International Journal of Scientific Reports
Sekhavat L et al. Int J Sci Rep. 2025 Dec;11(12):430-434
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164
DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20253763

Original Research Article

The effect of first-trimester bleeding on the newborn birth weight: a retrospective study

Leila Sekhavat*, Mojgan Hajisafari Tafti

Department of Obstetrics and Gynecology, Shahid Sedughi Hospital, Shahid Sedughi University of Medical Sciences and Health Services, Yazd, Iran

Received: 24 September 2025
Accepted: 15 October 2025

***Correspondence:**
Dr. Leila Sekhavat,
E-mail: sekhavat38@gmail.com

ABSTRACT

Background: Vaginal bleeding is a common complication during pregnancy and can cause some adverse pregnancy outcomes. The objective of this study is to evaluate the effect of first trimester bleeding in the current pregnancy on newborns Apgar.
Methods: A retrospective study was conducted on pregnant women who delivered at Shahid Sadoughi hospital in Yazd, Iran, between 2022 and 2023. They were singleton, nulliparous, non-diabetic women. Patients were categorized into two groups: exposure group (bleeding group) and control group (non-bleeding group), by using data from archived files. Apgar recorded in the newborn's file at the first minute and at the fifth minute after birth in both groups was noted.
Results: A total of 992 women were included in this study, with 218 exposure and 774 control groups. First minute Apgar score <7 was significantly increased in bleeding group. (22.5% versus 6.2%, p=0.02), while the five-minute Apgar score <7 did not increase significantly in this group.
Conclusion: This study showed, there is positive correlation between first trimester vaginal bleeding and low first minute Apgar score in newborns.

Keywords: First trimester vaginal bleeding, First minute Apgar, 5-minute Apgar

INTRODUCTION

The first trimester of pregnancy is a crucial period of fetal development, during which the body undergoes significant physiological changes to support the growing baby.[1] Maternal and fetal well-being are intricately linked, with various factors influencing fetal growth. These factors play a role in regulating fetal metabolic pathways and contribute to fetal programming.

First trimester bleeding defined as vaginal bleeding occurring between conception and 12 weeks of gestation. It is a common occurrence in pregnancy, affecting between 16-25% of all pregnancies and is often associated with significant anxiety for expectant mothers and healthcare providers alike.[3,4] While many pregnancies with first-trimester bleeding proceed without further complications, emerging evidence suggests that this condition can be associated with increased risks of maternal and neonatal complications later in pregnancy.[5,6]

Apgar scoring is a common and accepted practice used for evaluating newborns immediately after delivery. After its development by Dr. Virginia Apgar in the 1952.[7] It is a scoring system that is a rapid method of assessing the clinical status of the newborn infant at 1 minute of age and the need for prompt intervention to establish breathing. The Apgar score comprises 5 components: color, heart rate, reflexes, muscle tone, and respiration. Each of these components is given a score of 0, 1, or 2. Thus, the Apgar score quantitates clinical signs of neonatal depression, such as cyanosis or pallor, bradycardia, depressed reflex response to stimulation, hypotonia, and apnea or gasping respirations.[7-9] The score is reported at 1 minute and 5 minutes after birth for all infants, and at 5-minute intervals thereafter until 20 minutes for infants with a score less than

7.[10] Approximate 1% of live births had a 5-minute Apgar score below 7 among low-risk pregnancies, a decreased score was associated with a significantly higher risk of neonatal adverse outcomes, as well as infant mortality.[11] Recent studies have shown that non-malformed term infants born with lower Apgar scores at 1, 5, or 10 minutes are at higher risk of adverse long-term outcomes, such as epilepsy, cerebral palsy, having additional needs, and adverse child developmental health, compared with non-malformed term infants with an Apgar score of 7–10.[12-14]

Therefore, it is important to recognize the complications of pregnancy that can lead to a low Apgar score at birth and to pay attention to them during prenatal care.

Numerous studies have investigated the relationship between first-trimester bleeding and neonatal health. Some of these studies indicate a correlation between first-trimester bleeding and low Apgar scores at the first and fifth minutes after birth.[5,15-17] Conversely, other studies have reported that first-trimester bleeding has no effect on newborn Apgar scores.[18,19,21]

Some studies indicated that there is no direct correlation between first trimester bleeding and Apgar scores unless the bleeding leads to significant fetal distress or complications such as preterm labor, intrauterine growth restriction and low birth weight.[5,22,23] These complications from first trimester bleeding could potentially impact fetal health and consequently neonatal Apgar scores.

This article aims to explore the association between first trimester bleeding and neonatal Apgar scores, drawing on existing studies and clinical data. By obtaining the results of this relationship and by identifying modifiable risk factors, we hope to provide valuable insights for obstetricians and improve clinical management strategies for pregnancies complicated by first trimester bleeding.

METHODS

This study was designed as a retrospective study to evaluate the association between first-trimester bleeding and newborn birth weight. Data were collected from medical records of pregnant individuals who delivered at Shahid Sadoughi hospital in Yazd, Iran, between 2022 and 2023.

Inclusion criteria

The study included pregnant individuals who had a confirmed singleton pregnancy and delivered a live newborn at ≥37 weeks of gestation and birth weight >2500 g.

Patients were categorized into two groups: exposure group (bleeding group), pregnancies complicated by first-trimester vaginal bleeding and control group (non-bleeding group), pregnancies without any reported first-trimester vaginal bleeding.

Exclusion criteria

Exclusion criteria included fetal anomalies, chronic maternal conditions known to affect fetal growth (e.g., diabetes mellitus, hypertension, renal disease, cardiac or endocrine disorders), smoking and drug abuser, surgical conditions during pregnancy, and multiple pregnancies, placental abruption or previa later in pregnancy, and incomplete medical records.

All women were <40 years old. Demographic information such as occupation, economic status, education, and maternal body mass index (BMI) was also considered. Data were collected from archived medical and information recorded in patients file, including demographic information, obstetric history, number and details of any episodes of bleeding abortion during the first trimester of pregnancy.

First trimester bleeding was defined as vaginal bleeding before 12 weeks of gestation in the presence of a closed cervix and a viable intrauterine pregnancy.

Data were extracted from archived medical records, including Apgar scores recorded at the first and fifth minutes after birth. Apgar scores at 1 minute and 5 minutes after birth <7 considered low. Apgar scores described as normal (>7), low (5–7) and very low (<5).

Data were analyzed using statistical package for the social sciences (SPSS) 20 software. Continuous variables were compared using the t-test and Chi-square test. A $p<0.05$ was deemed statistically significant.

It is important to note that this study is retrospective, and the information was obtained from archived files at the hospital covering the period of 2021 to 2022. Prior to conducting the study, permission to use the files was obtained from the hospital's ethics committee.

RESULTS

A retrospective analysis was performed on 992 singleton term pregnant who delivered at Shahid Sadoughi Hospital, Yazd, Iran from 2022 to 2023. Among them, 218 women with first-trimester bleeding (exposure group) and 774 women without bleeding (control group).

Table 1 presents the maternal and neonatal demographic characteristics of these groups. Low scores Apgar (<7) were significantly more frequent in the bleeding group (22.5%, 49/218) versus controls (6.2%, 48/774) (p=0.02).

While the five-minute Apgar score <7 was increased in bleeding group, but no significant difference was observed between the groups. (bleeding: 8.7% versus control: 6.7%, p=0.6) (Table 2).

Additionally, vaginal bleeding characteristics showed in Table 3. Women with bleeding duration more than 2 days

had a higher incidence of low 1-minute Apgar (65.3%) compared to less than 2 days bleeding (36.7%), though this did not reach significance (p=0.06). Likewise, multiple episodes of bleeding demonstrated no significant higher incidence of low 1-minute Apgar in than single episode (p=0.07).

The mean±SD of newborn birth weight was 2891±539 grams. Low birth weight was greater in the bleeding groups, but the difference was not significant (Table 4).

This finding suggests an association between first-trimester bleeding and an increased risk of low first minute Apgar score.

Table 1: Comparison of maternal sociodemographic characteristics between two groups.

Maternal characteristics	Exposure group (first trimester bleeding), (n=218)	Control group (without bleeding), (n=774)	P value
Age in years, N (%)			
<20	45 (20.6)	155 (20)	2.1
20-30	146 (67)	513 (66.3)	
31-40	27 (12.4)	106 (13.7)	
Body mass index (kg/m^2), N (%)			
<18	38 (17.4)	148 (19.1)	1.1
18–25	145 (66.5)	490 (63.3)	
>25	35 (16.1)	136 (17.6)	
Employment, N (%)			
Yes	98 (44.9)	379 (49)	0.7
No	120 (55.1)	395 (51)	
Educational level			
<12	66 (30.3)	241 (31.1)	0.4
>12	152 (69.7)	533 (68.9)	
Prenatal care			0.3

Table 2: Comparison of neonatal 1- and 5- minutes Apgar scores in two groups.

Neonatal Apgar score	Exposure group (first trimester bleeding), (n=218)	Control group (without bleeding), (n=774)	P value
First min APGAR scores, N (%)			
<7	49 (22.5)	48 (6.2)	0.02
>7	169 (77.5)	726 (93.8)	
5 min after birth APGAR scores, N (%)			
<7	19 (8.7)	52 (6.7)	0.6
>7	199 (91.3)	722 (93.3)	

Table 3: Vaginal bleeding characteristics in low first minute Apgar group.

Characteristic	First min APGAR scores <7, (n=49)	P value
Bleeding episode, N (%)		
Single	19 (38.7)	0.07
Multiple	30 (61.2)	
Duration (days), N (%)		
1–2	18 (36.7)	0.06
>2	32 (65.3)	

Table 4: Comparison of neonatal weight within 15 minutes of birth in two groups.

Neonatal birth weight (gm)	Exposure group (first trimester bleeding), (n=218)	Control group (without bleeding), (n=774)	P value
LBW (<2500), N (%)	48 (22)	147 (19)	0.07
Normal weight (2500-4000), N (%)	159 (72.9)	563 (72.7)	41
Macrosomia (>4000), N (%)	11 (5.1)	64 (8.3)	0.2

DISCUSSION

The findings of this retrospective study, which analyzed 992 singleton term pregnancies at Shahid Sadoughi Hospital, Yazd, Iran, which 141 cases involved first-trimester bleeding. The study highlights a significant association between first-trimester vaginal bleeding and Apgar scores at 1 and 5 minutes after birth.

The Apgar score is a well-established marker for neonatal well-being, and lower scores are often correlated with increased risks of perinatal complications, including hypoxic-ischemic encephalopathy and neonatal intensive care unit (NICU) admission.[10,12]

One of the most significant findings in this study was the higher frequency of low Apgar scores (<7) at one minute in neonates born to mothers who experienced first-trimester bleeding (22.5%) compared to the control group (6.2%) p=0.02. This aligns with prior research demonstrating that vaginal bleeding in early pregnancy is associated with compromised neonatal outcomes. Karimi et al reported in their meta-analysis that vaginal bleeding during pregnancy is a risk factor for adverse outcomes, including low Apgar scores and preterm birth.[5] Bever et al found that first-trimester bleeding was linked to altered fetal growth patterns, which can contribute to neonatal distress and first minute low Apgar.[6] Some of these studies indicate a correlation between first-trimester bleeding and low Apgar scores at the first and fifth minutes after birth.[15-17,24]

The pathophysiology underlying the association between first-trimester bleeding and low Apgar scores may involve placental dysfunction. Bleeding in early pregnancy could indicate subchorionic hematomas or placental implantation abnormalities, leading to reduced placental efficiency and subsequent fetal hypoxia. Gaillard et al demonstrated that impaired placental function during critical trimesters adversely affects fetal growth and development, which may manifest as neonatal distress at birth.[1] Additionally, maternal inflammatory responses associated with early bleeding episodes may influence fetal development and increase the likelihood of perinatal complications.[15]

Although, some studies conversely have reported that first-trimester bleeding has no effect on newborn Apgar scores, therefore, it seems that more studies are needed in this objective.[18,19,21]

The lack of a significant difference in 5-minute Apgar scores between the groups (bleeding: 8.7% versus control: 6.7%, p=0.6) suggests that neonatal resilience or medical interventions may mitigate initial distress. This finding is consistent with Chen et al who suggested that while low 5-minute Apgar scores are predictive of long-term adverse outcomes, short-term resuscitation efforts often improve neonatal condition.[11] Current guidelines from the American Academy of Pediatrics recommend that neonates with low Apgar scores receive immediate and thorough evaluation to mitigate the risks associated with potential perinatal asphyxia.[7]

Further analysis of bleeding characteristics showed that prolonged bleeding (more than 2 days) was associated with a higher frequency of low one-minute Apgar scores (65.3% versus 36.7%). Additionally, multiple bleeding episodes showed a trend toward increased risk of adverse neonatal outcomes, although these findings did not reach statistical significance. These results are consistent with previous research, such as that by Chandrakala and Reshmi which suggested that recurrent episodes of bleeding are indicative of placental dysfunction and causes low Apgar and even contribute to perinatal morbidity.[24]

Interestingly, in this study despite a higher incidence of low birth weight in the bleeding group, the difference was not statistically significant with control group. This finding diverges from previous studies such as Karimi et al and Velez et al, which suggested that first-trimester bleeding is a risk factor for intrauterine growth restriction.[5,25] The discrepancy may be attributed to variations in study populations, sample sizes, and differing criteria for defining low birth weight.

CONCLUSION

This study highlights a significant association between first-trimester bleeding and lower one-minute Apgar scores, emphasizing the need for vigilant prenatal care in affected pregnancies. The increased incidence of low Apgar scores suggests that early pregnancy bleeding may have long-term implications for neonatal well-being. These findings reinforce the necessity of individualized prenatal monitoring and further research to optimize maternal and neonatal health outcomes.

Recommendations

Future research should aim to find better ways to diagnose and predict which cases of first-trimester bleeding will lead to adverse perinatal outcomes. Additionally, further investigation into preventive strategies, including potential pharmacological interventions and maternal lifestyle modifications, may help improve neonatal outcomes in pregnancies complicated by early bleeding.

ACKNOWLEDGEMENTS

Authors would like to thank the residents of the Obstetric and Pediatrics departments at Shahid Sadoughi University of Medical Sciences, Yazd, Iran, for their valuable assistance in data collection. They also thank the Department of Statistics for their support in data analysis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Gaillard R, Eric Ap Steegers AP, de Jongste JC, Hofman A, Vincent Wv Jaddoe V Wv. Tracking of fetal growth characteristics during different trimesters and the risks of adverse birth outcomes. Int J Epidemiol. 2014;43(4):1140-53.
2. Gluckman PD, Hanson MA, Cooper C, Thornburg KL. Effect of in utero and early-life conditions on adult health and disease. N Engl J Med. 2008;359(1):61-73.
3. Hendriks E, Macnaughton H, Castillo Mackenzie M. First Trimester Bleeding: Evaluation and Management. Am Fam Physician. 2019;99(3):166-74.
4. Salim S, Ravishankar D, Vinod KVG. A study on first trimester vaginal bleeding and outcome of pregnancy in Thiruvananthapuram, Kerala. J Clin Obstet Gynaecol. 2020;6:143-6.
5. Karimi A, Sayehmiri K, Vaismoradi M, Dianatinasab M, Daliri S. Vaginal bleeding in pregnancy and adverse clinical outcomes: a systematic review and meta-analysis. J Obstet Gynecol. 2024;44(1).
6. Bever AM, Pugh SJ, Kim S, Newman RB, Grobman WA, Chien EK, et al. Fetal Growth Patterns in Pregnancies with First-Trimester Bleeding. Obstet Gynecol. 2018;131(6):1021-30.
7. American Academy of Pediatrics Committee on Fetus and Newborn. The Apgar Score. Pediatrics. 2015;136(4):819-22.
8. Grünebaum A, Pollet S, Lewis D, De Four Jones M, Bornstein E, Adi Katz A. Is it time to modify the Apgar score? Am J Obstet Gynecol. 2024;230(3S):S988-9.
9. Alexandr M. Review of the Reliability and Validity of the Apgar Score. Adv Neonat Care. 2022;22(1):28-34.
10. Goswami IR, Whyte H, Wintermark P, Mohammad K, Shivananda S, Louis D, et al. Canadian Neonatal Network Investigators. Characteristics and short-term outcomes of neonates with mild hypoxic-ischemic encephalopathy treated with hypothermia. J Perinatol. 2020;40(2):275-83.
11. Chen HY, C Blackwell S, Chauhan SP. Association between apgar score at 5 minutes and adverse outcomes among Low-Risk pregnancies. J Matern Fetal Neonatal Med. 2022;35(7):1344-51.
12. Persson M, Razaz N, Tedroff K, Joseph KS, Cnattingius S. Five- and 10-minute Apgar scores and risks of cerebral palsy and epilepsy: population-based cohort study in Sweden. BMJ. 2018;360:k207.
13. Siddiqui A, Cuttini M, Wood R, Velebil P, Delnord M, Zile I, et al. Euro-Peristat Scientific Committee. Can the Apgar score be used for international comparisons of newborn health? Paediatr Perinat Epidemiol. 2017;31:338-45.
14. Li F, Wu T, Lei X, Zhang H, Mao M, Zhang J. The Apgar score and infant mortality. PLoS One. 2013;8:e69072.
15. Hosseini MS, Yaghoubipour S. Late Pregnancy Outcomes in Women with Vaginal Bleeding in Their First Trimester. J Obstet Gynecol India. 2013;63:311-5.
16. Saraswat L, Bhattacharya S, Maheshwari A, Bhattacharya S. Maternal and perinatal outcome in women with threatened miscarriage in the first trimester: a systematic review. BJOG. 2010;117(3):245-57.
17. Chaitanya N, Deepthisri T, Rohin. The study of first-trimester vaginal bleeding and its maternal and perinatal outcomes at a tertiary care center in Hyderabad. MRIMS J Health Sci. 2023;11(4):239-43.
18. Siddu S, Dhama V, Chaudhary R, Singh S. The study of outcome of pregnancy with first trimester vaginal bleeding and its complications. Int J Reprod Contracept Obstet Gynecol. 2022;11(4):1150-5.
19. Bhatti D, Dhar T, Mandrelle K, Sohi I. Pregnancy Outcomes in Women with Vaginal Bleeding in Early Pregnancy. Chrismed J Health Res. 2022;9(3):188-92.
20. Yakıştıran B, Yüce T, Söylemez F. First Trimester Bleeding and Pregnancy Outcomes: Case-Control Study. Int J Women's Health Reprod Sci. 2016;4(1):4-7.
21. Kamble P D, Bava A, Shukla M, Nandanvar Y S. First trimester bleeding and pregnancy outcome. Int J Reprod Contracept Obstet Gynecol. 2017;6(4):1484-7.
22. Velez E, Baird, R H, Savitz, KE H. First-trimester bleeding characteristics associate with increased risk of preterm birth: data from a prospective pregnancy cohort. Human Reprod. 2012;27(1):54-60.
23. Hackney DN, Christopher JG. Vaginal bleeding in early pregnancy and preterm birth: systemic review and analysis of heterogeneity. J. Maternal-Fetal Neonatal Med. 2011;24(6):778-86.
24. Chandrakala S, Reshmi MG. Maternal and fetal outcome in women experiencing first trimester vaginal bleed: a multicentric approach. Int J Reprod Contracept Obstet Gynecol. 2024;13(10):2765-9.

Cite this article as: Sekhavat L, Tafti MH. The effect of first-trimester bleeding on the newborn birth weight: a retrospective study. Int J Sci Rep 2025;11(12):430-4.