

BREASTFEEDING IN CHILDREN WITH MOTHERS SUFFERING FROM COVID-19. RISK OR BENEFIT?

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Abstract

The Covid-19 pandemic has led to multiple health problems. At the beginning lack of knowledge about the risk of transmission of the virus through breastfeeding has triggered the suspension of breastfeeding and early postpartum attachment in several areas of the world, over the benefits that these behaviors bring to the mother and the newborn.

Objective:

Carry out a search and analysis of the available scientific literature on breastfeeding and its risk of transmission to the newborn, as well as the risk of transmission during childbirth and early attachment.

Methods:

A systematic search was conducted in PUBMED, LILACS, MEDLINE and SCIELO with the search terms: Breastfeeding and Covid-19, vertical transmission, and Covid-19, it was verified that the articles have a description of the type of delivery, type of study performed to confirm the presence of the virus in the mother, newborn, and breast milk. English and Spanish studies were included.

Conclusions:

Up to now, there is scientific evidence showing that there is neither risk of virus transmission through breastfeeding, nor vertical transmission or early attachment to be a risk factor for the transmission of the virus to newborns.

Keywords: breastfeeding, breastfeeding behavior, human milk, Covid-19 infection, SARS virus CoV2.

Resumen

LACTANCIA MATERNA EN HIJOS DE MADRES CON COVID-19. ¿RIESGO O BENEFICIO?

La Pandemia por Covid-19 ha llevado a que existan múltiples complicaciones en el área de la salud. A sus inicios la falta de conocimiento sobre el riesgo de transmisión del virus por la lactancia materna desencadenó que en varias zonas del mundo se proceda a suspender la lactancia y el apego precoz posterior al parto, por sobre los beneficios que trae estas conductas a la madre y al recién nacido.

Objetivo:

Realizar una búsqueda y análisis de la literatura científica disponible sobre lactancia materna y su riesgo de transmisión al recién nacido, además el riesgo de transmisión durante el parto y apego precoz.

Métodos:

Se realizó una búsqueda sistemática en PUBMED, LILACS, MEDLINE y SCIELO con los términos de búsqueda: Lactancia Materna y Covid-19, transmisión vertical y Covid-19, se verificó que los artículos cuenten con descripción del tipo de parto, tipo de estudio realizado para confirmar la presencia del virus en la madre, el recién nacido y la leche materna. Se incluyeron estudios en inglés y español.

Conclusiones:

Al momento existe evidencia científica que demuestra que no existe riesgo de transmisión del virus por la lactancia materna, tampoco se ha comprobado la transmisión vertical o que el apego precoz sea un factor de riesgo para la transmisión del virus a los recién nacidos.

Palabras clave: lactancia materna, conducta en la lactancia, leche humana, sustitutos de la leche, Infección por Covid-19, Virus del SARS CoV2.

BACKGROUND

The severe pulmonary disease of unknown etiology was first described in December 2019 in China. In January 2020 it was identified as part of the coronavirus family being named by the World Health Organization (WHO) as coronavirus of 2019 (Covid-19)¹.

The disease caused major public health devastation and spread rapidly to other countries. On January 30 the Covid-19 epidemic is declared by WHO "a public health emergency of international concern". Gradually the virus became a public health emergency as it spread rapidly to other continents and on March 11, Dr. Tedros Adhanom Ghebreyesus, head of WHO, announced Covid-19 as pandemic².

In the 2009 AH1N1 influenza pandemic, pregnant women represented 1% of those infected, besides, SARS CoV1 and MERS have shown to cause serious complications during pregnancy, so the studies were based on clarifying the risks of Covid-19 in this age group³.

In September 2020, the Panamerican Health Organization (PAHO) reported that more than 60,000 cases of Covid-19 occurred in pregnant women, including 458 maternal deaths in the Americas, and called for intensified efforts to ensure adequate prenatal care.

In Ecuador, up to July 2021, there are more than 480,720 patients infected by Covid-19, being Pichincha and Guayas provinces with the highest percentage of cases⁴. In the Americas, 258,359 cases of COVID-19 in pregnant women were reported in July, including 2,375 deaths. In Ecuador, 10,207 cases were reported with 48 deaths, corresponding to 0.47% of the cases, while infants continue to be the smallest age group infected, representing 0.2% of the cases^{4,5}. Although the symptoms of Covid-19 in children are less severe than in adults, there has been evidence of increased rates of infection and occurrence of MIDS in children, which increases the risk of requiring intensive care and increases morbidity and mortality. The PAHO has reported 4960 confirmed cases of MIDS in the Americas, including 111 deaths^{4,6}.

The lack of knowledge as to whether SARS-CoV2 can be transmitted from mother to child during breastfeeding led to the first preventive measures being taken early in the pandemic. In China, the mother and the newborn were separated until they tested negative for Covid-19, resorted to cesarean section before cephalo-vaginal delivery, suspended breastfeeding to the newborn until the mother tested negative for Covid-19 because of the risk of transmission, and avoided early attachment after birth^{7,8}. Initially, there were many questions about the proper management of newborns and the use of breast milk, which led to several investigations being carried out, clarifying the means of transmission and maintaining the concept of the best diet based on breast milk.

METHODS

A search for scientific evidence was conducted in PUBMED, LILACS, MEDLINE and SCIELO using the following search strategy: "breastfeeding" AND "COVID-19" or "human milk" AND "SARS-CoV-2". Only studies in English and Spanish were considered.

There were excluded all studies that did not refer to the subject to be evaluated according to the abstract, studies that did not mention method of detection of Covid-19 in the mother or newborn, and those studies for which the full text was not available.

COVID-19 AND ITS TRANSMISSION THROUGH BREAST MILK.

Breastfeeding has been shown in countless studies to provide great benefits to both mother and newborn. The relationship between mother and child provides great benefits in the neural system, becoming one of the most important moments in the life of the human being, it is the first interaction with the outside world, stabilizes breathing and temperature⁹, provides great immunological benefits to the newborn, breastfeeding infants have a 64% reduction in the incidence of intestinal infections, reduces by 74% the severity of Respiratory Syncytial Virus, provides nutrients for the development of the child; it offers benefits to the mother such as reducing the risk of postpartum depression, anemia, breast cancer, among others^{10,11}.

The coronavirus uses the Angiotensin 2 (ACE2) receptor for its internalization into the body's cells, this receptor is widely distributed throughout the body including in the epithelial cells of mammary glands. For this reason, there is a possibility that the virus may be transmitted through breastfeeding¹².

Lactoferrin is considered an important factor in breast milk. Lactoferrin is known to inhibit both the attack and growth of Respiratory Syncytial Virus (RSV) and adenovirus. In the SARS CoV epidemic in 2002, studies revealed that lactoferrin competes with the binding sites of the virus, it means it competes with the ACE2 receptors inhibiting infection. SARS-CoV2 shares the same binding site as SARS-CoV, so breast milk could be a protective factor in reducing transmission of the virus to the newborn¹³. Another defense mechanism provided by breastfeeding is the demonstrated increase of type I interferon in children infected with influenza virus. In patients

with Covid-19 it has been shown that there is an altered response of this interferon, so breastfeeding can become an ally of defense against SARS-CoV2¹⁴.

After recognizing the great properties of breast milk and in view of the advent of the pandemic, both the CDC and several hospitals in China decided to suspend breastfeeding of mothers with Covid-19, several studies were conducted to determine the presence of the virus in breast milk and determine whether there is a risk of transmission by this means.

In China, Yang et al. carried out a review of breastfeeding in children born to mothers with Covid-19, they evaluated 13 mothers who tested positive for Covid-19, but all were negative when tested for nucleic acid in breast milk⁸. Wang et al. described a study of a 34-year-old woman who presented Covid-19 infection in the third trimester, after birth both mother and child tested positive for the virus, but the nasopharyngeal swab of the newborn was taken at 36 hours of life, the newborn was separated from its mother from birth and received breast milk substitutes, and the test for SARS-CoV2 in breast milk was negative. In this study it was not possible to determine the means of infection of the newborn¹⁵.

Liu et al., presents another case series of 19 mothers infected with Covid-19, RT-PCR test was performed on breast milk from 10 mothers whose results were negative, the form of breast milk collection was not specified¹⁶.

Gao et al. conducted a more detailed study measuring the presence of antibodies against Covid-19 in breast milk, the study was performed in 7 pregnant women with positive RT-PCR for Covid-19, the presence of the nucleic acid was not evidenced in any sample of breast milk, in 3 samples neutralized antibodies against SARS-CoV2 were identified¹⁷.

Fox et al. conducted a study using breast milk specifically from mothers with Covid-19, 15 milk samples were taken, each of 30 ml between days 14 and 30 after presenting symptoms, 80% of the samples analyzed showed IgA reactivity, of the 12 positive samples 4 showed reactivity for IgG and IgM, 2 samples showed positivity for IgG and not for IgM and one sample showed reactivity for IgM and not for IgG. This study demonstrated the presence of antibodies against SARS-CoV2 in breast milk, which can be transmitted to the newborn, improving its immunological status¹⁸.

Dong et al. published another case of a 33-year-old woman who presented a positive picture for Covid-19 at 38 weeks of gestation, the delivery was uncomplicated and in the same room an oropharyngeal smear was performed on the newborn, which was negative for Covid-19. Breast milk samples were collected to detect SARS-CoV2 RNA and were negative. Elisa detected antibody levels against SARS-CoV2, IgG and IgA. At hospital discharge, antibodies were performed on the newborn, who presented IgG titers. A month and a half after discharge, antibodies were performed on the mother, her breast milk and the

newborn, and the persistence of high levels of IgG in maternal serum and breast milk was evidenced, but no antibodies were detected in the newborn¹⁹. The antibodies transmitted from mother to child have a duration of 6 to 12 months, what is striking in this study is the short duration of antibodies in the newborn, which shows that it is still vulnerable to infection by the virus.

There are two cases published by different authors that evidenced the presence of Covid-19 virus genetic material in breast milk without demonstrating its virulence capacity, the first study published by Grob et al, followed two breastfeeding mothers with positive Covid, mother one presented respiratory symptoms from the second day of delivery, the newborn and the mother were isolated, both were Covid positive. Mother 2 was hospitalized in the same room as mother 1 after delivery, after being separated after mother 1 presented symptoms mother 2 was discharged on the 4th day with the newborn. On the 8th day, mother 2 presented mild symptoms and was hospitalized, two days later the newborn presented symptoms, and both were positive for SARS-CoV2. In both mothers, breast milk samples were collected after performing an adequate hand and breast disinfection process, the first obtained a negative PCR in breast milk and the second was PCR positive in breast milk on days 10, 12 and 13 of symptom initiation with a copy number 1.32×10^5 copies per mL in whole milk and 9.48×10^4 copies per/mL in skim milk, coincided with the stage of mild symptomatology, subsequent samples were negative, as there has been direct contact with the mother without protection, contagion by drops is considered.

Another publication with virus isolation in breast milk was published by Tam et al., which mentions the clinical case of a 40-year-old woman who is breastfeeding an 8-month-old infant, the mother was hospitalized after presenting respiratory symptoms, the swab was positive for Covid-19, after the beginning of maternal symptoms the infant presented symptoms one day later, the PCR was performed with positive results. Samples of breast milk were taken with all cleaning measures and virus RNA was identified up to 15 days after the onset of symptoms; it was not possible to identify whether the RNA was viable or only residual²¹. In these two cases, both children were directly exposed to the mother without the use or protection, which is why the main cause of contagion is considered, but not the use of breast milk.

In the presence of a lesion in the maternal areola, there could be a doubt that this could be a factor to increase the risk of transmission of the virus to the newborn during breastfeeding.

Pace et al, conducted a study to determine whether RNA of the virus can be detected in breast milk and breast skin of infected women, the risk of transmission during suckling from a mother with mastitis, and measured the concentrations of antibodies to SARS-CoV2 transmitted in breast milk. Milk samples were collected under all asepsis and antisepsis standards, with protective measures: face mask, gloves, hand washing of the mothers, breast skin swabs were taken before and after washing the breasts, sodium/potassium was quantified as an indirect marker of mastitis (a Na/K index greater than 0.6 was interpreted as subclinical mastitis). 18 women entered the study, 50% had subclinical mastitis, no breast milk sample identified virus RNA despite the previous finding of subclinical mastitis in half of the women in the study. Virus RNA was isolated from a swab taken prior to breast cleansing, but when an attempt was made to identify it in the post-cleansing swab, the result was negative. This study concludes that breast milk is not a transmitter of the SARS-CoV2 virus, breast washing led to the non-detection of the virus, which supports that proper hygiene prevents transmission breast milk samples. Also identified antibodies to SARS-CoV2 that were more IgA than IgG, supporting previous studies that breast milk provides a significant degree of immunity to the newborn to combat the virus²².

In some studies where neonates were separated from their mothers at birth, they were infected later, demonstrating that the separation of newborns is not a protective factor, since the neonate has contact with multiple health professionals, increasing the risk of infection, poor oral tolerance to formula feeding, alteration in thermal control, among others²³.

The current evidence on breast milk from mothers with Covid-19, so far, has shown to be safe for newborns, once again confirming the importance of the immunological contribution by transferring antibodies against the virus protecting the newborn, the risk remains the transmission of the newborn through drops of the infected mother. For this reason, the American Academy of Pediatrics supports breastfeeding in patients without severe symptoms; in case of severe symptoms, it is recommended to pump breast milk under adequate hygiene measures and to feed the newborn with unpasteurized breast milk (since there is no evidence of probable transmission of the virus and because it reduces the immunological value) given by a healthy person^{24,25}.

To prevent transmission, the mother should adopt adequate hand hygiene measures before and after contact with the

newborn, washing the breast before and after breastfeeding, strict use of masks, keeping the newborn at 2 meters distance in the room, use of a physical barrier, and periodic disinfection of the room. Isolation of the newborn from the mother has not proven to be beneficial so far²⁵⁻²⁶.

About early attachment, the WHO and the Italian Society of Neonatology recommend maintaining skin-to-skin contact in the delivery room and the likelihood of breastfeeding in the same room. The use of breast milk expressed from mothers with unpasteurized Covid-19 can be used to feed newborns who have been separated from their mothers due to health conditions^{27,28}.

CONCLUSION

The current evidence shows that breastfeeding provides protection to the newborn through the transmission of antibodies to the child, mainly immunoglobulin A, which provides immunologically active cells that support the immature immune system. Although there are two studies that have shown the presence of the virus in breast milk, there are no records proving the infection of the newborn through breastfeeding, so it is recommended to continue breastfeeding, in case the mother is able to do it directly, or to feed the newborn with breast milk expressed without pasteurization by a healthy caregiver in case the mother is not able to do it.

Always keep protective measures such as frequent hand washing, breast washing before and after breastfeeding, the use of masks and cleanliness of the entire place where the mother stays.

Regular check-ups in newborn are necessary, whether remote or face-to-face. When in doubt about the management of the newborn, specialized medical personnel should always be contacted.

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