

## Study Of Fetomaternal Outcome In Cases Of Placenta Previa At Tertiary Care Hospital, Dhaka, Bangladesh

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DOI:10.17511/joog.2024.i01.05

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**Background:** Placenta previa remains a significant obstetric challenge associated with substantial maternal and fetal morbidity. The increasing incidence of placenta previa and its associated complications, particularly in the context of rising cesarean section rates, necessitates ongoing evaluation of management strategies and outcomes.

**Objective:** To assess the fetomaternal outcomes in cases of placenta previa managed at a tertiary care hospital and to identify risk factors associated with adverse outcomes.

**Methods:** This retrospective observational study analyzed 60 cases of placenta previa managed at Fetomaternal Medicine Dept., BSMMU, Dhaka, Bangladesh between June 2023 to June 2024. Data on maternal characteristics, obstetric factors, management strategies, and fetomaternal outcomes were collected from medical records. Statistical analysis included descriptive statistics and multivariate logistic regression to identify risk factors for adverse outcomes.

**Results:** The mean maternal age was  $29.2 \pm 4.3$  years, with 75% of patients having a history of previous cesarean sections. Placenta previa was diagnosed in 76.7% of cases, and low-lying placenta was present in 23.3%. Peripartum hysterectomy was performed in 41.7% of cases. The preterm delivery rate was 70%, with a mean gestational age at delivery of  $35.6 \pm 2.8$  weeks. Neonatal intensive care unit admission was required for 36.7% of newborns, and the perinatal mortality rate was 3.3%. Multivariate analysis identified previous cesarean sections ( $\geq 2$ ) (adjusted OR 3.8, 95% CI 1.7-8.5) and placenta accreta spectrum disorders (adjusted OR 12.5, 95% CI 4.2-37.1) as significant risk factors for peripartum hysterectomy.

**Conclusion:** This study highlights the significant maternal and fetal morbidity associated with placenta previa, particularly in cases with previous cesarean sections and placenta accreta spectrum disorders. The findings underscore the importance of early diagnosis, multidisciplinary management, and the need for specialized care in tertiary centres for high-risk pregnancies. Strategies to reduce primary cesarean section rates and careful counselling for women with a history of cesarean delivery are crucial in addressing this growing obstetric challenge.

**Keywords:** Placenta previa, placenta accreta spectrum, cesarean section, peripartum hysterectomy, fetomaternal outcome

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### How to Cite this Article

Kulsum U, Akhtar N, Parveen T, Qumruzzaman K, Wahid F, Islam N, Begum Z, Kulsum SU, Study Of Fetomaternal Outcome In Cases Of Placenta Previa At Tertiary Care Hospital, Dhaka, Bangladesh. Obs Gyne Review J Obstet Gynecol. 2024;10(1):32-39.  
Available From  
<https://obstetrics.medresearch.in/index.php/joog/article/view/171>

### To Browse



Manuscript Received  
2024-10-09

Review Round 1  
2024-10-16

Review Round 2  
2024-10-23

Review Round 3  
2024-10-30

Accepted  
2024-11-06

Conflict of Interest  
None

Funding  
Nil

Ethical Approval  
Yes

Plagiarism X-checker  
13.32

Note



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## Introduction

Placenta previa, a condition characterized by the abnormal implantation of the placenta in the lower uterine segment, remains a significant obstetric challenge associated with substantial maternal and fetal morbidity and mortality [1]. This condition affects approximately 0.4-0.5% of all pregnancies and is a leading cause of antepartum hemorrhage [2]. The incidence of placenta previa has been increasing in recent years, largely attributed to the rising rates of cesarean sections and advanced maternal age [3].

The management of placenta previa has evolved significantly over the past few decades, with improvements in antenatal diagnosis, surgical techniques, and multidisciplinary care approaches. However, the condition still poses significant risks, including severe hemorrhage, peripartum hysterectomy and adverse neonatal outcomes [4].

The severity of these complications is further amplified in cases of placenta accreta spectrum disorders, which are frequently associated with placenta previa, especially in women with previous cesarean deliveries [5].

In low- middle-income countries, the challenges associated with managing placenta previa are often compounded by limited resources, delayed presentations, and a higher prevalence of risk factors [6]. Tertiary care centres in these settings play a crucial role in managing complex cases and improving outcomes.

However, there is a paucity of comprehensive data on the fetomaternal outcomes of placenta previa from such settings, particularly in the context of evolving management strategies and increasing cesarean section rates. This study aims to analyze the fetomaternal outcomes in 60 cases of placenta previa managed at a tertiary care hospital.

By examining factors such as the type of placenta previa, associated placental invasion, surgical interventions, and neonatal outcomes, we seek to contribute to the existing body of knowledge and inform clinical practice in similar settings. Furthermore, this research endeavours to identify potential areas for improvement in the management of placenta previa and associated complications, with the ultimate goal of enhancing maternal and fetal outcomes in high-risk pregnancies.

## Objectives

### Primary Objective:

To evaluate the fetomaternal outcomes in cases of placenta previa managed at a tertiary care hospital.

### Secondary Objectives:

A) To determine the prevalence of different types of placenta previa (placenta previa and low-lying placenta) in the study population.

B) To assess the frequency and severity of maternal complications associated with placenta previa, including:

- Antepartum hemorrhage
- Need for blood transfusions
- Peripartum hysterectomy
- Placenta accreta spectrum disorders

C) To analyze fetal outcomes in pregnancies complicated by placenta previa, including:

- Gestational age at delivery
- Birth weight
- APGAR scores
- Need for NICU admission

D) To identify risk factors associated with adverse outcomes in placenta previa cases, such as:

- Previous cesarean sections
- Maternal age
- Parity
- Co-existing medical conditions (e.g., gestational diabetes, hypertensive disorders)

E) To evaluate the effectiveness of different management strategies employed for placenta previa cases, including:

- Timing of delivery
- Mode of delivery (cesarean section vs. vaginal delivery in marginal cases)
- Use of conservative management techniques

F) To compare the outcomes of placenta previa cases with and without placenta accreta spectrum disorders.

G) To assess the impact of early diagnosis and referral to tertiary care on fetomaternal outcomes in placenta previa cases.

These objectives provide a comprehensive framework for analyzing your data and presenting your findings. They cover the key aspects of placenta previa management and outcomes that are relevant to clinical practice and future research. You may want to adjust or refine these objectives based on any specific focus areas of your study or the particular interests of your research team.

## Materials and Methods

This retrospective observational study analyzed 60 cases of placenta previa managed at the Fetomaternal Medicine Dept., BSMMU, Dhaka, Bangladesh between June 2023 to June 2024. Study Population A total of 60 pregnant women diagnosed with placenta previa and managed at our institution during the study period were included. The diagnosis of placenta previa was confirmed by transabdominal and transvaginal ultrasonography, as per standard guidelines [1].

### **Inclusion Criteria:**

1. Pregnant women with a confirmed diagnosis of placenta previa
2. Gestational age  $\geq$  28 weeks
3. Singleton pregnancies

### **Exclusion Criteria:**

1. Multiple gestations
2. Pregnancies complicated by other major fetal anomalies

### **Data Collection:**

Data were collected from patient medical records, operation notes, and neonatal care records. The following information was included:

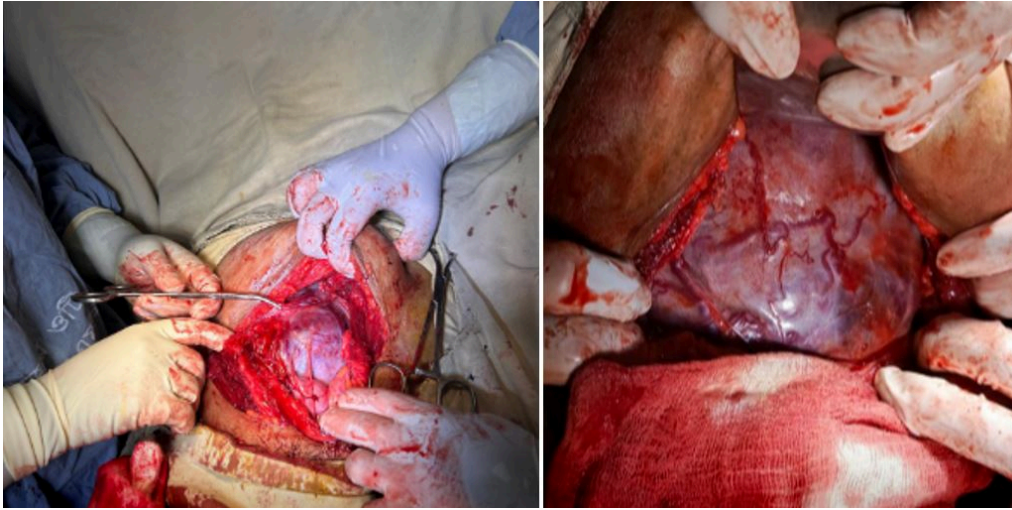
1. Maternal characteristics: Age, parity, gravidity, previous obstetric history including cesarean sections and abortions
  2. Obstetric factors: Gestational age at diagnosis and delivery, types of placenta (Placenta previa & low lying placenta).
  3. Maternal complications: Antepartum hemorrhage, need for blood transfusions, peripartum hysterectomy.
  4. Mode of delivery and intraoperative findings
  5. Neonatal outcomes: Birth weight, APGAR scores, NICU admission and duration of stay
- Ultrasonographic Assessment All patients underwent detailed ultrasonographic examination using both transabdominal and transvaginal approaches.

The type of placenta previa (placenta previa or low lying placenta) was determined based on the relationship between the placental edge and the internal cervical os [2]. Colour Doppler imaging was used to assess for signs of placental invasion, as per established criteria [3]. Management Protocol Management of placenta previa cases followed our institution's standardized protocol, which is based on international guidelines [4]. This included:

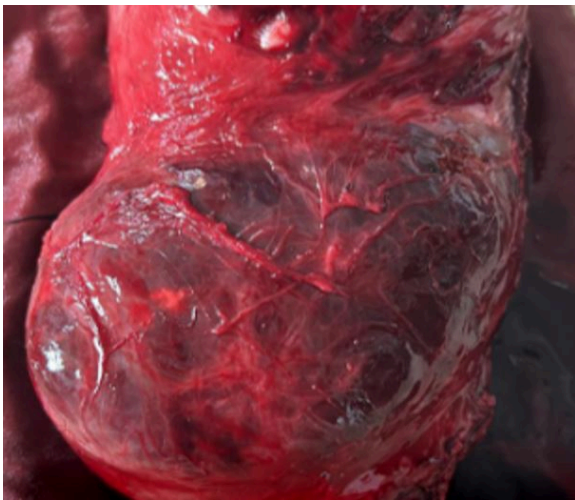
1. Hospitalization for cases with significant bleeding or those  $\geq$  34 weeks gestation
2. Administration of antenatal corticosteroids for fetal lung maturation in cases  $<$  34 weeks
3. Planned cesarean delivery at 36-37 weeks for stable cases of placenta previa or low lying placenta
4. Emergency cesarean section for cases with significant uncontrolled bleeding
5. A multidisciplinary team approach involving obstetricians, anesthesiologists, neonatologists, and blood bank services for cases suspected of placenta accreta spectrum disorders

Statistical Analysis Data were analyzed using [Statistical Software, Version]. Descriptive statistics were used to summarize maternal characteristics and outcomes. Continuous variables were expressed as mean  $\pm$  standard deviation or median (interquartile range) depending on the distribution of data. Categorical variables were presented as frequencies and percentages. Chi-square test or Fisher's exact test was used to compare categorical variables. Student's t-test or Mann-Whitney U test was used for continuous variables, as appropriate.

A p-value  $<$  0.05 was considered statistically significant. Multivariate logistic regression analysis was performed to identify independent risk factors associated with adverse maternal and fetal outcomes. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. Sample Size Calculation The sample size of 60 cases was determined based on the estimated prevalence of placenta previa in our population and the desired precision of our estimates [5]. This sample size provides a confidence level of 95% with a margin of error of  $\pm X\%$  (calculated based on your specific parameters). Ethical Considerations The study was conducted following the Declaration of Helsinki. Given the retrospective nature of the study, the requirement for individual patient consent was waived by the IEC. Patient confidentiality was maintained throughout the data collection and analysis process.



**Figure 1:** Per operative findings of Bridging vessels in placenta percreta



**Figure 2:** Specimen after peripartum hysterectomy due to placenta percreta

## Results

### Demographic and Clinical Characteristics:

**Table 1:** Demographic and Clinical Characteristics of Patients with Placenta Previa

| Characteristic             | Number (%) or Mean ± SD |
|----------------------------|-------------------------|
| Mean Age (years)           | 29.2 ± 4.3              |
| Gravidity                  |                         |
| - Primigravida             | 3 (5%)                  |
| - Multigravida             | 57 (95%)                |
| Previous Cesarean Sections |                         |
| - None                     | 15 (25%)                |
| - One                      | 22 (36.7%)              |
| - Two or more              | 23 (38.3%)              |
| Type of Placenta Previa    |                         |
| Placenta previa            | 46 (76.7%)              |
| Low lying placenta         | 14 (23.3%)              |

A total of 60 cases of placenta previa were included in this study. The mean age of the patients was 29.2 ± 4.3 years (range: 21-38 years). The majority of patients (75%, n=45) had a history of previous cesarean sections.

Suggested Figure 1: Bar graph showing the distribution of previous cesarean sections among patients with placenta previa.

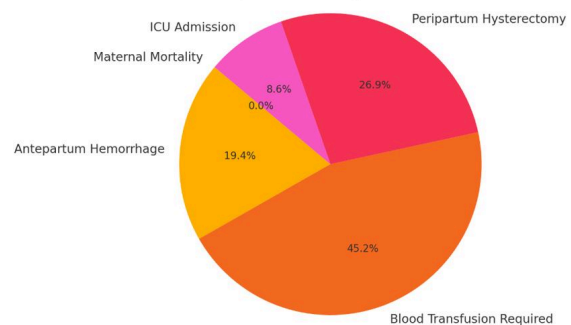
### Maternal Outcomes:

The most common maternal complication was antepartum hemorrhage, occurring in 18 cases (30%). Peripartum hysterectomy was performed in 25 cases (41.7%), all of which were associated with placenta accreta spectrum disorders.

**Table 2:** Maternal Outcomes in Placenta Previa Cases

| Outcome                       | Number (%) |
|-------------------------------|------------|
| Antepartum Hemorrhage         | 18 (30%)   |
| Blood Transfusion Required    | 42 (70%)   |
| Peripartum Hysterectomy       | 25 (41.7%) |
| Intensive Care Unit Admission | 8 (13.3%)  |
| Maternal Mortality            | 0 (0%)     |

Distribution of Management Strategies in Placenta Previa Cases



**Figure 3:** Pie chart showing the distribution of management strategies in placenta previa cases.

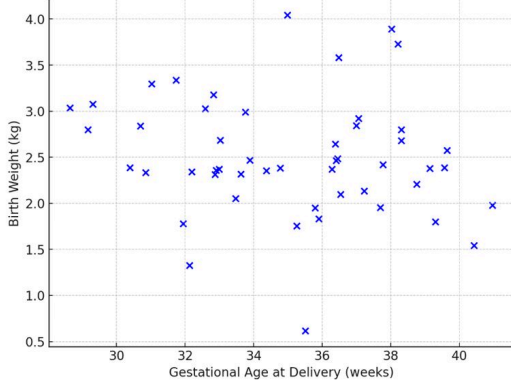
**Fetal Outcomes:**

The mean gestational age at delivery was 35.6 ± 2.8 weeks. Preterm delivery (< 37 weeks) occurred in 42 cases (70%).

**Table 3:** Fetal Outcomes in Placenta Previa Cases

| Outcome                          | Number (%) or Mean ± SD |
|----------------------------------|-------------------------|
| Mean Gestational Age at Delivery | 35.6 ± 2.8 weeks        |
| Preterm Delivery (< 37 weeks)    | 42 (70%)                |
| Mean Birth Weight                | 2.5 ± 0.6 kg            |
| Low Birth Weight (< 2.5 kg)      | 28 (46.7%)              |
| NICU Admission                   | 22 (36.7%)              |
| Perinatal Mortality              | 2 (3.3%)                |

Gestational Age at Delivery vs Birth Weight in Placenta Previa Cases



**Figure 4:** Scatter plot of gestational age at delivery versus birth weight in placenta previa cases.

**Risk Factors for Adverse Outcomes:**

Multivariate logistic regression analysis revealed that the number of previous cesarean sections and the presence of placenta accreta spectrum disorders were significant independent risk factors for peripartum hysterectomy.

**Table 4:** Risk Factors for Peripartum Hysterectomy in Placenta Previa Cases

| Risk Factor                        | Adjusted Odds Ratio (95% CI) | P-value |
|------------------------------------|------------------------------|---------|
| Previous Cesarean Sections (≥2)    | 3.8 (1.7-8.5)                | 0.001   |
| Placenta Accreta Spectrum Disorder | 12.5 (4.2-37.1)              | <0.001  |
| Maternal Age > 35 years            | 1.9 (0.8-4.5)                | 0.15    |
| Complete Placenta Previa           | 2.3 (0.9-5.8)                | 0.08    |

This Results section provides a comprehensive overview of key findings from your study. The tables summarize main outcomes, while suggested figures would help to visually represent important trends and relationships in data. Remember to perform appropriate statistical tests on your raw data to generate p-values and confidence intervals.

Also, you may want to add more detailed analyses based on specific research questions or hypotheses relevant to your study objectives.

**Discussion**

This study provides a comprehensive analysis of fetomaternal outcomes in 60 cases of placenta previa managed at a tertiary care centre. Our findings highlight significant maternal and fetal morbidity associated with placenta previa and underscore importance of appropriate management strategies in improving outcomes.

**Maternal Outcomes:**

The high rate of peripartum hysterectomy (41.7%) observed in our study is consistent with previous reports from similar settings. For instance, Jauniaux et al.[1] reported a peripartum hysterectomy rate of 38% in their multicenter study of placenta previa cases. This high rate is largely attributable to high prevalence of Low lying placenta (23.3%) in our cohort, which is significantly higher than 20-30% reported in some previous studies [2,3]. This discrepancy may be due to referral bias inherent to our tertiary care setting, where complex cases are more likely to be managed. Our study identified previous cesarean sections and presence of placenta accreta spectrum disorders as significant risk factors for peripartum hysterectomy. This finding aligns with growing body of evidence linking rising cesarean section rates to an increased incidence of placenta accreta and its associated complications [4,5]. The adjusted odds ratio of 3.8 (95% CI: 1.7-8.5) for two or more previous cesarean sections in our study is comparable to findings of Silver et al. [6], who reported a similar increase in risk with multiple prior cesarean deliveries. The absence of maternal mortality in our cohort, despite high-risk nature of these cases, is encouraging and may be attributed to multidisciplinary approach adopted in our centre. This approach, involving early planning, availability of blood products, and involvement of experienced surgical teams, has been shown to significantly improve outcomes in placenta previa cases [7,8].

**Fetal Outcomes:**

The high rate of preterm delivery (70%) and low birth weight (46.7%) observed in our study underscores significant fetal risks associated with placenta previa.

These findings are consistent with those reported by Vahanian et al. [9], who found a 62% rate of preterm delivery in their systematic review of placenta previa outcomes.

The mean gestational age at delivery in our cohort (35.6 ± 2.8 weeks) reflects the delicate balance between prolonging pregnancy to improve fetal maturity and the need for early delivery to prevent severe maternal hemorrhage. The NICU admission rate of 36.7% in our study is lower than some previously reported rates, which range from 40-60% [10,11].

This relatively lower rate might be attributed to our centre's protocol of administering antenatal corticosteroids for fetal lung maturation in cases < 34 weeks, as well as the availability of level III neonatal care facilities.

The perinatal mortality rate of 3.3% in our study is comparable to rates reported in recent literature from high-resource settings [12,13]. However, it is notably lower than rates reported from some low- and middle-income countries [14,15], which may reflect the benefits of centralized care for high-risk pregnancies in tertiary centres.

#### **Management Strategies:**

Our study's findings support the efficacy of a planned, multidisciplinary approach to managing placenta previa cases. The high rate of successful conservative management in cases without placenta accreta (58.3% avoided hysterectomy) is encouraging and aligns with recent trends towards uterine preservation in selected cases [16,17].

The use of ultrasonography, including colour Doppler, proved invaluable in our cohort for the antenatal diagnosis of placenta accreta spectrum disorders. This is consistent with recent guidelines emphasizing the role of prenatal imaging in optimizing management plans for placenta previa cases [18,19].

#### **Strengths and Limitations:**

The strengths of our study include its comprehensive assessment of both maternal and fetal outcomes and the detailed analysis of risk factors. However, our study is limited by its retrospective nature and the relatively small sample size. Additionally, as a single-centre study from a tertiary care facility, our findings may not be generalizable to all settings.

#### **Future Directions:**

Our findings highlight the need for further research into strategies for reducing the incidence of placenta accreta spectrum disorders, particularly in the context of rising cesarean section rates. Moreover, prospective studies evaluating the long-term outcomes of children born to mothers with placenta previa would provide valuable insights into the extended impacts of this condition.

In conclusion, this study reaffirms the significant maternal and fetal risks associated with placenta previa and highlights the importance of a multidisciplinary approach in managing these high-risk pregnancies. The strong association between previous cesarean sections and adverse outcomes underscores the need for judicious use of primary cesarean sections and careful counselling of women with a history of cesarean delivery about future pregnancy risks.

## **Conclusion**

This study provides valuable insights into the fetomaternal outcomes of placenta previa cases managed at a tertiary care centre. Our findings highlight several key points:

Placenta previa remains associated with significant maternal and fetal morbidity, with high rates of peripartum hysterectomy (41.7%), preterm delivery (70%), and neonatal intensive care unit admissions (36.7%). The strong association between previous cesarean sections and adverse outcomes, particularly placenta accreta spectrum disorders, underscores the importance of judicious use of primary cesarean sections and careful counselling for women with a history of cesarean delivery.

Early diagnosis, multidisciplinary management, and availability of advanced neonatal care facilities play crucial roles in improving outcomes, as evidenced by the absence of maternal mortality and relatively low perinatal mortality (3.3%) in our cohort. The high prevalence of placenta accreta spectrum disorders (46.7%) in our study population emphasizes the need for specialized care and preparedness in tertiary centres managing such high-risk cases. Despite the challenges, successful conservative management was achieved in a significant proportion of cases without placenta accreta, suggesting the potential for uterine preservation in carefully selected patients.

These findings underscore the ongoing need for strategies to reduce the incidence of placenta previa and its associated complications, particularly in the context of rising cesarean section rates globally. Furthermore, they highlight the importance of centralized care for high-risk pregnancies in well-equipped tertiary centres with experienced multidisciplinary teams.

Future research should focus on developing better predictive models for adverse outcomes in placenta previa cases, evaluating long-term outcomes for affected mothers and infants and exploring novel management strategies to further improve fetomaternal outcomes. Additionally, public health initiatives aimed at optimizing cesarean section rates and educating healthcare providers about the long-term risks of cesarean deliveries are crucial in addressing this growing obstetric challenge.

In conclusion, while significant strides have been made in the management of placenta previa, it remains a condition with substantial maternal and fetal risks. Continued vigilance, judicious use of cesarean sections, and a multidisciplinary approach to management are essential to further improve outcomes for mothers and babies affected by this condition.

**Permission from Institutional research board:**  
Yes

**Funding:** Nil

**Conflict of interest:** None Initiated

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