Indian Journal of Health Care, Medical & Pharmacy Practice (Vol 7, Issue 2, July-December 2026)
Home page of the journal: https://ijhmp.com/Home

Research Article

ASSESSMENT OF FETOMATERNAL OUTCOMES IN ABRUPTIO PLACENTAE AT A TERTIARY CARE CENTRE

Dr. Shivani Dusad[1*], Dr. Nidhi Chaturvedi[2], Dr. Pahal Panchori[1]

[1]3rd Year PG Resident, [2]Professor & Head, Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research, NIMS University, Jaipur, Rajasthan, India.

Corresponding Author*: Dr. Shivani Dusad, 3rd Year PG Resident, Department of Obstetrics & Gynaecology, National Institute of Medical Sciences and Research, NIMS University, Jaipur, Rajasthan, India.

Email ID: shividusad@gmail.com

DOI: https://doi.org/10.59551/IJHMP/25832069/2026.7.2.167

How to cite this article: Dusad S, Chaturvedi N, Panchori P. Assessment of Fetomaternal Outcomes in Abruptio Placentae at a Tertiary Care Centre. *Indian J. Health Care, Med. Pharm. Pract.* 2026;7(2):442-450.

Received: 01 July, 2026, Decision for Acceptance: 11 Aug, 2026

ABSTRACT

Background: Placental abruption (abruptio placentae) is an obstetric emergency caused by premature separation of a normally implanted placenta and may result in substantial maternal hemorrhage, coagulopathy, fetal compromise, preterm birth, and perinatal death. This study assessed the clinical profile, associated risk factors, management, and maternal and fetal outcomes among women with placental abruption managed at a tertiary care center.

Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, National Institute of Medical Sciences and Research, Jaipur, over 18 months. Sixty-six pregnant women with clinically diagnosed placental abruption at ≥28 weeks of gestation who provided informed consent were included. Women with other causes of antepartum bleeding or specified bleeding disorders were excluded. Sociodemographic and obstetric characteristics, risk factors, clinical presentation, laboratory and ultrasonographic findings, mode of delivery, maternal complications, and fetal/neonatal outcomes were recorded using a semi-structured proforma. Data thus analyzed categorically and p-value < 0.05 was set as statistically significant.

Results: Of 66 participants, 44 (66.67%) were aged 20–25 years, 49 (74.24%) were from rural areas, 44 (66.67%) were unbooked, and 48 (72.73%) had fewer than four antenatal visits. Maternal anemia was present in 49 (74.24%) women and hypertensive disorders of pregnancy in 38 (57.58%). Most women presented at 33–36 weeks (35, 53.03%), with abdominal pain (52, 78.79%) and bleeding of <6 hours' duration (42, 63.64%). Revealed abruption was the commonest type (36, 54.55%), and mild abruption was the most frequent severity category (30, 45.45%). Vaginal delivery occurred in 37 (56.06%) and LSCS in 29 (43.94%); fetal distress was the leading documented indication for LSCS. Blood transfusion was required in 38 (57.58%), postpartum anemia occurred in 42 (63.64%), and 12 (18.18%) required ICU admission. One maternal death occurred (1.52%). There were 42 (63.64%) live births, 8 (12.12%) IUFDs, and 16 (24.24%) stillbirths; 46 (69.70%) deliveries were preterm and 40 (60.61%) neonates required NICU admission. In the recorded association analyses, hypertensive disorders, maternal anemia, and PROM were significantly associated with maternal complications ($p<0.05$), while abruption severity was significantly associated with fetal outcome ($p<0.01$).

Conclusion: In this tertiary-care cohort, placental abruption was accompanied by substantial maternal morbidity and adverse perinatal outcomes. High frequencies of hypertensive disorders, anemia, inadequate antenatal care, preterm birth, fetal loss, and NICU admission underscore the importance of antenatal risk recognition, timely referral, rapid maternal stabilization, and coordinated obstetric and neonatal care.

KEYWORDS: Placental Abruption, Abruptio Placentae, Antepartum Hemorrhage, Fetomaternal Outcome, Perinatal Mortality, Hypertensive Disorders of Pregnancy.

Introduction

Placental abruption, or abruptio placentae, is defined as premature separation of a normally implanted placenta before delivery of the fetus. The separation disrupts uteroplacental exchange and can produce maternal hemorrhage, hypovolemia, consumptive coagulopathy, and fetal hypoxia or death. The clinical spectrum ranges from limited revealed bleeding to concealed hemorrhage with severe maternal and fetal compromise[1-3].

The condition has multifactorial determinants. Hypertensive disorders of pregnancy, previous abruption, smoking or substance exposure, trauma, multiparity, and other maternal or obstetric factors have been associated with increased risk[3-6]. Hypertensive disease is particularly relevant because abnormal placentation, endothelial dysfunction, and impaired uteroplacental perfusion can predispose to placental-bed vascular injury[3,7]. Maternal anemia may further complicate presentation and recovery, particularly in settings where antenatal care and referral are delayed[8,9].

Diagnosis is primarily clinical. Vaginal bleeding, abdominal pain, uterine tenderness or hypertonicity, and fetal heart-rate abnormalities are characteristic but may not occur together. Concealed hemorrhage can lead to underestimation of blood loss, while ultrasonography may fail to demonstrate an abruption despite clinical disease[2,10,11]. Laboratory evaluation is important for identifying anemia, thrombocytopenia, coagulation abnormalities, and renal or hepatic involvement[12,13].

Outcomes are influenced by the extent of placental separation, gestational age, fetal status, maternal hemodynamic condition, and speed of intervention. Severe abruption is associated with higher maternal morbidity and fetal loss, whereas preterm birth and neonatal morbidity remain important among surviving infants[14-18]. In resource-constrained settings, delayed recognition, referral, blood-product availability, and neonatal-care capacity may further influence outcomes[19-21].

The present study was undertaken to characterize women with placental abruption presenting to a tertiary-care center and to describe maternal and fetal outcomes in relation to selected clinical risk factors and abruption severity.

Materials and Methods

Study Design and Settings

This prospective, observational study was carried out in the Department of Obstetrics and Gynaecology, National Institute of Medical Sciences and Research, Jaipur, Rajasthan. The study was conducted over a period of 18 months. Institutional Ethics Committee approval (Ref. no.: NIMSUR/IEC/2024/1011, dated: 11/05/2024) was obtained before commencement of the study. Written informed consent was obtained from all participants.

Study Participants

Pregnant women of reproductive age with a diagnosis of placental abruption at ≥28 weeks of gestation, who were willing to provide informed consent were eligible and included in the study. Women with other causes of antepartum bleeding, including placenta previa, genital-tract trauma or lesions, and those with specified bleeding disorders such as hemophilia, von Willebrand disease, Marfan syndrome, or thrombocytopenia, were excluded.

Sample Size

Convenience sampling technique was used for data collection. A sample size of 66 participants was enrolled in the study according to the study time frame and pre-defined inclusion and exclusion criteria.

Data Collection

After obtaining Institutional Ethics Committee approval, eligible women were recruited and written informed consent was obtained. Clinical diagnosis was based on history, examination, and ultrasonographic findings. A semi-structured proforma captured sociodemographic characteristics, obstetric history, antenatal-care status, clinical presentation, risk factors, laboratory investigations, imaging findings, management, and outcomes. Maternal outcomes including hemorrhage, transfusion requirements, ICU admission, complications, and mortality were recorded. Fetal/neonatal outcomes such as, gestational age, birth weight, Apgar scores, NICU admission, reason for admission, and perinatal mortality were documented.

Study Endpoints

The primary endpoint was to assess the fetomaternal outcomes in pregnant women with abruptio placentae. The secondary endpoint was to determine the risk factors and co morbidities associated with Abruptio placentae.

Clinical Classification

Abruption was categorized as revealed, concealed, or mixed. Severity was recorded as mild, moderate, or severe according to the clinical classification, based on maternal and fetal status[12,22].

Laboratory and Imaging Assessment

Recorded investigations including CBC, blood group/Rh typing, thyroid profile, serum electrolytes, PT/INR, liver and renal function tests, urine examination, and fetal-well-being ultrasonography/Doppler velocimetry assessment for placental evaluation were performed.

Statistical Analysis

Data were entered into a Microsoft Excel and analysed using SPSS v.25. Data thus analyzed categorically. Associations between categorical variables were assessed using the Chi-square test. A p-value <0.05 was considered statistically significant.

ISSN 2583-2069

Results

The cohort was predominantly young, multiparous, rural, and unbooked among 66 women with placental abruption. Of 66 participants, majority of the participants [44 (66.67%)] were aged 20–25 years; [33 (50.00%)] were gravida 2, [30 (45.45%)] were gravida ≥3, [44 (66.67%)] were unbooked, [41 (62.12%)] belonged to the low socioeconomic group, and [49 (74.24%)] were from rural areas. Forty-eight (72.73%) had fewer than four antenatal visits. The detailed distribution is shown in Table 1.

The most frequently documented risk factors were maternal anemia (49, 74.24%) and hypertensive disorders of pregnancy (38, 57.58%). Poly/oligohydramnios was present in [21 (31.82%)], PROM/PPROM in [18 (27.27%)], and previous LSCS in [14 (21.21%)] participants. Smoking/alcohol use was reported in [7 (10.61%)] participants, while trauma and diabetes were each recorded in [2 (3.03%)] and [3 (4.55%)], respectively (Table 2).

Table 1: Sociodemographic & Obstetric Profile of the Study Participants

Variable	Category	n	Percentage (%) [N=66]
Age	<20	2	3.03
	20–25	44	66.67
	26–30	16	24.24
	>30	4	6.06
Gravida	G1	3	4.55
	G2	33	50.00
	≥G3	30	45.45
Booking	Booked	22	33.33
	Unbooked	44	66.67
Socioeconomic status	Low	41	62.12
	Middle	22	33.33
	High	3	4.55
Domicile	Rural	49	74.24
	Urban	17	25.76
Occupation	Housewife	61	92.42
	Working	5	7.58
Antenatal visits	<4	48	72.73
	≥4	18	27.27

Table 2: Risk Factors and Comorbidities Associated with Abruptio Placentae

Variable	Category	n	Percentage (%) [N=66]
Hypertensive disorders of pregnancy	Present	38	57.58
	Absent	28	42.42
Chronic hypertension	Present	6	9.09
	Absent	60	90.91
Maternal anemia	Present	49	74.24
	Absent	17	25.76
Hemoglobin	Mean ± SD	8.94±1.52 g/dL	
Previous LSCS	Yes	14	21.21
	No	52	78.79
PROM/PPROM	Yes	18	27.27
	No	48	72.73
Multifetal pregnancy	Yes	3	4.55
	No	63	95.45
Poly/oligohydramnios	Yes	21	31.82
	No	45	68.18

Smoking/alcohol	Yes	7	10.61
	No	59	89.39
Trauma	Yes	2	3.03
	No	64	96.97
Diabetes	Yes	3	4.55
	No	63	95.45
Thyroid	Hyperthyroidism	1	1.52
	Hypothyroidism	9	13.64
	No disorder	56	84.85

Most women were delivered at 33–36 weeks (35, 53.03%). Bleeding had begun within 6 hours in 42 (63.64%), and abdominal pain was reported by 52 (78.79%). Fetal heart sounds were absent at admission in 24 (36.36%). Revealed abruption was most common (36, 54.55%), followed by concealed (20, 30.30%) and mixed abruption (10, 15.15%). Mild, moderate, and severe abruption accounted for 30 (45.45%), 21 (31.82%), and 15 (22.73%), respectively (Table 3).

The mean platelet count was 1.42 ± 0.58 lakh/mm³ and mean PT/INR was 1.08 ± 0.12 according to Table 4. Abnormal LFT/RFT findings were present in 19 (28.79%). Ultrasonography visualized abruption in [44 (66.67%)], whereas no abruption was visualized in [22 (33.33%)] clinically diagnosed cases.

Table 3: Clinical Presentations of the Patients with Abruptio Placentae

Variable	Category	n	Percentage (%) [N=66]
Gestational age at termination	28–32 weeks	11	16.67
	33–36 weeks	35	53.03
	>37 weeks	20	30.30
Duration of bleeding	<6 h	42	63.64
	6–8 h	16	24.24
	>8 h	8	12.12
Abdominal pain	Yes	52	78.79
	No	14	21.21
Fetal heart sounds at admission	Present	42	63.64
	Absent	24	36.36
Type	Revealed	36	54.55
	Concealed	20	30.30
	Mixed	10	15.15
Severity	Mild	30	45.45
	Moderate	21	31.82
	Severe	15	22.73

Table 4: Laboratory and ultrasound findings among the Participants

Parameter	Finding	Value
Platelet count	Mean ± SD	1.42 ± 0.58 lakh/mm³
PT/INR	Mean ± SD	1.08 ± 0.12
LFT/RFT abnormality	Yes	19 (28.79%)
	No	47 (71.21%)
Ultrasound visualization of abruption	Detected	44 (66.67%)
	Not visualized	22 (33.33%)

ISSN 2583-2069

Vaginal delivery occurred in 37 (56.06%) women and LSCS in 29 (43.94%). Among LSCS deliveries, fetal distress accounted for 14 (48.28%), maternal indications for 13 (44.83%), and previous LSCS for 2 (6.90%). Spontaneous labor occurred in 39 (59.09%) and induction was required in 27 (40.91%) (Table 5).

Maternal morbidity included blood transfusion in 38 (57.58%), FFP transfusion in 15 (22.73%), platelet transfusion in 10 (15.15%), postpartum anemia in 42 (63.64%), PPH in 21 (31.82%), DIC in 2 (3.03%), renal failure in 2 (3.03%), ICU admission in 12 (18.18%), peripartum hysterectomy in 1 (1.52%), and maternal shock in 4 (6.06%). Median hospital stay was reported as 7±3 days. Of the participants, [65 (98.48%)] women recovered and [1 (1.52%)] died (Table 6).

Table 5: Delivery Details and Management Outcomes

Variable	Category	n	Percentage (%) [N=66]
Gestational age at delivery	<34 weeks	11	16.67
	34–37 weeks	30	45.45
	>37 weeks	25	37.88
Onset of labor	Spontaneous	39	59.09
	Induced	27	40.91
Mode of delivery	Vaginal	37	56.06
	LSCS	29	43.94
Indication for LSCS	Fetal distress	14	48.28
	Maternal indication	13	44.83
	Previous LSCS	2	6.90

Table 6: Maternal Outcomes in Abruptio Placentae

Outcome	Category	n	Percentage (%) [N=66]
Blood transfusion	Yes	38	57.58
	No	28	42.42
FFP transfusion	Yes	15	22.73
	No	51	77.27
Platelet transfusion	Yes	10	15.15
	No	56	84.85
Postpartum anemia	Yes	42	63.64
	No	24	36.36
PPH	Yes	21	31.82
	No	45	68.18
DIC	Yes	2	3.03
	No	64	96.97
Renal failure	Yes	2	3.03
	No	62	96.97
ICU admission	Yes	12	18.18
	No	54	81.82
Peripartum hysterectomy	Yes	1	1.52
	No	65	98.48
Maternal shock	Yes	4	6.06
	No	62	93.94
Hospital stay	Mean ± SD	7 ± 3 days	
Maternal outcome	Recovered	65	98.48
	Mortality	1	1.52

There were 42 (63.64%) live births, 8 (12.12%) IUFDs, and 16 (24.24%) stillbirths. Preterm birth occurred in 46 (69.70%). Mean birth weight was 2.12±0.64 kg; mean Apgar scores were 4±2 at 1 minute and 8±2 at 5 minutes. Forty neonates (60.61%) required NICU admission, principally because of prematurity (22/40, 55%), birth asphyxia (12/40, 30%), and sepsis (6/40, 15%) (Table 7).

Among the study participants, hypertensive disorders of pregnancy were present in 38 women, of whom 30 had maternal complications; maternal anemia was present in 49 women, of whom 35 had complications; and PROM was present in 18 women, of whom 16 had complications. Each association was reported as statistically significant ($p<0.05$). A significant association was also reported between abruption severity and fetal outcome ($p<0.01$). The narrative accompanying the dissertation gives internally consistent severity-specific counts of 16 live births/2 IUFD or stillbirths for mild abruption, 18/9 for moderate abruption, and 8/13 for severe abruption. These counts sum to 66 and reproduce the overall 42 live births and 24 IUFD/stillbirths (Table 8A & 8B).

Table 7: Fetal and Neonatal Outcomes in Abruptio Placentae

Outcome	Category	n	%
Fetal outcome	Live birth	42	63.64
	IUFD	8	12.12
	Stillbirth	16	24.24
Gestational status	Term	20	30.30
	Preterm	46	69.70
Sex	Male	36	54.55
	Female	30	45.45
Birth weight	Mean ± SD	2.12±0.64 kg	
Apgar at 1 min	Mean ± SD	4 ± 2	
Apgar at 5 mins	Mean ± SD	8 ± 2	
NICU admission	Yes	40	60.61
	No	26	39.39
Reason for NICU (N = 40)	Prematurity	22	55.00*
	Asphyxia	12	30.00*
	Sepsis	6	15.00*
NICU stay	Mean ± SD	8±2 days	

*Percentages for NICU indications use the 40 neonates admitted to NICU as the denominator.

Table 8(A): Selected Risk Factors versus Maternal Complications

Risk factor	Complications	No complications	Total	Reported p
Hypertensive disorders of pregnancy	30	8	38	<0.05
Maternal anemia	35	14	49	<0.05
PROM	16	2	18	<0.05

Table 8(B): Severity of abruption versus fetal outcome

Severity	Live birth	IUFD/stillbirth	Total	Reported p
Mild	16	2	18	<0.01
Moderate	18	9	27	
Severe	8	13	21	

ISSN 2583-2069

Discussion

This prospective tertiary-care cohort demonstrates the substantial maternal and perinatal burden associated with placental abruption. The observed pattern is characterized by a predominance of young women, high multiparity, rural residence, unbooked status, inadequate antenatal visits, frequent maternal anemia and hypertensive disorders, late-preterm presentation, and clinically important maternal and fetal complications.

Two features of the cohort are particularly relevant to the clinical context. First, 66.67% of women were unbooked and 72.73% had fewer than four antenatal visits. These findings are consistent with the previous studies such as Tikkanen et al. (2020) and Downes et al. (2019) have reported higher incidence in advanced maternal age due to vascular changes and comorbidities[3,23]. However, because the study was observational and included only women presenting with abruption, these characteristics should be interpreted as features of the cohort rather than as proven causal determinants of abruption or adverse outcome. Previous literature has similarly emphasized the role of access to antenatal and emergency obstetric care in outcomes in resource-limited settings[19,20,24,25].

Second, hypertensive disorders of pregnancy and anemia were common. HDP was documented in 57.58% and anemia in 74.24%, with a mean hemoglobin of 8.94±1.52 g/dL. Hypertensive disease is an established risk factor for placental abruption, plausibly through placental-bed vascular pathology and endothelial dysfunction[3,7,26]. Ananth et al. (2018) reported that hypertensive disorders increase the risk of abruption several fold[15]. The high prevalence of anemia in this cohort may increase vulnerability to symptomatic blood loss and complicate recovery, although the present study cannot establish that anemia caused abruption. Similar associations were reported by Sharma et al. (2020)[27].

PROM/PPROM occurred in 27.27% of participants and was significantly associated with maternal complications. Poly/oligohydramnios was also documented in nearly one-third of participants. These observations support the clinical importance of identifying coexisting obstetric conditions in women with abruption. These findings are consistent with studies by Tikkanen (2019) and Downes et al. (2020)[28,29].

The clinical presentation was typical of placental abruption: 78.79% reported abdominal pain and 63.64% presented within six hours of bleeding onset. Nevertheless, fetal heart sounds were absent in 36.36% at admission. The coexistence of a substantial proportion of fetal compromise with a high prevalence of unbooked status may reflect the severity of cases reaching a tertiary referral center. Concealed abruption can be especially difficult to recognize because visible bleeding may underestimate actual blood loss[2,10].

Ultrasonography demonstrated abruption in 66.67% of cases, while one-third of clinically diagnosed cases had no sonographic visualization., confirming its limited sensitivity, as also reported by Glantz and Purnell (2018) [30]. This finding is consistent with the established role of ultrasonography as an adjunct rather than a definitive exclusion test for abruption[2,10,30]. Therefore, a negative ultrasound should not be interpreted in isolation when the clinical presentation is strongly suggestive.

The mode of delivery reflected the clinical heterogeneity of abruption. Vaginal delivery occurred in 56.06%, while LSCS was undertaken in 43.94%, with fetal distress the leading documented indication. The choice of delivery in abruption is dependent on fetal viability and condition, maternal status, labor progress, and the presence of coagulopathy[22,31].

Maternal morbidity was substantial. More than half required blood transfusion, 22.73% received FFP, and 15.15% received platelets. Postpartum anemia occurred in 63.64%, PPH in 31.82%, ICU admission in 18.18%, shock in 6.06%, and DIC and renal failure in 3.03% each. One maternal death occurred. These findings are clinically plausible given the hemorrhagic and consumptive-coagulopathy mechanisms described in the literature[1,12,14,32]. The low absolute frequency of DIC in this cohort should not be interpreted as indicating negligible risk, particularly because severe abruption can produce rapidly evolving coagulopathy.

Perinatal outcomes were also unfavorable. Although 63.64% of pregnancies resulted in live birth, 36.36% ended in IUFD or stillbirth. Preterm delivery occurred in 69.70%, mean birth weight was 2.12 kg, and 60.61% of neonates required NICU admission. Prematurity accounted for more than half of NICU admissions, followed by birth asphyxia and sepsis. These outcomes are consistent with the mechanisms by which placental separation compromises oxygen delivery and precipitates either spontaneous or medically indicated preterm birth[14-17].

The reported association between abruption severity and fetal outcome is clinically important. Adverse fetal outcome increased from 2/18 cases with mild abruption to 9/27 with moderate and 13/21 with severe abruption, with a reported $p<0.01$. This gradient is consistent with the established relationship between extent of placental separation and fetal hypoxia.

However, the study has certain limitations. It was conducted at a single tertiary-care center with a relatively small sample size, limiting precision and generalizability. There was no comparison group of pregnancies without abruption, so risk factors cannot be interpreted as measures of relative risk. The study was observational and therefore cannot establish causal relationships. The available analysis reports p-values but not effect sizes or confidence intervals. Referral delay, time from symptom onset to hospital arrival, quantified blood loss, fibrinogen levels, and decision-to-delivery intervals were not presented in the reported results.

Despite these limitations, the study provides clinically

relevant descriptive data from a tertiary-care setting and highlights the combined burden of maternal hemorrhagic morbidity and perinatal compromise. Strengthening antenatal surveillance, recognition and management of hypertension and anemia, efficient referral pathways, blood-product readiness, rapid obstetric decision-making, and neonatal resuscitation capacity are reasonable health-system priorities supported by the observed pattern and the broader literature.

Conclusion

Abruptio placentae remains a significant obstetric emergency associated with substantial maternal and perinatal morbidity and mortality. In this study, hypertensive disorders of pregnancy, maternal anemia, and PROM were significantly associated with maternal complications, while greater severity of placental abruption was associated with adverse fetal outcomes. The high rates of preterm delivery, low birth weight, NICU admission, and perinatal mortality highlight the importance of early identification of high-risk pregnancies, adequate antenatal care, timely management of hypertension and anemia, and prompt referral and intervention to improve fetomaternal outcomes.

Acknowledgement

The authors thank all study participants, Department of Obstetrics & Gynecology, NIMS Medical College & Hospital, Jaipur for their support to collect the data. The authors were also grateful to the Institutional Ethics Committee and NIMS University Rajasthan, Jaipur for their support in the completion of this study.

Financial Support and Sponsorship

None

Conflict of Interest

None

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