Barw Medical Journal | 2025;3(5):3-6
Journal home page: https://barw.krd/index.php/BMJ

Original Article

Could first-trimester bleeding affect a newborn's Apgar score?

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Keywords:
First trimester
Vaginal bleeding
First minute Apgar
5-minute Apgar

Received: August 31, 2025
Revised: October 30, 2025
Accepted: November 13, 2025
First Published: December 03, 2025

Citation: Sekhavat L and Javaheri A. Could first-trimester bleeding affect a newborn's Apgar score? Barw Medical Journal. 2025;3(5):3-6.
https://doi.org/10.58742/bmj.v4i1.201

Abstract

Introduction

Vaginal bleeding is a common complication during pregnancy and may contribute to adverse pregnancy outcomes. This study aimed to evaluate the effect of first trimester bleeding on newborns Apgar scores.

Methods

A retrospective study was conducted on pregnant women who delivered at Shahid Sadoughi hospital in Yazd, Iran, between 2022 and 2023. Only singleton, nulliparous, non-diabetic women were included. Participants were divided into two groups: the exposure group (Bleeding Group) and control Group (Non-Bleeding Group), based on archived records. Apgar scores recorded at the first and fifth minutes after birth in newborns file were compared between groups.

Results

A total of 992 women were included, with 218 in the exposure and 774 in the control groups. The incidence of a first-minute Apgar score <7 was significantly higher in the bleeding group compared to controls (22.5% vs. 6.2%, p = 0.02). However, there was no significant difference in five-minute Apgar scores between groups.

Conclusion

This study demonstrated a positive association between first-trimester vaginal bleeding and a low first-minute Apgar score in newborns.

1. 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 closely interconnected, and multiple factors influence fetal growth and metabolic programming.

First trimester bleeding defined as vaginal bleeding occurring between conception and 12 weeks of gestation. It is common and affecting between 16 - 25% of all pregnancies and often causes anxiety for both patients and clinicians [2-4]. Although many pregnancies with first-trimester bleeding progress without complication, emerging evidence suggests an increased risk of neonatal complications later in pregnancy [5,6].

The Apgar score, developed by Dr. Virginia Apgar in 1952, is a rapid and reliable method of assessing newborn condition and clinical status immediately after delivery [7-9]. The score is reported at one and five minutes after birth and, if below 7, at five-minute intervals up to 20 minutes [10]. Approximately 1% of low-risk live births have a five-minute Apgar score below 7, which is associated with a significantly higher risk of neonatal morbidity and mortality [11]. Low Apgar scores have also been linked to long-term adverse outcomes such as epilepsy, cerebral palsy, and developmental delays [12-14].

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 [18-21].

Several studies have explored the association between first-trimester bleeding and neonatal outcomes, with mixed results. Some found a correlation between early bleeding and low Apgar scores [5,15–17]. The others reported no significant relationship [18–21]. Some evidence suggests that only when bleeding results in complications such as intrauterine growth restriction (IUGR), preterm birth, or low birth weight does it significantly affect neonatal Apgar scores [5,22,23].

This study aims to further investigate the relationship between first-trimester bleeding and neonatal Apgar scores.

2. Methods

2.1. Study design and setting

This study was designed as a retrospective study. Data were collected from archived files at the hospital and medical records of pregnant individuals who delivered at Shahid Sadoughi hospital in Yazd, Iran, during one year.

2.2. Inclusion criteria

This study included singleton pregnancies that resulted in the delivery of live newborns at or beyond 37 weeks of gestation, with a birth weight greater than 2500 grams.

2.3. Exclusion criteria

Pregnancies were excluded if there were fetal anomalies, chronic maternal diseases such as diabetes mellitus, hypertension, renal, cardiac, or endocrine disorders, or any history of smoking or drug abuse. Additional exclusions included surgical conditions during pregnancy, multiple gestations, placental abruption or placenta previa in the later trimesters, and cases with incomplete medical records.

2.4. Grouping and data collection

Participants were categorized into two groups: an exposure group, consisting of pregnancies complicated by first-trimester vaginal bleeding, and a control group, comprising pregnancies without first-trimester bleeding. All included women were under 40 years of age. Demographic characteristics such as occupation, economic status, educational level, and maternal body mass index (BMI) were obtained. Clinical data were extracted from archived hospital records and patients' files, including obstetric history and detailed documentation of any first-trimester bleeding episodes. First-trimester vaginal bleeding was defined as bleeding occurring before 12 weeks of gestation in the presence of a closed cervix and a viable intrauterine pregnancy. Newborn outcomes, including Apgar scores at one and five minutes, were also retrieved from medical records. An Apgar score <7 at either time point was considered low, with scores classified as normal (>7), low (5–7), or very low (<5).

2.5. Statistical analysis

Data were analyzed using SPSS version 20. Continuous variables were compared using the t-test, while categorical variables were assessed using the chi-square test. A p-value of <0.05 was considered statistically significant.

3. Results

A total of 992 term singleton pregnancies were included in the analysis, comprising 218 women in the exposure (bleeding) group and 774 in the control group. Maternal and neonatal characteristics of both groups are presented in (Table 1).

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)	
20 – 30	146 (67)	513 (66.3)	0.2
31 – 40	27 (12.4)	106 (13.7)	
Body mass index (kg/m2) N (%)			
<18	38 (17.4)	148 (19.1)	
18– 25	145 (66.5)	490 (63.3)	0.1
>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			
Adequate	99 (45.4)	363 (46.9)	0.3
Inadequate	119 (54.6)	411 (53.1)	

Newborns in the bleeding group had a significantly higher proportion of first-minute Apgar scores <7 compared with the control group (22.5% vs. 6.2%, p = 0.02). Although five-minute Apgar scores <7 were also more common among the bleeding group (8.7% vs. 6.7%), this difference did not reach statistical significance (p = 0.6) (Table 2).

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)	

Women who experienced bleeding lasting more than two days had a greater frequency of low first-minute Apgar scores (65.3%) than those with shorter-duration bleeding (36.7%); however, this trend was not statistically significant (p = 0.06). Similarly, multiple bleeding episodes were associated with a higher proportion of low Apgar scores compared with single episodes, but without statistical significance (p = 0.07) (Table 3).

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

Characteristics	First min APGAR scores <7 N=49	P-value
Bleeding episode N (%)		
Single	19 (38.8)	0.07
Multiple	30 (61.2)	
Duration (days) N (%)		
1– 2	18 (36.7)	0.06
> 2	31 (65.3)	

The mean birth weight of newborns was 2891 ± 539 g. While low birth weight was more common in the bleeding group, the difference was not statistically significant (Table 4).

Overall, these findings suggest that first-trimester vaginal bleeding is associated with an increased risk of a low first-minute Apgar score at birth.

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 one and five minutes of birth [15-17, 24].

The underlying mechanism may involve placental dysfunction. Early bleeding may indicate subchorionic hematoma or implantation abnormalities, which can reduce placental efficiency and lead to fetal hypoxia. Gaillard et al. [1] reported that placental dysfunction adversely affects fetal growth and development, potentially manifesting as low Apgar scores. Maternal inflammation during early bleeding episodes may also negatively influence fetal development [15].

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

The absence of a significant difference in five-minute Apgar scores in our study the groups (bleeding: 8.7% vs. control: 6.7%, p = 0.6) suggests that prompt neonatal care and resuscitation may mitigate initial distress. This finding is consistent with Chen et al, who suggested that while low five-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

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)	0.4
Macrosomia (> 4000) N (%)	11 (5.1)	64 (8.3)	0.2

4. Discussion

This study found a significant association between first-trimester vaginal bleeding and low one-minute Apgar scores. The Apgar score is a key indicator of neonatal health, and lower values often reflect perinatal distress and risk of complications such as hypoxic-ischemic encephalopathy and NICU admission [10,12].

One of the most significant findings in this study was Neonates born to mothers with first-trimester bleeding were more likely to have a one-minute Apgar <7 (22.5% vs. 6.2%, p = 0.02). This finding is consistent with previous research suggesting that early pregnancy bleeding may compromise fetal growth and lead to neonatal distress [5,6,15-17,24].

immediate and thorough evaluation to mitigate the risks associated with potential perinatal asphyxia [7].

Longer or recurrent bleeding episodes appeared to increase the risk of low Apgar scores, though not significantly. Chandrakala and Reshmi similarly noted that recurrent bleeding episodes often indicate placental dysfunction and can contribute to perinatal morbidity [24].

Although low birth weight was more common in the bleeding group, the difference was not statistically significant, differing from studies by Karimi et al, and Velez et al, possibly due to differences in population size and inclusion criteria [5, 22]. The discrepancy may be attributed to variations in study populations, sample sizes, and differing criteria for defining low birth weight.

5. Conclusion

This study underscores the importance of vigilant prenatal monitoring in pregnancies affected by early first-trimester bleeding. Further investigations are required to identify predictors of adverse neonatal outcomes and to develop preventive measures that may enhance newborn health.

Declarations

Conflicts of interest: The authors have no conflicts of interest to disclose.

Ethical approval: The study was approved by the Institutional Ethics Committee and utilized data obtained from hospital archives.

Patient consent (participation and publication): Was obtained from all participants prior to completing the questionnaire, and participants were assured of confidentiality and anonymity.

Funding: The present study received no financial support.

Acknowledgements: The authors thank the residents of the Obstetrics and Pediatrics Departments at Shahid Sadoughi University of Medical Sciences, Yazd, Iran, for their assistance in data collection, and the Department of Statistics for support with data analysis.

Authors' contributions: LS Contributed to drafting the manuscript and critically revising its content, and approved the final version prior to submission. AJ Responsible for data acquisition, study conception and design, as well as data analysis and interpretation. All authors read and approved the manuscript.

Use of AI: AI was not used in the drafting of the manuscript, the production of graphical elements, or the collection and analysis of data.

Data availability statement: Not applicable.

References

1. Gaillard R, Eric Ap Steegers A P, de Jongste J C, 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. doi:10.1093/ije/dyu036
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. doi:10.1056/NEJMra0708473.
3. Hendriks E, Macnaughton H, Castillo Mackenzie M. First Trimester Bleeding: Evaluation and Management. *Am Fam Physician*. 2019; 99(3): 166-174. doi:10.1155/2023/5249585
4. Salim S, Ravishankar D, Vinod KVG. A study on first trimester vaginal bleeding and outcome of pregnancy in Thiruvananthapuram, Kerala. *J Clinic Obstet Gynaecol*. 2020; 6: 143-146. doi.:10.33545/gynae.2020.v4.i6c.745
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. *Journal of Obstetrics and Gynecology*.2024; 44(Issue 1) doi:10.1080/01443615.2023.2288224
6. Bever AM, Pugh SJ, Kim S, Newman RB, Grobman WA, Chien EK, Wing DA, Li H, Albert PS, Grantz KL. Fetal Growth Patterns in Pregnancies with First-Trimester Bleeding. *Obstetrics & Gynecology*.2018; 131(6): 1021-1030. doi:10.1097/AOG.0000000000002616.
7. American Academy of Pediatrics Committee on Fetus and Newborn. The Apgar Score. *Pediatrics*. 2015;136(4): 819-22. doi:10.1542/peds.2015-2651
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-S989. doi:10.1016/j.ajog.2023.02.032.
9. Alexandr M. Review of the Reliability and Validity of the Apgar Score. *Advances in Neonatal Care*. 2022; 22(1): 28-34. doi:10.1097/ANC.0000000000000859.
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): 275-283. doi:10.1038/s41372-019-0551-2.
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): 1344-1351. doi:10.1080/14767058.2020.1754789
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. doi:10.1136/bmj.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? *Paediatric Perinatal Epidemiology*. 2017; 31: 338-45. doi:10.1111/ppe.12368
14. Li F, Wu T, Lei X, Zhang H, Mao M, Zhang J. The Apgar score and infant mortality. *PLoS One* 2013; 8:e69072. doi:10.1371/journal.pone.0069072
15. Hosseini MS, Yaghoubipour S. Late Pregnancy Outcomes in Women with Vaginal Bleeding in Their First Trimester. *The Journal of Obstetrics and Gynecology of India*. 2013; 63: 311–315. doi:10.1007/s13224-013-0389.
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. doi:10.1111/j.1471-0528.2009.02427.
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 Journal of Health Sciences. 2023; 11(4): 239-243. doi:10.4103/mjhs.mjhs_82_22.
18. Siddu S, Dhama V, Chaudhary R, Singh S. The study of outcome of pregnancy with first trimester vaginal bleeding and its complications. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2022; 11(4): 1150-1155. doi:10.18203/2320-1770.ijrcog20220896
19. Bhatti, Dimple; Dhar, Tapasya; Mandrelle, Kavita; Sohi, Inderpreet. Pregnancy Outcomes in Women with Vaginal Bleeding in Early Pregnancy. *Chrismed Journal of Health and Research*. 2022; 9(3):188-192. doi:10.4103/cjhr.cjhr_99_21.
20. Yakıştıran B, Yüce T, Söylemez F. First Trimester Bleeding and Pregnancy Outcomes: Case-Control Study. *International Journal of Women's Health and Reproduction Sciences*. 2016; 4(1): 4–7. doi:10.15296/ijwhr.2016.02.
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): 1484-1487. doi:10.18203/2320-1770.ijrcog20173499
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 Reproduction*. 2012; 27(1): 54–60. doi:10.1093/humrep/der354
23. Hackney DN, Christopher JG. Vaginal bleeding in early pregnancy and preterm birth: systemic review and analysis of heterogeneity. *J. Maternal-fetal and Neonatal Med.* 2011; 24(6): 778–86. doi:10.3109/14767058.2010.530707
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): 2765-2769. doi:10.18203/2320-1770.ijrcog20201786