

# Evidence of a Significant IgG Secretory Immune Response in Breast Milk and Blood There is a Mother Breastfeeding a Survivor of Covid 19 During Childbirth in Samarinda in 2022

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**Abstract:** The COVID-19 pandemic puts mothers at risk of transmitting SARS-CoV-2 to their babies or children while breastfeeding. East Kalimantan is ranked 5 in 2021 and ranked 10 in October 2022. Where children regardless of gender are all sensitive to COVID-19. (2) Breast milk contains high levels of secretory type antibodies (sIgG), breastfeeding from mothers who recover from COVID-19 can reduce this immunity to babies. (5), Objective: To analyze the relationship between IgG in breast milk and blood in breastfeeding mothers. Covid 19. The type of research is a control analytical study that is not exposed to covid. On the case control approach. Cases are breastfeeding mothers who are exposed to Covid. Blood and breast milk are taken for 5 CC each and then checked for levels of Ig A and Ig G. Total samples of 27 blood and 18 breast milk of respondents. Minimum Blood IgG result 1131.96300, Maximum 105774.58400 mean 40440.8053704, up to 33454.78224272. Minimum IgG ASI 4405.16200, Max 289530.00800, Mean 146174.3697222, up to 97794.70426397. Product Moment correlation analysis of Blood IgG with breast milk IgG P Value 0.000 < 0.005. There is a relationship between blood IgG and breast milk IgG in breastfeeding mothers who have survived covid 19. Suggestion: Mothers who are breastfeeding exposed to Covid 19 are expected to give breast milk, help provide immunity, especially for vulnerable newborns, contain high levels of secretory type antibodies (sIgG), breastfeed from mothers recovering from COVID-19 can decrease immunity to babies,

**Keywords:** IgG levels, breast milk, blood

## Introduction

The COVID-19 pandemic puts mothers at risk of transmitting SARS-CoV-2 to their babies or children while breastfeeding. Recommendations regarding mother-infant contact and breastfeeding should be based on consideration not the risk of infection to the infant, morbidity, mortality if the infant is not breastfed, inappropriate infant formula, and the protective effect of skin-to-skin contact. The number of confirmed positive Covid as of 15 May 2021 worldwide is 162 million people (1). Indonesia with 1,734,285 cases, East Kalimantan is in rank 5. Where children regardless of gender are all sensitive to COVID-19. (2)

In the fight against the global COVID-19 pandemic, there is an urgent need to identify factors such as specific antibodies to SARS-CoV-2 in breast milk that can help provide immunity, especially for highly susceptible newborns. Breast milk contains high levels of secretory type antibodies (sIgG), breastfeeding from mothers who have recovered from COVID-19 may decrease this immunity to infants, and it is

possible that purified breast milk antibodies could be therapeutic for adults with COVID-19 (3,4 ). Breast milk contains high levels of secretory type antibodies (sIgA), breastfeeding from mothers recovering from COVID-19 can reduce this immunity to infants. (5)

In this study, an IgG examination will be carried out on blood and breast milk samples on T-shirts for breastfeeding mothers exposed to COVID and controls not exposed. In an effort to determine whether antibodies in breast milk can be used as a treatment as in donors. The use of blood plasma in medicine is not new. The use of plasma from recovered patients as therapy has been carried out for the treatment of the 2009 swine flu epidemic, Ebola, SARS, and MERS. (6)

There is an increased response to SARS-CoV-2 specific antibodies, especially sIgG and sIgA in breast milk, both those who have been confirmed positive and mothers who have received the COVID-19 vaccination. Babies born and breastfed from mothers who were confirmed to be positive for Covid 19 did not find any development of SARS-CoV-2 infection. (19). General research objectives is to find out the relationship between breastfeeding exposure to Covid 19 and levels of Ig G, Sar cov general immunity which helps babies fight COVID-19. The research hypothesis is there is a relationship between mothers who are exposed to covid to Ig G, Sar Cov, breast milk and blood that helps babies fight COVID-19.

## Method

The type of research is an analytical study on breastfeeding mothers who are exposed to Covid. Blood and breast milk are taken for 5 CC each and then checked for IgG levels in breast milk and blood and the characteristics of the mother and baby. This research was conducted from May to July in 2022. Each object was taken blood and breast milk samples to be examined for IgA and Anti-SARS-CoV-2 to determine whether breast milk contains antibodies against COVID-19. The IgA and Anti-SARS-CoV-2 examination method uses the ELISA technique which is carried out at the Tropical Disease Center Laboratory of Airlangga University. The total number of samples of maternal Covid survivors was 27 respondents, using a purposive sampling technique. Analysis of research data includes univariate with percentage and Bivariate with Product moment correlation.

## Results and Discussion

Table 1: Characteristic Frequency Distribution IMA'am Breastfeeding Covid-19 Survivors in Samarinda

No.	Characteristics	(n)	(%)
1.	Age		
	< 20 years	0	0
	20-35 years old	20	72.0
	> 35 years old	7	28.0
2.	Education		
	SD	7	28.0
	JUNIOR HIGH SCHOOL	3	12.0
	SENIOR HIGH SCHOOL	7	28.0
	PT	10	37.0
3.	Parity		
	Primipartism	8	32.0
	Multiparity	16	56.0
	Grandemulti	3	12.0
4.	Gestational Age		
	28-31 weeks	2	8.0
	32-35 weeks	2	8.0
	36-39 weeks	17	60.0
	40-42 weeks	6	24.0
5.	Type of Delivery		
	Spontaneous	9	36.0
	SC	18	64.0
	Amount	27	100

Source: Primary Data, 2022

Based on table 1, it can be seen that of the 27 respondents, most of the respondents aged between 20-35 years were 18 people (72%), higher education education was 8 respondents (37%), most parity was multiparity as many as 16 respondents (56%), The gestational age at delivery was mostly 36-39 weeks as many as 157 respondents (60%), and the type of delivery was mostly cesarean delivery as many as 18 respondents (64%).

Table 2: Distribution of Blood and Breast Milk Ig G, Sar Cov Levels in IMA'am Breastfeeding Covid-19 Survivors in Samarinda

	N	Minimum	Maximum	mean	Std. Deviation
Blood IgG	27	1131.96	105774.58	40440.8054	3345478224
Sarcov 2 Blood	27	0	0.508	0.1023704	0.14454495
IgG breast milk	18	4405.16	289530.01	146174.37	9779470426
Sarcov 2 ASI	18	0.123	0.644	0.3308333	0.14841209

Source: Primary Data, 2022

Based on Table 2: of the 27 respondents exposed to covid 19 whose breast milk was produced there were 18 respondents, minimum blood Ig G level 1131 IU, Maximum 105774 IU, Mean 40440, Minimum Ig G ASI level 4405 IU, Max 289530, Mean 146174, Sarcov level in breast milk and the blood of all respondents was negative.

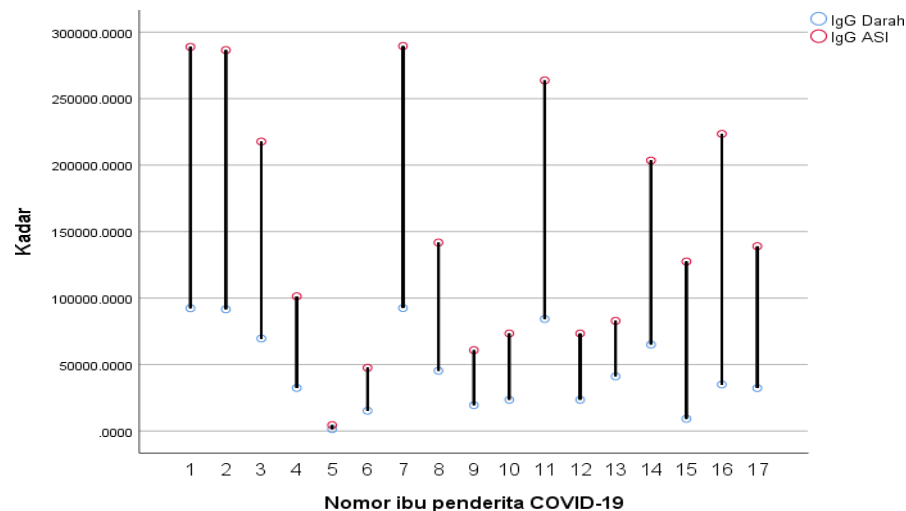


Figure 1. Levels of Blood IgG against IgG in breast milk in IMA'am Breastfeeding Covid-19 Survivors in Samarinda. Source: Primary Data, 2022

Overall IgG levels in breast milk are higher than blood IgG levels.

Table 3: Analysis of the relationship between Ig G and Sarcov levels in blood and breast milk on Mother Breastfeeding Covid-19 Survivors in Samarinda

No	Variable	P value	
1	Ig G blood - breast milk	0.000	0.05
2	Sarcov blood - breast milk	0.470	0.05

Source: Primary Data, 2022

Product Moment correlation analysis showed that there was only a relationship between Blood IgG and breast milk IgG in mothers with COVID while breastfeeding with a P value of 0.000. There is no relationship Sarcov blood – breast milk P value 0.470.

The World Health Organization (WHO) recommends that mothers with suspected or confirmed cases of COVID-19 should receive support to start or continue breastfeeding. Mothers should receive

consultation, information and education that the benefits of breastfeeding substantially outweigh the potential risks of transmission. Mother and baby should be allowed to remain together during hospitalization throughout the day and night and to practice skin-to-skin contact, including the kangaroo method of care, especially immediately after birth and during initiation of breastfeeding, regardless of whether they or the baby has suspected or confirmed COVID-19 (7).

From table 2 out of 27 respondents who were exposed to COVID-19 during childbirth in health services did not implement the WHO protocol correctly, namely mothers and babies were separated and not given breast milk which resulted in not producing breast milk, which resulted from 27 respondents who gave breast milk only 18 respondents. Based on table: 2 it is also proven that there is no transmission of COVID-19 either through breast milk or through blood.

Currently, there are insufficient data to conclude vertical transmission of COVID-19 from breastfeeding. Breastfeeding of newborns to mothers with COVID-19 is safe with breastfeeding adequate infection control measures to avoid mother-infant transmission. Pasteurization of donor breast milk (9). In infants, the risk of being infected with COVID-19 is still low, infection is usually mild or asymptomatic. On the other hand, the consequences of not breastfeeding and the separation between mother and baby can be significant. At this point it appears that COVID-19 in infants and children poses a much lower threat to survival and health than other infections protected by breastfeeding.

WHO recommendations regarding early initiation of breastfeeding, continued breastfeeding of infants and young children also apply to mothers with suspected or confirmed COVID-19. The presence of IgA in breast milk is one way in which breastfeeding protects infants from infection and death. IgA antibodies with reactivity to the COVID-19 virus have been identified in the breast milk of mothers previously infected with COVID-19 but their efficacy and resistance have not been studied adequately to overcome protection from COVID-19 among breastfed infants.

Beyond the neonatal period, the positive effects of mother-infant hugs include better sleep patterns, good, lower rates of behavior problems in children and higher quality of parental interactions (4,10). The evidence strongly supports breastfeeding, including skin-to-skin contact and early exclusive breastfeeding helps the baby develop, and there is no reason to stop after the SARS-CoV-2 virus (11). For mothers, breastfeeding protects against breast cancer and may protect against ovarian cancer and type 2 diabetes (12).

Milkmothers have high levels of secretory type antibodies (sIgA), breastfeeding from mothers who recover from COVID-19 may pass this immunity down to infants, and it is possible that purified breast milk antibodies could be therapeutic for adults with COVID-19 (4,7). Antibodies help the immune system recognize and destroy pathogens such as COVID-19. All mothers who recovered from COVID-19 had antibodies for COVID-19 in their breast milk. This opens up opportunities to use breast milk from mothers who have recovered from COVID-19 to treat critically ill infants or prevent severe illness in susceptible infants. They found high levels of a special type of antibody in milk called IgA, which is very good at fighting diseases that attack the lining of the lungs such as COVID-19 (3,4).

All breastfeeding mothers who had received the Sars-Cov-2 vaccination had IgG antibodies. The average content of IgG antibodies in breastfeeding mothers who received the Sars-Cov-2 vaccination was  $3379.6 \pm 1639.5$  /mL. A total of 89% of breast milk samples of breastfeeding mothers contained IgA. The number of antibodies in breast milk of mothers who breastfed for 24 months was significantly higher than mothers with breastfeeding periods < 0.001 (19).

This suggests that breast milk may have some general immune properties that help the infant fight COVID-19, even if the mother has never been infected with the disease (4,7,10). The next step is to compare the effectiveness of the antibodies in the milk with those found in the blood. Breast milk contains significantly higher levels of sIgA than plasma, and sIgA is especially helpful in protecting the lungs (3,4).

Breast milk is the best nutrition for most babies, and provides protection against many diseases. There are exceptions, though rare, where breastfeeding or expressed breast milk is not recommended. Mothers who have no suspected or confirmed COVID-19 and who have not been in close contact with a person who has COVID-19 do not need to take special precautions when breastfeeding or expressed breast milk. Everyone who is breastfeeding regardless of COVID-19 status, who uses a breast pump should have knowledge of how to properly clean and sanitize a breast pump (13).

Early initiation of breastfeeding (IMD) is carried out based on a joint decision with parents. Parents get information about the benefits and risks of IMD, as well as the modes of transmission and transmission of the COVID-19 virus. Early initiation of breastfeeding is carried out if the status of the mother is close contact or a case is suspected/suspected. BMI can also be considered in mothers with confirmatory status (mild symptomatic/asymptomatic), and clinically both mother and newborn have been declared stable. Protocol to prevent the spread of COVID-19 where to do mom using PPE at least a mask (14,15).

From the Indonesian Pediatrics Association (IDAI) there are 3 choices of ways to provide nutrition to babies who are born to a mother with suspected and confirmed COVID-19, judging by the mother's clinical condition (14,15): In a cohort study of 6 breastfeeding women who received 2 doses of the SARS-CoV-2 vaccine, there was a significant increase in the levels of SARS-specific IgG and IgA antibodies.

CoV-2 in breast milk was initiated on day 7 after the initial vaccine dose, with an IgG dominant response. (Jill K. Baird, 2021)

The humoral immune response is usually characterized by a primary IgM antibody response followed by a secondary antibody response associated with the immune system's memory of IgG, IgA and IgE. The role of IgA has a crucial role in protecting the mucosal surface against pathogens by neutralizing the virus or inhibiting the virus from attaching to the body's epithelial barrier cells (16). Immunoglobulin A was effective in preventing infection in mice and humans compared with influenza-specific IgG, and increased serum IgA levels correlated with the efficacy of influenza vaccination. IgA plays an important role in SARS-CoV infection, in mice intranasal vaccination with SARS-CoV protein induces a specific IgA response and provides better protection against SARS-CoV compared to intracellular vaccine administration (17).

Breastfeeding reduces the short and long term risk of both infectious and non-infectious conditions. Breast milk contains immunoglobulins and bioactive factors resulting from the response of viral infections from the mother given to the child through breast milk. IgA in breast milk is able to prevent the virus from entering through the barrier epithelium in the mucosa of infants or children against viral infection (18)

## Conclusion

There is a relationship between blood IgG and IgG breast milk in breastfeeding mothers exposed to COVID-19, which means that the breast milk of mothers exposed to COVID-19 contains effective immunity given to babies exposed to COVID-19. There is no proven transmission of the Covid 19 virus in the blood and breast milk of breastfeeding mothers who have survived Covid 19

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