Section: Obstetrics and Gynaecology

Original Research Article

BURDEN AND CLINICAL PROFILE OF PERIPARTUM BLOOD TRANSFUSION IN A TERTIARY OBSTETRIC CARE UNIT: RETROSPECTIVE STUDY OBSERVATIONAL STUDY

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ABSTRACT

Background: Peripartum blood transfusion is an important indicator of obstetric morbidity and provides useful information regarding maternal-care needs and transfusion-service utilization in tertiary care centres. Data on its burden from South Indian teaching hospitals remain limited. The objective is to determine the prevalence of peripartum blood transfusion and to describe the demographic profile, indications, transfusion characteristics, and maternal-neonatal outcomes of transfused women at a tertiary care teaching hospital.

Materials and Methods: A retrospective study was conducted among eligible women who delivered at the institution and received at least one unit of blood or blood component during the defined peripartum period between January and December 2025. Data were extracted from hospital records and analyzed descriptively.

Results: Forty-six women received a peripartum blood transfusion out of 705 total deliveries during the study period, giving a prevalence of 6.5% (65.2 per 1000 deliveries; approximately 1 in 15 deliveries). The mean maternal age was 25.7 ± 4.1 years, and 56.5% were multigravidae. Among the 46 women who received peripartum blood transfusion, postpartum haemorrhage was the leading indication (60.8%), predominantly due to uterine atony (26.1%), followed by antenatal or pre-existing anaemia (37.0%). Antepartum haemorrhage due to placental abruption accounted for 2.2% of cases. Transfusion was most often intrapartum (54.3%) or postpartum (34.8%). Mean pre-transfusion haemoglobin was 9.9 ± 1.5 g/dl and rose to 10.8 ± 1.4 g/dl post-transfusion. Most women (89.1%) received packed red cells alone, and 69.6% required only a single unit; two women (4.3%) needed massive/multi-component transfusion. The mean hospital stay was 5.5 ± 3.5 days, and 95.7% of women were discharged stable, with 4.3% requiring intensive care; there were no maternal deaths. Preterm birth occurred in 32.6% of neonates and low birth weight (<2.5 kg) in 15.2%.

Conclusion: Nearly 1 in 15 women delivering at this centre required a peripartum blood transfusion, driven chiefly by postpartum haemorrhage and antenatal anaemia. Strengthening antenatal anaemia correction and active management of the third stage of labour, together with a reliable blood-bank interface, may help reduce this burden.

Keywords: Peripartum blood transfusion, Postpartum haemorrhage, maternal anaemia, prevalence, tertiary care, obstetric morbidity.

INTRODUCTION

Blood transfusion in the peripartum period — encompassing the antepartum, intrapartum, and postpartum windows — remains one of the most common life-saving interventions in obstetric practice and is frequently used as a proxy indicator of severe maternal morbidity and "near-miss"

obstetric events.[1] Obstetric haemorrhage continues to be a leading direct cause of maternal mortality and morbidity, and most women who develop life-threatening obstetric complications require transfusion of blood or its components.[1] In India, the burden is compounded by a high background prevalence of anaemia in pregnancy: national survey data show that 52.2% of pregnant women were anaemic in the most recent round of the National Family Health Survey, an increase from 50.4% in the preceding round.[2] Pre-existing anaemia lowers the physiological reserve of parturients and increases the likelihood that even moderate obstetric blood loss will necessitate transfusion.

Reported rates of peripartum transfusion vary widely across Indian tertiary centres, from about 1–2% of all obstetric admissions in some series to over 20% when audits are restricted to women presenting with obstetric emergencies, reflecting differences in case-mix, referral pattern, and institutional transfusion thresholds.[3–5] Postpartum haemorrhage, placental causes (abruption and previa), and antenatal anaemia is consistently reported as the leading indications for transfusion in these studies.[3,5]

Despite the clinical and public-health importance of peripartum transfusion, prospectively or retrospectively audited data specific to tertiary teaching hospitals in Tamil Nadu are sparse. Such data are important both for local blood-bank planning and for benchmarking obstetric quality-of-care indicators. This study was therefore undertaken to determine the prevalence of peri-partum blood transfusion and to characterise the demographic profile, clinical indications, transfusion practices, and maternal and neonatal outcomes among women who received a peri-partum blood transfusion at a tertiary care teaching hospital in South India over a one-year period.

MATERIALS AND METHODS

Study design and setting: This was a retrospective hospital-record-based study conducted in the Department of Obstetrics and Gynaecology, Sri Venkateswaraa Medical College Hospital and Research Institute, Tamil Nadu, India, a tertiary care teaching hospital.

Study period and population: All women who underwent delivery and received at least one unit of blood or a blood product during the antepartum, intrapartum, or postpartum period (up to hospital discharge) between 1 January 2025 and 31 December 2025 were included. During this period, 705 deliveries were conducted at the institution, which formed the denominator for prevalence estimation.

Data collection: Case records of eligible women were reviewed and data abstracted on maternal age, residence, socio-economic and booking status, parity and gestational age, associated comorbidities, mode of delivery, indication and timing of transfusion (antepartum, intrapartum, or postpartum), type and number of units of blood product transfused, pre- and post-transfusion haemoglobin and packed cell volume (haematocrit), duration of hospital stay, maternal outcome, and neonatal birth weight, sex, and Apgar status. Directly identifying information was removed before analysis, and only de-identified, aggregated data have been reported in this manuscript.

Statistical analysis: Data were entered and analysed using SPSS 25 Version. Continuous variables are summarised as mean ± standard deviation (SD) and range; categorical variables are summarised as frequencies and percentages. The prevalence of peripartum transfusion was calculated as the number of transfused women divided by the total number of deliveries during the study period, expressed as a percentage and as a rate per 1000 deliveries. As this was a descriptive study, no inferential statistical testing was performed.

Ethical considerations: The study was conducted after approval from the Institutional Ethics Committee. (073/12/2025/IEC/SVMCHRI) Given the retrospective, record-based design and use of anonymised data, a waiver of individual informed consent was obtained as per institutional policy. Patient confidentiality was maintained throughout data extraction and analysis.

RESULTS

Prevalence of peripartum transfusion: During the one-year study period, 46 women received a peripartum blood transfusion out of 705 total deliveries at the institution, yielding a prevalence of 6.5% (65.2 per 1000 deliveries), or approximately 1 in every 15 women delivered.

Monthly distribution: Transfused cases occurred throughout the year, with a higher case load in April and May (8 cases each) and comparatively fewer cases in February, July, and December (2 cases each) [Figure 1].

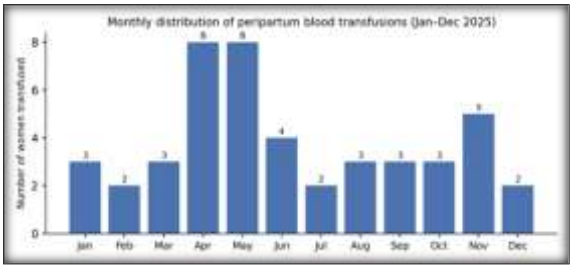

Figure 1: Monthly distribution of peripartum blood transfusions, January–December 2025 (N = 46).

Demographic and obstetric profile: The mean maternal age was 25.7 ± 4.1 years (range 19–33 years). Most transfused women were urban residents (84.8%) and booked for antenatal care (100%). The majority of families (45.7%) belonged to the lower middle socioeconomic class, followed by 39.1% in the upper middle class according to Modified

Kuppuswamy Classification 2026. Multigravidae accounted for 56.5% of cases. The mean gestational age at transfusion/delivery was 36.0 ± 4.3 weeks, and 34.1% of women were delivered preterm (<37 weeks). Nearly half (45.7%) had no documented comorbidity, while 19.6% had undergone a prior caesarean delivery [Table 1].

Table 1: Demographic and obstetric characteristics of transfused women (N = 46)

Characteristic	Value
Maternal age (years), mean ± SD (range)	25.7 ± 4.1 (19–33)
Residence – Urban	39 (84.8%)
Residence – Rural	4 (8.7%)
Residence – Not documented	3 (6.5%)
Booking status – Booked	46 (100%)
Parity – Primigravida	20 (43.5%)
Parity – Multigravida	26 (56.5%)
Gestational age at transfusion/delivery (weeks), mean ± SD (range)	36.0 ± 4.3 (21–40)
Preterm gestation (<37 weeks)	15/44 (34.1%)
No documented comorbidity	21 (45.7%)
Prior caesarean delivery	9 (19.6%)
Other comorbidity (dengue, GDM, gestational thrombocytopenia, hypertensive disorder, low-lying placenta, etc.)	16 (34.8%)
Socio-economic category – Self-pay	42 (91.3%)
Socio-economic category – Insurance/special ward	3 (6.5%)
Socio-economic Status - Upper class (I)	3 (6.5%)
Socio-economic Status - Upper middle class (II)	18 (39.1%)
Socio-economic Status - Lower middle class (III)	21 (45.7%)
Socio-economic Status - Upper lower class (IV)	4 (8.7%)

Table 2: Indication for peripartum blood transfusion (N = 46)

Indication	n (%)
Postpartum haemorrhage – all causes	28 (60.8%)
Atonic postpartum haemorrhage	12 (26.1%)
Mild postpartum haemorrhage (cause unspecified)	10 (21.7%)
Traumatic postpartum haemorrhage / genital tract trauma	4 (8.7%)
Moderate postpartum haemorrhage (cause unspecified)	1 (2.2%)
Postpartum haemorrhage with pre-eclampsia/eclampsia	1 (2.2%)
Antepartum haemorrhage - Placental abruption	1 (2.2%)
Antenatal / pre-existing anaemia (incl. anaemia with dengue, jaundice, or thrombocytopenia)	17 (37.0%)

Indication for transfusion: Among the 46 women who received peripartum blood transfusion, postpartum haemorrhage (PPH) was the most common indication, accounting for 28 cases (60.8%). Among the cases of PPH, atonic postpartum haemorrhage was the predominant cause, contributing to 12 cases (26.1%), followed by mild PPH with unspecified cause in 10 cases (21.7%). Traumatic PPH or genital tract trauma accounted for 4 cases (8.7%), while moderate PPH of unspecified cause and PPH associated with pre-eclampsia/eclampsia accounted for 1 case each (2.2%). Antenatal or pre-existing anaemia, including anaemia associated with dengue, jaundice or thrombocytopenia, was the indication for transfusion in 17 women (37.0%). Antepartum haemorrhage due to placental abruption accounted for 1 case (2.2%). [Table 2].

Table 3: Timing, mode of delivery, and transfusion characteristics (N = 46)

Variable	n (%) / Mean ± SD
Timing of transfusion – Intrapartum	25 (54.3%)
Timing of transfusion – Postpartum	16 (34.8%)
Timing of transfusion – Antepartum	5 (10.9%)
Mode of delivery – Emergency LSCS	19 (41.3%)
Mode of delivery – Vaginal delivery (incl. instrumental)	17 (37.0%)
Mode of delivery – Elective LSCS	8 (17.4%)
Mode of delivery – Antepartum (undelivered at transfusion)	2 (4.3%)
Blood product – Packed red cells only	41 (89.1%)
Blood product – Packed red cells + component (FFP)	3 (6.5%)
Blood product – Massive / multi-component transfusion	2 (4.3%)
Units transfused per woman, mean ± SD (range)	2.0 ± 2.5 (1–14)
Single-unit transfusion	32 (69.6%)
≥2 units transfused	14 (30.4%)
Pre-transfusion haemoglobin (g/dl), mean ± SD (range)	9.9 ± 1.5 (6.4–13.2)
Pre-transfusion PCV (%), mean ± SD (range)	30.2 ± 4.1 (22–40)
Post-transfusion haemoglobin (g/dl), mean ± SD (range)	10.8 ± 1.4 (8.1–13.9)
Post-transfusion PCV (%), mean ± SD (range)	33.2 ± 4.1 (24–41)
Rise in haemoglobin (g/dl), mean ± SD	0.9 ± 1.1

Timing, mode of delivery, and transfusion characteristics: Transfusion was most often given intrapartum (54.3%) or postpartum (34.8%); only 10.9% of women received transfusion in the antepartum period. Emergency lower-segment caesarean section was the commonest mode of delivery (41.3%), followed by vaginal delivery (37.0%, including one instrumental delivery) and elective caesarean section (17.4%); two women (4.3%) had not yet delivered at the time of transfusion. The large majority of women (89.1%) were managed with packed red cells alone, and single-unit transfusion sufficed in 69.6% of cases. Two women (4.3%) required massive or multi-component transfusion (packed cells with fresh frozen plasma and/or cryoprecipitate), reflecting more severe haemorrhagic morbidity. Mean pre-transfusion haemoglobin was 9.9 ± 1.5 g/dl, rising to 10.8 ± 1.4 g/dl after transfusion, a mean increment of 0.9 ± 1.1 g/dl [Table 3].

Table 4: Maternal and neonatal outcomes (N = 46)

Outcome	Value
Hospital stay (days), mean ± SD (range)	5.5 ± 3.5 (1–24)
Maternal outcome – Recovered / discharged stable	44 (95.7%)
Maternal outcome – ICU admission	2 (4.3%)
Maternal deaths	0 (0%)
Birth weight (kg), mean ± SD (range) (n = 44)	2.80 ± 0.48 (1.20–4.20)
Low birth weight (<2.5 kg)	7/44 (15.2%)
Neonatal sex – Male	23/44 (52.3%)
Neonatal sex – Female	21/44 (47.7%)
Apgar – Good at birth (documented)	41/44 (93.2%)

Maternal and neonatal outcomes: The mean hospital stay was 5.5 ± 3.5 days (range 1–24 days). The vast majority of women (95.7%) recovered and was discharged in a stable condition; two women (4.3%) required intensive care unit admission, and there were no maternal deaths in this series. Among neonates with recorded birth weight (n = 44), the mean birth weight was 2.80 ± 0.48 kg, and 15.2% were low birth weight (<2.5 kg). A good Apgar status at birth was documented in 93.2% of neonates [Table 4].

DISCUSSION

In this one-year retrospective analysis from a South Indian tertiary teaching hospital, nearly 1 in 15 women who delivered (6.5 %, or 65.2 per 1000 deliveries) required a peripartum blood transfusion. This figure sits within the wide range reported from Indian obstetric units, which spans roughly 1–2% of unselected obstetric admissions in some prospective audits to over 20% when the denominator is restricted to women presenting with obstetric emergencies rather than all deliveries.[3–6] The variation in transfusion rates between institutions may reflect differences in referral patterns, patient characteristics, clinical indications and institutional transfusion practices.

Among the 46 women who received peripartum blood transfusion, postpartum haemorrhage was the leading indication (60.8%), predominantly due to uterine atony (26.1%), followed by antenatal or pre-existing anaemia (37.0%). Antepartum haemorrhage due to placental abruption accounted for 2.2% of cases, consistent with several Indian and South Asian series in which postpartum haemorrhage and placental causes are consistently reported as the commonest triggers for transfusion.[3–5] A prospective audit from western India similarly found atonic postpartum haemorrhage to be the single most frequent indication among transfused obstetric patients, followed by placental abruption and praevia.[4] The substantial contribution of antenatal anaemia to the transfusion burden in the present series (37.0%) reinforces the well-documented link between antenatal anaemia and peripartum transfusion requirement: a Central India audit of transfusion practice during obstetric emergencies reported a mean pre-transfusion haemoglobin of 7.5 ± 1.0 g/dl, appreciably lower than the mean of 9.9 g/dl observed in the present cohort, suggesting that women in the present series were, on average, transfused at a comparatively earlier stage of anaemia.[5] This difference may reflect variation in institutional transfusion thresholds or in the severity of the underlying case-mix between centres.

The predominance of single-unit, packed-red-cell-only transfusion in this cohort (69.6% single unit; 89.1% packed cells alone) is reassuring from a blood-conservation standpoint, indicating that most transfusions in this series were for correction of moderate anaemia or uncomplicated haemorrhage rather than massive obstetric haemorrhage. Nonetheless, two women (4.3%) required multi-component or massive transfusion with fresh frozen plasma and/or cryoprecipitate, underscoring the continued need for a functioning massive transfusion protocol and round-the-clock blood-bank support even in units where most transfusion episodes are modest in scale. The overall favourable maternal outcome in this series — 95.7% of women recovering and discharged stable, no maternal deaths, and only 4.3% requiring intensive care — compares favourably with hospital series that specifically enrol women with massive obstetric haemorrhage or near-miss criteria, in which intensive-care admission and mortality rates are considerably higher, reflecting the more severe case selection in those studies rather than a direct like-

for-like comparison with the present, broader peripartum transfusion cohort.[1]

Emergency caesarean section was the commonest mode of delivery among transfused women (41.3%), and nearly a third of neonates were born preterm (32.6%), with 15.2% classified as low birth weight. These findings are consistent with the recognised association between maternal haemorrhagic and anaemic morbidity and adverse perinatal outcome, and highlight that peripartum transfusion audits offer a useful window into overall maternal-fetal unit performance, not merely transfusion-service utilisation.

This study has few limitations. It is a retrospective, single-centre case series describing only the cohort of women who were transfused; women with significant blood loss or anaemia who were managed without transfusion are not captured, so the true burden of peripartum haemorrhagic and anaemic morbidity in the delivery population is likely to be greater than the transfusion prevalence alone suggests.

CONCLUSION

Peripartum blood transfusion constituted an important component of obstetric care at this tertiary teaching hospital, with postpartum haemorrhage, and antenatal/pre-existing anaemia being the most frequently documented indications. Maternal outcomes were largely favourable, although a proportion of women required intensive care. Strengthening antenatal anaemia screening and correction, proactive management of postpartum haemorrhage, and effective blood-bank preparedness may contribute to reducing transfusion requirements and associated maternal morbidity.

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