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# MATERNAL AND FETAL OUTCOME IN WOMEN WITH PLACENTA PREVIA PRESENTING AT MARDAN MEDICAL COMPLEX

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## ABSTRACT

**Background:** Placenta previa is a major obstetric condition with considerable maternal and newborn morbidity. Clinical management and early diagnosis are the most important factors in the prevention of undesirable results. Despite the fact that cesarean delivery is generally the preferable delivery method, the prevalence of maternal anemia, postpartum hemorrhage, and newborn pathology such as NICU admission or stillbirth is substantial, particularly in limited-resource settings.

**Objective:** To determine the frequency of maternal and fetal outcome in women with placenta previa in patients presenting at Mardan Medical Complex.

**Study Design:** A Descriptive cross-sectional study.

**Duration and Place of Study:** This study was conducted from October 2024 to April 2025 at the Department of Obstetrics and Gynecology, Mardan Medical Complex.

**Methodology:** A total of 211 pregnant women aged 18–40 years with singleton pregnancies and ultrasonography confirmation of placenta previa beyond 20 weeks of gestation were included. Fetal outcomes included NICU admissions and stillbirths (intrauterine death ≥24 weeks with no cardiac activity). Data were collected on a structured proforma and analyzed using SPSS version 21.

**Results:** The mean age was 29.75 ± 5.23 years and 97.2% of deliveries were by cesarean section. Severe anemia was observed in 68.2% of women, and 47.9% experienced postpartum hemorrhage. NICU admission was required in 71.1% of neonates, while stillbirth occurred in 5.2% of cases. Adverse outcomes were more frequent in women over 30 years, those with lower BMI, and rural residents. Statistically significant associations were observed for age with postpartum hemorrhage (p=0.008) and stillbirth (p=0.030), and for BMI with anemia (p=0.044) and PPH (p=0.004).

**Conclusion:** Placenta previa is linked with high rates of severe maternal anemia, postpartum hemorrhage, and adverse fetal outcomes.

**Keywords:** Placenta Previa, Maternal Outcome, Fetal Outcome, Postpartum Hemorrhage, NICU Admission

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## INTRODUCTION

Placenta previa is an abnormal placental location at the lower uterine segment, extending over the internal cervical os partially or totally [(1)]. It is most common during the third trimester and is the leading cause of painless vaginal hemorrhage beyond mid pregnancy [(2)]. History of previous cesarean delivery, multiple gestation,

advanced maternal age, smoking, and a past uterine surgery are risk factors [3]. It is confirmed by transvaginal ultrasonography, with the latter offering high Sensitivity for the determination of the location of the placenta [4]. Early diagnosis is critical for the purposes of timely appropriate obstetric intervention with the aim of eliminating risks from the fetus and the mother [5]. Placenta previa has numerous maternal and foetal complications. One of the most serious is the risk of antepartum hemorrhage, with the potential for significant maternal blood loss, and the requirement for emergency delivery [6]. Patients with placenta previa are also at risk from abnormal placental attachment, such as placenta accreta spectrum conditions, particularly if the woman has had a previous uterine operation [7]. Placenta previa is complicating factor for placental separation and increase the risk of peripartum hysterectomy [8]. Preterm labour and delivery are also elevated, resulting in increased neonatal morbidity [9]. The maternal outcome of placenta previa can be markedly exacerbated, especially if hemorrhage is not controlled. Severe anemia is also frequent secondary to recurrent or heavy bouts of bleeding, with the necessity for multiple blood transfusions [10]. Postpartum hemorrhage (PPH) is also a problem, secondary to poor uterine contractibility or by placental retention [6]. In extreme cases, even surgery such as hysterectomy may be required for the control of hemorrhage, correspondingly increasing the maternal morbidity [8]. Close observation and multi- disciplinary approach are indispensable for the prevention of these complications and for the attainment of maternal safety. Fetal outcomes are also unfavorably affected with placenta previa pregnancies. Preterm delivery, often iatrogenic secondary to maternal hemorrhage, is a frequent NICU admission source [11]. Low birth weight and respiratory distress syndrome are common with these infants [12]. Occasionally, most characteristically with widespread placental perfusion compromise secondary to severe bleeding, intrauterine fetal demise or stillbirth can occur [13]. A clinical investigation reported that among women diagnosed with placenta previa, 56.15% developed significant anemia, and 32.30% experienced postpartum hemorrhage. In terms of neonatal outcomes, 57.46% of the newborns required admission to the neonatal intensive care unit, while 9.7% resulted in stillbirths [14]. Research of maternal and fetal placenta previa outcomes is warranted due to the high risk of severe complications with the condition. Placenta previa, despite advances in obstetric practice, remains the leading preventable cause of obstetric hemorrhage and adverse perinatal outcomes. Information regarding the incidence and nature of complications such as severe anemia, PPH, NICU admission, and intrauterine fetus death can be helpful with clinical decision support, risk scoring improvement, and guidance for the development of dedicated interventions aimed at the optimization of maternal and newborn support. Objective of the study is to determine the frequency of maternal and fetal outcomes in women with placenta previa.

## METHODOLOGY

This descriptive cross-sectional study was carried out at the Department of Obstetrics and Gynecology, Mardan Medical Complex, from October 2024 to April 2025 following formal approval from the hospital's ethics review board. A total of 211 pregnant women diagnosed with placenta previa were included. The sample size was determined using the WHO sample size calculator, based on a projected 9.7% frequency of stillbirths in this population, (14) a 95% confidence interval, and a 4% absolute precision. Women aged between 18 and 40 years, with a singleton pregnancy, and found to have placenta previa on ultrasound after the 20th week of gestation were eligible. Placenta previa was defined as placental tissue covering 2 cm or more of the internal cervical os, confirmed via transabdominal or transvaginal

ultrasonography. Patients with comorbid conditions such as pre-eclampsia, gestational diabetes, or chronic liver disease were excluded from the study. Prior to participation, all women were informed about the objectives and procedures, and signed written consent was obtained. Detailed demographic data including patient age, residence, mode of delivery and BMI were recorded. Clinical evaluation and obstetric history were taken. Maternal outcomes were assessed in terms of two parameters: postpartum hemorrhage and severe anemia. Blood loss following spontaneous vaginal delivery was calculated using the gravimetric method—gauze, sponges, and pads were weighed before and after use, and 1 gram increase was equated to 1 mL of blood loss. Blood loss exceeding 500 mL was categorized as postpartum hemorrhage. Hemoglobin concentration was measured using laboratory testing, and levels below 7 g/dL were considered indicative of severe anemia. Neonatal outcomes included NICU admission and stillbirth. A newborn was admitted to the NICU if immediate postnatal complications required intensive care monitoring. Stillbirth was recorded in cases where fetal death occurred at or beyond 24 weeks of gestation and was confirmed by absence of fetal cardiac activity on ultrasound prior to delivery. Each clinical judgment and measurement was supervised by a consultant obstetrician with over three years of post- fellowship experience. All data were entered on a structured proforma developed for the study. The collected data were analyzed using IBM SPSS version 21. Categorical variables were reported using frequencies and percentages. Continuous variables were assessed for normal distribution using the Shapiro-Wilk test. Normally distributed variables were summarized as mean ± standard deviation, while skewed data were expressed as median with interquartile ranges. To control for potential confounding factors such as age, BMI, delivery mode and residential setting, stratification was performed. Chi-square or Fisher's exact test was applied post- stratification, and a p-value of less than 0.05 was considered statistically significant.

The study was approved by the Institutional Review Board of Mardan Medical Complex **(Ref No: BKMC-766/23)** on May 20th 2024. All participants were allowed to sign written informed consent after being informed about the research aims.

This study was designed to include women between the ages of 18-40 years old with singleton pregnancies and their ultrasound-verified placenta previa diagnosed after 20 weeks of gestation.

Patients with pre-eclampsia, gestational diabetes and chronic liver disease were excluded. All the participants gave informed written consent. Data were collected using a structured proforma including demographic and clinical variables. Fetomaternal outcomes, delivery details, and demographical factors were recorded. Measurement of blood loss was done after delivery, and haemoglobin levels were determined through laboratory investigation. Status after birth was determined as neonatal.

The statistical analysis of all data was conducted using IBM SPSS version 21.0. Categorical data were reported as frequency or percentages; continuous data as the measure of mean + SD or median with IQR. The normality of data was tested using the Shapiro-Wilk test. The stratification was done, and the associations were determined using Chi-square test or Fisher exact test. P value < 0.05 was considered as significant.

## RESULTS

The study included 211 women with placenta previa with a mean age of 29.75±5.23 years, mean weight of 63.16±5.83 kg, mean height of 1.60±0.05 m, and mean BMI of 24.65±0.85 kg/m². The majority of patients (67.8%, n=143) resided in rural areas, while 32.2%

(n=68) were from urban areas. Cesarean section was the predominant mode of delivery in 97.2% (n=205) of cases, with only 2.8% (n=6) delivering vaginally (as shown in Table-I).

**Table 1:** Patient Demographics Outcome

| Demographics | Mean ± SD | Percentage(%) |
|---|---|---|
| Age (years) | 29.75±5.23 | |
| Weight (kg) | 63.16±5.83 | |
| Height (m) | 1.60±0.05 | |
| BMI (kg/m²) | 24.65±0.85 | |
| Residence | Rural n (%) | 143 (67.8%) |
| | Urban n (%) | 68 (32.2%) |
| Mode of Delivery | Vaginal n (%) | 6 (2.8%) |
| | C-section n (%) | 205 (97.2%) |

Regarding feto-maternal outcomes, severe anemia was observed in 68.2% (n=144) of patients while 31.8% (n=67) did not develop severe anemia, postpartum hemorrhage (PPH) occurred in 47.9% (n=101) with 52.1% (n=110) not experiencing PPH, NICU admission was required for 71.1% (n=150) of neonates while 28.9% (n=61) did not require NICU admission, and stillbirth occurred in 5.2% (n=11) of cases with 94.8% (n=200) resulting in live births (as shown in Table- II).

**Table 2:** Frequency of Feto-maternal Outcome

| Outcome | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Severe Anemia | Yes | 144 | 68.2% |
| | No | 67 | 31.8% |
| Postpartum Hemorrhage (PPH) | Yes | 101 | 47.9% |
| | No | 110 | 52.1% |
| NICU Admission | Yes | 150 | 71.1% |
| | No | 61 | 28.9% |
| Stillbirth | Yes | 11 | 5.2% |
| | No | 200 | 94.8% |

The stratified analysis revealed significant associations between demographic factors and adverse outcomes. Among women ≤30 years, 70.4% (n=76) developed severe anemia versus 29.6% (n=32) who did not, while in women >30 years, 66.0% (n=68) developed severe anemia versus 34.0% (n=35) who did not (p=0.497). For PPH, women ≤30 years had a rate of 38.9% (n=42) versus 61.1% (n=66) without PPH, while women >30 years had significantly higher PPH rates of 57.3% (n=59) versus 42.7% (n=44) without PPH (p=0.008). NICU admission rates were 72.2% (n=78) versus 27.8% (n=30) in women ≤30 years and 69.9% (n=72) versus 30.1% (n=31) in women >30 years (p=0.710). Stillbirth rates were significantly higher in women >30 years at 8.7% (n=9) versus 91.3% (n=94) live births compared to 1.9% (n=2) versus 98.1% (n=106) in women ≤30 years (p=0.030). Patients with BMI 25 kg/m² demonstrated significantly higher rates of severe anemia at 73.4% (n=94) versus 26.6% (n=34) without severe anemia compared to those with BMI >25 kg/m² who had 60.2% (n=50) versus 39.8% (n=33) rates respectively (p=0.044). Conversely, PPH rates were significantly lower in the BMI ≤25 group at 39.8% (n=51) versus 60.2% (n=77) without PPH compared to the BMI >25 group with 60.2% (n=50) versus 39.8% (n=33) respectively (p=0.004). NICU admission rates were 75.0% (n=96) versus 25.0% (n=32) in the BMI ≤25 group and 65.1% (n=54) versus 34.9% (n=29) in the BMI >25 group (p=0.120). Stillbirth rates were 7.0% (n=9) versus 93.0% (n=119) in the BMI ≤25 group and 2.4% (n=2) versus 97.6% (n=81) in the BMI >25 group (p=0.207). Rural patients had severe anemia rates of 71.3% (n=102) versus 28.7% (n=41) without severe anemia, while urban patients had rates of 61.8% (n=42) versus 38.2% (n=26) respectively (p=0.163). PPH occurred in 43.4% (n=62) versus 56.6% (n=81) of rural patients and 57.4% (n=39) versus 42.6% (n=29) of urban patients (p=0.057). NICU admission rates were 74.8% (n=107) versus 25.2% (n=36) in rural patients and 63.2%

(n=43) versus 36.8% (n=25) in urban patients (p=0.083). Stillbirth rates were 4.2% (n=6) versus 95.8% (n=137) in rural patients and 7.4% (n=5) versus 92.6% (n=63) in urban patients (p=0.509). Regarding mode of delivery, among the six vaginal deliveries, severe anemia occurred in 66.7% (n=4) versus 33.3% (n=2), PPH in 33.3% (n=2) versus 66.7% (n=4), NICU admission in 33.3% (n=2) versus 66.7% (n=4), and no stillbirths occurred. Among cesarean deliveries, severe anemia occurred in 68.3% (n=140) versus 31.7% (n=65), PPH in 48.3% (n=99) versus 51.7% (n=106), NICU admission in 72.2% (n=148) versus 27.8% (n=57), and stillbirth in 5.4% (n=11) versus 94.6% (n=194), with p-values of 1.000, 0.685, 0.059, and 1.000 respectively, indicating no statistically significant differences (as shown in Table-III).

**Table 3:** Association of Demographic Factors with Fetomaternal Outcomes

| Demographic Factor | Outcome | Yes n (%) | No n (%) | p-value |
|---|---|---|---|---|
| Age (Years) | Severe Anemia | | | 0.497 |
| | ≤30 | 76 (70.4%) | 32 (29.6%) | |
| | >30 | 68 (66.0%) | 35 (34.0%) | |
| | Postpartum Hemorrhage | | | **0.008*** |
| | ≤30 | 42 (38.9%) | 66 (61.1%) | |
| | >30 | 59 (57.3%) | 44 (42.7%) | |
| | NICU Admission | | | 0.710 |
| | ≤30 | 78 (72.2%) | 30 (27.8%) | |
| | >30 | 72 (69.9%) | 31 (30.1%) | |
| | Stillbirth | | | **0.030*** |
| | ≤30 | 2 (1.9%) | 106 (98.1%) | |
| | >30 | 9 (8.7%) | 94 (91.3%) | |
| BMI (kg/m²) | Severe Anemia | | | **0.044*** |
| | ≤25 | 94 (73.4%) | 34 (26.6%) | |
| | >25 | 50 (60.2%) | 33 (39.8%) | |
| | Postpartum Hemorrhage | | | **0.004*** |
| | ≤25 | 51 (39.8%) | 77 (60.2%) | |
| | >25 | 50 (60.2%) | 33 (39.8%) | |
| | NICU Admission | | | 0.120 |
| | ≤25 | 96 (75.0%) | 32 (25.0%) | |
| | >25 | 54 (65.1%) | 29 (34.9%) | |
| | Stillbirth | | | 0.207 |
| | ≤25 | 9 (7.0%) | 119 (93.0%) | |
| | >25 | 2 (2.4%) | 81 (97.6%) | |
| Residence | Severe Anemia | | | 0.163 |
| | Rural | 102 (71.3%) | 41 (28.7%) | |
| | Urban | 42 (61.8%) | 26 (38.2%) | |
| | Postpartum Hemorrhage | | | 0.057 |
| | Rural | 62 (43.4%) | 81 (56.6%) | |
| | Urban | 39 (57.4%) | 29 (42.6%) | |
| | NICU Admission | | | 0.083 |
| | Rural | 107 (74.8%) | 36 (25.2%) | |

| | | | | |
|---|---|---|---|---|
| | Urban | 43 (63.2%) | 25 (36.8%) | |
| | Stillbirth | | | 0.509 |
| | Rural | 6 (4.2%) | 137 (95.8%) | |
| | Urban | 5 (7.4%) | 63 (92.6%) | |
| Mode of Delivery | Severe Anemia | | | 1.000 |
| | Vaginal | 4 (66.7%) | 2 (33.3%) | |
| | Cesarean | 140 (68.3%) | 65 (31.7%) | |
| | Postpartum Hemorrhage | | | 0.685 |
| | Vaginal | 2 (33.3%) | 4 (66.7%) | |
| | Cesarean | 99 (48.3%) | 106 (51.7%) | |
| | NICU Admission | | | 0.059 |
| | Vaginal | 2 (33.3%) | 4 (66.7%) | |
| | Cesarean | 148 (72.2%) | 57 (27.8%) | |
| | Stillbirth | | | 1.000 |
| | Vaginal | 0 (0.0%) | 6 (100.0%) | |
| | Cesarean | 11 (5.4%) | 194 (94.6%) | |

The present study aimed to evaluate maternal and fetal outcomes in women with placenta previa, and the findings demonstrate significant morbidity associated with this condition. The predominance of cesarean section delivery (97.2%) reflects the established clinical practice of avoiding vaginal delivery in placenta previa cases due to the risk of catastrophic hemorrhage when the cervix dilates and the placental attachment site is disrupted. The high prevalence of severe anemia (68.2%) can be attributed to chronic antepartum bleeding episodes' characteristic of placenta previa, where repeated small hemorrhages gradually deplete maternal iron stores and hemoglobin levels. The substantial rate of postpartum hemorrhage (47.9%) occurs because the lower uterine segment, where the placenta is abnormally implanted in placenta previa, has reduced contractile capacity compared to the upper uterine segment, leading to inadequate compression of spiral arteries after placental separation. The significantly higher rates of adverse outcomes in women over 30 years, particularly increased PPH (57.3% vs 38.9%) and stillbirth (8.7% vs 1.9%), likely reflect age-related changes in uterine vasculature and decreased myometrial contractility with advancing maternal age. The association between lower BMI and higher rates of severe anemia but paradoxically lower PPH rates suggests that undernourished women may have pre- existing iron deficiency that is exacerbated by placental bleeding, while their smaller body habitus and potentially different vascular characteristics may influence bleeding patterns. The high NICU admission rate (71.1%) reflects the increased risk of preterm delivery associated with placenta previa, as antepartum hemorrhage often necessitates early delivery to preserve maternal safety, resulting in neonatal complications related to prematurity and the stress of in-utero bleeding episodes. Cesarean section was the predominant mode of delivery in 97.2% (n=205) of cases, with only 2.8% (n=6) delivering vaginally. These findings align with the study by Fazari AB, Javid U, [14] which reported a high incidence of cesarean section (78.7%) in their cohort of 75 patients with placenta previa. Regarding fetomaternal outcomes, severe anemia was observed in 68.2% (n=144) of patients, while 31.8% (n=67) did not develop severe anemia. Postpartum hemorrhage (PPH) occurred in 47.9% (n=101) of cases, with 52.1% (n=110) not experiencing PPH. NICU admission was required for 71.1% (n=150) of neonates, while 28.9% (n=61) did not require NICU admission. Stillbirth occurred in 5.2%

(n=11) of cases, with 94.8% (n=200) resulting in live births. These outcomes are comparable to those reported by Ren D, Yang Z,et al [15] who found a perinatal mortality rate of 12% and a maternal mortality rate of 2% in their study of 37 patients with placenta previa. The stratified analysis revealed significant associations between demographic factors and adverse outcomes. Women ≤30 years had a higher rate of severe anemia (70.4%, n=76) compared to those >30 years (66.0%, n=68), although this difference was not statistically significant (p=0.497). However, women >30 years had significantly higher PPH rates (57.3%, n=59) compared to those ≤30 years (38.9%, n=42) (p=0.008). This finding is consistent with the study by Liu C et al [16] which reported that older age was associated with increased maternal morbidity in placenta previa cases. NICU admission rates were similar across age groups, with 72.2% (n=78) in women ≤30 years and 69.9% (n=72) in women >30 years (p=0.710). Stillbirth rates were significantly higher in women >30 years (8.7%, n=9) compared to those ≤30 years (1.9%, n=2) (p=0.030). Patients with BMI ≤25 kg/m² had significantly higher rates of severe anemia (73.4%, n=94) compared to those with BMI >25 kg/m² (60.2%, n=50) (p=0.044). Conversely, PPH rates were significantly lower in the BMI ≤25 group (39.8%, n=51) compared to the BMI >25 group (60.2%, n=50) (p=0.004). NICU admission rates were 75.0% (n=96) in the BMI ≤25 group and 65.1% (n=54) in the BMI >25 group (p=0.120). Stillbirth rates were 7.0% (n=9) in the BMI ≤25 group and 2.4% (n=2) in the BMI >25 group (p=0.207). These findings suggest that lower BMI may be associated with better maternal outcomes, which is in line with the study by Verma ML et al [17] who reported that advancing maternal age and higher BMI were risk factors for placenta previa. Regarding mode of delivery, among the six vaginal deliveries, severe anemia occurred in 66.7% (n=4), PPH in 33.3% (n=2), NICU admission in 33.3% (n=2), and no stillbirths occurred. Among cesarean deliveries, severe anemia occurred in 68.3% (n=140), PPH in 48.3% (n=99), NICU admission in 72.2% (n=148), and stillbirth in 5.4% (n=11). The p-values for these comparisons were 1.000, 0.685, 0.059, and interpreting the results. Our study was a single-center study with a cross-sectional design carried out at a tertiary, referral- based hospital. This will most likely rule out full generalizability of the results from our population to other clinical locations. The sample was also limited by sample size, perhaps diminishing the power of some end points to achieve significant levels. These are directions for future research, for the addition of larger, multicenter groups, and the prospective design of the investigation, enhancing the strength of the conclusions [18].

## CONCLUSION

Placenta previa is associated with significant maternal and neonatal morbidity. Early diagnosis and improved obstetric care are essential to reduce complications.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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## AUTHORS CONTRIBUTIONS

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**Critical Review:** Shahrukh

**Final Approval of version:** All Mentioned Authors Approved

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