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Maternal Outcome in Pregnant Patients with Abruptio Placentae at Mardan Medical Complex

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Declaration
Authors' Contribution
Sadia Mahmood: Facilitated development of research design, gathered data from hospital records, and drafted the initial manuscript.
Tayyaba Akhtar: Contributed to research design, data collection, and initial manuscript drafting.
Nuzhat Amin: Assisted in study design, data interpretation, and manuscript revision.
Sundas Jamal: Provided academic supervision, methodological guidance, and final approval.

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ABSTRACT

Background: Abruptio placentae remains a major cause of obstetric morbidity, especially in developing regions. Prompt diagnosis and risk stratification are essential for reducing maternal complications. Understanding demographic and clinical predictors can improve outcomes and resource allocation in tertiary care settings. **Objective:** To evaluate maternal outcomes in pregnant women diagnosed with abruptio placentae and to assess associations with demographic and clinical risk factors. **Study Design:** Descriptive cross-sectional study. **Duration and Place of Study:** The study was conducted from August 2024 to February 2025 at the Department of Obstetrics and Gynecology, Mardan Medical Complex, Mardan. **Methodology:** A total of 157 pregnant women aged 18–40 years with gestational age >26 weeks and ultrasound-confirmed abruptio placentae were enrolled. Maternal complications including blood transfusion (≥8 units), postpartum hemorrhage (>500 mL), and acute kidney injury were recorded. Data were analyzed using SPSS v21. Chi-square and Fisher's exact tests were used to explore associations with risk factors such as age, BMI, diabetes, hypertension, and socioeconomic status. **Results:** The mean maternal age was 29.87±5.52 years and gestational age was 31.70±3.26 weeks. Blood transfusion was required in 80.3% of cases, postpartum hemorrhage occurred in 49.7%, and 5.1% developed acute kidney injury. **Conclusion:** Abruptio placentae remains a serious obstetric emergency linked to increased maternal morbidity. Key risk factors include high BMI, advanced age, hypertension, and diabetes. Lower socioeconomic status heightens vulnerability, underscoring the need for early diagnosis, risk stratification, and improved antenatal care access.

INTRODUCTION

Abruptio placenta, also termed abruption of the placenta, is an obstetric complication in which the placenta prematurely separates from the uterine wall at over 20 weeks of gestation.[1] Placental abruption results in severe maternal bleeding, fetal distress, and life-threatening complications in the mother and the infant if not addressed.[2] Symptoms of abruption of the placenta are sudden pain in the belly, vaginal bleeding, and frequent and severe contractions.[3] Risk factors of abruption of the placenta include hypertension, trauma, smoking, cocaine abuse, as well as a past episode of abruption of the placenta.[4] Correct diagnosis using clinical evaluation as well as the adoption of ultrasound, and together with immediate medical treatment from close monitoring to immediate delivery is critical in abruption of the placenta to treat the condition as well as avoid unfavorable outcomes.[5]

Maternal outcomes in pregnant women with abruptio placentae usually are severe due to the cascade of serious complications.[6] Blood loss is still one of the predominant reasons for maternal morbidity in the form of hemorrhagic shock, and coagulopathy due to the loss of clotting factors contributes to the severity of the bleeding.[7] Emergency delivery usually has to be done to prevent further compromise of the mother, most commonly by the route of cesarean section, which is in turn accompanied by surgical risks.[8] In addition to the immediate blood loss, abruptio placentae can result in multi-organ dysfunction in the form

of disseminated intravascular coagulation (DIC), acute renal failure, and respiratory distress.[9]

Postpartum hemorrhage is a major maternal complication of abruptio placentae as a result of disruption of the uteroplacental bed as well as underlying uterine vasculature.[10] Both concealed as well as overt bleeding can occur with resultant loss of maternal blood volume.[10] Blood transfusion is generally needed in such a scenario to restore oxygen-carrying capacity as well as circulatory volume.[11] Blood transfusion volume depends on the extent of bleeding, progression of coagulopathy, as well as timing of intervention.[12] Massive transfusion criteria can in some cases be used to restore hypovolemia and avert subsequent complications of shock as well as organ failure.[13] Judicious use of blood product as well as effective control of PPH is critical to ensuring maximal maternal survival in abruptio placentae.[7]

Acute kidney injury is a known but rare complication in patients with abruptio placentae, typically resulting from hypovolemia due to hemorrhage and hypoperfusion.[14] The renal damage is further enhanced by disseminated intravascular coagulation as a mechanism of microvascular thrombus development in the kidneys with resultant worsening of ischemia.[15] Symptoms and signs include oliguria, rising serum creatinine, and electrolyte imbalances, which need to be identified and treated immediately.[16]

Barua et al. conducted a study on maternal outcomes in pregnant patients with abruptio placentae, finding that blood transfusions were required in 73.68% of cases. Postpartum hemorrhage occurred in 10.52% of patients, and acute kidney injury was documented in 5.26%, underscoring the serious maternal risks associated with this obstetric emergency.[17]

It is essential to research this study in particularly in our region where there is poor antenatal care and socio-economic conditions worsening maternal complications. Outcomes such as postpartum hemorrhage, need for blood transfusions, and acute kidney injury are significant threats to maternal survival and well-being. Such research in this population can contribute to the identification of particular risk factors, improvement in the early diagnosis, and preparation of customized management protocols to reduce adverse outcomes. This study attempts to fill the gap in the local data, providing evidence to support strengthening of the clinical practice and also allocation of funds to better the maternal outcomes in Mardan and such other regions.

METHODOLOGY

This descriptive study was conducted from August 2024 to February 2025 in the Department of Obstetrics and Gynecology at Mardan Medical Complex. The study enrolled 157 pregnant women aged between 18 and 40 years with gestational age beyond 26 weeks, diagnosed with abruptio placentae. The diagnosis was confirmed through ultrasonography, identifying key indicators such as intraplacental anechoic areas, retroplacental hematoma, disruption in retroplacental circulation, and intra-amniotic echoes. Patients with chronic renal failure, glomerulopathy, or hepatic dysfunction were excluded to avoid confounding effects on maternal outcomes.

Participants were recruited consecutively as they met the inclusion criteria after ethical approval was obtained from the hospital's ethical board and the research unit of CPSP. Before recruitment, patients were given a thorough description of the aim of the study, its advantages, and possible risks, and written consent was obtained. Demographic characteristics in the form of age, residence, education, employment, socioeconomic level, and comorbidities like hypertension and diabetes were collected. Extensive medical histories and physical exams were conducted. Outcomes in the mother were measured during pregnancy and at the time of delivery according to predetermined criteria. Major maternal complications were the demand for blood transfusion of more than eight units of red blood cell in 24 hours following 26 weeks of gestation, post-partum hemorrhage as the loss of more than 500 mL of blood in 24 hours as measured by pre-post weighed sanitary pads, and acute kidney injury as determined by an increase in the serum creatinine of more than 0.3 mg/dL within 48 hours. Patient evaluations and data recording were supervised by an experienced consultant with over five years of post-fellowship expertise, utilizing a standardized proforma to ensure consistency.

Data analysis was performed using SPSS version 21. Categorical variables were summarized using frequencies and percentages. Numerical variables were expressed as mean ± standard deviation or median with interquartile range, depending on the distribution determined by the Shapiro-Wilk test. To account for potential confounding factors stratified analyses were conducted. Associations were tested using chi-square or Fisher's exact test where appropriate, with a significance threshold set at $p < 0.05$.

RESULTS

The mean maternal age was 29.87±5.52 years with a mean gestational age of 31.70±3.26 weeks. Patients had a mean weight of 67.72±9.72 kg, height of 1.59±0.05 meters, and body mass index of 26.49±2.06 kg/m^2. Regarding education, 67 patients (42.7%) were literate while 90 (57.3%) were illiterate. Employment status showed 24 patients (15.3%) were employed and 133 (84.7%) were unemployed. Socioeconomic distribution included 11 patients (7.0%) classified as rich, 56 (35.7%) as middle class, and 90 (57.3%) as poor. Rural residence was reported in 90 patients (57.3%) compared to 67 (42.7%) in urban areas. Medical comorbidities included diabetes in 40 patients (25.5%) and hypertension in 76 patients (48.4%) (as shown in Table-I).

Table I

Patient Demographics

Demographics		Mean ± SD
Age (years)		29.87±5.52
Gestational Age (weeks)		31.70±3.26
Weight (Kg)		67.72±9.72
Height (meters)		1.59±0.05
Body Mass Index (Kg/m^2)		26.49±2.06
Education	Literate	67 (42.7%)
	Illiterate	90 (57.3%)
Employment	Employed	24 (15.3%)
	Un-employed	133 (84.7%)

Socioeconomic Status	Rich	11 (7.0%)
	Middle Class	56 (35.7%)
	Poor	90 (57.3%)
Residence	Rural	90 (57.3%)
	Urban	67 (42.7%)
Diabetes	Yes	40 (25.5%)
	No	117 (74.5%)
Hypertension	Yes	76 (48.4%)
	No	81 (51.6%)

Maternal outcomes revealed that 126 patients (80.30%) required blood transfusion, 78 patients (49.70%) experienced postpartum hemorrhage, and 8 patients (5.10%) developed acute kidney injury (as shown in Table-II).

Table II

Frequency of Maternal Outcomes

Maternal Outcomes	Frequency	% age
Blood Transfusion		
Yes	126	80.30%
No	31	19.70%
Postpartum Hemorrhage		
Yes	78	49.70%
No	79	50.30%
Acute Kidney Injury		
Yes	8	5.10%
No	149	94.90%

Blood transfusion requirements showed significant associations with age >30 years (100.0% vs 61.7% for ≤30 years, p<0.001), BMI >25 kg/m^2 (89.9% vs 58.3% for ≤25 kg/m^2, p<0.001), presence of diabetes (100.0% vs 73.5% without diabetes, p<0.001), and hypertension (100.0% vs 61.7% without hypertension, p<0.001). Socioeconomic status and residence showed no significant association with blood transfusion (p=0.246 and p=0.366 respectively) (as shown in Table-III).

Table III

Association of Blood Transfusion with Demographic Factors

Demographic Factors		Blood Transfusion		p-value
		Yes n(%)	No n(%)	
Age Group (years)	≤30	50 (61.7%)	31 (38.3%)	<0.001*
	>30	76 (100.0%)	0 (0.0%)	
Body Mass Index (Kg/m^2)	≤25	28 (58.3%)	20 (41.7%)	<0.001*
	>25	98 (89.9%)	11 (10.1%)	
Socioeconomic Status	Rich	11 (100.0%)	0 (0.0%)	0.246*
	Middle Class	45 (80.4%)	11 (19.6%)	
	Poor	70 (77.8%)	20 (22.2%)	
Residence	Rural	70 (77.8%)	20 (22.2%)	0.366
	Urban	56 (83.6%)	11 (16.4%)	
Diabetes	Yes	40 (100.0%)	0 (0.0%)	<0.001*
	No	86 (73.5%)	31 (26.5%)	
Hypertension	Yes	76 (100.0%)	0 (0.0%)	<0.001*
	No	50 (61.7%)	31 (38.3%)	

Postpartum hemorrhage demonstrated significant associations with age >30 years (97.4% vs 4.9% for ≤30 years, p<0.001), BMI >25 kg/m^2 (71.6% vs 0.0% for ≤25 kg/m^2, p<0.001), higher socioeconomic status with rich patients showing 100.0% occurrence (p=0.001), presence of diabetes (100.0% vs 32.5% without diabetes, p<0.001), and hypertension (97.4% vs 4.9% without hypertension, p<0.001). Residence showed no significant association (p=0.818) (as shown in Table-IV).

Table IV

Association of Postpartum Hemorrhage with Demographic Factors

Demographic Factors		Postpartum Hemorrhage		p-value
		Yes n(%)	No n(%)	
Age Group (years)	≤30	4 (4.9%)	77 (95.1%)	<0.001*
	>30	74 (97.4%)	2 (2.6%)	
Body Mass Index (Kg/m^2)	≤25	0 (0.0%)	48 (100.0%)	<0.001*
	>25	78 (71.6%)	31 (28.4%)	
Socioeconomic Status	Rich	11 (100.0%)	0 (0.0%)	0.001*
	Middle Class	23 (41.1%)	33 (58.9%)	
	Poor	44 (48.9%)	46 (51.1%)	
Residence	Rural	44 (48.9%)	46 (51.1%)	0.818
	Urban	34 (50.7%)	33 (49.3%)	
Diabetes	Yes	40 (100.0%)	0 (0.0%)	<0.001*
	No	38 (32.5%)	79 (67.5%)	
Hypertension	Yes	74 (97.4%)	2 (2.6%)	<0.001*
	No	4 (4.9%)	77 (95.1%)	

Acute kidney injury was significantly associated with age >30 years (10.5% vs 0.0% for ≤30 years, p=0.002), rich socioeconomic status (18.2% vs 0.0% middle class and 6.7% poor, p=0.022), presence of diabetes (20.0% vs 0.0% without diabetes, p<0.001), and hypertension (10.5% vs 0.0% without hypertension, p=0.002). BMI and residence showed no significant associations with acute kidney injury (p=0.107 and p=0.468 respectively) (as shown in Table-V).

Table V

Association of Acute Kidney Injury with Demographic Factors

Demographic Factors		Acute Kidney Injury		p-value
		Yes n(%)	No n(%)	
Age Group (years)	≤30	0 (0.0%)	81 (100.0%)	0.002*
	>30	8 (10.5%)	68 (89.5%)	
Body Mass Index (Kg/m^2)	≤25	0 (0.0%)	48 (100.0%)	0.107*
	>25	8 (7.3%)	101 (92.7%)	
Socioeconomic Status	Rich	2 (18.2%)	9 (81.8%)	0.022*
	Middle Class	0 (0.0%)	56 (100.0%)	
	Poor	6 (6.7%)	84 (93.3%)	
Residence	Rural	6 (6.7%)	84 (93.3%)	0.468
	Urban	2 (3.0%)	65 (97.0%)	
Diabetes	Yes	8 (20.0%)	32 (80.0%)	<0.001*

	No	0 (0.0%)	117 (100.0%)	
Hypertension	Yes	8 (10.5%)	68 (89.5%)	0.002*
	No	0 (0.0%)	81 (100.0%)	

DISCUSSION

The present study demonstrates that abruptio placentae is associated with significant maternal morbidity, with 80.3% of patients requiring blood transfusion, 49.7% experiencing postpartum hemorrhage, and 5.1% developing acute kidney injury. The high frequency of blood transfusion can be attributed to the pathophysiology of abruptio placentae, where premature separation of the placenta leads to concealed or revealed hemorrhage, resulting in acute blood loss and coagulopathy that necessitates immediate blood product replacement to maintain hemodynamic stability. The substantial occurrence of postpartum hemorrhage (49.7%) is scientifically explained by the disruption of normal hemostatic mechanisms at the placental bed following abruption, combined with potential consumptive coagulopathy and uterine atony that impairs effective contraction and compression of spiral arteries. The development of acute kidney injury in 5.1% of cases reflects the consequences of severe hypovolemic shock and hypoperfusion leading to acute tubular necrosis, particularly in the setting of massive hemorrhage and inadequate fluid resuscitation.

Our study's mean maternal age of 29.87±5.52 years aligns closely with several studies, including Tadese et al. [18] who reported a mean age of 27.91±5.5 years, and Naurin et al. [19] with a mean age of 27.67±5.411 years. However, our findings contrast with Naseeb et al. [20] who found a higher mean age of 36.1±12.6 years, and Sarwar et al. [21] with 31.55±6.21 years. Our patient age distribution, with the largest number of patients under the age of 30, is different from many reported studies with increased incidence in older age groups. For example, Naseeb et al. [20] presented 61.4% of patients aged more than 30 years, and 51.1% of patients in the age group 25-30 years were reported in the study by Qamarunisa et al. [22] This disparity of age distribution is likely to indicate disparity in population demographics, accessibility of the health facilities, and family planning behavior in various geographic regions and health systems.

Our research identified striking disparities across the socioeconomic spectrum, with 90 patients (57.3%) being poor and 90 (57.3%) illiterate, which is in agreement with the experiences in other developing nations. This is in agreement with the findings of Sarwar et al. [21] who reported 77.4% came from poor socio-economic groups, and Alka and Dudhrejia [23] who reported 76% were from lower socioeconomic class with 76% having no education. Naurin et al. [19] in their study, also reported 76% were from lower socioeconomic class and 76% were without education. This consistency in the findings across studies from developing nations indicates that poverty and poor education are major risk factors for abruptio placentae, which may result from poor antenatal care, poor nutrition, and poor health-seeking behavior.

Our finding of 84.7% unemployment rate among patients is notably higher than what might be expected in general population studies, suggesting possible associations between economic instability and pregnancy complications. The rural-urban distribution in our study (57.3% rural vs 42.7% urban) contrasts with Tadese et al. [18] who found 60% urban residents, indicating geographic variations in healthcare access and possibly different referral patterns between rural and urban healthcare facilities.

Our mean gestational age of 31.70±3.26 weeks indicates that most cases presented in the preterm period, which aligns with the findings of several other studies. This is consistent with Sarwar et al. [21] who reported a mean gestational age of 33.81±3.64 weeks, and supports the well-established association between abruptio placentae and preterm delivery. The preterm presentation in our study may explain the higher complication rates observed.

The prevalence of hypertension in our study (48.4%) falls within the range reported in other studies but shows considerable variation across different populations. Our result is higher than that of Qamarunisa et al.[22] who documented 18.75% hypertension, but lower than that of Aktürk et al.[24] who identified 80.3% of the women with hypertensive disorders. 25.2% with hypertension and pre-eclampsia were reported by Naseeb et al.[20] This discrepancy can be explained by differences in diagnostic criteria, population characteristics, as well as the severity of cases referred to different health facilities. The 25.5% of diabetic patients is significantly higher in this study from the majority of the earlier studies and can reflect regional variations in the prevalence of diabetes or may signify that diabetic patients are more likely to have severe abruptio placentae needing to be treated in a tertiary facility.

Our study's finding that 80.30% of patients required blood transfusion is remarkably high and represents one of the highest rates reported in the literature. This is significantly higher than Aktürk et al.[24] who reported 43.1%, Alka and Dudhrejia [23] with 100% requiring transfusion, and Naurin et al.[19] with 82%. The high transfusion rate in our study may reflect the severity of cases, delayed presentation, or the preterm gestational age at presentation. Our finding of significant associations between blood transfusion requirements and various factors (age >30 years, BMI >25 kg/m^2, diabetes, and hypertension) provides important clinical insights for risk stratification and management planning.

The postpartum hemorrhage rate in our study (49.70%) is considerably higher than most other studies. Naseeb et al.[20] reported 14.3%, Sarwar et al.[21] found 18.9%, Qamarunisa et al.[22] reported 13%, Naurin et al.[19] found 11%, and Alka and Dudhrejia[23] reported 14.4%. Our significantly higher rate may be attributed to the high proportion of patients with risk factors such as advanced maternal age, diabetes, and hypertension. The strong associations we found between postpartum hemorrhage and these risk factors ($p<0.001$) support this hypothesis and highlight the importance of careful monitoring and preparation for potential complications in high-risk patients.

Our acute kidney injury rate of 5.10% is comparable to some studies but varies considerably across the literature. Sarwar et al.[21] reported 6.25% renal failure, while Alka and Dudhrejia[23] found 15.6% acute renal failure, and Naurin et al. [19] reported only 1%. The significant associations we identified between acute kidney injury and older age, diabetes, and hypertension align with known risk factors for renal complications and emphasize the importance of monitoring kidney function in high-risk patients with abruptio placentae

Our study's high complication rates, particularly for blood transfusion and postpartum hemorrhage, may reflect the combination of preterm presentation (mean gestational age 31.70 weeks), high prevalence of risk factors, and possibly delayed healthcare seeking in our population. The strong statistical associations we identified provide valuable guidance for clinical practice, suggesting that patients with diabetes, hypertension, advanced age, and higher BMI require enhanced monitoring and preparation for potential complications.

Our study has several important limitations that should be acknowledged when interpreting the results. First, this was a single-center study conducted at one tertiary care hospital, which may limit the generalizability of our findings to other healthcare settings, particularly primary and secondary care facilities, or different geographic regions with varying healthcare infrastructure and patient populations. Second, the relatively small sample size of 157 patients may have limited our statistical power to detect certain associations and could affect the precision of our estimates, particularly for less common complications such as acute kidney injury.

CONCLUSION

Our investigation concludes that abruptio placentae is still a critical obstetric emergency with significant maternal morbidity. Increased BMI, advanced age, hypertension, and diabetes were the major risk factors that were responsible for complication such as transfusion, postpartum hemorrhage, and acute kidney injury. Women from lower socioeconomic classes were disproportionately affected, which emphasizes the importance of uninterrupted antenatal care, early diagnosis, and timely intervention. The study highlights the importance of risk stratification and improved access to care in preventing maternal morbidity, particularly in poor facilities.

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