Evaluation of Risk Factors and Maternal Outcome of Placenta Praevia

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ABSTRACT

Background: Abnormal placental implantation in the lower uterine segment is the hallmark of placenta praevia, a serious obstetric complication that poses serious risks to the health of both the mother and the fetus. Increased maternal morbidity and mortality are linked to the condition, especially through antepartum and postpartum hemorrhage. This study aimed to assess associated risk factors and maternal outcomes to enhance clinical strategies. **Methods & Materials:** This prospective study was carried out at the Department of Obstetrics and Gynaecology, Rangpur Medical College, from January to December 2018. A total of 100 pregnant women admitted after 28 weeks of gestation were purposively selected, consisting of 50 participants diagnosed with placenta praevia (Group A) and 50 without placenta praevia (Group B). Data collection employed pre-tested structured questionnaires and follow-up forms. Statistical analysis on SPSS version 26, with a significance at $p < 0.05$. **Results:** Maternal age over 30 years exhibited a significant correlation with placenta previa (76% vs 20%, p=0.001). A history of cesarean section was identified as a significant risk factor (64% vs 34%, p=0.010), in conjunction with a history of dilation and curettage (60% vs 36%, p=0.003). Women with placenta praevia exhibited markedly elevated rates of cesarean delivery (68% vs 40%, p=0.005), primary postpartum hemorrhage (20% vs 4%, p=0.001), and the necessity for blood transfusion (96% vs 10%, p=0.001). Maternal mortality was exclusively noted in the placenta praevia cohort (8% vs 0%, p=0.041). **Conclusion:** Placenta praevia is closely linked to uterine instrumentation, prior caesarean sections, and advanced maternal age. Due to hemorrhage, the condition significantly raises maternal morbidity, requiring surgical delivery and blood transfusions. Improving maternal outcomes requires early risk factor identification and suitable management practices.

Keywords: *Placenta praevia, Maternal morbidity, Caesarean section*

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INTRODUCTION

One of the most dangerous pregnancy complications is placenta praevia, which is defined by the abnormal placement of placental tissue over or close to the internal cervical os [1]. Its importance in obstetric practice stems from the significant perinatal morbidity, increased operative interventions, and high risk of maternal hemorrhage. Incidence patterns differ around the world; Asian populations have the highest rates, at 12.2 per 1000 pregnancies, while Europe and North America have rates of about 3 per 1000 [2]. Growing rates of caesarean sections and older mothers have been associated with a progressive increase in global prevalence, both of which modify the dynamics of placental implantation. A number of theories have been put forth to explain aberrant implantation, despite the fact that the pathophysiology is still unclear. Placental implantation within the lower uterine segment, where vascular characteristics differ significantly from the fundus, is thought to result from endometrial disruption caused by uterine surgeries such as caesarean section, dilatation, and curettage, which impairs normal decidualization [3]. Recurrent bleeding episodes, a characteristic of clinical presentation in placenta praevia cases, are caused by the lower segment's altered blood supply and decreased contractility [4]. Epidemiologic studies have consistently identified a number of risk factors. Due to age-related changes in the uterine vasculature and decreased endometrial receptivity, advanced maternal age, especially 35 years or older, is linked to a six-fold increase in risk [5]. The most important modifiable risk factor is prior caesarean sections, with observed incidence increasing in proportion to the number of prior procedures: roughly 2% after one, 4% after two, and up to 22% after three or more [6,7]. Other factors include multiparity, assisted reproductive technology, smoking, prior placenta praevia, prior myomectomy, and previous uterine instrumentation such as dilatation and curettage, which may result in cumulative endometrial trauma [8-9]. Placenta praevia causes significant problems for mothers. About 42% of cases involve antepartum hemorrhage, which usually manifests as painless bleeding in the third trimester [10]. With rates of 7% to 20%, postpartum hemorrhage is still a serious problem that frequently calls for blood transfusions; in severe cases, transfusions are necessary in as many as 96% of cases [11]. Placenta accreta spectrum disorders, caesarean delivery, caesarean hysterectomy (5-12% of cases), wound infections, bladder injuries, ICU admission, and extended hospital stays are all made more likely by the condition [2,5,10]. Placenta praevia necessitates careful delivery planning, coordinated multidisciplinary management, and resource readiness due to its increasing frequency and serious consequences. In order to support better region-specific clinical strategies, this study assessed risk factors and maternal outcomes in a tertiary care setting in Bangladesh.

METHODS & MATERIALS

This prospective observational study was carried out at the Department of Obstetrics and Gynecology at Rangpur Medical College in Bangladesh over 12 months, from January to December 2018. 100 pregnant women over 28 weeks of gestation were purposefully chosen and split into two groups: 50 women with placenta praevia (Group A), identified by ultrasound or antepartum hemorrhage, and 50 gestational-age-matched controls with placentae that were normally located (Group B). Women with placentae that were normally positioned were included in Group B, whereas singleton pregnancies over 28 weeks and ultrasound-confirmed placenta

praevia within 2 cm of the internal OS were required for Group A. Multiple pregnancies, significant medical comorbidities, bleeding disorders, placenta accreta spectrum diagnosed during pregnancy, incomplete records, or refusal to participate were the exclusion criteria for both groups. Pre-tested structured questionnaires were used for data collection, and the results were confirmed by reviewing medical records. Demographic data, a thorough obstetric and gynecological history, lifestyle factors, delivery characteristics, and maternal complications like postpartum hemorrhage, transfusion requirements, surgical injuries, ICU admission, wound infection, length of hospital stay, and maternal death were all recorded. Every participant provided written informed consent. SPSS version 26 was utilized for data entry and analysis, including chi-square tests, which were used to assess correlations between placenta praevia and specific risk factors, delivery outcomes, and maternal complications. Descriptive statistics summarized categorical variables as frequencies and percentages. The threshold for statistical significance was set at $p < 0.05$. The institutional review board granted ethical approval.

RESULTS

Table I revealed a significant association between maternal age over 30 and placenta praevia (χ^2=33.398, p=0.001). In Group A, the majority of participants (76%) were older than 30 years, compared to only 20% in Group B. Conversely, the 20-30 years age group represented 70% of controls but only 16% of placenta praevia cases. Women younger than 20 years showed minimal difference between groups (8% vs 10%).

Table I
Maternal Age Distribution by Placenta Praevia Status (*n* = 100).

Age Group	Group A (Placenta praevia) n=50	Group B (No placenta praevia) n=50	χ^2	p-value
<20 years	4 (8%)	5 (10%)	33.398	0.001
20-30 years	8 (16%)	35 (70%)		
>30 years	38 (76%)	10 (20%)		

Table II represents similar proportions across parity categories and no significant difference between groups (χ^2=0.505, p=0.918). However, there was a highly significant correlation between placenta praevia and the prior mode of delivery (χ^2=9.150, p=0.010). Compared to Group B (34%), women in Group A had significantly higher rates of prior cesarean sections (64%). On the other hand, compared to placenta praevia cases (32%), controls (56%) had more prior normal vaginal deliveries. In both groups, assisted deliveries contributed very little.

Table II
Parity and Previous Mode of Delivery (*n* = 100).

Parameter	Group A	Group B	χ^2	p-value
Parity	-	-	-	-
<2	18 (36%)	20 (40%)	0.505	0.918
2-3	25 (50%)	25 (50%)		
3-4	6 (12%)	4 (8%)		
>4	1 (2%)	1 (2%)		
Previous Mode of Delivery				
NVD	16 (32%)	28 (56%)	9.150	0.010
Assisted	2 (4%)	5 (10%)		
LSCS	32 (64%)	17 (34%)		

Table III showed Gynaecological and Obstetric Risk Factors. Placenta praevia was significantly correlated with several gynecological factors. Group A had a significantly higher history of dilatation and curettage (60%) compared to Group B (36%), reaching statistical significance (χ^2=14.287, p=0.003). Only the afflicted group had prior placenta praevia (20% vs. 0%, p=0.001), suggesting a high risk of recurrence. Myomectomy and menstrual regulation procedures were more common in Group A, although smaller numbers limited statistical power. Smoking did not significantly correlate with prior manual placenta removal (8% vs. 20%, p=0.084).

Table III
Gynaecological and Obstetric Risk Factors (*n* = 100).

Risk Factor	Group A	Group B	χ^2	p-value
D&C	30 (60%)	18 (36%)	14.287	0.003
MR	10 (20%)	7 (14%)		
H/O myomectomy	2 (4%)	0 (0%)		
Previous placenta praevia	10 (20%)	0 (0%)	1.111	0.001
Previous manual removal of the placenta	4 (8%)	10 (20%)	2.990	0.084
Smoking	2 (4%)	0 (0%)	2.041	0.153

Table IV depicts maternal delivery outcomes. Group A had significantly higher rates of Caesarean sections (68%) than Group B (40%), reaching statistical significance (χ^2=7.890, p=0.005). The placenta praevia group experienced a corresponding decrease in normal vaginal delivery (32% vs. 60%). Notably, only Group A underwent caesarean hysterectomy (12% vs. 0%, p=0.012), indicating the treatment of severe bleeding that was not under control with conservative measures.

Table IV
Maternal Delivery Outcomes (n = 100).

Outcome	Group A	Group B	χ^2	p-value
Mode of Delivery				
NVD	16 (32%)	30 (60%)	7.890	0.005
LSCS	34 (68%)	20 (40%)		
Caesarean hysterectomy	6 (12%)	0 (0%)	6.683	0.012

Table V demonstrates maternal delivery outcomes. In Group A, maternal morbidity was significantly higher. 20% of placenta praevia cases and 4% of controls experienced primary postpartum hemorrhage (χ^2=93.333, p=0.001). The most notable difference was in the need for blood transfusions, with 96% of Group A and only 10% of Group B requiring transfusions (χ^2=74.840, p=0.001). The placenta praevia group had much higher wound infection rates (30% vs. 10%, p=0.012). Although Group A had higher trends in bladder injury and ICU admission. The length of hospital stays was comparable for both groups, although Group A exhibited more variation. Only Group A experienced maternal mortality (8% vs. 0%, p=0.041), with four deaths linked to massive bleeding and placenta praevia complications.

Table V
Maternal Complications and Hospital Outcomes (n = 100).

Complication / Outcome	Group A	Group B	χ^2	p-value
Primary PPH	10 (20%)	2 (4%)	93.333	0.001
Blood transfusion				
Not needed	2 (4%)	45 (90%)	74.840	0.001
Needed	48 (96%)	5 (10%)		
Bladder injury	2 (4%)	0 (0%)	2.041	0.153
ICU admission	3 (6%)	0 (0%)	3.093	0.079
Wound infection	15 (30%)	5 (10%)	6.250	0.012
Hospital Stay				
<7 days	35 (70%)	40 (80%)	2.000	0.368
7–14 days	10 (20%)	5 (10%)		
>14 days	5 (10%)	5 (10%)		
Maternal death	4 (8%)	0 (0%)	4.167	0.041

DISCUSSION

This prospective study denotes placenta praevia's status as a significant obstetric complication with significant morbidity and mortality implications by offering an integrated assessment of risk factors and maternal outcomes related to the condition in a tertiary care setting in Bangladesh. This study found a strong correlation between advanced maternal age and placenta praevia, with 76% of affected women being older than 30. This finding is in line with Martinelli et al., who reported that women 35 years of age and older have a significantly higher risk [12]. Age-related physiological alterations in uterine vasculature and endometrial quality probably encourage aberrant placental implantation [13]. This demographic trend highlights the significance of improved surveillance and age-based risk stratification in prenatal care as maternal age continues to rise globally. In this study, the most significant modifiable risk factor was prior caesarean section; women who had previously had a caesarean delivery accounted for 64% of placenta praevia cases. This is consistent with Ogawa et al., who showed a dose-response relationship between the risk of placenta praevia and the number of caesarean sections [14]. According to Faiz et al., risk rates rise from 2.5% following a single caesarean to exponentially higher levels with subsequent procedures [15]. The burden of placenta praevia is predicted to increase due to South Asia's rising caesarean rates, underscoring the importance of carefully assessing caesarean indications. Placenta praevia was also significantly correlated with a history of dilatation and curettage (60% vs. 36%, p=0.003). Sandall et al. have identified endometrial trauma from curettage as a risk factor for aberrant placentation, which is corroborated by a dose-dependent pattern with repeated procedures [16]. These results emphasize the value of family planning counseling and, when necessary, taking into account medical options for early pregnancy loss. This is in line with Oyelese et al., who recommend caesarean section for complete placenta praevia in order to prevent catastrophic hemorrhage. Our study found a 68% caesarean delivery rate among placenta praevia cases, which was significantly higher than controls [17]. Despite being high, the recorded 12% caesarean hysterectomy rate is within the ranges reported by on were et al., especially in cases where placenta accreta spectrum coexists [18]. In handling such high-risk cases, this emphasizes the necessity of having strong surgical readiness and access to skilled obstetric surgeons. This study showed significant hemorrhagic morbidity, with 20% of women experiencing primary postpartum hemorrhage and 96% needing blood transfusions. These numbers are higher than those found in many high-resource settings, but they are consistent with Fan et al. [19]. According to Kollmann et al., 42% of placenta praevia cases had antepartum hemorrhage, and 7% had postpartum hemorrhage [20]. Delays in presentation, limited prenatal monitoring, and referrals of more serious cases could all contribute to our setting's noticeably higher transfusion rate. In the placenta praevia group, maternal mortality reached 8%, which is much higher than rates in high-income nations, where mortality is almost zero because of prompt diagnosis, effective blood banking, and state-of-the-art surgical and critical care facilities [21]. With a 30% wound infection rate that was probably caused by lengthy procedures, significant blood loss, and urgent surgical procedures, infectious morbidity was also noteworthy. These correlations have been documented by Hadar et al., especially after difficult caesarean deliveries [22]. These results emphasize the significance of thorough perioperative care and close postoperative observation. Overall, the study shows that placenta praevia is still a serious obstetric condition that calls for early detection of high-risk women, specialized delivery planning, and improved health system capabilities to reduce complications.

LIMITATIONS

This study's primary limitations include the relatively small sample size and single-centered design, which may limit the generalizability of findings to other

populations and healthcare settings. The purposive sampling method introduces potential selection bias that may not fully represent the broader population of women with placenta praevia.

CONCLUSION

Placenta praevia is closely linked to advanced maternal age, prior caesarean sections, and a history of uterine instrumentation. Maternal mortality, massive bleeding, the need for blood transfusions, and surgical delivery are all significantly increased by this condition. Optimizing maternal outcomes and lowering associated morbidity and mortality requires early identification of high-risk women, appropriate prenatal surveillance, planned delivery at tertiary facilities with comprehensive resources, and primary prevention through prudent use of uterine surgery.

RECOMMENDATIONS

In order to provide more reliable epidemiological data and outcome assessments across various healthcare settings, future research should use multicenter prospective cohort designs with larger sample sizes. In order to lower the incidence of placenta praevia in the future, studies should examine the efficacy of particular interventions, such as prophylactic balloon occlusion of internal iliac arteries, the best time for elective delivery based on placenta praevia classification, and methods for lowering primary caesarean section rates.

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee

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