

Association between a history of threatened miscarriage and maternal and perinatal outcomes in women delivering at a Tertiary Referral Hospital in Indonesia

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Abstract

Background: A history of threatened miscarriage is a common complication of early pregnancy and has been suggested to be associated with adverse maternal and perinatal outcomes. However, previous studies have reported inconsistent findings regarding the association between a history of threatened miscarriage and these outcomes. Therefore, this study aimed to analyze the association between a history of threatened miscarriage and maternal and perinatal outcomes among women who delivered at RSUD Haji East Java Province.

Methods: This analytical observational study employed a cross-sectional design using retrospective medical record data of women who delivered between January and December 2025. A total of 160 participants were selected through simple random sampling. The independent variable was a history of threatened miscarriage, while the dependent variables were maternal and perinatal outcomes. Data were analyzed using univariate and bivariate analyses. Fisher's Exact Test was used to assess the association between variables, with a significance level of $p < 0.05$.

Results: The prevalence of a history of threatened miscarriage among the study participants was 8.8% (14/160). Most participants did not experience maternal or perinatal complications. Bivariate analysis showed no statistically significant association between a history of threatened miscarriage and maternal outcomes ($p > 0.05$) or perinatal outcomes ($p > 0.05$).

Conclusion: A history of threatened miscarriage was not significantly associated with maternal or perinatal outcomes among women who delivered at RSUD Haji East Java Province between January and December 2025. Nevertheless, pregnancies complicated by threatened miscarriage still require optimal antenatal surveillance to facilitate early detection and prevention of potential pregnancy complications.

Keywords: History of Threatened Miscarriage; Maternal Outcomes; Perinatal Outcomes; Pregnancy Complications; Sustainable Development Goals (SDGs), Good Health and Well-being

1. Introduction

First-trimester bleeding is one of the most common complaints encountered in obstetric practice and may indicate potential disturbances in pregnancy viability. One of the most common causes of early pregnancy bleeding is threatened miscarriage. Threatened miscarriage is defined as vaginal bleeding occurring before 20 weeks of gestation in a viable intrauterine pregnancy, with a closed cervix and no evidence of embryonic or fetal demise on ultrasonographic examination. This condition requires appropriate evaluation and monitoring because some cases may progress to early pregnancy loss and may be associated with an increased risk of subsequent pregnancy complications (1).

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Early pregnancy bleeding is a relatively common condition. Approximately 15–25% of pregnant women experience bleeding during the first trimester. The causes of bleeding during this period vary, ranging from benign conditions to pregnancy complications such as early pregnancy loss and ectopic pregnancy (2). Early pregnancy loss is one of the most common complications of pregnancy and is estimated to occur in approximately 15–20% of clinically recognized pregnancies (3).

Threatened miscarriage is not only an indicator of the risk of early pregnancy loss but may also be associated with an increased risk of adverse pregnancy outcomes. Early pregnancy bleeding is hypothesized to be related to impaired implantation processes and placental function, which may subsequently affect pregnancy progression. Recent studies suggest that hormonal factors and alterations in the intrauterine environment in cases of threatened miscarriage may contribute to pregnancy outcomes, although the association with obstetric and neonatal outcomes remains variable depending on population characteristics and study settings (4,5).

Although threatened miscarriage is a frequently encountered condition in early pregnancy, evidence regarding its long-term impact on maternal and perinatal outcomes remains inconsistent. Previous studies have predominantly focused on the risk of early pregnancy loss, whereas evidence regarding pregnancy outcomes extending to delivery, including maternal complications and neonatal conditions, remains limited, particularly in developing countries. Furthermore, tertiary referral hospitals have distinct patient characteristics due to the management of more complex cases with higher-risk pregnancies. Therefore, further research is needed to evaluate the association between threatened miscarriage and maternal and perinatal outcomes among women delivering in tertiary referral facilities.

Therefore, this study aimed to determine the association between threatened miscarriage and maternal and perinatal outcomes among women who delivered at a tertiary referral hospital in East Java, Indonesia. The findings of this study are expected to provide additional evidence regarding the pregnancy outcomes following threatened miscarriage and contribute to risk assessment and clinical management of affected pregnant women.

2. Methods

2.1. Study Design and Setting

This study was a quantitative observational analytic study with a cross-sectional analytic design. The study was conducted at RSUD Haji Provinsi Jawa Timur, a tertiary referral hospital located in East Java, Indonesia. The study analyzed the association between threatened miscarriage and maternal and perinatal outcomes among women who delivered at the hospital during the period of January to December 2025.

2.2. Population and Sample

The study population consisted of all women who delivered at RSUD Haji Provinsi Jawa Timur during the study period. The study sample included women who met the inclusion criteria and were selected based on the predetermined sample size calculation using the two-proportion formula.

The inclusion criteria were women who delivered at RSUD Haji Provinsi Jawa Timur during January–December 2025 with complete medical record data related to pregnancy history, maternal outcomes, and neonatal outcomes. Records with incomplete information regarding the main study variables were excluded.

A total of 160 women who delivered were included in the final analysis.

2.3. Study Variables and Definitions

The independent variable was a history of threatened miscarriage, defined as vaginal bleeding before 20 weeks of gestation in a viable intrauterine pregnancy with a closed cervix.

The dependent variables were maternal and perinatal outcomes.

Maternal outcomes included the occurrence of maternal complications during pregnancy, delivery, or postpartum period, including preeclampsia, severe preeclampsia, premature rupture of membranes, placenta previa, retained placenta, postpartum hemorrhage, and absence of maternal complications.

Perinatal outcomes included neonatal complications such as asphyxia, prematurity, low birth weight, intrauterine growth restriction, intrauterine fetal death, and absence of perinatal complications.

2.4. Data Collection

Data were obtained from medical records of women who delivered at RSUD Haji Provinsi Jawa Timur during January–December 2025. Data collection included maternal characteristics, history of threatened miscarriage, maternal complications, delivery outcomes, and neonatal outcomes.

2.5. Statistical Analysis

Data were analyzed using statistical software. Categorical variables were summarized as frequencies and percentages. The associations between a history of threatened miscarriage and maternal and perinatal outcomes were analyzed using Fisher's exact test because one or more cells in the contingency table had an expected count of less than 5.

2.6. Ethical Considerations

This study was conducted after obtaining ethical approval from the relevant Health Research Ethics Committee. Patient confidentiality was maintained by using anonymized data and ensuring that all collected information was used solely for research purposes.

3. Results

3.1. Characteristics of Participants

A total of 160 women who delivered at RSUD Haji Provinsi Jawa Timur during January–December 2025 were included in this study. Among the participants, 14 women (8.8%) had a history of threatened miscarriage, while 146 women (91.2%) did not experience threatened miscarriage during pregnancy.

The characteristics of participants are presented in Table 1. The characteristics assessed in this study included maternal age, parity, gestational age at delivery, maternal comorbidities, and other relevant obstetric characteristics.

Table 1 Characteristics of women who delivered at RSUD Haji Provinsi Jawa Timur

Characteristics		History of Threatened Miscarriage			
		With Complications		Without Complications	
		(n)	(%)	(n)	(%)
Maternal Age	<20 years	0	0%	5	3.4%
	20-35 years	11	78.6%	113	77.4%
	>35 years	3	21.4%	28	19.2%
Education Level	Primary School	1	7.1%	12	8.2%
	Junior High School	2	14.3%	15	10.3%
	Senior High School	9	64.3%	82	56.2%
	Diploma	0	0%	6	4.1%
	Bachelor's Degree	2	14.3%	31	21.2%
Occupation	Homemaker	8	57.1%	92	63%
	Employee	5	35.7%	39	26.7%
	Laborer	1	7.1%	4	2.7%
	Trader	0	0%	6	4.1%
	Student	0	0%	5	3.4%
Parity	Primiparous	5	35.7%	47	32.2%
	Multiparous	6	42.9%	76	52.1%
	Grandemultiparous	3	21.4%	23	15.8%
Previous history of miscarriage	No	9	64.3%	119	81.5%
	Yes	5	35.7%	27	18.5%

Status Anemia	No Anemia (≥ 11)	6	42.9%	94	64.4%
	Mild Anemia (10 – 10,9)	4	28.6%	25	17.1%
	Moderate Anemia (7 – 9,9)	4	28.6%	27	18.5%
	Severe Anemia (< 7)	0	0%	0	0%
BMI	Underweight ($< 18,5$)	1	7.1%	5	3.4%
	Normal weight (18,5-22,9)	6	42.9%	22	15.1%
	Overweight (23-24,9)	0	0%	15	10.3%
	Class I Obesity (25-29,9)	5	35.7%	55	37.7%
	Class II Obesity (≥ 30)	2	14.3%	49	33.6%
Allergy Status	No Allergy	13	92.9%	129	88.4%
	Food Allergy	1	7.1%	13	8.9%
	Drug Allergy	0	0%	4	2.7%
Number of Antenatal Care (ANC) Visits	No. ANC visits	0	0%	3	2.1%
	1-3 ANC visits	0	0%	21	14.4%
	> 3 ANC visits	14	100%	122	83.6%
	Total	14		146	

3.2. Maternal Outcomes

Maternal outcomes among women with and without threatened miscarriage are presented in Table 2. Maternal complications identified in this study included premature rupture of membranes, placenta previa, retained placenta, postpartum hemorrhage, preeclampsia, and severe preeclampsia.

Among women with threatened miscarriage, several maternal complications were observed; however, statistical analysis showed that there was no significant association between threatened miscarriage and maternal outcomes (Fisher's exact test, $p = 0.746$).

Table 2 Distribution of maternal outcomes according to threatened miscarriage status

Maternal Outcome	History of Threatened Miscarriage				p-value
	With Complications		Without Complications		
	(n)	(%)	(n)	(%)	
Without Complications	10	71.4%	111	76%	
With Complications :	4	28.6%	35	24%	
Premature rupture of membranes (PROM)	3	21.4%	10	6.8%	
Placenta Previa	1	7.1%	2	1.4%	
Retained Placenta	0	0%	2	1.4%	
Preeclampsia	0	0%	7	4.8%	
Severe Preeclampsia	0	0%	13	8.9%	
Postpartum Hemorrhage	0	0%	1	0.7%	
Total	14		146		0.746

3.3. Perinatal Outcomes

Perinatal outcomes according to threatened miscarriage status are presented in Table 3. The perinatal outcomes assessed included asphyxia, prematurity, low birth weight, intrauterine fetal death, intrauterine growth restriction, and absence of perinatal complications.

The occurrence of perinatal complications was observed in both groups; however, Fisher's exact test showed no statistically significant association between threatened miscarriage and perinatal outcomes (Fisher's exact test, $p = 0.552$).

Table 3 Distribution of perinatal outcomes according to threatened miscarriage status

Perinatal Outcome	History of Threatened Miscarriage				p-value
	With Complications		Without Complications		
	(n)	(%)	(n)	(%)	
Without Complications	11	78.6%	99	67.8%	
With Complications :	3	21.4%	47	32.2%	
Asphyxia	2	66.7%	20	42.6%	
Low Birth Weight (LBW)	0	0%	8	17%	
Intrauterine Fetal Death (IUFD)	0	0%	4	8.5%	
Intrauterine Growth Restriction (IUGR)	0	0%	1	2.1%	
Prematurity	1	33.3%	14	29.8%	
Total	14		146		0.552

Association Between a History of Threatened Miscarriage and Pregnancy Outcomes in Women Delivering

The association analysis between threatened miscarriage and pregnancy outcomes showed no statistically significant relationship between threatened miscarriage and maternal outcomes or perinatal outcomes.

The results indicate that, within this study population, a history of threatened miscarriage was not associated with increased occurrence of adverse maternal or perinatal outcomes.

4. Discussion

This study evaluated the association between threatened miscarriage and maternal as well as perinatal outcomes among women who delivered at a tertiary referral hospital in East Java, Indonesia. Among 160 women included in the study, 14 (8.8%) had experienced threatened miscarriage during pregnancy. The findings showed that threatened miscarriage was not significantly associated with maternal outcomes (Fisher's exact test, $p = 0.746$) or perinatal outcomes (Fisher's exact test, $p = 0.552$).

Although threatened miscarriage has been recognized as a condition associated with an increased risk of adverse pregnancy outcomes, the present study did not demonstrate a statistically significant association with maternal complications or neonatal outcomes. Differences in study populations, clinical characteristics, management strategies, and healthcare settings may contribute to variations in pregnancy outcomes among women with threatened miscarriage.

The incidence of threatened miscarriage in this study was 8.8% among women who delivered during the study period. The reported incidence of threatened miscarriage varies across studies due to differences in population characteristics, study design, inclusion criteria, and healthcare settings. First-trimester bleeding occurs in approximately 15–25% of pregnancies; however, not all cases of early pregnancy bleeding meet the diagnostic criteria for threatened miscarriage (2). Differences in referral patterns, clinical characteristics, and inclusion criteria may contribute to variations in the reported incidence of threatened miscarriage across studies.

In this study, threatened miscarriage was not significantly associated with maternal outcomes ($p = 0.746$). Although several maternal complications were identified, their occurrence was not significantly different between women with and without threatened miscarriage.

All women with threatened miscarriage in this study received progesterone therapy. Progesterone supplementation has been investigated as a treatment option for women with threatened miscarriage; however, evidence regarding its effectiveness varies according to patient characteristics and progesterone regimen. A systematic review and meta-analysis reported that progestogen therapy may improve live birth rates in some women with threatened miscarriage, although the benefit differs based on the type of progestogen used (6)

This study also found no significant association between threatened miscarriage and perinatal outcomes ($p = 0.552$). Previous studies have reported varying associations between threatened miscarriage and adverse perinatal outcomes. Differences in study findings may be related to variations in study populations, diagnostic criteria, severity of bleeding, gestational age at presentation, and clinical management. In the present study, the absence of a significant association may be related to the characteristics of the study population, which included women who continued their pregnancies until delivery.

One possible explanation for the non-significant finding is that this study included women who continued their pregnancies until delivery. Pregnancies with severe complications leading to early pregnancy loss may not be represented in the study population, which could influence the observed association between threatened miscarriage and perinatal outcomes.

Despite the absence of statistically significant associations, threatened miscarriage remains an important clinical condition requiring appropriate assessment and follow-up. Early identification of maternal risk factors, adequate antenatal surveillance, and comprehensive management are essential to optimize pregnancy outcomes, particularly in tertiary referral settings.

This study has several limitations. First, the use of medical record data may have resulted in limitations related to data completeness and accuracy, as the quality of the analysis depended on the quality of clinical documentation by healthcare providers. Second, some cases of threatened miscarriage that continued to delivery without subsequent complications may not have been fully documented, which may have influenced the identification and classification of study variables. Third, the relatively small number of women with threatened miscarriage in the study population may have limited the statistical power to detect significant associations between threatened miscarriage and maternal or perinatal outcomes.

5. Conclusion

This study found that the incidence of threatened miscarriage among women who delivered at RSUD Haji Provinsi Jawa Timur during January–December 2025 was 8.8%. Statistical analysis showed no significant association between threatened miscarriage and maternal outcomes or perinatal outcomes. Further studies with larger sample sizes and multicenter designs are needed to better evaluate the potential relationship between threatened miscarriage and subsequent pregnancy outcomes.

Recommendations

Further research involving larger populations and multiple healthcare facilities is recommended to provide stronger evidence regarding the association between threatened miscarriage and maternal and perinatal outcomes. Future studies may also consider including additional clinical factors, such as severity of bleeding, presence of subchorionic hematoma, maternal comorbidities, and treatment characteristics, to better understand factors influencing pregnancy outcomes following threatened miscarriage.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval was obtained from the Health Research Ethics Committee of RSUD Haji Provinsi Jawa Timur (No. 445/60/KOM-ETIK/2026).

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