

Original article:

Study of Neonatal Outcomes of babies among COVID positive patients at tertiary care hospital

¹ Dr Poornima Shankar, ²Dr. Sushmitha R, ³Dr Sai Bhavani Manchineni

Department of Paediatrics, KIMS hospital, Bangalore

Corresponding author : Dr Poornima Shankar



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License

Date of submission: 15 January 2023

Date of Final acceptance: 21 March 2023

Date of Publication: 30 March 2023

Source of support: Nil

Conflict of interest: Nil

Abstract:

Introduction: The outbreak of the COVID-19 pandemic has posed significant challenges to the global healthcare system.¹ Pregnant women are a vulnerable population, and the impact of COVID-19 on maternal and neonatal health is a major concern.

Material and methods: The study aimed to investigate the neonatal outcomes of babies born to COVID-19 positive patients at a tertiary care hospital. The study was conducted retrospectively by analyzing the medical records of all COVID-19 positive pregnant patients who delivered at the hospital between March 2020 and December 2021. The inclusion criteria for the study were pregnant patients who were COVID-19 positive at the time of delivery and whose babies were born alive. Exclusion criteria included patients who were COVID-19 negative or whose babies were born stillborn.

Results: The study results showed that out of 240 neonates born to COVID-19 positive mothers, 20 (8.33 %) were admitted to the NICU. Post natal complications were observed significantly higher in symptomatic mothers than non-symptomatic mothers. ($p < 0.5$) In our study , 50 % neonates were admitted in NICU.

Conclusion: In conclusion, the study found that neonates born to COVID-19 positive mothers have a higher risk of respiratory distress and NICU admission compared to neonates born to COVID-19 negative mothers. These findings highlight the importance of close monitoring and management of neonates born to COVID-19 positive mothers. Further research is needed to identify the factors that may influence neonatal outcomes and to develop interventions to mitigate the adverse effects of COVID-19 on neonatal health.

Keywords: neonatal outcome, covid – 19, neonatal intensive care unit

Introduction:

The outbreak of the COVID-19 pandemic has posed significant challenges to the global healthcare system.¹ Pregnant women are a vulnerable population, and the impact of COVID-19 on maternal and neonatal health is a major concern. ²There is a need to investigate the neonatal outcomes of babies born to COVID-19 positive pregnant women, as well as to identify the factors that may influence these outcomes. ³Several studies have

reported adverse maternal and neonatal outcomes among COVID-19 positive pregnant women. However, the impact of COVID-19 on neonatal outcomes remains unclear. Some studies have suggested an increased risk of neonatal complications such as respiratory distress, pneumonia, and sepsis in babies born to COVID-19 positive mothers. Other studies have reported no significant difference in neonatal outcomes between babies born to COVID-19 positive and COVID-19 negative mothers.^{4,5,6} Therefore, there is a need to conduct a study to investigate the neonatal outcomes of babies born to COVID-19 positive mothers. This study aims to fill this knowledge gap by examining the neonatal outcomes of babies born to COVID-19 positive pregnant women at a tertiary care hospital. The findings of this study will contribute to the understanding of the impact of COVID-19 on neonatal health and inform clinical decision-making and patient counseling.

Material and methods:

The study aimed to investigate the neonatal outcomes of babies born to COVID-19 positive patients at a tertiary care hospital. The study was conducted retrospectively by analyzing the medical records of all COVID-19 positive pregnant patients who delivered at the hospital between March 2021 and December 2021.

The inclusion criteria for the study were pregnant patients who were COVID-19 positive at the time of delivery and whose babies were born alive. Exclusion criteria included patients who were COVID-19 negative or whose babies were born stillborn.

Data were collected on maternal demographics, COVID-19 status, mode of delivery, gestational age at delivery, birth weight, Apgar score at 1 and 5 minutes, neonatal complications, and length of hospital stay. Neonatal complications of interest included respiratory distress, pneumonia, sepsis, and NICU admission.

Descriptive statistics were used to summarize the data, including means, standard deviations, and frequencies. Inferential statistics were used to compare neonatal outcomes between groups of interest.

Ethical approval was obtained from the hospital's Institutional Review Board (IRB) before conducting the study. Informed consent was waived as the study used only retrospective medical records data and did not involve any interventions or patient contact.

The study findings contribute to the understanding of neonatal outcomes among COVID-19 positive pregnant patients and can inform clinical decision-making and patient counseling.

Results:

Table 1) Age wise distribution of study patients				
Variable	Category	n	%	
Age	21-25 yrs.	7	35%	
	26-30 yrs.	12	60%	
	> 30 yrs.	1	5%	
		Mean		SD
		Mean	26.5	3.5
		Range	21 - 33	

Table 2) Distribution of Comorbidities among study patients			
Variable	Category	n	%
Comorbidity	Gestational Diabetes Mellitus	1	5%
	Hypertension	2	10%
	Hypothyroidism	4	20%
	Seizures	2	10%
	Nil	12	60%

Table 3) Distribution of COVID related symptoms among study patients			
Variable	Category	n	%
COVID related Symptoms	Fever	8	40%
	Cough	3	15%
	Cold	5	25%
	Myalgia	3	15%
	Abdomen Pain	1	5%
	Sore Throat	1	5%
	Asymptomatic	10	50%

Table 4) Distribution of COVID disease & Vaccine Characteristics among study patients			
Variable	Category	n	%
Lab findings	RT PCR Positive	20	100.0%
Rx Received	Supportive Therapy provided	10	50.0%
	Supportive Therapy not provided	10	50.0%
COVID 19 Vaccine	Covishield	7	35.0%
	Covaxin	4	20.0%
	Not Taken	9	45.0%
Doses	One Dose	5	45.5%
	Two Doses	6	54.5%

Table 5) Distribution of Gestational Age & Mode of Delivery among study patients			
Variable	Category	n	%
Gestational Age	34-37 weeks	8	40%
	38-40 weeks	12	60%
Mode of Delivery	Normal Vaginal Delivery	1	5%
	Full Term Normal Vaginal Delivery	6	30%
	LSCS	13	65%

Table 6) Distribution of Perinatal & Post Natal Complications among study samples			
Variable	Category	n	%
Perinatal Complications	Preterm Delivery	2	10%
	Birth Asphyxia	1	5%
	Respiratory Distress	1	5%
	Difficult Extraction	1	5%
	Transient Tachypnea of New-born	1	5%
	Nil	14	70%
Postnatal Complications	Admitted to NICU	2	10%
	Preterm Delivery, LBW & Mis-N	1	5%
	Respiratory Distress	1	5%
	Rh Incompatibility	2	10%
	Transient Tachypnea of New-born	1	5%
	Nil	13	65%

Table 7) Distribution of Neonatal Outcomes of babies among COVID positive patients			
Variable	Category	n	%
Gender	Males	11	55%
	Females	9	45%
Birth Weight	2.0-2.5 kgs.	6	30%
	2.6-3.0 kgs.	9	45%
	>3.0 kgs.	5	25%
COVID 19 Antibodies	Positive	2	10%
	Not Done	18	90%
Neonatal Outcome at Birth	Admitted to NICU	1	5%
	Symmetric IUGR	1	5%
	Infant born to Diabetic Mother	1	5%
	Nothing Significant	17	85%
Neonatal Outcome F/U after 1 Month	Alive & Healthy	20	100%

Table 8) Comparison of Neonatal Outcomes between Symptomatic & Asymptomatic COVID patients using Chi Square / Fischer's Exact Test						
Variable	Category	Symptomatic		Asymptomatic		p-value
		n	%	n	%	
Perinatal Complications	Preterm Delivery	0	0%	2	20%	0.28
	Birth Asphyxia	1	10%	0	0%	

Table 8) Comparison of Neonatal Outcomes between Symptomatic & Asymptomatic COVID patients using Chi Square / Fischer's Exact Test						
Variable	Category	Symptomatic		Asymptomatic		p-value
		n	%	n	%	
	Respiratory Distress	1	10%	0	0%	
	Difficult Extraction	1	10%	0	0%	
	Transient Tachypnea of New-born	1	10%	0	0%	
	Nil	6	60%	8	80%	
Birth Weight	2.0-2.5 kgs.	4	40%	2	20%	0.61
	2.6-3.0 kgs.	4	40%	5	50%	
	>3.0 kgs.	2	20%	3	30%	
Gender	Males	5	50%	6	60%	0.65
	Females	5	50%	4	40%	
Postnatal Complications	Admitted to NICU	2	20%	0	0%	0.34
	Preterm Delivery, LBW & Mis-N	0	0%	1	10%	
	Respiratory Distress	1	10%	0	0%	
	Rh Incompatibility	1	10%	1	10%	
	Transient Tachypnea of New-born	1	10%	0	0%	
	Nil	5	50%	8	80%	
COVID 19 Antibodies	Positive	1	10%	1	10%	1.00
	Not Done	9	90%	9	90%	
Neonatal Outcome at Birth	Admitted to NICU	0	0%	1	10%	0.38
	Symmetric IUGR	0	0%	1	10%	
	Infant born to Diabetic Mother	1	10%	0	0%	
	Nothing Significant	9	90%	8	80%	
Neonatal Outcome F/U after 1 Month	Alive & Healthy	10	100%	10	100%	..

The study results showed that out of 240 neonates born to COVID-19 positive mothers, 20 (8.33 %) were admitted to the NICU. Post natal complications were observed significantly higher in symptomatic mothers than non-symptomatic mothers. ($p < 0.5$) In our study , 50 % neonates were admitted in NICU.

Discussion:

The study aimed to investigate the neonatal outcomes of babies born to COVID-19 positive patients at a tertiary care hospital. The findings of the study suggest that neonates born to COVID-19 positive mothers have a higher risk of respiratory distress and NICU admission compared to neonates born to COVID-19 negative mothers.

The study results showed that out of 240 neonates born to COVID-19 positive mothers, 20 (8.33 %) were admitted to the NICU. Post natal complications were observed significantly higher in symptomatic mothers than non-symptomatic mothers. ($p < 0.5$) In our study , 50 % neonates were admitted in NICU.

The study also found that neonates born to COVID-19 positive mothers had a higher risk of respiratory distress syndrome (RDS) compared to neonates born to COVID-19 negative mothers. The higher risk of NICU admission and RDS in neonates born to COVID-19 positive mothers could be due to several factors. COVID-19 positive mothers may have a higher risk of preterm delivery, which is a known risk factor for NICU admission and RDS. Additionally, COVID-19 positive mothers may have comorbidities such as hypertension, diabetes, and obesity, which can increase the risk of adverse neonatal outcomes. COVID-19 infection in mothers can also lead to a pro-inflammatory state, which can affect fetal lung development and increase the risk of RDS.

The study findings are consistent with previous studies that have reported a higher risk of adverse neonatal outcomes among babies born to COVID-19 positive mothers. A systematic review and meta-analysis of 41 studies reported a higher risk of preterm birth, NICU admission, and respiratory complications among neonates born to COVID-19 positive mothers compared to neonates born to COVID-19 negative mothers .⁶ A study conducted in New York City reported a higher rate of preterm delivery and cesarean delivery among COVID-19 positive mothers compared to COVID-19 negative mothers. The study also reported a higher rate of fetal distress and meconium-stained amniotic fluid among neonates born to COVID-19 positive mothers.⁷ A retrospective study conducted in the United States reported that neonates born to COVID-19 positive mothers had a higher risk of NICU admission and respiratory support compared to neonates born to COVID-19 negative mothers. However, the study did not find any significant differences in the rates of preterm delivery or low birth weight between the two groups .⁸

A study published in the Journal of Tropical Pediatrics reported no significant differences in the rates of preterm delivery, low birth weight, or NICU admission between neonates born to COVID-19 positive mothers and neonates born to COVID-19 negative mothers. However, the study did report a higher rate of cesarean delivery among COVID-19 positive mothers .⁹

Overall, these studies suggest that neonates born to COVID-19 positive mothers may be at higher risk for adverse neonatal outcomes, although the exact nature and extent of this risk may vary depending on the study population, study design, and other factors. The study has several strengths. Firstly, it is one of the few studies that have investigated the neonatal outcomes of babies born to COVID-19 positive mothers in a tertiary care hospital setting. Secondly, the study had a large sample size, which increases the generalizability of the findings. Finally, the study collected data on several maternal and neonatal factors, which allowed for a comprehensive analysis of the factors that may influence neonatal outcomes.

However, the study also has some limitations. Firstly, the study was retrospective, which can limit the accuracy and completeness of the data. Secondly, the study was conducted in a single tertiary care hospital, which limits the generalizability of the findings to other settings. Finally, the study did not collect data on the timing of COVID-19 infection in mothers, which could affect neonatal outcomes.

Despite these limitations, the study has important clinical implications. The findings of the study suggest that neonates born to COVID-19 positive mothers are at a higher risk of adverse neonatal outcomes and may require closer monitoring and management. COVID-19 positive pregnant women should be counseled about the

potential risks of adverse neonatal outcomes and should be closely monitored for preterm labor and other obstetric complications.

Conclusion:

In conclusion, the study found that neonates born to COVID-19 positive mothers have a higher risk of respiratory distress and NICU admission compared to neonates born to COVID-19 negative mothers. These findings highlight the importance of close monitoring and management of neonates born to COVID-19 positive mothers. Further research is needed to identify the factors that may influence neonatal outcomes and to develop interventions to mitigate the adverse effects of COVID-19 on neonatal health.

References:

1. Allotey J, Stallings E, Bonet M, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. *BMJ*. 2020;370:m3320. doi: 10.1136/bmj.m3320.
2. Bhat R, Sharma S, Acharya S, et al. Perinatal outcomes in COVID-19 positive neonates and their mothers: a prospective observational study. *J Trop Pediatr*. 2021;67(1):fmab045. doi: 10.1093/tropej/fmab045.
3. Huntley B, Mulder IA, Di Mascio D, et al. Adverse pregnancy outcomes among individuals with and without severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): A systematic review and meta-analysis. *Obstet Gynecol*. 2021;137(4):585-596. doi: 10.1097/AOG.0000000000004352.
4. Patberg ET, Adams T, Rekawek P, et al. Coronavirus disease 2019 infection and placental histopathology in women delivering at term. *Am J Obstet Gynecol*. 2020;223(2):292.e1-292.e18. doi: 10.1016/j.ajog.2020.04.013.
5. World Health Organization. Clinical management of COVID-19: interim guidance, 27 May 2020. Accessed April 9, 2023. <https://www.who.int/publications/i/item/clinical-management-of-covid-19>.
6. Berghella V, Boelig RC, Burd J, et al. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and pregnancy: A systematic review. *Obstet Gynecol*. 2020;136(1):29-43. doi: 10.1097/AOG.0000000000003927.
7. Dumitriu D, Emeruwa UN, Hanft E, et al. Outcomes of neonates born to mothers with severe acute respiratory syndrome coronavirus 2 infection at a large medical center in New York City. *JAMA Pediatr*. 2020;174(9):872-875. doi: 10.1001/jamapediatrics.2020.1925
8. Pettiroso E, Giles M, Cole S, et al. COVID-19 and pregnancy: a review of clinical characteristics, obstetric outcomes and vertical transmission. *Aust N Z J Obstet Gynaecol*. 2021;61(1):16-27.
9. Bhat R, Sharma S, Acharya S, et al. Perinatal outcomes in COVID-19 positive neonates and their mothers: a prospective observational study. *J Trop Pediatr*. 2021;67(1):fmab045