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Maternal and Perinatal Outcomes in Antepartum Haemorrhage at a Tertiary Care Centre in Western Rajasthan: A Prospective Observational Study

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ABSTRACT

Aims and objectives: To evaluate maternal and perinatal outcomes in antepartum haemorrhage (APH) and compare key outcomes between placental abruption and placenta previa. **Materials and Methods**: This prospective observational study included 100 consecutive women aged over 18 years who presented after 28 weeks of gestation with APH at a tertiary care centre in Jodhpur. Maternal and early neonatal outcomes were recorded. Categorical variables were compared using the chi-square or Fisher exact test, and selected unadjusted odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. **Results**: Placental abruption accounted for 61% of cases and placenta previa for 39%. Caesarean delivery was performed in 77%, 72% required blood or blood-product transfusion, 19% required intensive care, and 11% developed disseminated intravascular coagulation. One maternal death occurred. Overall, 88% of babies were live born, 51% were preterm, 45% had low birth weight, and early neonatal mortality was 7%. Compared with placenta previa, abruption had higher odds of preterm delivery (OR 3.30, 95% CI 1.42-7.68) and low birth weight (OR 3.21, 95% CI 1.35-7.58). Previous caesarean delivery was more frequent in placenta previa (OR 8.71, 95% CI 3.04-24.91). **Conclusion**: APH imposed substantial operative, transfusion, critical-care, and neonatal burdens. Early recognition, prompt referral, blood-bank readiness, and coordinated obstetric-neonatal care are essential.

Keywords: *antepartum haemorrhage, placental abruption, placenta previa, maternal outcome, perinatal outcome.*

INTRODUCTION

Antepartum haemorrhage (APH) is bleeding from or into the genital tract after fetal viability and before birth. Placenta previa and placental abruption are the principal obstetric causes. Although APH complicates a minority of pregnancies, it can deteriorate rapidly and is associated with maternal anaemia, shock, coagulopathy, emergency operative delivery, critical-care admission, prematurity, fetal compromise, and perinatal death [1]. Obstetric haemorrhage remains a major direct cause of maternal death worldwide, with the largest burden occurring in low- and middle-income countries [2].

Placental abruption and placenta previa differ in their risk profiles and pathways to adverse outcome. Abruption may present with concealed bleeding, uterine hypertonus, fetal hypoxia, disseminated intravascular coagulation, and urgent preterm delivery [3]. Placenta previa is strongly related to prior caesarean delivery and other uterine procedures and commonly results in recurrent bleeding, malpresentation, operative delivery, and major obstetric haemorrhage [4,5]. Neonatal outcome in both conditions is substantially influenced by gestational age and birth weight [6].

Institution-specific data are important because referral pathways, antenatal-care utilisation, transfusion availability, and neonatal intensive-care capacity vary widely. Published tertiary-care series from India have reported heterogeneous

proportions of abruption and placenta previa, caesarean delivery, transfusion, prematurity, and fetal loss [7-11]. The present study therefore evaluated maternal and perinatal outcomes among women with APH at a tertiary care centre in western Rajasthan and compared key outcomes between placental abruption and placenta previa.

MATERIALS AND METHODS

Study design and setting

A hospital-based prospective observational study was conducted in the Department of Obstetrics and Gynaecology, MDM Hospital, Dr. S. N. Medical College, Jodhpur, Rajasthan. The overall study period was November 2025 to March 2026; prospective recruitment and data collection commenced after Institutional Ethics Committee approval on 17 December 2025.

Participants and sampling

Consecutive sampling was used. The study included 100 pregnant women aged over 18 years who were admitted with bleeding from or into the genital tract after 28 completed weeks of gestation and before birth. Women were eligible when placenta previa, placental abruption, or another obstetric cause of APH was diagnosed clinically and/or radiologically and written informed consent was obtained. Bleeding before 28 weeks, bleeding attributable to local genital-tract lesions, and refusal of consent were exclusion criteria.

Data collection and definitions

Data were recorded in a predesigned case-record form using patient interviews, clinical examination, case sheets, operative notes, laboratory reports, ultrasonography, and neonatal records. Maternal variables included demographics, obstetric profile, APH type, mode of delivery, transfusion, intensive-care admission, complications, and death. Fetal and neonatal outcomes included live birth, intrauterine fetal death, stillbirth, preterm birth, birth weight, Apgar score, NICU admission, morbidity, and early neonatal death until hospital discharge. Preterm birth was delivery before 37 completed weeks, and low birth weight was birth weight below 2.5 kg.

Statistical analysis and ethics

Data were analysed using SPSS version 23. Categorical variables were summarised as frequencies and percentages and compared using the chi-square test or Fisher exact test. Selected unadjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. A two-sided p value below 0.05 was considered statistically significant. The Institutional Ethics Committee of Dr. S. N. Medical College, Jodhpur approved the study (SNMC/IEC/2025/Plan/1222; 17 December 2025), and written informed consent was obtained from all participants.

RESULTS

A total of 100 women with APH were analysed. The median maternal age was 26 years (interquartile range 23-29 years), and 76% were aged 21-30 years. Half were literate, 60% belonged to socioeconomic class IV, 67% were booked, and 69% were multigravida. Placental abruption was diagnosed in 61% and placenta previa in 39%. Participant characteristics are shown in Table 1.

Table 1. Baseline and obstetric characteristics of participants (N=100)

Characteristic	n	%
Age 18-20 years	9	9.0
Age 21-25 years	38	38.0
Age 26-30 years	38	38.0
Age >30 years	15	15.0
Literate	50	50.0
Socioeconomic class IV	60	60.0
Booked pregnancy	67	67.0
Multigravida	69	69.0
Placental abruption	61	61.0
Placenta previa	39	39.0
Preterm delivery	51	51.0
Previous caesarean delivery	25	25.0

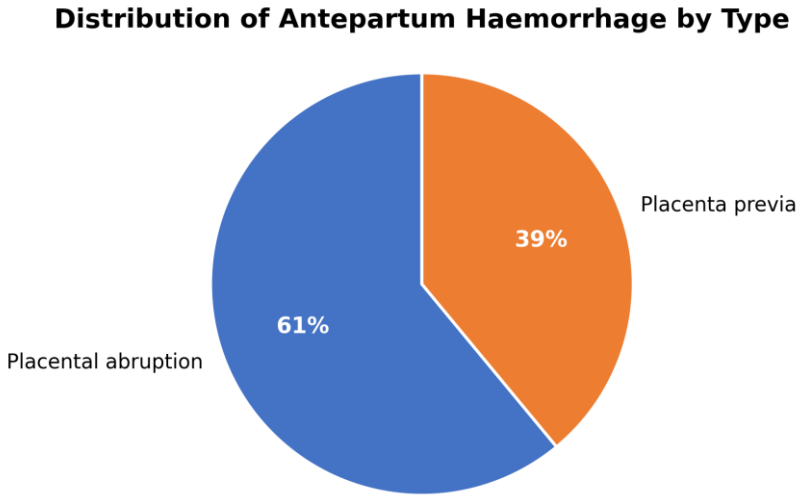

Figure 1. Distribution of antepartum haemorrhage by type (N=100).

Emergency or operative delivery was common. Twenty-three women delivered vaginally and 77 underwent caesarean delivery, including additional haemostatic or reconstructive procedures when clinically required. Blood or blood products were administered to 72 women. Nineteen women required intensive care, 11 developed disseminated intravascular coagulation, and one maternal death occurred (Table 2).

Table 2. Maternal management and outcomes (N=100)

Outcome	n	%
Caesarean delivery	77	77.0
Vaginal delivery	23	23.0
Any blood or blood-product transfusion	72	72.0
Bilateral uterine vessel/artery ligation	25	25.0
ICU admission	19	19.0
Disseminated intravascular coagulation	11	11.0
Intubation	2	2.0
Renal dysfunction recorded	2	2.0
Caesarean hysterectomy	1	1.0
Maternal death	1	1.0

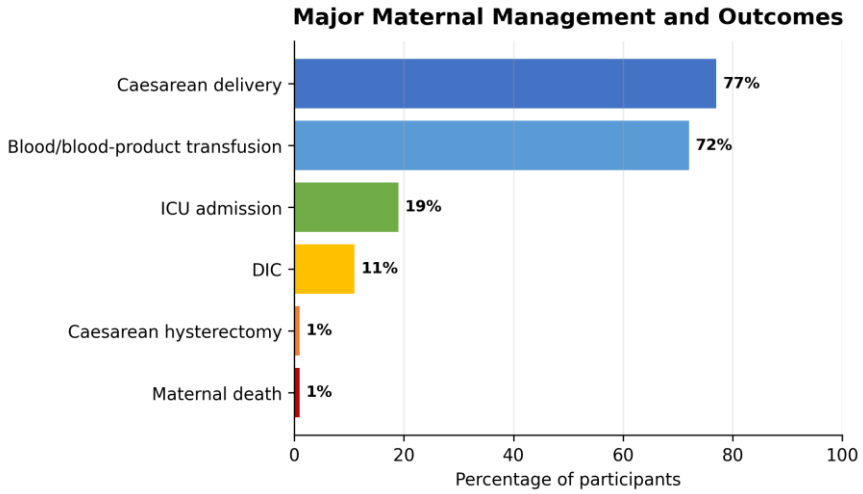

Figure 2. Major maternal management and outcomes among women with antepartum haemorrhage.

ICU: intensive care unit.

A prior caesarean delivery was documented in 48.7% of women with placenta previa and 9.8% of women with abruption (OR for placenta previa vs abruption 8.71, 95% CI 3.04-24.91; p<0.001). Hypertensive disorders were more frequent in the abruption group (31.1% vs 10.3%; OR 3.96, 95% CI 1.23-12.73; p=0.016). Preterm birth and low birth weight were

also significantly more frequent with abruption. Adverse fetal outcome was numerically higher with abruption but did not reach statistical significance (Table 3).

Table 3. Comparison of selected characteristics and outcomes by APH type

Variable	Abruption n/N (%)	Placenta previa n/N (%)	Unadjusted OR (95% CI)	p value
Previous caesarean delivery	6/61 (9.8)	19/39 (48.7)	8.71 (3.04-24.91)*	**<0.001**
Hypertensive disorder	19/61 (31.1)	4/39 (10.3)	3.96 (1.23-12.73)	**0.016**
Preterm delivery	38/61 (62.3)	13/39 (33.3)	3.30 (1.42-7.68)	**0.005**
Low birth weight	34/61 (55.7)	11/39 (28.2)	3.21 (1.35-7.58)	**0.007**
IUD or stillbirth	10/61 (16.4)	2/39 (5.1)	3.63 (0.75-17.54)	0.120
ICU admission	14/61 (23.0)	5/39 (12.8)	Not estimated	0.214

*APH: antepartum haemorrhage; CI: confidence interval; ICU: intensive care unit; IUD: intrauterine fetal death; OR: odds ratio. *OR expresses the odds of previous caesarean delivery in placenta previa relative to abruption; all other ORs express the odds in abruption relative to placenta previa.*

Eighty-eight babies were live born; 10 pregnancies ended in intrauterine fetal death and two in stillbirth. Low birth weight occurred in 45%, and 51% were born preterm. Eight neonates required NICU admission for low birth weight or respiratory distress. Physiological jaundice was recorded in 18%, and seven early neonatal deaths occurred, mainly due to severe respiratory distress, refractory shock, or hypoxic-ischaemic encephalopathy (Table 4).

Table 4. Fetal and early neonatal outcomes (N=100 pregnancies)

Outcome	n	%
Live birth	88	88.0
Intrauterine fetal death	10	10.0
Stillbirth recorded separately	2	2.0
Preterm birth	51	51.0
Low birth weight (<2.5 kg)	45	45.0
NICU admission for low birth weight/respiratory distress	8	8.0
Physiological jaundice	18	18.0
Early neonatal death	7	7.0

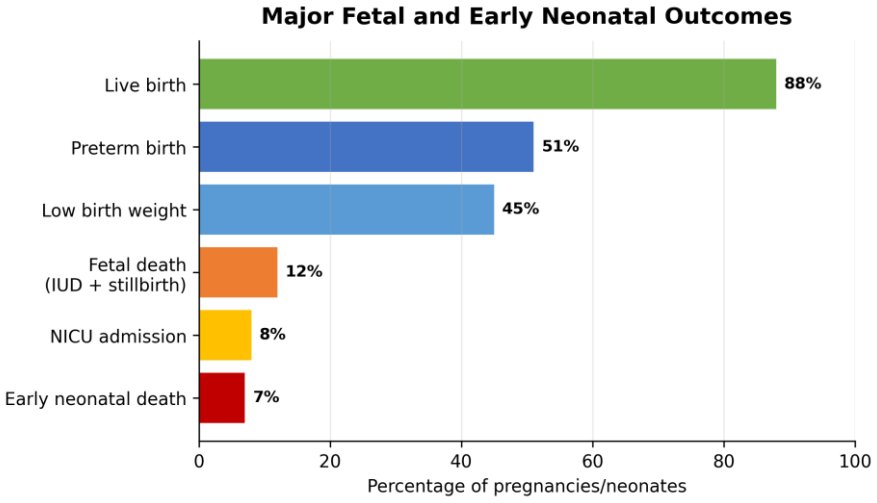

Figure 3. Major fetal and early neonatal outcomes in pregnancies complicated by antepartum haemorrhage.

NICU: neonatal intensive care unit.

DISCUSSION

This prospective series demonstrates that APH continues to impose substantial maternal and neonatal burdens in a tertiary referral setting. Placental abruption accounted for nearly two-thirds of cases, more than three-quarters of women required caesarean delivery, nearly three-quarters received blood or blood products, and almost one in five required intensive care. Although most babies were live born, prematurity, low birth weight, fetal loss, and early neonatal death remained clinically important.

The predominance of placental abruption is comparable with several Indian tertiary-care studies. Kedar et al., Rathi and Pawar, Anjankar and Ramteke, and Mandal et al. reported abruption in approximately 52%-63% of APH cases [7,9-11]. Such distributions are influenced by referral patterns and the association of abruption with hypertensive disorders. In our study, hypertensive disorders were almost four times more likely in the abruption group, consistent with the established role of maternal vascular disease and placental ischaemia [3].

Previous caesarean delivery showed the strongest between-group difference. Almost half of women with placenta previa had a prior caesarean delivery, compared with fewer than one in ten women with abruption. Prior uterine scarring is a well-established risk factor for placenta previa and placenta accreta spectrum [4,5]. This finding supports careful placental localisation and anticipatory planning for haemorrhage in women with previous caesarean delivery.

Prematurity and low birth weight were both approximately three times more likely in abruption than in placenta previa. Gadgi and Rajaratnam similarly reported lower birth weight and poorer Apgar scores among abruption cases [12]. Placenta previa also carries major neonatal risks, chiefly mediated through preterm birth [6]. The overall 51% preterm-birth rate in our study confirms that gestational age remains a major determinant of neonatal outcome in APH. Environmental and occupational exposures have also been associated with preterm labour and other adverse reproductive outcomes [17], although these exposures were not assessed in the present study.

The 77% caesarean-delivery rate reflects the frequency of placenta previa, fetal compromise, malpresentation, and the need for rapid haemorrhage control. Comparable operative-delivery rates have been reported in tertiary-care cohorts [13,14]. The transfusion rate of 72% highlights the need for immediate blood-bank access and major-obstetric-haemorrhage protocols; Reddy et al. also reported transfusion in 66% of women with APH [16]. DIC was the most frequent severe maternal complication, consistent with the recognised coagulopathic risk of abruption [1,3].

Maternal survival was favourable in most cases, but one death, 19 ICU admissions, and 11 cases of DIC show that APH remains life-threatening even in a tertiary centre. The 88% live-birth rate was similar to the 89% reported by Das et al. and the 85.3% reported by Ghattuwar et al. [8,15]. Early neonatal mortality of 7% was primarily related to respiratory distress, shock, and hypoxic-ischaemic encephalopathy, reinforcing the importance of coordinated obstetric and neonatal resuscitation.

Strengths and limitations

The prospective design, consecutive recruitment, and simultaneous evaluation of maternal and early neonatal outcomes are strengths. Limitations include the single-centre design, sample size of 100, short recruitment period, and follow-up only until hospital discharge. Multivariable adjustment was not possible, and the findings should be confirmed in larger multicentre studies.

CONCLUSION

Antepartum haemorrhage was associated with high rates of caesarean delivery, transfusion, critical-care use, prematurity, and low birth weight. Placental abruption was characterised by more hypertensive disease, preterm delivery, and low birth weight, whereas placenta previa was strongly associated with previous caesarean delivery. Timely recognition, rapid referral, blood-component availability, readiness for haemostatic surgery, and integrated neonatal support are central to improving outcomes. Women with previous caesarean delivery and those with hypertensive disorders should be identified early for targeted surveillance and planned referral. Strengthening antenatal risk assessment, emergency transport, and institutional obstetric-haemorrhage protocols may further reduce preventable maternal and neonatal morbidity and mortality.

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