



NEWBORN HEALTH OUTCOMES IN BABIES BORN TO MOTHERS WITH COVID-19 INFECTION

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ABSTRACT The global impact of COVID-19 has been profound, yet there has been a notable lack of comprehensive data on the well-being of infants born to mothers with COVID-19. The overall health status of these infants remains undefined. To address this knowledge gap, we undertook a cross-sectional study with the aim of assessing the feeding outcomes, immunization status, and the overall hospitalization needs of infants born to mothers affected by COVID-19.

KEYWORDS : Newborns, COVID 19, Breast feeding, Immunisation

INTRODUCTION

The Covid-19 pandemic has had a huge impact worldwide, especially in developing countries with limited healthcare resources. The infection in children continues to be less severe than in the adult population in developed countries. However, the absolute pediatric mortality rates are disproportionately higher in developing countries like India. (1) Neonates can acquire this infection through possible vertical transmission from infected mother to child or during or after child birth (2)

The transplacental transmission of Covid-19 has not yet been established. However, it is postulated that in a manner similar to the past SARS-CoV-1 (Severe Acute Respiratory Syndrome) and MERS-CoV (Middle East Respiratory Syndrome Coronavirus) epidemics, fetal and neonatal outcome (e.g. prematurity) may depend more on the severity of the maternal infection and on concurrent obstetric diseases, rather than on the SARS-CoV-2 infection from the pregnant woman to the fetus.(3,4)

Neonatal COVID-19 is more likely to result from postpartum respiratory transmission from the mother rather than antenatal transmission. As of current scientific understanding, COVID-19 is not considered to be transmitted through breast milk, in contrast to some other respiratory viral infections.(5)

Specifically, evaluating the health status of a newborns born to infected mothers were some big questions. Our study presents a holistic and comprehensive approach to studying the feeding outcome, immunization, health status of the infant and need of hospitalization during the first 6 weeks for healthy infants born to mothers infected with the COVID-19 virus.

AIMS & OBJECTIVES

AIM

To study the early neonatal outcomes like feeding, immunization, health status and need of hospitalization by a telephonic follow-up at or after 6 weeks of age for healthy infants born to mothers with Covid-19 infection during pandemic at a tertiary urban hospital in Mumbai, India.

OBJECTIVES

- 1 To assess the feeding outcome of infants born to mothers with COVID-19 during pandemic, and provide counseling if necessary.
- 2 To check the immunization status of the infant, and offer appropriate advice.
- 3 To assess the health status and need of hospitalization at early follow-up at 6 weeks of age for infants born to mothers with COVID-19 and their families during the pandemic.
- 4 To understand barriers to health-seeking behaviour of these families

MATERIALS & METHODS

Design, Place and Duration of study: This was an observational cross sectional study, conducted in a tertiary care center in Mumbai, India from 1st April 2020 to 30th June 2020.

Sample size:

All healthy babies born during the period from 1st April 2020 to 15th May 2020 who would turn 6 weeks or older between 16th May to 30th June

Statistical analysis:

Data will be analyzed using appropriate statistical methods.

Inclusion criteria :

All healthy neonates born to mothers infected with SARS-Cov-2

Exclusion criteria:

All sick neonates requiring admission to the NICU at birth and neonates for whom parental consent was not obtained.

METHODOLOGY:

Records of all healthy neonates born to mothers infected with Covid-19 were reviewed and details noted. We noted mother's demographic details, obstetric and medical history. Baby details included birth weight, gestational age, feeding details during hospital stay and at discharge and details of birth dose of immunization.

We followed the practice of rooming/bedding in of healthy mothers with COVID-19 positive mothers, encouraging exclusive breastfeeding while ensuring respiratory and hand hygiene, giving birth dose of vaccination prior to discharge, providing routine neonatal care, providing counseling regarding breastfeeding and baby care practices, and providing a telephonic follow up at 2 weeks and 4 weeks post delivery to these patients. We also told mothers to download the Shishuposhan app for basic guidance about breastfeeding and baby care practices.

Babies were tested for RT-PCR of nasopharyngeal swab once mother's report was available, which was approximately after 24-48 hours. Baby and mother stayed bedded throughout the hospital stay unless baby/ mother developed any symptoms and needed admission to another area.

All these mothers were contacted telephonically at 6 weeks postpartum or later. Following questionnaire was administered in the local language after verbal telephonic consent. Questionnaire was administered in the local language (Marathi/Hindi/English) best understood by them and the responses were noted.

a) Questions pertaining to breastfeeding:

1) Was the baby discharged on exclusive breast feed? Yes/No

2)Whether the baby has been exclusively breastfed? (Defined as received only breast milk in last 24 hours) Yes/No

If NO then reason/s for the same amongst the following:

- 1)Low milk output perceived by mother? Yes/No
- 2)Breast feeding stopped on whose advice :relative/Health care worker/Friends/Others : Yes/No
- 3)Personal Belief or fear in mother / relative regarding transmission of covid 19 through breastfeeding: Yes/No
- 4)Others:
Which type of top feed were given: Cow milk/Formula feed/Packet milk

b)History of immunization:

1)Has the infant received birth dose of vaccination during birth admission? Yes/No.

If no, when and where it was taken-

If no then reason/s for the same -

2)Has the infant received vaccination at 6th week? yes/no.

If yes, when and where it was taken-

If no then reason/s for the same-

c) Health status of the baby :

- 1) Is baby well at present: yes/no
- 2) Weight gain: yes/no .

Is the mother perceiving that baby is gaining weight if exact weight is not known? Yes/no

3)Any respiratory/ systemic sign/s and /or symptom/s such as cough / cold /fever / breathing difficulty/ Presence of jaundice/ Decreased activity/Need of hospitalization in the infant during the last 6 weeks : Yes/no

If yes, whether baby tested for Covid-19.

If Infant COVID-19 positive, what is the outcome.

4)Any health concerns for the infant:

d) Whether mothers repeat swab was taken: yes/no,if yes what is the outcome

e) Any family member evaluated for covid-19: yes/no, yes what is the outcome

f) Was there need for hospitalization for any family member for COVID/ COVID like illness: Yes/No

f) Whether mother downloaded ShishuPoshan app: yes/no.

g) Have you received telephonic counselling regarding breast feeding/ baby care practices from our facility in the last 6 weeks: Yes/no

All the details were fed into the study proforma and analysed terms of feeding outcome, immunization, health status and need of hospitalization on early follow-up at 6 week of age for infants born to mothers infected with Covid-19 during pandemic.

RESULTS

There were total of 891 live births from 1st April to 15th May. Out of those, 152 mothers had tested COVID-19 positive. The mean age of mothers positive with covid 19 infection in our study was 25(+/- 2) years .30 babies born to COVID-19-positive mothers required NICU admission immediately after birth and the remaining 122 healthy babies were roomed in/ bedded in with the mother. Routine neonatal care was provided to all of them. We conducted telephonic follow-ups from 15th May to 15th July 2020 and tried to follow up all 122 healthy infants who had turned 6 weeks of age or older during this study period. Maternal characteristics of Covid Positive Out of 122 COVID-19-positive mothers. 46(37.7%) were primigravida and 76(62%) were multigravida.79 (64.8%) were delivered vaginally and 43(35.2%) were delivered by LSCS. The most common obstetric morbidity noted was PROM 24(19.7%) followed by PIH.18(14.8%).121(99.2%) Covid positive mothers were asymptomatic. One symptomatic mother succumbed to death. She also had co-morbidities like severe eclampsia and HELLP syndrome.

122 babies delivered from Covid-19 positive mothers 59(48.2%) were male and 63(51.8%) were female with mean birth weight of 2700 +/- 300 grams. 105(86%) were born as appropriate for gestational age,16(13.1%) were small for gestational age and 1(0.8%) was large for gestational age with history of gestational diabetes mellitus in mother as shown in Table 1.

Table 1: Gender, birth weight and weight wise gestational age

distribution of babies born to Covid- 19 positive mother.

		Frequency	%
Sex	Male	59	47.5%
	Female	63	52.5%
Birth wt	<2500	27	22.1%
	>2500	95	77.9%
	Mean ± SD	2719.59 ± 306.58	
Gestational Age	Appropriate for GA	105	86.1%
	Small for GA	16	13.1%
	Large for GA	1	0.8%

All the babies(n =122) born to Covid-19 positive mothers were screened for infection and out of them 10(8.2%) babies tested positive for Covid-19.All the babies were screened in between day life 2 to day of life 4.Swab was collected by nasopharyngeal route as depicted in Fig 1.

Fig 1 : Covid status of babies born to Covid- 19 positive mother.

Mean duration of hospital stay was 8(+/-2) days as shown in Table 2. Discharge criteria of babies and mother was based on respective health status. They were advised 14 days of home quarantine post discharge. All close relatives and contacts were screened for symptoms of Covid-19, but all mothers and their family members were asymptomatic.

Table 2: Duration of stay at Covid care hospital.

No. of days of admission at Covid care hospital	Number of babies	%
<7 days	43	35.2%
8 - 10 days	65	53.3%
>10 days	14	11.5%
Total	122	100.0%
Mean ± SD	8.28 ± 2.31	

During the hospital stay, 112 babies (91.80%) were on exclusive breastfeeding and 10(8.19%) received mixed feeding. On day of discharge 116(95.08%) babies were on EBM and 6(4.91%) babies were on mixed feeding. Post discharge at home at 6 weeks ,out of 122, 104(85%) were on exclusive breast feed and 5(4.1%) received mixed feeding. Follow up data was not available for 13 infant-mother dyads. The following was is shown in Table 3.

Table 3: Breastfeeding status of babies during hospital stay, on day of discharge and after discharge.

Timing	Feeding Status of the babies	Number(n=122)	Percentage
During Hospital Stay	On EBF	112	91.80%
	On mixed feeds	10	8.19%
On the day of discharge	On EBF	116	95.08%
	On mixed feeds	6	4.91%
After 6 weeks of discharge	On EBF	104	85.20%
	Not on EBF	5	4.10%
Unable to contact for telephonic follow-up	-	13	10.70%

EBF : Exclusive breastfeeding

We obtained data regarding the perception of breast feeding in infected mothers (Table 4 and 5)

Table 4 :Perception of mothers regarding BF problems

Perception	n(%)
Low milk output	16(13.1%)
Fear of COVID-19 transmission	5(4.1%)
Persuasion by relatives/friends toward mixed feeding	3(2.4%)

Table 5: Reasons for resorting to mixed-feeding

Reasons	Number(n=5)
Low milk output perceived by the mother	3
BF stopped on advice of relatives/friends	0
Fear of COVID-19 transmission via breast milk	2

Despite aforementioned problems faced by breast-feeding mothers, only 5(4.1%) mothers gave top feed to their babies with cow milk.

Immunisation status was evaluated for study cohort. 107(87.7%) babies received their birth dose vaccination. All of them received immunization at our hospital only before discharge. 2(1.6%) babies did not receive birth dose vaccination as they got discharge against medical advice(DAMA)

Out of 122 infants, 83(63%) received 6th week immunization and 26(21.3%) did not receive. Out of the 83 babies who received 6th week immunization, 68(56.6%) babies received vaccination at our hospital and 26(21.3%) received at immunization centre in their vicinity. Only 6(4.9%) babies received 6th week immunization on scheduled time, rest all were delayed. Out of 83 babies who received delayed vaccination, 42(34.5%) babies received the dose at 6 to 8 week of life (delayed by 2 week). (Table 6)

Table 6 : Immunization status of babies regarding birth dose and 6 week dose.

Birth dose	Received		107 (87.7%)	
	Not received (DAMA)		2 (1.6%)	
	Unable to contact telephonically		13 (10.7%)	
6 weeks dose(OPV, Penta, IPV,Rota)	Received at 6 weeks		6	83 (68%)
	Received at 6 to 8 weeks		42	
	Received at 8 to 10 weeks		35	
	Not taken		26 (21.30%)	

The reasons for infants not taking immunisation at the 6 week mark were also noted as in Table 7. All those who didn't receive immunization were counselled regarding the need of immunization during telephonic communication

Table 7 : Reasons for not taking 6th week immunization dose.

Reasons for not taking 6 weeks dose	Frequency	%
Not able to contact telephonically	13	10.7%
Migration due to ongoing COVID-19 pandemic	14	11.5%
Fear of getting COVID-19 infection if visited to health centre	8	1.7%
Vaccination centre shut	2	1.6%
Lack of awareness	2	2.8%
Those who received vaccine at 6 week	83	65.6%
Total	122	100%

Health status of Babies were then evaluated as well.(Table8) Upper respiratory tract symptoms(n=7;5.7%) such as cold, cough and sneezing were noted during the study period. One baby had mild jaundice. Out of all, 2 babies required hospitalization. One was admitted on day of life 12 with chief complaint of fever of 1 day duration, for which baby was evaluated and was tested positive for Covid-19 infection subsequently. Another baby was admitted on day of life 12 with complaint of decreased activity, came to be covid negative on evaluation. Subsequently both babies were growing well and have no further issues.

Other minor health problem noticed were constipation in 20(16.4%) babies, followed by vomiting (n=11;9%) and loose stools in 5(4.1%) babies. None of these problem required consultation or hospitalization.

Table 8 : Health issues in babies born to COVID- 19 positive mother during the first 6 weeks as informed at follow up.

Health hospital	Frequency (n)	Percentage
Upper respiratory tract symptoms (mild cough, cold)	7	5.7%
Mild jaundice	1	0.8%
Decreased activity requiring hospitalization	1	0.8%
Fever requiring hospitalization	1	0.8%
Constipation	20	16.4%
Vomiting	11	9.0%
Loose stool	5	4.1%

Out of 122 mothers, 82(67.2%) received telephonic advice from counsellor regarding breast feeding and baby care practices from our Hospital at post natal age of 2 and 4 weeks post partum.(Table 9)

Table 9 : Received telephonic follow up by mother from counsellor after hospital stay.

Received telephonic follow up from counsellor	Number	%
Received at post natal age of 2,4 and 6 week	82	67.2%
Not received any telephonic follow up	26	21.1%
Not able to contact telephonically	13	10.70%
Total	122	100%

DISCUSSION

In our study, 122 healthy babies were delivered to COVID-19-positive mothers. All babies born to covid positive mothers, irrespective of symptomatology were tested between days of life 2-4 by nasopharyngeal route of sample collection and tested by RT-PCR technique. Of these, 10(8.2%) babies were tested positive for Covid-19. We found that most of the babies were appropriate for gestational age by weight. None of the babies were symptomatic during the hospital stay and only two babies required re-hospitalization. Chen H et al, who studied the clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in pregnant women retrospectively, found that none of the Covid-19 babies born to Covid-19-positive mothers were symptomatic(6). Li et al and Wang et al also reported no symptomatic neonates in their studies on babies born to mothers suffering from Covid-19 disease.(7,8)

In our study, out of 122 mothers, only one had COVID-19-related symptoms and eventually succumbed to it, albeit with other comorbidities like eclampsia and HELLP syndrome. Mozgan KZ et al in their study reported that two mothers died from COVID-19-related respiratory complications after delivery.(9)

There is little data about early follow-up describing the feeding trends and immunization status of the babies after discharge from the hospital. In our study, above factors were assessed on telephonic communication.

According to the World Health Organization (WHO), A woman with suspected or confirmed COVID- 19 can practice skin-to-skin contact in the delivery room and exclusively breastfeed her child. If maternal general health conditions impede direct breastfeeding, she should be encouraged and supported to express breast milk and feed it to her child[10]. While in our study, majority of the babies had received exclusive breast feeding. This trend was found to be continued even after discharge. The small percentage of babies who received mixed feeds after discharge were on cow's milk. Most common reason for not breast feeding was low milk output perceived by mother. Other reasons included advice to stop breastfeeding by relatives, friends or health care workers and personal belief of the mothers that they might transmit the disease via breastfeeding.

As for vaccination, most of the babies received their birth dose before discharge and 63% infants received 6th week immunization. Of the 26 babies who were not immunized, the most common cause was migration to native places because of ongoing Covid-19 pandemic. They had the fear of getting infected with coronavirus by visiting vaccination centres. Other causes were lack of functioning vaccination centres in the vicinity and no knowledge of the immunization schedule.

At the time of telephonic communication all babies were well. Few common problems encountered by mothers were constipation in babies, vomiting and loose stools. None of these problems had required hospitalization. We could address all their issues by telephonic counselling. We also gave them the choice of visiting our facility for a follow up.

All family members were screened for Covid-19 infection but tested negative. Post discharge, 67.2% of the mothers received telephonic advice regarding breast feeding and baby care practices from counsellors of Sion Hospital.

Telephonic follow up provided by doctors and counsellors from our facility proved quite effective in overcoming early lactation difficulties and dealing with minor complaints. This has reflected as very high rates of exclusive breastfeeding and no hospitalisations in the infants.

SUMMARY AND CONCLUSION

- 1 It is safe and essential to initiate and continue exclusive breastfeeding in babies those are born to COVID-19 positive mothers. The benefits of breastfeeding far outweigh the risks of contracting the infection if appropriate hygiene precautions are followed.
- 2 Despite the COVID-19 pandemic essential immunization should not be deferred and people must access health services for the same
- 3 As per our available data healthy infants, mothers and family members seem to have predominantly asymptomatic course of infection.
- 4 Greater advocacy for exclusive breast feeding and timely immunization among the post discharge mother and baby dyad will result in better utilization of health care services and outcomes.
- 5 Telephonic follow up is an effective way of addressing minor issues in mother-infant dyads

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