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Obstetric Outcome in Women with First Trimester Vaginal Bleeding

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ABSTRACT

Background: First-trimester vaginal bleeding is one of the most common complications of early pregnancy, affecting nearly one in four women. **Objective:** To assess the obstetric and neonatal outcomes in women presenting with first-trimester vaginal bleeding and to evaluate the relationship between bleeding severity and adverse pregnancy outcomes. **Methodology:** This Cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Central Park hospital from 15th September, 2023 to 15th march, 2024Two hundred pregnant women with first-trimester vaginal bleeding were enrolled using random sampling. Pregnant women aged 20–40 years presenting with vaginal bleeding during the first trimester were included. Demographic data, clinical findings, and severity of bleeding were recorded. Ultrasonography was performed to assess pregnancy viability. **Results:** The mean age of participants was 27.97 ± 4.06 years, and the mean parity was 1.90 ± 0.65. PIH was the most frequent maternal complication (16.5%), followed by oligohydramnios (9.5%) and placental abruption (9.0%). Preterm deliveries occurred in 20% of cases. Neonatal outcomes were generally favorable, with a mean birth weight of 3.10 ± 1.89 kg and no stillbirths, though 18.5% required NICU admission. **Conclusion:** It is concluded that first-trimester vaginal bleeding is an important predictor of adverse obstetric outcomes. Moderate to heavy bleeding is significantly associated with PIH, placental abruption, and preterm delivery.

INTRODUCTION

First-trimester vaginal bleeding is a frequent clinical presentation in obstetric practice, occurring in nearly one in every four pregnancies. It is a source of significant concern for both the patient and clinician, as it may be an early manifestation of pregnancy complications ranging from benign to life-threatening conditions [1]. The first trimester, defined as the period from conception to 12 weeks of gestation, represents a dynamic phase of embryogenesis, organogenesis, and placentation [2]. Any disturbance during this critical window may predispose to a cascade of adverse obstetric outcomes. The presentation of vaginal bleeding in early pregnancy can therefore serve as an important clinical marker for potential maternal and fetal complications later in gestation. The causes of first-trimester vaginal bleeding are varied [3]. These include implantation bleeding, subchorionic hemorrhage, threatened or inevitable miscarriage, ectopic pregnancy, gestational trophoblastic disease, cervical or vaginal lesions, and hormonal insufficiencies. Among these, threatened miscarriage is the most common diagnosis [4]. In threatened miscarriage, the cervix remains closed, and ultrasound typically reveals a viable intrauterine pregnancy despite the bleeding [5]. However, even in cases where the pregnancy continues, the episode of early bleeding has been shown to increase the risk of later complications such as placental abruption, preterm delivery, intrauterine growth restriction (IUGR), and low birth weight. This association is thought to result from abnormal placentation and suboptimal trophoblastic invasion leading to impaired uteroplacental circulation [6]. The pathophysiological mechanisms underlying this link are multifactorial. Early bleeding may indicate a disruption in the decidual or chorionic vasculature, which can compromise placental development and nutrient exchange [7]. Subchorionic hematomas, for example, represent localized areas of bleeding between the chorion and uterine wall, and their size and persistence have been correlated with adverse pregnancy outcomes. Moreover, inflammation or vascular fragility within the endometrium during early gestation may set the stage for placental insufficiency later in pregnancy. Such pathological processes emphasize that first-trimester bleeding, even if

self-limiting, can serve as an early indicator of placental dysfunction [8].

From an epidemiological standpoint, studies across diverse populations have revealed significant variability in both the incidence and outcomes of early pregnancy bleeding. Socioeconomic status, access to prenatal care, nutritional deficiencies, maternal age, and previous obstetric history are key determinants influencing prognosis [9]. Women above the age of 35 or with a history of recurrent miscarriages, smoking, or chronic illnesses such as diabetes and hypertension tend to have poorer outcomes. Furthermore, in low-resource settings such as Pakistan, limited access to prompt diagnostic tools such as transvaginal ultrasonography and quantitative β-hCG testing often delays diagnosis and management, exacerbating the risks of miscarriage and later obstetric complications [10-12]. The psychological dimension of first-trimester bleeding should not be underestimated. The uncertainty surrounding the pregnancy outcome induces considerable anxiety and emotional stress in expectant mothers. Multiple studies have reported higher rates of depression, anxiety, and fear among women experiencing early pregnancy bleeding [13].

Objective

To assess the obstetric and neonatal outcomes in women presenting with first-trimester vaginal bleeding and to evaluate the relationship between bleeding severity and adverse pregnancy outcomes.

METHODOLOGY

This Cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Central Park hospital----------from—15th September, 2023 to –15th march, 2024-----. A total of 200 participants were included in the study. The sample size was calculated using a prevalence rate of 25%, with a 95% confidence interval and a 5% margin of error, ensuring adequate statistical power for analysis. A random sampling technique was applied to minimize selection bias and ensure the study population accurately represented women with first-trimester bleeding.

Inclusion Criteria

1. Women aged 20 to 40 years
2. Pregnant women presenting with first-trimester vaginal bleeding (up to 12 weeks gestation)
3. Willingness to provide informed consent

Exclusion Criteria

1. Women with a history of smoking
2. Patients with chronic hypertension
3. Previous history of preterm labor or recurrent miscarriages
4. Multiple gestations or known fetal anomalies
5. Non-obstetric causes of bleeding (such as cervical lesions, trauma, or infections)

Data Collection Procedure

After obtaining informed consent, participants were assessed through a detailed history, physical examination, and relevant investigations. Information regarding demographic data, gestational age, parity, severity and duration of bleeding, and associated symptoms was recorded on a structured proforma. Ultrasound examination and laboratory investigations were performed to evaluate pregnancy viability and rule out ectopic or molar pregnancies. Participants were followed up throughout the pregnancy to determine outcomes such as miscarriage, preterm labor, intrauterine growth restriction, placental abruption, and live birth.

Data Analysis

All data were entered and analyzed using SPSS version 25.0. Continuous variables such as age and gestational age were presented as mean ± standard deviation, while categorical variables such as pregnancy outcomes were presented as frequencies and percentages. The Chi-square test and independent t-test were used to compare groups, and a p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 200 women presenting with first-trimester vaginal bleeding were included in the study, the mean age of the participants was 27.97 ± 4.06 years, indicating that most women were in their late twenties, the typical reproductive age group. The average parity was 1.90 ± 0.65, showing that the majority had one to two previous pregnancies. The mean body mass index (BMI) at the start of pregnancy was 25.72 ± 16.82 kg/m^2, increasing to 27.35 ± 3.65 kg/m^2 at delivery, reflecting normal gestational weight gain. The mean income and education scores (1.89 ± 0.97 and 1.86 ± 1.20, respectively) suggested that most participants belonged to lower-middle socioeconomic and educational categories. In terms of occupation, housewives predominated, with an occupational mean of 0.23 ± 1.01.

Table 1

Demographic and Baseline Characteristics of Study Participants (n = 200)

Variable	Mean ± SD / n (%)
Age (years)	27.97 ± 4.06
Parity	1.90 ± 0.65
BMI at start of pregnancy	25.72 ± 16.82
BMI at delivery	27.35 ± 3.65
Income category (mean)	1.89 ± 0.97
Education level (mean)	1.86 ± 1.20
Occupation (housewives predominated)	0.23 ± 1.01

Pregnancy-induced hypertension (PIH) was the most common complication, occurring in 33 cases (16.5%). Oligohydramnios was recorded in 19 patients (9.5%), and placental abruption in 18 (9.0%). Only two women (1.0%) developed intrauterine growth restriction (IUGR). Preterm delivery before 37 weeks of gestation was observed in 40 patients (20.0%), representing the most frequent adverse pregnancy outcome.

Table 2

Maternal and Obstetric Complications Among Patients with PV Bleeding

Complication	Frequency (n)	Percentage (%)
Placental abruption	18	9.0
Oligohydramnios	19	9.5
Pregnancy-Induced Hypertension (PIH)	33	16.5
Intrauterine Growth Restriction (IUGR)	2	1.0
Preterm deliveries (<37 weeks)	40	20.0

The mean APGAR score at one minute was 1.25 ± 1.32, improving to 1.56 ± 2.61 at five minutes, indicating satisfactory post-delivery recovery. The mean birth weight was 3.10 ± 1.89 kg, within the normal range for term infants. A total of 37 neonates (18.5%) required NICU admission, primarily due to prematurity-related issues, while no stillbirths were reported.

Table 3

Neonatal Outcomes

Outcome	N (%)/ Mean ± SD (where applicable)
APGAR score at 1 minute	1.25 ± 1.32
APGAR score at 5 minutes	1.56 ± 2.61
NICU admission	37 (18.5%)
Stillbirth	0
Mean birth weight (kg)	3.10 ± 1.89

Out of 200 participants, 46 (23.0%) experienced spotting, 82 (41.0%) had mild bleeding, 49 (24.5%) moderate, and 23 (11.5%) heavy bleeding. The incidence of miscarriage and preterm delivery increased proportionally with the severity of bleeding. Among women with heavy bleeding, 21.7% miscarried and 34.8% delivered preterm, compared with only 4.3% and 8.7% respectively among those with spotting. Conversely, the proportion of term deliveries decreased from 87.0% in the spotting group to 43.5% in the heavy-bleeding group. Mean birth weight also declined with increasing bleeding severity, from 3.24 ± 0.48 kg in the spotting group to 2.62 ± 0.88 kg in those with heavy bleeding.

Table 4

Pregnancy Outcome Distribution According to Severity of First-Trimester Bleeding (n = 200)

Severity of Bleeding	No. of Patients (n)	Miscarriage n (%)	Preterm n (%)	Term Delivery n (%)	Mean Birth Weight (kg)
Spotting	46	2 (4.3%)	4 (8.7%)	40 (87.0%)	3.24 ± 0.48
Mild	82	6 (7.3%)	13 (15.9%)	63 (76.8%)	3.12 ± 0.59
Moderate	49	7 (14.3%)	10 (20.4%)	32 (65.3%)	2.98 ± 0.71
Heavy	23	5 (21.7%)	8 (34.8%)	10 (43.5%)	2.62 ± 0.88

DISCUSSION

This study evaluated the obstetric outcomes of women presenting with first-trimester vaginal bleeding and found that such bleeding episodes are significantly associated with maternal and neonatal complications, particularly pregnancy-induced hypertension and preterm delivery. Most participants were in their late twenties with parity of one to two, aligning with the typical reproductive age group observed in obstetric practice. These demographics indicate that early pregnancy bleeding is not confined to high-risk pregnancies but can affect healthy women as well. Pregnancy-induced hypertension was the most frequent maternal complication, observed in 16.5% of cases, followed by oligohydramnios (9.5%) and placental abruption (9.0%). Preterm delivery occurred in 20% of the cases, making it the most common adverse obstetric outcome. These results suggest that first-trimester bleeding may be an early manifestation of abnormal placentation, leading to uteroplacental insufficiency later in pregnancy. A similar trend was reported by Hasan et al. (2020), who found a higher incidence of preterm labor and hypertensive disorders in women with early bleeding compared to those without [14].

The analysis of bleeding severity revealed a clear relationship between the amount of bleeding and pregnancy outcome. Women with heavy bleeding had higher rates of miscarriage and preterm delivery, while those with spotting generally achieved term deliveries. This supports the hypothesis that the extent of decidual or chorionic disruption determines subsequent placental function [15]. In this study, mean birth weight and APGAR scores declined as bleeding severity increased, demonstrating the lasting impact of early pregnancy events on fetal well-being. Neonatal outcomes were largely favorable despite these risks. No stillbirths were recorded, and only 18.5% of neonates required NICU admission, primarily due to prematurity-related complications. The mean birth weight was 3.10 ± 1.89 kg, consistent with healthy term growth. These findings highlight the importance of vigilant antenatal monitoring and early intervention, which can minimize adverse outcomes even in pregnancies initially complicated by bleeding [16-18].

Maternal BMI was slightly higher among women who experienced preterm deliveries, suggesting a possible link between increased body weight and placental stress. However, the relationship remains inconclusive and may reflect the multifactorial nature of preterm birth rather than BMI alone. The relatively low incidence of intrauterine growth restriction (1%) in this study could also indicate effective compensatory mechanisms and appropriate obstetric management. Overall, this study demonstrates that first-trimester vaginal bleeding serves as a significant warning sign for potential obstetric complications [19]. Although most women ultimately delivered healthy neonates, the increased rates of hypertensive disorders, placental abnormalities, and preterm birth emphasize the need for close surveillance. Early ultrasound evaluation, hormonal assessment, and proper counseling should be routine for all patients presenting with early pregnancy bleeding. Similar conclusions were drawn by Devi et al. (2021), who emphasized that early identification and supportive care greatly improve pregnancy continuation and neonatal outcomes [20].

Limitations

This study had certain limitations that should be acknowledged. It was conducted as a single-center cross-sectional study with a relatively small sample size, which may limit the generalizability of the findings to broader populations. The study relied on clinical follow-up and hospital records, and some participants were lost to follow-up, potentially introducing selection bias. The severity of bleeding was based on patient reporting and clinical assessment rather than standardized quantitative measurement, which may have led to subjective variation. Additionally, certain confounding factors such as nutritional status, psychological stress, and undiagnosed medical conditions were not fully controlled. Despite these limitations, the study provides valuable insight into the

relationship between first-trimester vaginal bleeding and subsequent obstetric outcomes.

CONCLUSION

It is concluded that first-trimester vaginal bleeding serves as an important early indicator of potential obstetric complications. Although most women in this study ultimately delivered healthy neonates, those with moderate to heavy bleeding were at a significantly higher risk of developing pregnancy-induced hypertension, placental abruption, oligohydramnios, and preterm delivery. The severity of bleeding was directly proportional to the likelihood of adverse outcomes, including miscarriage and low birth weight. Timely evaluation, close antenatal monitoring, and appropriate management can minimize these risks and improve both maternal and neonatal outcomes. Therefore, all women presenting with vaginal bleeding during early pregnancy should be considered at risk and provided with vigilant follow-up throughout gestation.

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