Is early pregnancy vaginal bleeding a risk factor for preterm labor?

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Abstract
Introduction: Preterm birth (PTB) has been a major source of infant illness and death globally for decades. Pregnant women get 14%–20% vaginal bleeding. Aim of the study: To determine if early pregnancy vaginal bleeding increase the risk of preterm labor. Method: This retrospective case-control research was undertaken at Al Mawany teaching hospital from October 1, 2021, to August 1, 2022, with a convenient sample of 180 pregnant women admitted to the labour department in labour, 90 women with term births, and 90 women with preterm births. Participants provided age, parity, gestational age, gynaecological, medical, and surgical histories. Every woman was examined. All pregnant women admitted in labour (term and preterm) were retrospectively asked about vaginal bleeding in the first and second trimesters. Results: Early pregnancy vaginal bleeding increased the risk of premature labour (75% vs. 43.8%). Preterm moms were more likely to have menstrual-like vaginal bleeding (51.9%) than term mothers (66.7%). 37% of preterm women reported vaginal bleeding in the 2nd trimester, compared to 0% of term mothers. Vaginal haemorrhage was substantially associated with early preterm birth (58.3% vs. 25%). PPROM was greater in individuals with vaginal haemorrhage (22.2%) than those without (5.6%). Conclusion: Pregnancy Menstrual-like vaginal bleeding in the second trimester is more likely to cause premature labour than first-trimester spotting.
Keywords: early, pregnancy, vaginal bleeding, risk factor, preterm labor.

1. Introduction

Preterm birth (PTB) has been a major source of infant illness and death globally for decades [1]. The global preterm birth rate was 10.6% in 2014, while China had the second-highest rate at 7.8% [2]. Due to a shortage of neonatal care, premature newborn mortality is growing in many low- and middle-income nations, despite rising survival rates in high-income ones. The WHO's millennium development goals include PTL prevention [3]. 14%–20% of pregnant women experience vaginal bleeding [4]. Vaginal bleeding can induce anxiety and increase the risk of spontaneous miscarriage, premature delivery, and low birth weight [5]. For decades, first-trimester vaginal bleeding has been linked to poor perinatal outcomes. Some studies have linked early pregnancy vaginal bleeding to PTL [6,7], whereas others have not [8]. Pregnancy bleeding is hard to identify. Thus, some studies aggregate all bleeding. Some studies have examined how bleeding intensity or duration affects subgroup PTL risk. This study investigated the connection of early pregnancy vaginal bleeding and preterm delivery as the evidence on PTL and vaginal bleeding is contradictory [9] and Iraqi population studies are few. Preterm birth, also known as premature birth, is the birth of a baby at less than completed 37 weeks' gestational age, as opposed to full-term delivery at approximately 40 weeks [10]. PTB is a major cause of newborn death, morbidity, and developmental impairment. Long-term health issues result. These consequences include apnea of prematurity, hypoxic-ischemic encephalopathy (HIE), retinopathy of prematurity (ROP), developmental impairment, cerebral palsy, and intraventricular hemorrhage [11]. RDS—respiratory distress syndrome—is frequent (previously called hyaline membrane disease). Chronic lung disease (BPD) is another issue [12]. Neonatal hypoglycemia, feeding problems, rickets of prematurity, and necrotizing enterocolitis can cause gastrointestinal and metabolic problems (NEC). Anemia of prematurity, thrombocytopenia, and jaundice may cause kernicterus Pneumonia and sepsis [13]. Early-pregnancy vaginal bleeding is frequent in the ER. Threatened miscarriage and incomplete induced or spontaneous miscarriages can cause significant bleeding. Genetic abnormalities explain 50-70% of spontaneous miscarriages, however early pregnancy vaginal bleeding may be caused by incedintal bleeding [14]. Ultrasound frequently confirms clinical diagnosis. First trimester bleeding is definitively diagnosed by ultrasound [15]. Without ultrasonography, life-threatening disorders like ectopic pregnancy may appear with modest vaginal bleeding and no hemodynamic changes [16]. Clinically, threatening miscarriage is diagnosed by a history of vaginal spotting in the first 20 weeks of gestation and a closed cervix during vaginal inspection. Ultrasound can detect foetal cardiac activity in intrauterine pregnancies, confirming impending termination [17]. Patients and doctors are most stressed by pregnancy bleeding, especially in the first trimester. In the first trimester, spotting or bleeding is common for no apparent reason [18]. Severe bleeding can harm pregnancy, although half of first-trimester vaginal hemorrhage causes spontaneous abortion, while those who stay

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pregnant risk difficulties. Bleeding in the first trimester predicts pregnancy complications and raises the chance of foetal or neonatal mortality by four times [19]. First-trimester bleeding may suggest placental malfunction, which may lead to pre-eclampsia, preterm birth, PPROM, placental abruption, and IUGR later in pregnancy [20]. The aim of study is Overall case evaluation, including both preterm and full-term pregnancies. To determine if or whether there is a correlation between vaginal bleeding and the onset of labour too soon. The goal of this study was to determine whether or not vaginal bleeding levels were associated with premature birth.

2. Method

This retrospective case–control study was conducted at Al Mawany teaching hospital from October 1, 2021, to August 1, 2022, with a convenient sample of 180 pregnant women admitted to the labor word in labor, 90 women with term birth (37–42 weeks), and 90 women with preterm birth (24–36 weeks + 6 days). Each subject gave informed permission. Questionnaire contained all required data. Data acquired by direct interview with women using a standardized questionnaire prepared by the researcher included age, parity, and gestational age based on the date of last menstrual period (LMP) confirmed by early ultrasound examination before 20 weeks' gestation. If LMP and ultrasound dating agreed within 7 days, LMP was used to determine gestational age. If they disagreed by more than 7 days, ultrasound was employed. Other factors include bodyweight, socioeconomic class (high, middle, or poor based on educational level and financial status), employment (hard work or not), smoking, antepartum hemorrhage in this pregnancy, and prior obstetrical history of miscarriage or premature birth. All pregnant women admitted in labor (term and preterm) were retrospectively questioned if they had vaginal bleeding in the first and/or second trimesters (before 20 weeks' gestation) (time of the bleeding, frequency of attacks, severity of bleeding and whether they need hospital admission or not). Gynecological, medical, and surgical histories, including cervical surgery, was noted. Each lady was examined general and obstetrically. Moderate preterm (32–36 weeks), extremely preterm (28–31 weeks), and extreme preterm were premature birth categories (before 28 completed weeks). Spontaneous PTB with or without PPROM and medically prescribed PB were also PTL [21]. Inclusion criteria: Include laboring women with singleton pregnancy (term and preterm) who have early pregnancy ultrasound or sure LMP. Exclusion criteria: Patients with diabetes mellitus, hypertension, maternal liver, renal, or heart disease, infection, especially urinary tract and genital tract infections, uterine anomalies, foetal anomalies, multiple pregnancy, cervical incompetence (history of second trimester spontaneous misscariege or preterm labour with progressive shortening of cervix detected by ultrasound), or cervical surgery were excluded from the study. These women were divided into 2 groups. Group 1: include women in labour with previous history of early pregnancy vaginal bleeding (case group). Group 2: include women in labour with no history of early pregnancy vaginal bleeding (control group). Women in each group were subdivided into two subgroups those delivered at term (from completed 37 weeks till 42 weeks) And those delivered prematurely (from completed 24 weeks till 36 weeks + 6 days). Data was entered and analysed using SPSS 23.0 and Excel 2010. Tables utilised percentages. The categorical chi-square test compared research groups. P-value < 0.05 was significant.

3. Results

Table 1 shows that individuals having a history of vaginal bleeding were older (41.7%) than those without a history (12.5%). Vaginal bleeding history does not affect parity. Statistically non-significantly, women with early vaginal bleeding had APH history in this pregnancy (8.3%) more than those without (4.2%). Vaginal bleeding increases the risk of IUGR (16.7% vs. 0%).

Table 1: The general characteristics of the studied pregnant women.

		History of Vaginal bleeding				P value
		Yes		No		
		F	%	F	%	
Age	<20 years	9	25.00%	39	27.10%	<0.05 S
	20-34 years	12	33.30%	87	60.40%	
	≥ 34 years	15	41.70%	18	12.50%	
Parity	<4	27	75.00%	114	79.20%	>0.05 NS
	≥ 4	9	25.00%	30	20.80%	
APH	Yes	3	8.3%	6	4.2 %	>0.05 NS
	No	33	91.7 %	138	95.8 %	
IUGR	Yes	6	16.70%	0	0.00%	<0.05 S
	No	30	83.30%	144	100.00%	
Total		36	100.00%	144	100.00%	

Table 2 The low social class was greater among preterm labourers 21(23.3%) than term labourers 12(13.3%), whereas the middle social class was higher among term labourers 58(64.4%) than preterm labourers 45(50%), which was not statistically significant. Preterm moms 27(30%) worked harder than term mothers 9(10%), P value < 0.05. Preterm labour moms had a significantly lower

mean weight (69.4±12.4) than term labour mothers (73.2±10.4). Smoking during pregnancy was non-significantly higher among preterm moms 9(10%) than term mothers 3(3.3%), P > 0.05. Table 3.2 shows that 20 (22.2%) preterm moms had a history of preterm birth, compared to 3 (3.3%) term mothers, P < 0.05.

Table 2: The risk factors among women with term and preterm labor

	Preterm		Term		Total		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Social class							
Low	21	23.3%	12	13.3%	33	18.3%	>0.05 NS
Middle	45	50.0%	58	64.4%	103	57.2%	
High	24	26.7%	20	22.2%	44	24.4%	
Hard work							
Yes	27	30.00%	9	10.00%	36	20.00%	0.001 S
No	63	70.00%	81	90.00%	144	80.00%	
Weight of Mother							
Weight (mean ±SD)	69.4±12.4		73.2±10.4				<0.05 S
Smoking							
Yes	9	10.00%	3	3.30%	12	6.70%	>0.05 NS
No	81	90.00%	87	96.70%	168	93.30%	
History of Miscarriage							
Yes	30	33.3%	21	23.3%	51	28.3%	>0.05 NS
No	60	66.7%	69	76.7%	129	71.7%	
History of preterm							
Yes	20	22.2%	3	3.3%	23	12.8%	<0.05S
No	70	77.8%	87	96.7%	157	87.2%	
Total	90	100%	90	100%	180	100%	
S; significant, NS; non- significant							

The analysis of 180 pregnant women data show that from those 36 case with history of vaginal bleeding, 27 (75%) had preterm labor, in comparison of those 144 case without vaginal bleeding ,63(43.8%) had preterm labor. This relation was statistically significant (P value <0.05) as shown in figure 1.

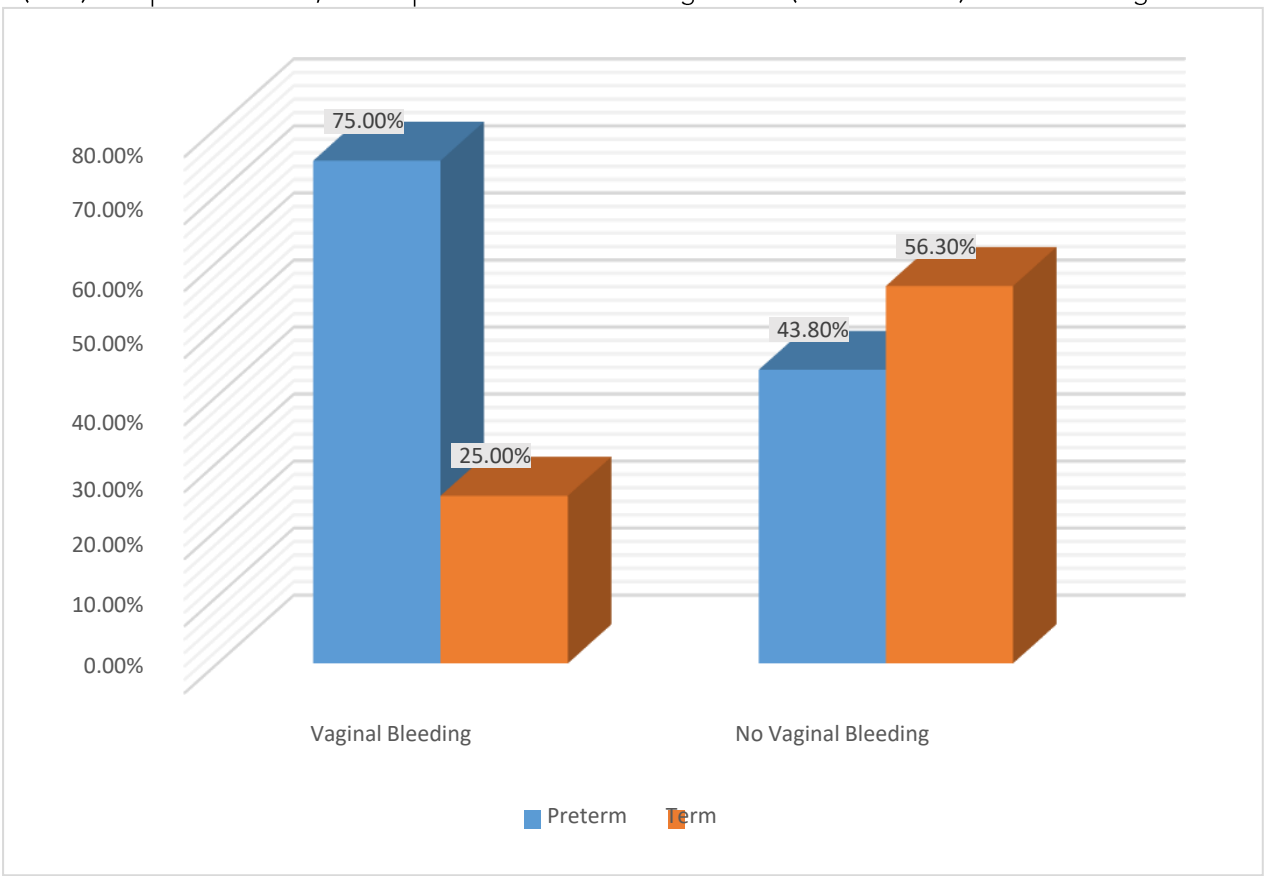

Figure 1: The relation of preterm and vaginal bleeding.

As shown in table 3 Most of the preterm mothers had significantly higher vaginal bleeding like menstruation 14 (51.9%) than term 3 (33.3%), while term had spotting 6 (66.7%) more than preterm labor group 7 (25.9%), this relation was statistically significant (P value< 0.05). Most of the preterm mothers had significantly higher vaginal bleeding during 2nd trimester 10 (37 %) than term mothers 0(0 %), P value< 0.05.

Table 3: The vaginal bleeding history of the studied case group.							
	Preterm		Term		Total		P value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Amount of bleeding							
Spotting	7	25.90%	6	66.70%	13	36.10%	0.02*
like menstruation	14	51.90%	3	33.30%	17	47.20%	
More than menstruation	6	22.20%	0	0.00%	6	16.70%	
GA at bleeding							
1st trimester	17	63.00%	9	100.00 %	26	72.20%	0.03*
2nd trimester	10	37.00%	0	0.00%	10	27.80%	
*significant							

Table 4, Early preterm births were greater among those with a history of vaginal bleeding 21 (58.3%) than those without 36 (25%), whereas term labour was higher among those without 81 (56.3%) than those with 9 (25.2%). Preterm premature rupture of membrane (PPROM) was greater in those with vaginal bleeding 8 (22.2%) than those without 8 (5.6%), and term PROM was higher in those with vaginal bleeding 4 (11.1%) than those without 4 (2.8%). Medically induced labour owing to foetal IUGR was considerably greater among individuals with vaginal haemorrhage 6 (16.7%) than those without 0 (0%) (p value < 0.05).

Table 4: The relation of vaginal bleeding and preterm labor.							
	vaginal bleeding		No vaginal bleeding		Total		value
	F	%	F	%	F	%	
Gestational Age at labor							
Early preterm 24-34 wk	21	58.30%	36	25.00%	57	31.70 %	< 0.05
Late preterm >34 week	6	16.70%	27	18.80%	33	18.30 %	< 0.05 *
Term	9	25.00%	81	56.30%	90	50.00 %	
Rupture of membrane							
PPROM	8	22.20%	8	5.60%	16	8.90%	< 0.05 *
term PROM	4	11.10%	4	2.80%	8	4.40%	
No	24	66.70%	132	91.70%	156	86.70 %	
Medically induced labor							
Yes	6	16.70%	0	0.00%	6	3.30%	< 0.05*
No	30	83.30%	144	100.00%	174	96.70%	
Total	36	100.00%	144	100.00%	180	100.00 %	
*significant							

4. Discussion

Preterm labour causes global newborn morbidity and death. Thus, high-risk women's triggering causes and prevention are critical. Our analysis found that 41.7% of women with vaginal bleeding were under 34 years old, compared to 12.5% of those without. This contradicts Sotiriadis A's 2004 study, which found a statistically insignificant greater rate of threatening miscarriage in women over 34 [22]. Due to diminished cardiovascular reserve, relatively high rates of underlying medical condition, and impaired capacity to respond and adapt to physical stress, older mothers may have more obstetric problems. In 2011, Bhandiwad A et al. in Nigeria reported that age-related sclerotic alterations on intra-myometrium arteries reduce placenta blood flow [23]. Our study found no significant connection between parity and threatening miscarriage, contrary to Naz S et al., who found a greater rate in multigravida than primigravida [24]. Our study found no relationship between early pregnancy vaginal bleeding and A.P.H, confirming Naz S et al [47]. Unlike Snelgrove JW and Murphy KE, our study found no connection between preterm birth and socioeconomic status. Poor social support and unemployment affect premature birth [25]. This may be because primary health care clinics provide prenatal care (ANC) to low-income women, and unlike in industrialised nations, low-income women in our country do not smoke, drink, or use drugs. Preterm moms (30%) worked harder than natal mothers (10%), P value < 0.05. Sharami, Seyedeh et al. (2013) observed that working during pregnancy is associated with premature birth [26]. According to Pigatti Silva's 2019 study, underweight moms had a higher risk of PTB [27]. Preterm labour mothers had a lower mean weight (69.4±12.4) Kg than term labour mothers (73.2±10.4) Kg. The current study found that (51.9%) preterm women had much more vaginal bleeding resembling menstruation than (33.3%) term, whereas term experienced spotting (66.7%) more than preterm labour (25.9%). This link was statistically significant (P value < 0.05). Preterm moms experienced 37% more vaginal bleeding in the second trimester than term mothers (0%), P value < 0.05. This study found that second-trimester vaginal bleeding increases the chance of premature labour. In 2004, Juan Yang et al. observed that bleeding in the first trimester only was related with earlier preterm delivery (34 weeks) and preterm birth owing to early rupture of the membranes. (PPROM), which contradicts our study. However, greater vaginal bleeding was related with a 2-fold

increase in premature labour and PPROM, which supports our study [28]. Second-trimester vaginal bleeding is linked to placental malfunction that might cause premature labour [29]. Chaithra M et al. observed that low birth weight and preterm delivery were substantially linked with second trimester haemorrhage, and that 20% of first trimester vaginal bleeding patients had preterm delivery and 5% had premature rupture of membranes [30]. In Kamble PD et al. patients who maintained pregnancy after first trimester vaginal bleeding, 1.8% had a second trimester abortion, 15.3% went into preterm labour, 6.75% experienced premature rupture of membranes, and 1.8% had antepartum haemorrhage [31]. In the current research, 58.3% of those with vaginal bleeding had early preterm delivery compared to 25% of those without, and 56.3% of those without had term labour compared to 25% of those with. David N. et al. observed in a 2012 analysis that early pregnancy bleeding increases the incidence of early PTB [32]. The current study found that PPROM was (22.2%) of those with vaginal haemorrhage and (5.6%) of those without. Sharami SH et colleagues showed that first- and second-trimester vaginal haemorrhage was linked to preterm premature rupture of membranes [26]. Thus, early pregnancy vaginal bleeding was associated with early preterm labour (before 34 weeks) preterm pre-labour membrane rupture. Although the cause is uncertain, vaginal bleeding may be a sign of subclinical intrauterine infection related to deciduitis and local placental haemorrhage. Decidual thrombosis causes ischemia and necrosis, vaginal bleeding, pro-inflammatory response, and thrombin production, which may increase uterine contraction and premature labour [33]. Our study found that 75% of women with a history of vaginal bleeding in early pregnancy had preterm labour, compared to 43% of those without such a history. Rydhwana Hossain et al. found that any vaginal bleeding during early pregnancy was associated with a 60% increased risk of preterm delivery [34].

5. Conclusion

Our study shows that vaginal bleeding in the first and/or second trimester is associated with increased risk of PTL. 2nd trimester vaginal bleeding associated with higher risk of PTL than 1st trimester bleeding and menstrual like vaginal bleeding associated with higher risk of PTL than spotting bleeding.

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