

Breastfeeding and infection control measures among lactating COVID-positive mothers: A retrospective study



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ABSTRACT

Background: Exclusive breastfeeding along with infection prevention measures is recommended for lactating COVID-positive mothers as benefits outweigh the risk. **Aims and Objectives:** The present study was undertaken to assess the feeding and infection prevention measures among the COVID-19 infected lactating mothers in Indira Gandhi Medical College and Research Institute, Puducherry to identify areas of concern. **Materials and Methods:** The cross-sectional and observational study was conducted by telephonic survey after verbal consent on a series of 103 COVID-positive postnatal mothers regarding their feeding practices and infection prevention measures. Descriptive statistics was used. **Results:** Breastfeeding was given by 72 (69.9%), mixed feeding by 27 mothers (26.2%), and formula feeds by four (3.9%). Overall, exclusive breastfeeding was given by 66 mothers (64.1%). With respect to infection prevention measures, high performance of frequent/always was observed for use of hand hygiene (n = 90, 87.3%) and use of mask (n = 81, 78.5%). **Conclusion:** Despite the pandemic situation, the most COVID-positive mothers breastfed their infants with fair compliance to infection prevention measures.

Key words: Breast feeding; COVID 19; Lactation; Milk; Prevention; SARS-COV-2

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INTRODUCTION

SARS-CoV-2 which is responsible for COVID-19 infection has been reported among lactating mothers with a prevalence of 7–10%.¹ A perinatal transmission of 8% and vertical transmission of 1.5% have been reported among intramural neonates by National Neonatology Forum (NNF) COVID-19 registry.² Although few initial studies on smaller samples have reported the virus in human breast milk, later studies have not demonstrated the virus in breast milk.^{3,4} Therefore, overall risk of transmission through breast milk appears to be low as there is no scientific evidence that proves transmission through breast milk. On the other hand, breast milk from mothers with natural infection or

following COVID-19 vaccination has been shown to contain specific neutralizing antibodies that prevents or modulate SARS-CoV-2 in the neonate.^{4,5} Besides the oligosaccharides in breast milk and lactoferrin with other whey proteins are shown to be protective. Since benefits of continuing breastfeeding outweigh the risk of infection, breastfeeding is still recommended for neonates born to COVID-19 mothers.⁶⁻⁸ The World Health Organization advocates regular and exclusive breastfeeding with rooming-in and skin-to-skin contact between the mother-newborn dyad and early initiation of feeding within 1 h of birth.⁹ The Indian Academy of Pediatrics, Infant, and Young Child Feeding (IAP, IYCF) chapter too recommends the same. In case, the mother is ill, she may still provide expressed breast milk to her newborn

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with the help of her COVID-negative caretaker. In case, the mother's milk is not available, recommended options are wet nursing with proper precautions or donor human milk.¹⁰

Initially, there was no consensus on mother-infant separation at birth or rooming-in for the mother-infant dyad.^{11,12} However, later consensus recommends skin-to-skin contact and kangaroo mother care rather than physical distancing.⁹ As COVID-19 is transmitted by close contact through respiratory droplets and direct breastfeeding involves close contact between mother-infant dyad, adequate infection prevention and control (IPC) measures need to be ensured to minimize risk of transmission between the mother-infant dyad. Such measures include the mother wearing triple layer mask, hand hygiene before feeding and after handling the infant, breast cleansing especially if expressing breast milk or if she happens to cough over her exposed breasts, maintaining social distancing rather than bedding-in, and surface decontamination of the surfaces, the infected mother has touched.¹³ Breast cleansing is not mandated by some as there is no compelling evidence for it.¹⁴

Pregnancy and lactation during such trying times are challenging and require motivation from both mothers and their support system of family and health-care personnel. In this background, the present study is undertaken to learn about the feeding and infection prevention practices observed by the COVID-19 infected lactating mothers in our local population as there are very few studies available in the current medical literature.

Aim and objectives

The objectives of the study are as follows:

1. To assess the feeding practices of the COVID-positive mothers.
2. To study compliance of the mothers to the IPC measures while feeding their newborn during the 10 days of COVID treatment.

MATERIALS AND METHODS

It was a cross-sectional and observational survey conducted retrospectively by the Department of Pediatrics after approval from the Institute Ethics Committee (323/IEC-32/IGMC&RI/PP-3/2021) and after informed consent from the participants. Our institute being a designated COVID hospital catered not only to COVID positive adults, pregnant women, neonates, and pediatric patients of our institute but to all who were referred to the COVID hospital from government and private health-care facilities. Inclusion criteria were all postnatal COVID-positive mothers who delivered between April and June 2021 of the COVID second wave and were either admitted for safe confinement

or referred postnatally from outside hospital for COVID management and discharged as per COVID protocol or sent on home isolation and were willing to participate in the study. Exclusion criteria were those not willing to participate. The study period was from September 2021 to February 2022.

Medical data and phone numbers were obtained from the case records. Out of the 138 COVID-positive deliveries during this time, a series of 103 mothers who were confirmed COVID-positive in their perinatal period were interviewed after verbal consent by telephonic survey by a trained research assistant using a pretested validated semi-structured questionnaire. Thirty-five mothers were excluded as they were not reachable or not responded or not willing. The questionnaire included (1) mother's details namely age, parity, COVID status, type of delivery, and education status, (2) baby details namely gestational age, birth weight, gender, COVID status, and clinical status (3) lactation practices, namely, type of feeding, time of initiation of feeding, any prelacteal feed, giving colostrum, and continuation of breastfeeding, and (4) infection control measures such as use of surgical or N95 mask, hand hygiene before and after handling her baby, breast cleansing, distancing at two feet from baby if followed, and surface decontamination using a Likert scale ranging from never (0%) to always (100%).

The following working definitions were used in the study – Separation of mother-infant dyad was defined as when rooming-in did not occur. “Breastfeeding only” was defined as infant being given direct breastfeeding or expressed breast milk and no animal milk and infant formula. “Mixed feeding” was defined as breastfeeding including expressed breast milk but in addition to that giving infant formula or animal milk as top feeds or complementary feeds. “Formula feeding” was defined as use of breast milk substitute such as infant formula. Exclusive breastfeeding was defined as infant being fed only human milk whether by direct breastfeeding or expressed breast milk and no other food, drink, or even plain water with the exception of medications or vitamin drops. Timely initiation of feeding was defined as starting of feeds within the 1st h after delivery.

Statistical methods

Data were entered into Microsoft Excel, cleaned and coded, and then imported into SPSS. Descriptive statistics, namely, frequency, mean, and standard deviation were estimated for characteristics using SPSS software version 23 (SPSS, Chicago, IL).

RESULTS

The mean age (SD) of the mothers was 27.0 (4.9) years. School-educated was 39 mothers (37.9%) and college

educated was 64 mothers (62.1%). Regarding parity, 53 (51.5%) were primiparous and 50 (48.5%) were parity two and above. Of these, 48 (46.6%) had spontaneous vaginal delivery, 54 (52.4%) cesarean section, and one outlet forceps (0.9%). Their clinical classification was asymptomatic (n=69, 67%), mild (n=32, 31.1%), and moderate symptomatic (n=2, 1.9%). None were critically ill in this series. Mother-infant separation was followed by 5 mothers (4.9%). The mean time of such separation was 6 (2.7) days.

The mean age of the infants at the time of study was 4.2 (1.2) months. Among them, 94 (91.3%) were term neonates and 9 (8.7%) were preterm. Their mean birth weight was 3.0 (0.5) kg. The male: female ratio was 0.9:1. All except three (2.9%) were COVID-negative, tested according to protocol at 24–48 h postnatal. Their neonatal period was uneventful in 81 (78.6%), while eight had (7.8%) respiratory distress, five (4.9%) had coryza, three birth asphyxia (2.9%), two seizures (1.9%), and two sepsis (1.9%), one each (0.9%) had diarrhea and neonatal jaundice, respectively.

Breastfeeding was given by 72 mothers (69.9%), mixed feeding (breastfeeding plus formula feeds) by 27 (26.2%) and formula feeds by four (3.9%). Of these 72 mothers, 6 mothers gave plain water or gripe water to the baby. The reasons reported for mixed feeding (n=27) were not enough milk (n=9, 33.3%), mother-infant separation as mother was quarantined (n=5, 18.5%), mother-infant separation with baby in neonatal intensive care unit (n=5, 18.5%), not able to express breast milk (n=2, 7.4%), mother had pain (n=2, 7.4%), mother under anesthesia (n=1, 3.7%), and unspecified (n=3, 11.1%). The mean (SD) time of initiation of first feed was 1.9 (1.5) hours of birth. The mean feed frequency was 10.2 (2.3) times in 24 h. Less than the recommended feed frequency of minimum eight feeds per day was reported by 14 mothers (13.6%). Overall, exclusive breastfeeding was given by 66 mothers (64.1%). The feeding particulars are highlighted in Table 1.

The compliance to the IPC measures practiced by the mothers during their breastfeeding sessions is depicted in Table 2. With respect to use of mask and hand hygiene, the highest performance of always (100%) on Likert scale was observed in 51 (49.5%) and 57 (55.3%) mothers, respectively. Regarding breast cleansing, physical distancing, and surface decontamination, highest performance was for Likert scale of frequent practiced by 38 (36.9%), 42 (40.8%), and 49 (47.6%) mothers, respectively (Table 2). Only four mothers followed all the five guidelines always for the prescribed duration of 10 days.

DISCUSSION

In the present study, though 96.1% of the COVID-positive mothers opted for breastfeeding, only 64.1% followed exclusive breastfeeding. This observation is similar to that of Ceulemans et al., who reported 97% mothers breastfed, out of which 53% gave exclusive breastfeeding.¹⁵ Reason for the decline was perceived lactation insufficiency in their study. In the present study too, the reasons quoted were perceived inadequate milk secretion followed by mother-infant separation. Another study by Pereira et al., reported 90.9% breastfed during hospital admission, and subsequently 37.5% gave complementary feeds temporarily.¹⁶ A study from Italy reported that 69.4% mothers gave exclusive breastfeeding at discharge from health facility which then dropped to 54.3% at 30 days and 31.8% at 90 days.¹⁷ Timely initiation of feeding was noted in 37.9% in the present study which is lesser than that observed by Pereira et al., who reported a rate of 54.5%.¹⁶ The rate of exclusive breastfeeding in the present study (64.1%) is comparable with that reported by National Family Health Statistics-5 (2019–21) which is 64.8% while the rate of timely initiation of feeding in the present study is much lower than that reported by the infant feeding score card, February 2020 which is 64.6%.^{18,19} Colostrum was discarded by 38.8% in this study whereas colostrum is shown to contain specific antibodies against the virus and the whey protein in it is shown to inhibit viral replication.^{20,21} At the time of the present study, all the mothers (including the ones who opted for infant formula who were encouraged to breastfeed and had started direct breastfeeding) continued breastfeeding. Similar observation was made by Ceulemans et al., in their study who reported that mothers desired to breastfeed longer during the pandemic.¹⁵ No prelacteal feeds were given in the present study. Similarly, no animal milk feeding was given though infant formula, gripe water and plain water use was reported.

Table 1: Lactation practices observed by the COVID-positive mothers

Variable	n (%), n=104
Type of feed	
Breastfeed	72 (69.9)
Mixed (breastfeeding+formula)	27 (26.2)
Formula	4 (3.9)
Prelacteal feed	
No	103 (100)
Timely feed initiation (within 1 h)	
Yes	39 (37.9)
Colostrum given?	
Yes	63 (61.2)
Feed frequency	
Feeds per day	
<8	14 (13.6)
≥8	89 (86.4)
Was water given any time?	
Yes	12 (11.7)
Was any other food/drink given?	
Yes (gripe water)	2 (1.9)

Table 2: Infection control measures observed by the mothers

Indicator/Scale	Use of triple layered or N95 mask	Hand hygiene	Breast cleansing before feed	Physical distancing	Surface decontamination
Always	51 (49.5)	57 (55.3)	21 (20.4)	11 (10.7)	11 (10.7)
Frequent	30 (29.1)	33 (32)	38 (36.9)	42 (40.8)	49 (47.6)
Often	10 (9.7)	9 (8.7)	14 (13.6)	24 (23.3)	25 (24.3)
Sometimes	4 (3.9)	0 (0)	2 (1.9)	12 (11.7)	14 (13.6)
Occasionally	4 (3.9)	4 (3.9)	5 (4.9)	14 (13.6)	4 (3.9)
Never	4 (3.9)	0 (0)	23 (22.3)	0 (0)	0 (0)

Always=100%, Frequent=75–99%, Often=50–75%, Sometimes=25–50%, Occasionally<25%, Never=0

With respect to IPC measures, high performance of always or frequent in Likert scale was observed for the use of hand hygiene by the mothers (n=90, 87.3%) followed by use of triple layered mask or N95 mask (n=81, 78.5%), surface decontamination (n=60, 58.3%), breast cleansing (n=59, 57.3%), and physical distancing (n=53, 51.5%). A study by Conti et al., reported high adherence of 100% for hand washing, 84.8% for surgical mask and 51.5% adhered to the use of all protective measures.²²

Physical distancing was the least observed in the present study. Recent recommendations to encourage skin-to skin contact and kangaroo mother care considering the physiological benefits for the infant.^{9,10} A study from Italy by Ronchi et al., which evaluated rooming-in reported that rooming-in can be encouraged with use of mask, hand hygiene, and physical distancing. Further, only one neonate was infected in their study.²³ As per the NNF COVID-19 registry, however, rooming-in was associated with higher risk of transmission unlike the mode of delivery and the type of feeding followed which did not have an effect on transmission.² The advantage with rooming-in is that it encourages early initiation as well as helps in maintaining successful breastfeeding. It is also noteworthy that the mortality from not breastfeeding is reportedly 67 times higher than that resulting from COVID infection.¹⁰ Since the benefits of rooming-in and breastfeeding outweigh risk to the infant, both are advocated. As a simple measure of safety, combining hand washing by mother before handling infant along with use of mask is the most effective barrier for ensuring successful and safe breastfeeding by COVID-positive mothers.²⁴

It is worthy to consider that during a pandemic crisis, the mental health of the mothers and provision of adequate breastfeeding support must especially be taken care of to ensure successful breastfeeding. The study by Ceulemans et al., reported increased stress from childcare in some mothers while others reported reduced medical counseling and social support during the pandemic, which can be significant deterrents to successful breastfeeding.¹⁵ The IAP and IYCF chapter recommends technical and psychosocial support for the mothers to not only establish or reestablish breastfeeding but also to maintain milk supply. Further, for

both mothers as well as their family, counseling and extra support from trained personnel are advocated.¹⁰

Limitations of the study

Limitations in our study are the small series of cases, a retrospective design, and recall bias. The mental health of the mothers and breastfeeding support from medical personnel and their family was not studied.

What the study adds

1. Breastfeeding is still the number one option for COVID-positive mothers during the pandemic but timely initiation of feeding and giving colostrum needs to be stressed.
2. The infection prevention measures are fair especially with mask and hand hygiene by the mothers.

CONCLUSION

Despite the pandemic situation, the most COVID-positive mothers breastfed their infants with fair compliance to IPC measures. However, the practice of timely initiation of feeds and giving colostrum suffered and is worthy of pre-emptive advocacy.

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REFERENCES

1. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, 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. <https://doi.org/10.1136/bmj.m3320>
2. More K, Chawla D, Murki S, Tandur B, Deorari AK, Kumar P, et al. Outcomes of neonates born to mothers with coronavirus disease 2019 (COVID-19) national neonatology forum (NNF) India COVID-19 registry. *Indian Pediatr*. 2021;58(6):525-531. <https://doi.org/10.1007/s13312-021-2234-2>
3. Groß R, Conzelmann C, Müller JA, Stenger S, Steinhart K, Kirchhoff F, et al. Detection of SARS-CoV-2 in human breastmilk.

- Lancet. 2020;395:1757-1758.
[https://doi.org/10.1016/s0140-6736\(20\)31181-8](https://doi.org/10.1016/s0140-6736(20)31181-8)
4. Pace RM, Williams JE, Järvinen KM, Belfort MB, Pace CD, Lackey KA et al. Characterization of SARS-CoV-2 RNA, antibodies, and neutralizing capacity in milk produced by women with COVID-19. *mBio*. 2021;12(1):e03192-20.
<https://doi.org/10.1128/mbio.03192-20>
 5. Perl SH, Uzan-Yulzari A, Klainer H, Asiskovich L, Youngster M, Rinott E, et al. SARS-CoV-2-specific antibodies in breast milk after COVID-19 vaccination of breastfeeding women. *JAMA*. 2021;325(19):2013-2014.
<https://doi.org/10.1001/jama.2021.5782>
 6. Rousseaux A, Brosseau C, Le Gall S, Piloquet H, Barbarot S and Bodinier M. Human milk oligosaccharides: Their effects on the host and their potential as therapeutic agents. *Front Immunol*. 2021;12:680911.
<https://doi.org/10.3389/fimmu.2021.680911>
 7. Peroni DG and Fanos V. Lactoferrin is an important factor when breastfeeding and COVID-19 are considered. *Acta Paediatr*. 2020;109(10):2139-2140.
<https://doi.org/10.1111/apa.15417>
 8. Gallo V, Giansanti F, Arienzo A and Antonini G. Antiviral properties of whey proteins and their activity against SARS-CoV-2 infection. *J Funct Foods*. 2022;89:104932.
<https://doi.org/10.1016/j.jff.2022.104932>
 9. World Health Organization. Clinical Management of COVID-19: Interim Guidance (27 May 2020). Geneva, Switzerland: World Health Organization; 2020.
 10. Bharadva K, Bellad RM, Tiwari S, Somasekar R, Phadke M, Bodhankar U, et al. Breastfeeding in coronavirus disease 2019 (COVID-19): Position statement of Indian academy of pediatrics and infant and young child feeding chapter. *Indian Pediatr*. 2022;59(1):58-62.
<https://doi.org/10.1007/s13312-022-2422-8>
 11. Li F, Feng ZC and Shi Y. Proposal for prevention and control of the 2019 novel coronavirus disease in newborn infants. *Arch Dis Child Fetal Neonatal Ed* 2020;105(6):683-684.
<https://doi.org/10.1136/archdischild-2020-318996>
 12. Royal College of Obstetricians and Gynaecologists. Coronavirus (COVID-19) Infection in Pregnancy. Information for Healthcare Professionals. Version 1: Published Monday 9 March; 2020. Available from: <https://www.rcog.org.uk/globalassets/documents/guidelines/coronavirus-covid-19-virus-infection-in-pregnancy-2020-03-09.pdf> [Last accessed on 2020 Apr 10].
<https://doi.org/10.25100/cm.v51i2.4271>
 13. Dashraath P, Wong JL, Lim MX, Lim LM, Li S, Biswas A, et al. Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *Am J Obstet Gynecol*. 2020;222(6):521-531.
<https://doi.org/10.1016/j.ajog.2020.03.021>
 14. Calii VM, Krebs VL and Carvalho WB. Guidance on breastfeeding during the Covid-19 pandemic. *Rev Assoc Med Bras* (1992). 2020;66(4):541-546.
<https://doi.org/10.1590/1806-9282.66.4.541>
 15. Ceulemans M, Verbakel JY, Van Calsteren K, Eerdeken A, Allegaert K and Foulon V. SARS-CoV-2 infections and impact of the COVID-19 pandemic in pregnancy and breastfeeding: Results from an observational study in primary care in Belgium. *Int J Environ Res Public Health*. 2020;17(18):6766.
<https://doi.org/10.3390/ijerph17186766>
 16. Pereira A, Cruz-Melguizo S, Adrien M, Fuentes L, Marin E, Forti A, et al. Breastfeeding mothers with COVID-19 infection: A case series. *Int Breastfeed J*. 2020;15(1):69.
<https://doi.org/10.1186/s13006-020-00314-8>
 17. Latorre G, Martinelli D, Guida P, Masi E, De Benedictis R and Maggio L. Impact of COVID-19 pandemic lockdown on exclusive breastfeeding in non-infected mothers. *Int Breastfeed J*. 2021;16(1):36.
<https://doi.org/10.1186/s13006-021-00382-4>
 18. Key Findings for NFHS 5. Available from: http://rchiips.org/nfhs/factsheet_NFHS-5.shtml [Last accessed on 2022 May 03].
 19. Infant Feeding (IF) Score and Infant Mortality Rate. Available from: <https://www.bpni.org/wp-content/uploads/2020/03/IF-score-card-Feb-2020.pdf> [Last accessed on 2022 Mar 08].
 20. Briana DD, Papadopoulou A, Syridou G, Marchisio E, Kapsabeli E, Daskalaki A, et al. Early human milk lactoferrin during SARS-CoV-2 infection. *J Matern Fetal Neonatal Med*. 2021;341-4.
<https://doi.org/10.1080/14767058.2021.1920010>
 21. Fan H, Hong B, Luo Y, Peng Q, Wang L, Jin X, et al. The effect of whey protein on viral infection and replication of SARS-CoV-2 and pangolin coronavirus *in vitro*. *Sig Transduct Target Ther*. 2020;5(1):275.
<https://doi.org/10.1038/s41392-020-00408-z>
 22. Conti MG, Natale F, Stolfi I, Pedicino R, Boscarino G, Ajassa C, et al. Consequences of early separation of maternal-newborn dyad in neonates born to SARS-CoV-2 positive mothers: An observational study. *Int J Environ Res Public Health*. 2021;18(11):5899.
<https://doi.org/10.3390/ijerph18115899>
 23. Ronchi A, Pietrasanta C, Zavattoni M, Saruggia M, Schena F, Sinelli MT, et al. Evaluation of rooming-in practice for neonates born to mothers with severe acute respiratory syndrome coronavirus 2 infection in Italy. *JAMA Pediatr*. 2021;175(3):260-266.
<https://doi.org/10.1001/jamapediatrics.2020.5086>
 24. Davanzo R. Breast feeding at the time of COVID-19: Do not forget expressed mother's milk, please. *Arch Dis Child Fetal Neonatal Ed*. 2020;105(4):455.

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