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RESEARCH

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Implications of COVID-19 for obstetric and neonatal outcomes[a]

Implicações da COVID-19 para desfechos obstétricos e neonatais

Implicaciones de la COVID-19 para los resultados obstétricos y neonatales

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Abstract

Objective: To analyze the implications of COVID-19 on obstetric and neonatal outcomes among hospitalized pregnant women. **Method:** This retrospective, documentary, and analytical cohort study was conducted at a hospital in southern Brazil. The study population consisted of 126 pregnant women admitted between 2020 and 2022. Data were collected from April to June 2023 using epidemiological bulletins and electronic medical records and analyzed using the Statistical Package for the Social Sciences software. **Results:** The pregnant women had a gestational age of ≥37 weeks (50.4%), obesity (22.2%), and chronic hypertension (19.0%). Emergency cesarean sections occurred in 43.7% of cases, and only 27% of them were vaccinated. Mechanical ventilation was required in 10.3% of cases, and 4.8% of them were admitted to the intensive care unit. Severe Acute Respiratory Syndrome was associated with prematurity and reduced skin-to-skin contact and breastfeeding in the first hour of life. **Conclusion and implications for practice:** Pregnant women are a vulnerable group to the implications of COVID-19, which can have negative effects on obstetric and neonatal outcomes. Prevention and adequate monitoring are the main implications for practice when infection occurs.

Keywords: COVID-19; Pregnancy; Hospitalization; Newborn. SARS-CoV-2.

Resumo

Objetivo: Analisar as implicações da COVID-19 nos desfechos obstétricos e neonatais de gestantes hospitalizadas. **Método:** Este estudo de coorte, retrospectivo, documental e analítico foi realizado em um hospital no Sul do Brasil. Sua população foi composta por 126 gestantes internadas entre 2020 e 2022. As variáveis foram coletadas de abril a junho de 2023, usando boletins epidemiológicos e prontuários eletrônicos, e analisadas no software *Statistical Package for the Social Sciences*. **Resultados:** As gestantes tinham idade gestacional ≥37 semanas (50.4%), obesidade (22.2%) e hipertensão crônica (19.0%). Cesáreas de emergência ocorreram em 43.7% dos casos, e só 27% delas estavam vacinadas. Ventilação mecânica foi necessária em 10.3% dos casos, e 4.8% delas foram internadas em unidade de terapia intensiva. A Síndrome Respiratória Aguda Grave esteve associada à prematuridade e redução no contato pele-a-pele e amamentação na primeira hora de vida. **Conclusão e implicações para a prática:** Gestantes são um grupo vulnerável às implicações da COVID-19 que podem ser negativos em desfechos obstétricos e neonatais. A prevenção e o monitoramento adequado são as principais implicações para a prática quando ocorre a infecção.

Palavras-chave: COVID-19; Gravidez; Hospitalização; Recém-Nascido; SARS-CoV-2.

Resumen

Objetivo: Analizar las implicaciones de la COVID-19 en los resultados obstétricos y neonatales de gestantes hospitalizadas. **Método:** Este estudio de cohorte, retrospectivo, documental y analítico se realizó en un hospital del sur de Brasil. Su población estuvo constituida por 126 gestantes hospitalizadas entre 2020 y 2022. Las variables fueron recolectadas de abril a junio de 2023, mediante boletines epidemiológicos y historias clínicas electrónicas, y analizadas en el software estadístico *Statistical Package for the Social Sciences*. **Resultados:** Las gestantes tenían edad gestacional ≥37 semanas (50.4%), obesidad (22.2%) e hipertensión crónica (19.0%). En el 43.7% de los casos se realizaron cesáreas de urgencia y solo el 27% de ellas estaban vacunadas. En el 10.3% de los casos fue necesaria ventilación mecánica y el 4.8% de ellos fueron ingresados en la unidad de cuidados intensivos. El síndrome respiratorio agudo severo se asoció con prematuridad y reducción del contacto piel con piel y de la lactancia materna en la primera hora de vida. **Conclusión e implicaciones para la práctica:** Las gestantes son un grupo vulnerable a las implicaciones del COVID-19, que puede tener efectos negativos en los resultados obstétricos y neonatales. La prevención y un seguimiento adecuado son las principales implicaciones para la práctica cuando se produce la infección.

Palabras Clave: COVID-19; Embarazo; Hospitalización; Recién Nacido; SARS-CoV-2.

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INTRODUCTION

Care for women during pregnancy is justified by the anatomical and physiological changes that occur during this period, including alterations to the respiratory system and a state of immunosuppression, which increase the risk of respiratory infections in this population. This specificity contributed to pregnant women being considered at-risk groups during the COVID-19 pandemic.[1] This disease is caused by the coronavirus SARS-CoV-2, which was first detected in Wuhan (China; Dec 2019) and initially named 2019-nCoV.[2,3]

Confirmed cases of the infection have reached a global scale. In Brazil, 2.247.434 cases of pregnant and postpartum women with Severe Acute Respiratory Syndrome (SARS) caused by the coronavirus were reported by February 2025.[4] It was also found that symptomatic pregnant women with COVID-19 have higher rates of hospitalization in the Intensive Care Unit (ICU) compared to the general population and pregnant women without the disease.[1]

Maternal mortality, as evidenced by 3.573 deaths that occurred in Brazil in the period mentioned above, is among the outcomes caused by this infection4 and shows a temporal correlation with the highest peak in the historical series of the Brazilian maternal mortality rates.[5] In addition, negative outcomes related to newborns (NBs), such as the risk of prematurity and fetal growth restriction, were observed.[6] Thus, COVID-19 has established itself as a severe acute respiratory infection that requires special attention when the pregnant population is affected.

As COVID-19 increases the risk of complications during pregnancy.[7] developing research focusing on these complications and their association with other diseases can contribute to evidence that improves maternal health care recommendations. Furthermore, such initiatives also contribute to fulfilling the 2030 Agenda for Sustainable Development, reducing global maternal mortality.[8] Therefore, the objective of the present study was to analyze the implications of COVID-19 on the obstetric and neonatal outcomesamong hospitalized pregnant women.

METHOD

This was a quantitative, retrospective cohort study with a documentary nature. The methodological description of this research was conducted in accordance with the guidelines of the Checklist for Reporting Results of Internet E-Surveys and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) instruments. This research was carried out in a public teaching hospital (located in the central region of the State of Rio Grande do Sul, Southern Brazil) that is a reference for obstetric care in cases of high-risk pregnancies and whose services are linked to the country's Unified Health System.

Recruitment was carried out by accessing document data from four sectors: Obstetric Center (OC), Gynecological Inpatient Unit (GIU), Intensive Care Unit (ICU-COVID-19), and Health Surveillance Unit (HSU). Pregnant women admitted to the OC and GI, or ICU-COVID-19 units, with a positive diagnosis for COVID-19 in the period 2020-2022, were the inclusion criteria. The epidemiological bulletins of disease notifications provided by UVS/HSU were initially consulted to collect eligible data. Then, information regarding pregnant women and their newborns (NBs) was obtained using the electronic medical record number in the online information system. There was no exclusion criterion, and data labeled "ignored" and "blank" were considered losses.

Information was collected using an instrument developed by the researchers in the period April-June 2023, and a pilot test was conducted. The data collection was conducted by the research author and a trained data collector. The instrument consisted of questions about the pregnant woman's sociodemographic data, such as age, race, and/or skin color (white, black, brown, yellow, and indigenous), marital status, and education level.

The clinical variables referred to the classification of the type of infection (Coronavirus Flu Syndrome or Severe Acute Respiratory Syndrome associated with coronavirus) and obstetric history: (previous and current) pregnancies, outcome of (previous and current) pregnancy, (single or twin) fetus, gestational age, (quantitative) prenatal consultations, and delivery (type and sentinel events). Regarding COVID-19, the following variables were collected: signs and symptoms (runny nose, olfactory and gustatory disturbances, headache, cough, fever, dyspnea, and sore throat); vaccination against COVID-19; comorbidities (chronic and/or infectious diseases, or pregnancy-specific diseases); reason for hospitalization (childbirth, cesarean section, abortion, changes in pregnancy, clinical treatment, and suspected or confirmed case of COVID-19); length of hospital stay, and outcome of hospitalization (hospital discharge, death, or discharge). Gestational age (Capurro method), breastfeeding in the first hour of life, skin-to-skin contact (yes or no and reason), and outcomes such as miscarriage and fetal death were the information collected about the NBs.

A database was generated to organize the data, which was then analyzed in the Statistical Package for the Social Sciences (SPSS) software. A descriptive and correlational analysis was performed using the Mann-Whitney test (for skewed quantitative data) and Chi-square or Fisher's exact test (for qualitative data). The normality of quantitative variables was verified using the Kolmogorov-Smirnov test.

The research followed the guidelines of Resolution 466 (December 2012) for the development of research involving humans, being approved by the Research Ethics Committee (REC; Opinion 5.995.015).

RESULTS

A total of 126 pregnant women were hospitalized with COVID-19 between 2020 and 2022: 4.7% (n=6) in 2020, 38.8% (n=49) in 2021, and 56.3% (n=71) in 2022. The pregnant women had a mean age of 27.8 years; they stated as white (88.1%; n=111), single (66.7%; n=84), and most had completed high school (36.5%; n=46). Regarding obstetric history, most pregnant women were multiparous (78.5%; n=99), with a median of three

pregnancies of a single-fetus (97.6%; n=123), and gestational age >37 weeks (50.4%; n=63). Most pregnant women underwent prenatal (PN) examination (66.7%; n=84) with a median of seven consultations.

The clinical characteristics of the pregnant women are presented in Table 1, where the aggravation due to coronavirus flu syndrome prevailed (92.1%; n=116), and cough was the most common sign (39.7%; n=50). Regarding vaccination against COVID-19, some (n=34; 27%) of pregnant women were vaccinated. Among the high-risk pregnancy conditions observed, 22.2% (n=28) of the pregnant women were obese, and 15.9% (n=20) of them were aged >35 years. Furthermore, 12.7% (n=16) of them had been diagnosed with pre-eclampsia and 19.8% (n=25) with gestational diabetes. Regarding infectious diseases, 8.7% (n=11) of them had syphilis and 13.5% (n=17) had urinary tract infection (UTI).

Table 1. Clinical characteristics and hospitalization data of pregnant women with COVID-19 hospitalized from 2020 to 2022 (Santa Maria, RS, 2024; n=126).

Variables	n (%)	Median (IIQ)
Worsening		
Coronavirus Flu Syndrome	116 (92.1)	
Severe Acute Respiratory Syndrome	10 (7.9)	
Signs and symptoms		
Runny nose	10 (7.9)	
Olfactory disorders	6 (4.8)	
Taste disorders	4 (3.2)	
Headache	31 (24.6)	
Cough	50 (39.7)	
Fever	30 (23.8)	
Dyspnea	23 (18.3)	
Sore throat	13 (10.3)	
Vaccination		
Yes	34 (27.0)	
No	2 (1.6)	
Vaccine was not produced during hospitalization	26 (20.7)	
Not declared	64 (50.8)	
Comorbidity		
Chronic Arterial Hypertension	24 (19.0)	
Obesity	28 (22.2)	
Smoking	23 (18.3)	
Reasons for hospitalization		
Induction of labor	8 (6.3)	
Labor	35 (27.8)	
Caesarean section	19 (15.1)	
Abortion	4 (3.2)	
Warning signs during pregnancy*	27 (21.4)	
COVID-19 or suspected	19 (15.1)	
Others	2 (1.6)	
Not declared	2 (1.6)	
Length of hospital stay		3 (2-6)
Admission in COVID-19 ICU	6 (4.8)	
Length of hospital stay		14 (13-28)
Hospitalization outcome		
Hospital discharge	123 (97.6)	
Evasion	2 (1.6)	
Death	1 (0.8)	

Caption: n: absolute value; IIQ: Interquartile Range; * Warning signs during pregnancy (bleeding, decreased fetal movements, hypertensive symptoms, infectious signs, and sudden neurological changes, etc.).

Regarding the reason for hospitalization, 50% (n=63) of them were referred to the service by a health unit, mainly because they were in labor (27.8%; n=35) or due to changes in the physiological course of pregnancy (21.4%; n=27), such as bleeding, generalized edema, decreased fetal movements, loss of amniotic fluid, etc. Use of ventilatory support (n=13; 10.3%) and emergency cesarean section (n=55; 43.7%) was necessary. We emphasize that all cesarean sections performed on pregnant women who tested positive for the coronavirus were classified as urgent at the hospital where the data were collected. Regarding the length of hospital stay, pregnant women were hospitalized for up to two (n=31; 25%) and six (n=94; 75%) days. Furthermore, (n=123; 97.6%) of the participants were discharged from the hospital as an outcome of hospitalization, which was followed by dropout and death.

Among the newborns evaluated (n=92), they were full-term (n=59; 46.8%), preterm (n=27; 21.4%), and post-term (n=1; 0.8%; according to data from the Capurro method). Abortion (n=4; 3.2%) and fetal death (n=1; 0.8%) were recorded. In the first hour of life, they were breastfed (n=38; 30.2%) and experienced skin-to-skin contact (n=52; 41.3%). Furthermore, some of them were not breastfed in the first hour due to instability (n=10; 7.9%) and were not placed in skin-to-skin contact due to transfer to the ICU (n=12; 9.5%). We emphasize that the population analyzed refers to births that occurred during the hospitalization of the pregnant woman with active COVID-19; the remaining cases occurred during hospitalizations after the infection.

In the analysis among the variables of pregnant women with symptomatic COVID-19, it was observed that the presence of cough or dyspnea was significantly associated with both an increase in the length of hospital stay and a higher percentage of ICU admissions. Pregnant women with a cough were 12% more likely to either remain hospitalized for a prolonged period or require admission to the ICU. Similarly, the presence of dyspnea increased this chance to 26.1% (Table 2).

Regarding the type of aggravation, both Coronavirus Influenza Syndrome and SARS showed a significant relationship with the hospitalization of pregnant women infected with COVID-19 in the ICU (Table 3).

Among maternal morbidity conditions, having systemic arterial hypertension (SAH) was statistically significant for a longer hospital stay, increasing the chances of prolonged hospitalization or ICU admission by 8.3% (Table 4).

Newborns of mothers with SARS had a higher proportion of preterm classification compared to children of mothers with flu syndrome. In addition, lower frequencies of skin-to-skin contact and breastfeeding were observed in the first hour of life among newborns of mothers with SARS (Table 5).

Table 2. Relationship of clinical data, length of hospital stay, and Intensive Care Unit (ICU) admission of pregnant women with COVID-19 from 2020 to 2022 (Santa Maria, RS, 2024; n=126).

	n	Length of stay Median (IIQ)	P*	ICU admission Percentage %	P*
Cough					
Yes	50	4 (2-8)	0.023	12.0%	0.003
No	76	3 (2-4)		0.0%	
Dyspnea					
Yes	23	7 (3-11)	0.001	26.1%	0.001
No	103	3 (2-4)		0.0%	
Fever					
Yes	30	3 (2-7)	0.490	13.3%	0.28
No	96	3 (2-6)		2.1%	

Caption: IIQ: Interquartile Range; * Mann-Whitney test.

Table 3. Relationship between Coronavirus-associated Severe Acute Respiratory Syndrome (SARS) and Intensive Care Unit (ICU) admission of pregnant women with COVID-19 hospitalized from 2020 to 2022 (Santa Maria, RS, 2024; n=126).

		Coronavirus Flu Syndrome		Coronavirus-associated SARS		P*
		n	%	n	%	
ICU admission	No	115	99.1	5	50	**0.001**
	Yes	1	0.9	5	50	

* Chi-square test.

Table 4. Relationship between maternal morbidity conditions *versus* length of hospital stay and pregnant women who required admission to the Intensive Care Unit (ICU) from 2020 to 2022 (Santa Maria, RS, 2024; n=126).

	n	Length of hospital stay	p*	ICU admission	p**
Chronic arterial hypertension			0.016		0.321
Yes	24	5 (2-9)		8.3%	
No	102	3 (2-5)		3.9%	
Obesity (BMI>25)					
Yes	28	4 (2-10)	0.057	10.7%	0.123
No	98	3 (2-5)		3.1%	
Smoking					
Yes	23	3 (2-5)	0.906	4.3%	0.999
No	103	3 (2-7)		4.9%	

Caption: BMI: Body Mass Index; * Mann-Whitney test; ** Chi-square test.

Table 5. Relationship between preterm newborn; skin-to-skin contact; breastfeeding in the first hour of life, and clinical picture of coronavirus flu syndrome or Coronavirus-associated Severe Acute Respiratory Syndrome (SARS) of pregnant women hospitalized in the Santa Maria University Hospital (HUSM) from 2020 to 2022 (Santa Maria, RS, 2024; n=126).

	Coronavirus Flu Syndrome		Coronavirus-associated SARS		p*
	n	%	n	%	
Preterm newborn	21	18.3	6	60	0.007
Skin-to-skin contact	49	84.5%	3	42.9%	0.025
Breast-feeding	35	81.4%	3	42.9%	0.048

* Chi-Square Test.

DISCUSSION

The findings of this study indicated an increase in the number of cases over the years analyzed. This suggests that this phenomenon may be related to the emergence of new coronavirus variants during the pandemic. A study carried out in Brazil indicated that the Gamma variant was associated with higher rates of virulence, transmissibility, and mortality in pregnant and postpartum women.[9]

In the analyzed population, a large proportion (n=116; 92.1%) of the reported cases was classified as Coronavirus Influenza Syndrome, and pregnant women presented cough, headache, dyspnea, and fever when symptomatic. In general, flu syndrome and SARS are characterized by the presence of symptoms that can range from fever, cough, myalgia, and fatigue to less frequent manifestations such as headache and gastrointestinal symptoms.[10] In the present study, most pregnant women were asymptomatic and had a mean age of 27.8 years. These data are similar to those presented in a systematic review and meta-analysis that analyzed the clinical presentation, risk factors, and pregnancy outcomes in pregnant women with COVID-19.[11]

Regarding obstetric history, most of the pregnant women analyzed were multiparous. This characteristic is similar to that of participants in the study conducted in 15 community health centers in Bengkulu, Indonesia.[12] Regarding gestational age at the time of hospitalization, the third trimester predominated among the participants in this study.

Regarding the history of prenatal care in Brazil, the first recommendations issued in 2020 included maintaining the six consultations recommended by the Ministry of Health for low-risk pregnant women: one in the first trimester, two in the second trimester, and three to four in the third trimester. In the case of pregnant women considered to be at high risk, the recommendation was to maintain prenatal monitoring until delivery without changing the care protocols.[3]

In this sense, many (n=84; 66.7%) pregnant women in this study underwent prenatal care (median: 7 consultations) despite social isolation and fear of exposure to the virus. In a cross-sectional study conducted in southern Brazil, pregnant women received prenatal care (96.8%), attended six or more consultations (84.9%), and began follow-up during the first trimester of pregnancy (85.2%).[13] This scenario favors both monitoring of gestational progress and early identification of risk factors for maternal-fetal morbidity and mortality, including those related to COVID-19.[14]

Among the participants in this study, obesity, hypertension, gestational diabetes, and pre-eclampsia were the main comorbidities identified, in addition to infectious diseases, such as syphilis and UTI. It is known that pregnant women with obesity, gestational diabetes, hypertension, preeclampsia, respiratory diseases, and smokers are at higher risk of negative obstetric outcomes related to COVID-19, including death. This requires immediate evaluation and possible consideration of termination of pregnancy.[15] As for infectious diseases, they can increase the likelihood of a pregnant woman needing an emergency cesarean section or experiencing premature birth, although the evidence that they worsen COVID-19 is insufficient.[1] Consequently, this may increase the risk of negative outcomes for both mother and newborn, including death.[15,16]

Brazilian recommendations[17] indicate that the choice of delivery route should be based on obstetric criteria, the as well as the pregnant woman's preference . In this context, the need to avoid unnecessary interventions emphasize, such as elective cesarean sections, vaginal deliveries with forceps, and induction of labor without routine medical or fetal indications. These procedures tend to prolong women's hospital stays, being associated with a higher incidence of obstetric complications, such as postpartum hemorrhage and puerperal infections, which, in turn, increase the risk of contagion and spread of SARS-CoV-2 infection.[18]

In the present study, emergency cesarean section occurred in 43.7% (n=55) of cases, being configured as an obstetric outcome. At the hospital where the data were collected, infection was considered a criterion for performing emergency cesarean sections; however, there is no evidence supporting the need for pregnant women with a confirmed diagnosis of COVID-19 to deliver early. On the other hand, vaginal delivery may be associated with a shorter hospital stay and should therefore be considered as the first option when there is no contraindication.[17,18]

The study in question showed that no vaccination record was found in 50.8% of the medical records; this represents a limitation in inferring whether vaccination was not declared, there was a failure in registration, or even vaccine hesitancy.[19] However, a meta-analysis showed the effectiveness of vaccination, comparing 18.828 vaccinated pregnant women with the same number of unvaccinated pregnant women. The study authors noted a progressive reduction in negative outcomes in the majority (89.5%) of members of the group of vaccinated pregnant women (*e.g.*, manifestation of aggressive symptoms).[20]

The use of some ventilatory support may be necessary when respiratory symptoms caused by COVID-19 are observed. The use of ventilatory support was required in some (n=13; 10.3%) of the pregnant women analyzed in this study, with hospitalization in the COVID-19 ICU in 4.8% of cases (median stay: 14 days). Regarding the predominance of the type of ventilatory support for pregnant women with COVID-19, a Brazilian cross-sectional and population-based study (conducted with secondary data from the Influenza Epidemiological Surveillance Information System, SIVEP-Gripe) showed that 38.5% of 6.276 pregnant women required non-invasive ventilation. Among those who required invasive ventilatory support (12.6%), the risk of death increased approximately 10 times.[21]

The need for hospitalization to monitor the clinical condition reveals the worsening of COVID-19. In the United States of America (USA), the hospitalization rate of pregnant women was disproportionately higher than that of non-pregnant women due to infection.[22] In Brazil, 19.430 of the 20.267 known cases of pregnant women with COVID-19 required hospitalization by January 2024. In 2020, the State of Rio Grande do Sul ranked fourth among those with the highest rate of hospitalizations due to SARS in pregnant women.[4,18]

In this study, most pregnant women who entered hospital care services due to COVID-19 did so through referrals, mainly from Primary Health Care (PHC) services. In turn, these were considered essential during the pandemic, reinforcing the need for the professionals involved to be properly qualified to make decisions in critical cases.[3]

In this study, obstetric causes (including labor or delivery) were the main reason for most hospitalizations, although COVID-19 in its aggravated form is associated with hospitalization of pregnant women. A study conducted in the US found that some pregnant women with COVID-19 were hospitalized only for the birth, highlighting that this may be associated with the greater likelihood of pregnant women being tested upon hospital admission than non-pregnant women. However, hospitalization rates for pregnant women were higher, reinforcing that this is a population vulnerable to the harm caused by COVID-19.[22] Regarding the severity of the disease, there is a greater propensity for both mild and severe signs and symptoms (as well as the occurrence of adverse outcomes) to be more frequent at the end of the second and third trimesters of pregnancy due to the immunological characteristics of pregnancy.[23]

This study showed a significant association between symptomatic cases with cough or dyspnea and increased length of hospital stay, mainly in the ICU. These characteristic symptoms of SARS were related to a greater likelihood of either ICU admission or the need for invasive ventilation in pregnant women.[24] Other comorbidities also influence the periods of hospitalization and admission in the ICU, as in the case of hypertensive syndromes with an increased risk of serious obstetric and neonatal outcomes.[16] In the study in question, SAH was statistically significant in increasing the length of hospital stay: pregnant women with COVID-19 and a diagnosis of SAH were 8.3% more likely to have prolonged hospital or ICU stays.

Regarding neonatal outcomes, full-term newborns prevailed in this study. This finding contrasts with the increased risk of prematurity associated with elective cesarean sections compared to vaginal delivery. In a systematic review of maternal and perinatal outcomes, it was found that pregnant women with COVID-19 were more likely to have a cesarean section and preterm birth compared to pregnant women without the infection.[16]

In the present study, breastfeeding and skin-to-skin contact were rarely practiced in the context of births during the pandemic.

In most cases, this was due to the newborn's clinical conditions and the need for transfer to the neonatal ICU. Regarding breast milk from infected women, a study analyzed 19 samples and identified one of them with a positive result for the virus. However, the corresponding newborn had a negative nasopharyngeal test for SARS-CoV-2. This shows that viral load does not necessarily indicate the presence of viable or potentially infectious virus when detected.[25] Thus, the initiation or continuation of breastfeeding by mothers diagnosed with COVID-19 is recommended, as long as appropriate hygiene precautions and mask use are ensured. In addition, skin-to-skin contact must be maintained with an appropriate support for its implementation.[26]

The data from the present study showed a statistically significant association between prematurity and maternal diagnosis of SARS. Furthermore, skin-to-skin contact and breastfeeding were less practiced in the first hour of life. Prematurity has been highlighted since the first cases monitored regarding the impact of coronavirus infection during pregnancy. A baseline study identified nearly half of the cases analyzed to define guidelines for care for pregnant women during the global health emergency.[27]

The context of uncertainty and the lack of pre-defined recommendations at the beginning of the pandemic required a rapid reorganization of health services and professionals. At times, this affected established routines, such as encouraging skin-to-skin contact and breastfeeding within the first hour of life, until new guidelines were proposed. The efficiency of this reorganization could be observed in patients' reports on their satisfaction with the nursing care received during hospitalization, highlighting aspects such as good communication and organization of services, and the care received in the postpartum period.[28]

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The results analyzed indicate that pregnant women are a risk group vulnerable to the implications of COVID-19, with potentially negative obstetric and neonatal outcomes. Among the adverse obstetric outcomes, the need for hospitalization, prolonged hospital stay, use of ventilatory support, emergency cesarean section, and worsening of the clinical condition associated with comorbidities can be highlighted. Regarding negative neonatal outcomes, we highlight prematurity, reduced skin-to-skin contact, and early breastfeeding practices. Therefore, the consequences of COVID-19 resulting from manifestations such as flu syndrome or SARS are unfavorable to the pregnancy-puerperal process, the fetus, and the newborn.

As implications for practice, we emphasize both the importance of vaccination (as a way to prevent worsening of COVID-19) and adequately monitor the infection. Furthermore, ongoing investment in professional training to assist and monitor these cases is necessary to strengthen the Healthcare Network to continue providing care. As a perspective for further research, we suggest investigating and monitoring late complications of the infection known as "long COVID-19". As a limitation of this study, we can mention the loss of data due to inconsistencies observed in the recording of information in medical records.

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DATA AVAILABILITY RESEARCH

The contents underlying the research text are included in the article.

CONFLICT OF INTEREST

No conflict of interest.

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