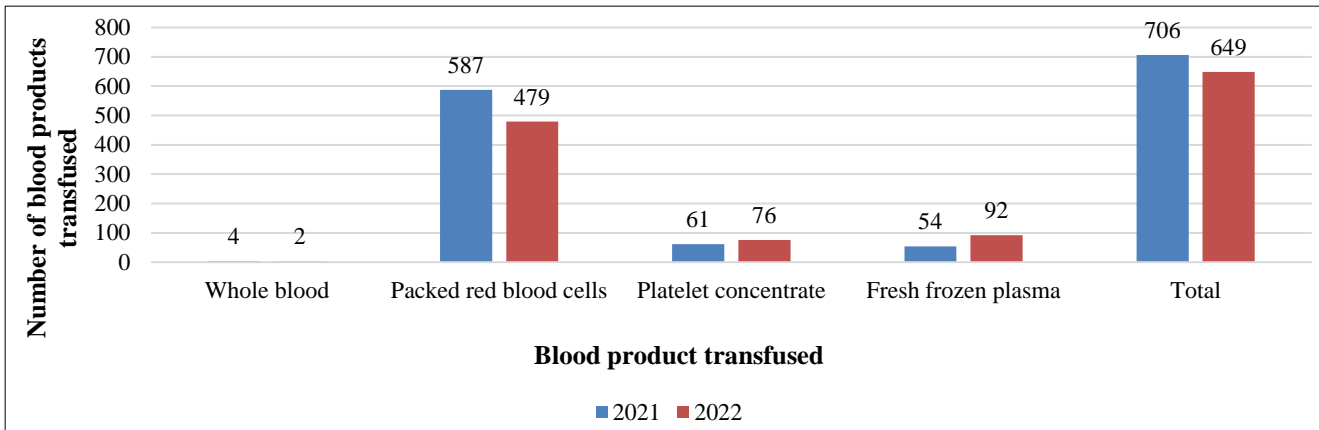


Figure 2: Different blood products transfused in 2021 and 2022.

DISCUSSION

The present study demonstrated a decline in transfusion cases from 475 in 2021 to 435 in 2022, with anemia in pregnancy remaining the leading indication in both years (39.8% and 36.8%, respectively). Similar findings have been reported by Kalaivani et al, who identified maternal anemia as a major contributor to obstetric transfusion in developing countries due to high background prevalence and inadequate antenatal correction.⁸ Likewise, Bencaiova et al reported that anemia significantly increases the likelihood of peripartum transfusion, particularly in women with moderate to severe anemia.⁹

Abortion was the second most common indication in this study, accounting for approximately one-quarter of transfusion cases. Comparable proportions were reported by Bates et al, who noted that complications of abortion substantially contribute to transfusion needs in resource-limited settings.¹⁰ In contrast, studies from high-income countries report lower proportions of abortion-related transfusions, likely reflecting safer abortion services and earlier interventions.

Postpartum hemorrhage (PPH) accounted for 10.7% and 10.1% of cases in 2021 and 2022, respectively, which is lower than proportions reported in some tertiary hospital-based studies. For example, Green et al observed that PPH was the leading cause of massive transfusion in obstetric patients, representing the majority of acute transfusion episodes.¹¹ Similarly, Shields et al emphasized that PPH remains the primary indication for emergency blood component therapy in obstetrics.¹² The relatively lower proportion of PPH-related transfusion in the present study may reflect effective active management of the third stage of labor or differences in case mix.

Regarding blood components, packed red blood cells (PRBCs) constituted 78.7% of all transfused units in this study, consistent with findings by Murphy et al, who reported PRBCs as the most frequently used blood component in obstetric transfusion practice.¹³ The increased use of fresh frozen plasma and platelet concentrates in 2022 aligns with recommendations for balanced component therapy in obstetric hemorrhage, as described by Charbit et al, who highlighted the importance of early plasma replacement in severe hemorrhage.¹⁴ Green et al also documented rising use of plasma and platelets in massive transfusion protocols for obstetric bleeding.¹¹

The overall reduction in total units transfused in 2022 (649 versus 706) may suggest improved transfusion practices, better antenatal anemia management, or adherence to restrictive transfusion thresholds. Similar downward trends in transfusion rates following implementation of updated obstetric blood management protocols have been reported by Patel et al.¹⁵

In summary, the findings of this study are largely consistent with existing literature, which identifies anemia and obstetric hemorrhage as the principal drivers of transfusion in obstetrics. However, the proportionate contribution of each indication varies across settings, likely reflecting differences in healthcare access, antenatal care quality, and institutional transfusion policies.

CONCLUSION

This study demonstrated that obstetric-related conditions remain the principal indications for blood and blood product transfusion, with anemia in pregnancy and hemorrhagic complications accounting for the majority of

cases in both years. Although a modest reduction in transfusion cases and total units was observed in 2022, packed red blood cells continued to constitute the predominant component used, reflecting adherence to component therapy practices. The findings highlight the ongoing burden of maternal anemia and obstetric hemorrhage and underscore the importance of strengthening antenatal anemia management, early identification of high-risk pregnancies, and optimized blood component utilization to further reduce transfusion requirements and improve maternal outcomes.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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