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Impact of COVID-19 pandemic on births: A university hospital experience

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Ethics Committee Approval
This study was approved by Sivas Cumhuriyet University non-interventional clinical research ethics committee (Date: 21.09.2022 No: 2022-09-01).
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest
No conflict of interest was declared by the authors.

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Abstract

Background/Aim: Many studies have focused on assessing the effects of coronavirus 2019 (COVID-19) on the general population, but insufficient data concerning the impact on vulnerable populations, such as pregnant women, are available. The aim of this study was to compare the results of births before and during the pandemic in terms of maternal and newborn health and to determine the effect of the pandemic on such births.

Methods: The population of this descriptive, retrospective cohort study consisted of women who gave birth in Sivas Cumhuriyet University Hospital Gynecology and Obstetrics Clinic between 01.03.2019–31.08.2019 and 01.03.2020–31.08.2020. No sample selection was made. As birth characteristics, the total and average number of births per month, the week of birth, whether there was a preterm birth, and the mode of delivery were evaluated. Age, number of pregnancies and births were evaluated as maternal characteristics. The birth weight and height of the newborn, number of babies with low birth weight, presence of stillbirth, Apgar 0 and 5 minute scores, and birth complications were evaluated as birth outcomes. Countable data were expressed as numbers and percentages and measurement data as mean, standard deviation, and minimum and maximum values. Inter-period means were compared with the t-test, nominal data were compared with the chi-squared test, and $P < 0.05$ was considered significant.

Results: It was observed that a 22.1% increase in the number of births during the pandemic period (n = 685) occurred when compared with the pre-pandemic period (n = 561). The difference in the increase in the number of births in both periods was not statistically significant ($P = 0.153$). The birth patterns, gender of the newborns, and the birth rates, including low birth weights, were similar during both periods. Gravidity and parity averages and minimum–maximum values were similar in both periods. When the weeks of gestation at birth were compared, it was observed that births occurred in the months before the pandemic, on average, during earlier gestational weeks. The number of births with fetal anomalies and stillbirths were compared, and it was found that the number of cases seen in both periods were similar.

Conclusion: In this study, the characteristics and results of the pre-pandemic and pandemic periods were found to be similar.

Keywords: COVID-19, Neonatal outcome, Pregnancy outcome, Preterm birth

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Introduction

Coronavirus 2019 (COVID-19) is a public health problem worldwide. that has greatly affected health systems, resulting in significant morbidity and mortality. To limit the spread of the disease, many practices were initially carried out globally , such as stay-at-home practices, social isolation, quarantine, curfews, restriction of health services provided in hospitals, closure of schools, and other aspects [1]. Although many studies that examine the effects of COVID 19 on human health are available, more data are needed to reveal its effects on populations in special groups, such as pregnant women. Due to physiological changes in pregnancy (immune system, cardiac, pulmonary, and others), the risk of developing serious diseases increases with viral infections [2]. The need for more information about the placental transmission of COVID-19 during pregnancy and how it affects pregnancy outcomes is present. These data are important for maternal and newborn health. In addition to the diseases directly caused by COVID-19 itself, the policies taken to prevent the spread of the disease, such as quarantines and the inability of people to access adequate healthcare services due to the fear of being in a crowded environment, may have adversely affected the health of pregnant woman and their fetuses [3].

The aim of this study was to compare the results of births before and during the pandemic in terms of maternal and newborn health and to determine the effect of the pandemic on such births.

Materials and methods

In the descriptive, retrospective cohort type of study, the study group consisted of women who gave birth in the Sivas Cumhuriyet University Hospital Gynecology and Obstetrics Clinic between 01.03.2019–31.08.2019 and 01.03.2020–31.08.2020 periods. Ethics committee approval dated 21.09.2022 and numbered 2022-09/01 was obtained from the ethics committee of Sivas Cumhuriyet University non-interventional clinical research. Data were obtained from Sivas Cumhuriyet University Gynecology and Obstetrics Clinic. The characteristics and birth parameters of the newborns and mothers were compared in the six-month periods covering the pandemic period (01.03.2020–31.08.2020) and the pre-pandemic period (01.03.2019–31.08.2019) between the same dates of the previous year. As the birth characteristics, the total and average number of births per month, the week of birth, whether a preterm birth (births below 37 weeks were considered preterm) had occurred, and the mode of delivery (cesarean/vaginal) were evaluated. Age and number of pregnancies and births were evaluated as maternal characteristics. The birth weight and height of the newborn, the number of babies with low birth weight (newborns under 2500 g were considered as low birth weight), the presence of stillbirth, Apgar 0 and 5 minute scores, and birth complications were evaluated as birth outcomes. Pregnancy complications were classified as the absence/presence of premature rupture of membranes, oligohydramnios, preeclampsia, placenta previa, and other fetal anomalies.

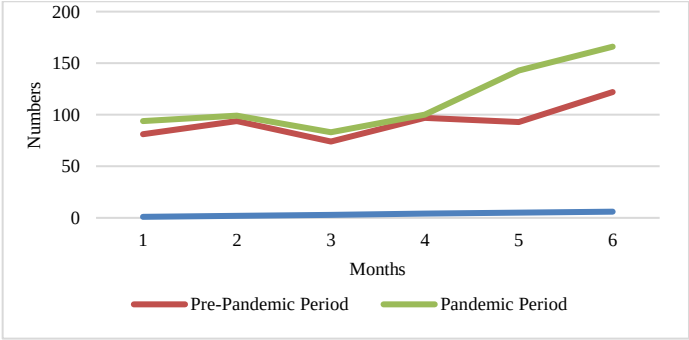
Statistical analysis

Statistical analyzes were performed with SPSS-22 (SPSS INC., Chicago, IL, USA) program. Countable data were represented as numbers and percentages and measurement data as mean, standard deviation, and minimum and maximum values. Inter-period means were compared with the t-test, nominal data were compared with the chi-squared test, and $P < 0.05$ was considered significant.

Results

When the number of births of the pre-pandemic period and the pandemic period were compared, the lowest number of births in both periods was in May (pre-pandemic period n = 74, pandemic period n = 83) and the highest birthrates were found in August (pre-pandemic period n = 122, pandemic period n = 166) as shown in Figure 1.

Figure 1: Comparison of birth numbers based on pre-pandemic and pandemic period months



A 22.1% increase in the number of births during the pandemic period compared to the pre-pandemic period was found (Table 1). The increase in the number of births in both periods is not statistically significant (n = 561 and 685, respectively; $P = 0.153$).

When the characteristics of deliveries performed during the pre-pandemic and pandemic periods were compared, it can be seen that the rate of preterm birth was significantly lower during the pandemic period ($P = 0.030$) as shown in Table 1. The birth patterns, the gender of the newborns, and the birth rates with low birth weight were similar in both periods (Table 1).

Table 1: Characteristics of pre-pandemic and pandemic-period births

	Pre-pandemic period n	%	Pandemic period n	%	*P*-value
Type of birth					0.060
Cesarean section	376	67.0	424	61.9	
Vaginal birth	185	33.0	261	38.1	
Gender					0.203
Female	258	46.0	340	49.6	
Male	303	54.0	345	50.4	
Preterm birth					0.030
Yes	178	31.7	208	30.4	
No	383	68.3	477	69.6	
Low birth weight					0.061
Yes	87	15.5	93	13.6	
No	474	84.5	592	86.4	
Birth numbers	561		685		0.153

When the characteristics of the women who gave birth in both periods were compared, it can be seen that the average ages were similar. While the youngest mother giving birth in the pre-pandemic period was 16, the youngest age was found to be 14 during the pandemic period. Gravidity and parity averages and minimum–maximum values were similar during both periods (Table 2).

When the results of deliveries performed in the pre-pandemic period and during the pandemic period were compared, the week of birth, weight and height of newborns, and

Apgar 0 and 5th minute scores were compared, and it was found that they were similar during both periods with no statistically significant difference. When the weeks of gestation at birth were compared, it was observed that births occurred in the months before the pandemic, on average, in earlier gestational weeks ($P = 0.050$) as shown in Table 3.

Table 2: Comparison of pre-pandemic and pandemic maternal characteristics

	Pre-pandemic period		Pandemic period		*P*-value
	Mean (SD)	Min–Max	Mean (SD)	Min-Max	
Age	29.1 (5.7)	16–45	28.9 (6.0)	14–48	0.210
Gravidity	2.7 (1.7)	1–14	2.7 (1.6)	1–9	0.131
Parity	1.3 (1.4)	0–9	1.2 (1.2)	0–7	0.132

SD: standard deviation

Table 3: Comparison of pre-pandemic and pandemic birth outcomes

	Pre-pandemic period		Pandemic period		*P*-value
	Mean (SD)	Min-Max	Mean (SD)	Min-Max	
Gestational week at birth	39.4 (2.8)	22 - 41	37.8 (2.5)	(25–42)	0.050
Birth weight (gr)	3021.8 (656.5)	465 - 4420	3081.6 (633.3)	(620–5010)	0.370
Height (cm)	48.1 (4.0)	28–55	48.8 (3.6)	(31–58)	0.086
Apgar 0 minute	7.6 (1.9)	0 - 10	7.5 (1.5)	(0–10)	0.116
Apgar 5 minute	8.7 (1.7)	0 - 10	8.8 (1.4)	(0 – 10)	0.133

SD: standard deviation

The number of births with pregnancy complications in the pre-pandemic period and the corresponding number during the pandemic, and the number of births with fetal anomalies and stillbirths were compared, and it was found that the number of cases seen in both periods were similar (Table 4).

Table 4: Comparison of pregnancy complications and congenital anomalies between the pre-pandemic period and the pandemic period

	Pre-pandemic period		Pandemic period		*P*-value
	n	%	n	%	
Pregnancy Complication					0.631
Premature rupture of membranes	27	23.2	42	31.5	
Oligohydramnios	20	17.4	21	15.8	
Preeclampsia	18	15.5	30	22.6	
Placenta previa	11	9.5	12	9.0	
Other	40	34.4	28	21.1	
Fetal anomaly					
Yes	10	1.8	8	1.2	0.371
No	551	98.2	677	98.8	
Stillbirth					
Yes	11	2.0	6	0.9	0.106
No	550	98.0	679	99.1	

Discussion

Severe acute and Middle East respiratory syndrome viruses (SARS and MERS, respectively) have attracted attention as infections resulting in extremely high mortality rates and extremely serious pregnancy complications. It is known that the mortality of SARS during pregnancy is up to 25% [4]. The effects of COVID-19, which is similar to these viruses, on pregnancy and birth is also a public health problem that needs to be examined. In a study examining the data of many countries, it was reported that natural population growth rates decreased in 2020 and 2021 [5]. In our study, a 22.1% increase in the number of births occurred during the pandemic period compared to the pre-pandemic period; however, this increase was not statistically significant.

Premature birth is the leading cause of infant/child death worldwide, and most survivors face negative long-term consequences. Results on preterm birth rates during COVID-19 quarantines are conflicting. In a systematic meta-analysis review study, it was reported that the risk of preterm birth increased significantly during COVID-19 [6]. In our study, when the characteristics of deliveries performed during the pre-pandemic and pandemic periods were compared, it was found that the rates of preterm births decreased significantly during the pandemic period. The etiology of preterm births during the COVID-19 pandemic is largely unclear and possibly multifactorial thus hindering effective prevention.

In some studies, it was shown that COVID-19 causes an increase in preterm births and cesarean deliveries [7], but it seems that many pregnant women deliver by planned cesarean section with the belief that serious maternal respiratory disease will be cured by delivery. Published studies have shown that the clinical course of COVID-19 is more severe during pregnancy, but pregnancy does not increase susceptibility to COVID-19 [8]. One study included 11,078 pregnant women, and 65 of them were reported to have COVID-19. As a result of the study, it was shown that COVID-19 led to increases in adverse pregnancy outcomes, such as preterm birth and cesarean delivery, but insufficient evidence regarding placental transmission of SARS-COV-2 is available [9]. In a study conducted in Nanjing, China, it was observed that no change in preterm birth during the pandemic occurred, but a decrease in birth weight in term babies had occurred, and it was thought that anxiety and stress caused by the pandemic may also contribute to this lower weight [10]. A systematic meta-analysis review study found that low birth weight rates in neonates are more common in pregnancy with severe COVID-19 [11]. In our study, no significant difference was found in terms of birth weights of newborns between the pre-pandemic and pandemic periods. In a study examining the effect of COVID-19 on preterm birth rates, it was shown that a decrease in cesarean section and iatrogenic preterm births during the pandemic process occurred, and it was suggested that the reason for this decrease was caused by the decrease in visits to the obstetrician during childbirth and curfews [12].

In a systematic review and meta-analysis study including 40 studies, it was stated that maternal deaths, stillbirths, ruptured ectopic pregnancies, and maternal depression had increased during the COVID-19 pandemic, and the pandemic period was worse for mother and baby. It was also reported that differences between high- and low-income families in the studies included in the study were found [13]. In our study, no significant difference was found in terms of pregnancy complications in any group.

In a study, 13 states of the United States were included, and it was reported that one in four women aged 15–49 who were hospitalized for COVID-19 between August 2020 and March 2022 were pregnant, and about half of the pregnant women admitted to the hospital were asymptomatic. It was reported that 16.2% of symptomatic pregnant women were admitted to the intensive care unit, and 8.5% required mechanical ventilation. It was reported that 2.2% of all pregnancies identified during hospitalization associated with COVID-19 resulted in pregnancy loss [14].

Limitations

The limitations of this study are its single center nature, short time interval, and small sample size.

Conclusion

Although many studies have been conducted on the effects of COVID-19 during pregnancy, the long-term effects on infants are not yet clear. Although no inconvenience in terms of vaginal birth as a method of delivery has been reported, cesarean

delivery is generally preferred. Among people infected with COVID-19, pregnant women should be considered as a special group, especially due to changes in the immune system. In this study, the pre-pandemic and pandemic periods were compared in term of births, and it was seen that the number of births, birth characteristics, and birth outcomes were similar during both periods. More multidisciplinary research is needed to reveal the effects of the pandemic on births.

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