ALBANIAN JOURNAL OF TRAUMA AND EMERGENCY SURGERY
Volume 10 | Issue 2 | July 2026
Pages: 2080-2083
DOI: https://doi.org/10.32391/ajtes.v10i2.535

ORIGINAL ARTICLES

Gestational Age and Pregnancy Outcomes in SARS-CoV-2- Positive Women: A Retrospective Cohort Study with External Comparison

Vera Beca*; Mirela Rista, Daniela Nakuçi, Eliona Demaliaj

University Hospital of Obstetrics and Gynecology "Queen Geraldine", Tirana, Albania

Corresponding author: Vera Beca MD, Ph.D.c
Head of the Hospital Infection Control Service
University Hospital of Obstetrics and Gynecology "Queen Geraldine", Tirana, Albania
Email: vera_beca@yahoo.co.uk

Received: 31 March 2026 • Accepted: 15 May 2026 • Published online: 20 July 2026

ABSTRACT

Introduction: While SARS-CoV-2 infection is known to impact maternal health, the effects of infection timing during pregnancy on maternal and neonatal outcomes remain less well understood.
This study investigates the impact of SARS-CoV-2 infection timing during pregnancy on maternal and neonatal health outcomes.
Materials and Methods: Medical records of 254 women with SARS-CoV-2 infection treated at the "Queen Geraldine" University Hospital of Obstetrics and Gynecology were reviewed retrospectively. Participants were categorized into four groups by gestational age at infection: under 22 weeks, 22–27 weeks, 27–37 weeks, and 37–42 weeks. Outcomes assessed included miscarriage, fetal death, preterm birth, and neonatal birth weight.
Results: We found that the time of SARS-CoV-2 infection during pregnancy had an impact on the health of the mother and the baby. Early-onset infection (under 22 weeks) was linked to significantly higher rates of spontaneous abortion (31.3%) and fetal death (9.4%) ($p<0.001$ and $p=0.017$, respectively). Preterm birth occurred in 46.7% of pregnancies, and infection timing also influenced neonatal birth weight.
Conclusion: The timing of SARS-CoV-2 infection during pregnancy is a critical determinant of maternal and neonatal health. Early pregnancy infection increases the risk of complications, indicating the need for enhanced monitoring and individualized care strategies.
Keywords: SARS-CoV-2; Gestational Age; Spontaneous Abortion; Fetal Demise; Preterm Birth;

How to cite this article:
Beca, V., Rista, M., Nakuçi, D., & Demaliaj, E. (2026). Gestational age and pregnancy outcomes in SARS-CoV-2-positive women: A retrospective cohort study with external comparison. Albanian Journal of Trauma and Emergency Surgery, 10(2), 2080-2083. https://doi.org/10.32391/ajtes.v10i2.535

OPEN ACCESS

This article is published with Open Access at journal.astes.org.al.
© The Author(s) 2026.
The Albanian Journal of Trauma and Emergency Surgery (AJTES) is an Open Access journal. All articles are distributed under the terms of the Creative Commons Attribution–NonCommercial License (CC BY-NC), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.
Licence: https://creativecommons.org/licenses/by-nc/4.0/

INTRODUCTION

The emergence of coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, has posed significant challenges for maternal and fetal health worldwide.

Pregnancy involves dynamic immunological and physiological adaptations, including altered cellular immunity and increased cardiopulmonary demand, which may predispose women to adverse outcomes from viral infections (1,2). Although early reports suggested mild disease courses in pregnant women, later large-scale studies showed increased risks of complications such as preterm birth, intensive care admission, and maternal morbidity (3,4).

An important yet underexplored factor is the gestational age at the time of infection.

Early pregnancy is a critical window for placental development, and disruptions during this period may cause implantation failure or early pregnancy loss. Infection during later gestational stages is linked to systemic inflammatory responses and placental dysfunction, potentially leading to preterm birth and fetal growth restriction (5,6). Despite growing evidence, few studies have systematically examined outcomes by gestational age.

The present study aims to evaluate the association between gestational age and pregnancy outcomes in women with confirmed SARS-CoV-2 infection.

Because there was no contemporaneous non-COVID cohort at the same institution, outcomes were compared with baseline rates from large population-based studies, serving as an external reference in this retrospective analysis.

MATERIALS AND METHODS

This retrospective cohort study included 254 pregnant women with confirmed SARS-CoV-2 infection diagnosed by polymerase chain reaction and managed at the Hospital of Obstetrics and Gynecology "Queen Geraldine."

Patients were categorized into four gestational age groups: <22 weeks, 22–27 weeks, 27–37 weeks, and 37–42 weeks.

The primary outcomes assessed included live birth, abortion, intrauterine fetal death (IUFD), preterm birth, and neonatal birth weight, consistent with outcome measures used in previous COVID-19 pregnancy studies (6,9).

To contextualize the findings, this study used an external comparison approach, comparing baseline rates with those from established epidemiological studies and international datasets.

Reported baseline rates included preterm birth of about 10–12%, low birth weight of 8–10%, IUFD rates of 0.5–1%, and abortion rates between 10% and 15% in early pregnancy (8,10). Statistical analysis used chi-square testing, with p-values < 0.01 considered significant.

RESULTS

The analysis demonstrated a significant association between gestational age and live birth outcome, with an overall live birth rate of 93.3% (Table 1).

Lower gestational age was linked to reduced likelihood of live birth, especially in pregnancies below 22 weeks, reflecting biological viability limits and increased vulnerability to early pregnancy complications.

This association was statistically significant (p < 0.001) and aligns with findings from large cohort studies demonstrating improved neonatal survival with advancing gestational age (5,9).

Abortion was observed in 3.9% of the total cohort but occurred exclusively in pregnancies below 22 weeks, where the rate reached 31.3%.

Table 1. The association between gestational age and live births

Gestational age	Live birth		
	no	yes	Total
>22 weeks	12(35.5)	20(62.5)	32 (100.0)
22-27 weeks	0(0.0)	17(100.0)	17(100.0)
27-37 weeks	5(5.6)	84(94.4)	89(100.0)
37-42 weeks	0(0.0)	116(100.0)	116(100.0)
Total	17(6.7)	237(93.3)	254(100.0)

*Chi-square test 58.3, P value 0.00001

Table 2. The association between gestational age and abortion

Gestational age	Abortion		
	no	yes	Total
>22 weeks	22(68.8)	10(31.3)	32 (100.0)
22-27 weeks	17(100.0)	0(0.0)	17(100.0)
27-37 weeks	89(100.0)	0(0.0)	89(100.0)
37-42 weeks	116(100.0)	0 (0.0)	116(100.0)
Total	244(96.1)	10(3.9)	254(100.0)

*Chi-square test 72.2, P value 0.0001

No abortions occurred in later gestational groups. This highly significant association (p < 0.001) suggests that early gestational stages are particularly susceptible to the adverse effects of SARS-CoV-2 infection, potentially through disruption of early placental development and increased inflammatory response (1,2).

Fetal death (IUFD) occurred in 3.1% of cases and demonstrated a statistically significant association with gestational age (p = 0.017) (Table 3).

Table 3. The association between gestational age and IUFD

Gestational age	Fetal death (IUFD)		
	no	yes	Total
>22 weeks	29(90.6)	3(9.4)	32 (100.0)
22-27 weeks	17(100.0)	0(0.0)	17(100.0)
27-37 weeks	84(94.4)	5(5.6)	89(100.0)
37-42 weeks	116(100.0)	0 (0.0)	116(100.0)
Total	246(96.9)	8(3.1)	254(100.0)

*Chi-square test 10.168, P value 0.017

The highest rate occurred in pregnancies below 22 weeks, with no cases recorded in term pregnancies. Compared with baseline IUFD rates of about 0.5–1% reported in population-based studies, the observed rate in this cohort is elevated, suggesting a potential contribution of COVID-19–related placental pathology (10,11).

Preterm birth, shown in Table 4, occurred in 46.7% of pregnancies, substantially exceeding expected baseline rates of about 10–12% reported globally.

Although the association with gestational age groups was not statistically significant (p = 0.07), the overall prevalence of preterm delivery is clinically significant and consistent with multinational studies reporting increased rates of spontaneous and medically indicated preterm birth in COVID-19–affected pregnancies (3,5). Analysis of neonatal birth weight (Table 5) demonstrated a statistically significant association with gestational age (p = 0.002).

Table 4. The association between gestational age and preterm birth

Gestational age	Preterm birth		
	no	yes	Total
>22 weeks	16(72.7)	6(27.3)	22 (100.0)
22-27 weeks	10(62.5)	6(37.5)	16(100.0)
27-37 weeks	46(56.1)	36(43.9)	89(100.0)
37-42 weeks	40(44.4)	50 (55.6)	90(100.0)
Total	112(53.3)	98(46.7)	210(100.0)

*Chi-square test 6.97, P value 0.07

Table 5. The association between gestational age and neonatal birth weight

Gestational age	Neonatal birth weight		
	no	yes	Total
>22 weeks	32(100.0)	0(0.0)	22 (100.0)
22-27 weeks	12(75.0)	4(25.0)	16(100.0)
27-37 weeks	67(79.8)	17(22.2)	84(100.0)
37-42 weeks	109(95.6)	5 (4.4)	114(100.0)
Total	204(87.2)	30(12.8)	234(100.0)

*Chi-square test 14.4, P value 0.002

Low birth weight was observed in 12.8% of neonates, with higher prevalence in earlier gestational age groups, especially between 22 and 37 weeks. Term pregnancies showed significantly lower rates. These findings suggest that SARS-CoV-2 infection may contribute to impaired fetal growth, potentially through mechanisms involving placental vascular malperfusion and inflammatory injury, as described in histopathological studies (11,12).

DISCUSSION

This study shows that gestational age plays a critical role in pregnancy outcomes in women with SARS-CoV-2 infection, with distinct patterns across pregnancy stages.

Early gestational age was strongly linked to abortion and fetal death, supporting the hypothesis that early placental development is vulnerable to inflammatory and vascular disturbances caused by viral infection (1,2).

In later gestational stages, complications shifted toward preterm birth and low birth weight. The elevated rate of preterm delivery observed aligns with findings from the INTERCOVID study and other large cohorts reporting increased medically indicated preterm birth due to maternal or fetal compromise (5,9).

These outcomes may be driven by systemic inflammation, maternal hypoxia, and placental dysfunction. Comparison with external baseline data supports the impact of COVID-19 on pregnancy outcomes.

Observed rates of preterm birth, IUFD, and low birth weight exceed those in non-infected populations, suggesting SARS-CoV-2 infection adds risks beyond normal pregnancy physiology (3,7).

Placental studies have demonstrated features such as maternal vascular malperfusion, fibrin deposition, and thrombotic lesions, which may impair fetal oxygenation and nutrient transfer (11, 12)

CONCLUSION

Gestational age is a fundamental determinant of pregnancy outcomes in women with SARS-CoV-2 infection. This study shows infection during early pregnancy is linked to a significantly increased risk of abortion and fetal death, while infection in later stages is more strongly linked to preterm birth and low birth weight (5,7).

These results have important clinical implications, emphasizing the need for a gestational age–specific approach in managing COVID-19–complicated pregnancies. Early gestation is particularly vulnerable due to critical implantation and placental development processes, which may be disrupted by inflammatory and vascular mechanisms. Infections in the second and third trimesters require closer surveillance for preterm labor and fetal growth abnormalities.

This study contributes to a deeper understanding of the interaction between viral infections and pregnancy biology, highlighting that timing of exposure is as crucial as the infection itself.

These findings support the development of tailored clinical protocols and targeted monitoring strategies to

improve maternal and neonatal outcomes in pregnancies affected by COVID-19.

Editorial Statements

Ethics Approval and Consent to Participate

This study involved the analysis of data from human participants. The research protocol was reviewed and approved by the Institutional Ethics Committee and was conducted in accordance with institutional regulations, the principles of the Declaration of Helsinki, and internationally accepted standards for biomedical research ethics.

Data Availability Statement: The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions (CRediT): Conceptualization & Methodology: VB, ED; Data Curation, Investigation and Writing – Original Draft: MR: Formal Analysis: DN, VB: Writing – Review & Editing: MR, ED: Supervision: VB. All authors have read and approved the final version of the manuscript.

Artificial Intelligence (AI) Statement

The authors used a generative artificial intelligence tool solely for language editing and grammar improvement. All scientific content, data analysis, interpretation, and conclusions were independently developed, verified, and approved by the authors.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest: The authors declare that they have no competing interests or conflicts of interest related to this study.

Acknowledgements: The authors thank all the healthcare professionals at our institution whose work contributed to the development of evidence-based data, regarding the our study

REFERENCES

1. Wastnedge EAN, Reynolds RM, van Boeckel SR, Stock SJ, Denison FC, Maybin JA, Critchley HOD. Pregnancy and COVID-19. Physiol Rev. 2021 Jan 1;101(1):303-318. doi: 10.1152/physrev.00024.2020.
2. Rasmussen S, Smulian J, Lednicky J 'Coronavirus Disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. American Journal of Obstetrics & Gynecology, 2020; 222, 415-426. doi.org/10.1016/j.ajog.2020.02.017
3. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, et al. (2020);for Preg COV-19 Living Systematic Review Consortium. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. BMJ. 2020 Sep 1;370:m3320. doi: 10.1136/bmj.m3320
4. Knight M, Bunch K, Vousden N, Morris E, Simpson N, Gale C, O'Brien P, Quigley M, Brocklehurst P, Kurinczuk JJ; UK Obstetric Surveillance System SARS-CoV-2 Infection in Pregnancy Collaborative Group. Characteristics and outcomes of pregnant women admitted to hospital with confirmed SARS-CoV-2 infection in the UK: national population-based cohort study. BMJ. 2020 Jun 8;369:m2107. doi: 10.1136/bmj.m2107
5. Villar J, Ariff S, Gunier RB, Thiruvengadam R, Rauch S, Kholin A, et al (2021). Maternal and Neonatal Morbidity and Mortality Among Pregnant Women With and Without COVID-19 Infection: The INTERCOVID Multinational Cohort Study. JAMA Pediatr. 2021 Aug 1;175(8):817-826. doi: 10.1001/jamapediatrics.2021.1050.
6. Di Mascio D, Khalil A, Saccone G, Rizzo G, Buca D, Liberati M, Vecchiet J, Nappi L, Scambia G, Berghella V, D'Antonio F. Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy: a systematic review and meta-analysis. Am J Obstet Gynecol MFM. 2020 May;2(2):100107. doi: 10.1016/j.ajogmf.2020.100107
7. Aho Glele LS, Simon E, Bouit C, Serrand M, Filipuzzi L, Astruc K, Kadhel P, Sagot P. Association between SARS-CoV-2 infection during pregnancy and adverse pregnancy outcomes: A re-analysis of the data reported by Wei et al. (2021). Infect Dis Now. 2022 May;52(3):123-128. doi: 10.1016/j.idnow.2022.02.009.
8. World Health Organization. Maternal and perinatal COVID-19 report. Geneva: World Health Organization; 2021
9. Metz TD,Clifton RG,Hughes BL, et al. Association of SARS-CoV-2 Infection With Serious Maternal Morbidity and Mortality From Obstetric Complications. *JAMA*.2022;327(8):748–759. doi:10.1001/jama.2022.1190
10. Blencowe H, Krasevec J, de Onis M, Black RE, An X, Stevens GA, Borghi E, Hayashi C, Estevez D, Cegolon L, Shiekh S, Ponce Hardy V, Lawn JE, Cousens S. National, regional, and worldwide estimates of low birthweight in 2015, with trends from 2000: a systematic analysis. Lancet Glob Health. 2019 Jul;7(7):e849-e860. doi: 10.1016/S2214-109X(18)30565-5.
11. Schwartz DA. An Analysis of 38 Pregnant Women With COVID-19, Their Newborn Infants, and Maternal-Fetal Transmission of SARS-CoV-2: Maternal Coronavirus Infections and Pregnancy Outcomes. Arch Pathol Lab Med. 2020 Jul 1;144(7):799-805. doi: 10.5858/arpa.2020-0901-SA.
12. Shanes ED, Mithal LB, Otero S, Azad HA, Miller ES, Goldstein JA. Placental Pathology in COVID-19. Am J Clin Pathol. 2020 Jun 8;154(1):23-32. doi: 10.1093/ajcp/aqaa089
13. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Xia J, Yu T, Zhang X, Zhang L. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020 Feb 15;395(10223):507-513. doi: 10.1016/S0140-6736(20)30211-7