

# Are preterm infants who have been breastfed at an increased risk for undernutrition compared with full-term infants who are breastfed without complications?

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## Abstract

Babies born prematurely can experience a variety of health issues. Preterm babies can develop “breathing problems, developmental delays, and vision problems” (“Preterm Birth”, 2019). On top of these issues, babies can also experience feeding difficulties. Premature babies have more problems latching which can lead to them ingesting an inadequate amount of nutrients. As a result, the baby can lack the essential vitamins and minerals needed to grow and thrive. The purpose of this research study was to explore the effects of being preterm on the ability to breastfeed and the risk of developing malnutrition compared to full-term babies. This research poster observes various studies on this subject, along with our own clinical experiences.

## Background

Preterm birth is defined as “any birth that occurs between 20 0/7 and 36 6/7 weeks off gestation” (Perry et al., 2018). Premature infants can often have a variety of health issues due to being born early. In fact, “complications of preterm birth are the leading cause of mortality in children younger than 5 years” (Muhe et al., 2019). Issues like feeding difficulty can be common in preterm infants. “Postnatal growth velocity is greatest in infancy”, meaning that infants who do not receive adequate nutrition could have their growth permanently stunted (Robinson, 2015). With these feeding difficulties, preterm babies do not receive enough calories or vitamins which can lead to malnutrition and growth restrictions.

Preterm infants can have difficulties latching due to their sucking reflex not being fully developed. In a study conducted by the International Breastfeeding Journal, eleven mothers with preterm infants were interviewed and 41% experienced latching difficulties. At the end of the study, “the authors concluded that breastfeeding late preterm infants is complex and public health nurses need to receive training on the issues many other/baby couples face” (Dosani et al., 2017). Mothers of infants born at 35 to 36 weeks gestation are less likely to start breastfeeding and continue breastfeeding for six months than mothers of infants born at 37–39 weeks gestation (Ayton et al., 2012).

## Methods

We conducted research through scientific articles, textbooks, and government articles. We followed this information with a generalized background of what is preterm birth and malnutrition. We then used photographs to allow visualization of what preterm infants may look like. We evaluated articles and pulled conclusions from them. We focused on our information towards similarities we were seeing in the clinical setting. However, as the semester progressed, we were unable to evaluate our conclusions in the hospital setting due to the COVID-19 pandemic.

## Preterm Birth Effects

Physical delays caused by preterm birth “can lead to severe respiratory distress, hypoglycemia, and hypothermia that require escalation of care and separation of the infant from the mother and delay initiation of breastfeeding” (as cited in Cartwright, 2017). “Neuronal immaturity affects oro-motor tone that causes poor suck-swallow coordination, decreased intraoral pressure, and an inadequate suck” (as cited in Cartwright, 2017). More feeding difficulties occur in preterm infants because they do not have fully developed reflexes including the suck, swallow, and breathe reflexes.



Figure 1: This image shows three different terms of babies. The preterm baby (left), term baby (center) and post-term baby (right) all have distinct features to tell them apart. Looking at the preterm, the infant appears scrawny, has bright pink skin, has a large head and little fat deposits. Some other features that may be seen is skin to be smooth and shiny, lanugo hair disperse along the body, and bones feel soft. (Perry et al., 2018).

## Nutrition in Preterm Infants

Preterm infants are very common in the United States. According to the CDC, 1 in every 10 infants is premature (Center of Disease Control and Prevention, 2019). Many mothers experience this and have no idea what to expect. They want to breastfeed their infants because “infants who breastfeed successfully have fewer respiratory tract infections that require hospitalization, less otitis media, and fewer gastrointestinal tract infections, as well as a long-term reduction in childhood diabetes” (as cited in Cartwright, 2017). However, preterm infants experience many issues with nutrition.

Preterm babies need better nutrition in their first year due to not receiving all nutrition intrauterine. The preterm baby needs extra support compared to term due to decreased “buccal coordination and swallowing mechanisms [that] are not fully matured” (Huang, et al., 2016). They also need to catch up on shorter length of growth, due to being born early. Much of the preterm infants have “fewer nutrient reserves at birth than full-term infants, and are often fed preterm formula or supplementation of mother’s milk with human milk fortifiers” (Huang, et al., 2016). This shows that the preterm infants can not always take in the nutrition that they need due to internal growth. This leads to the need for doctors and nurses to look into different ways to get the protein and energy needed into the infants. This can be done by enteral feedings or supplementation as mentioned in the article. The health care team needs to optimize the nutrition of an infant (Huang, et al.,

2016). These infants need to receive aggressive nutrition to reach optimal growth as fast as they can. The goal is to have the same growth as a term fetus. This is normally done in a three stage process; aggressive, preterm formula, and postdischarge. The aggressive period is were the nutrition level is the same as an 18 week old and there is “initiation of an amino acid infusion providing about 3 g protein/kg/day within hours of birth, initiation of a lipid emulsion of 0.5–1.0 g lipids/kg/day within 24 to 30 hours of birth” (Su, 2014). During the preterm formula phase, this formula is added to maternal breast milk to increase the calories, proteins and minerals. Lastly, the postdischarge is the “window of opportunity” to continue to normalize the growth of the infant and provide “optimal neurodevelopment” (Su, 2014).



Figure 2: This is an image of a nourished baby (left) and a malnourished baby (right). Some of the features you will see with malnourished infants are dry and scaly skin, decreased muscle mass and weakness, irritability, pallor, sensitivity to cold and changes in tongue (Lewis, et al., 2017, p. 859).

## Evaluation & Analysis

Many of the nutritional issues faced in preterm infants are focused around the underdevelopment that is associated with being born too early. When looking at full-term infants, they do not experience these nutritional issues.

A full term infant is not faced with a decreased coordination of sucking or decreased nutrient reserves. Their nutrition issues are mostly related to defects. Since term infants have “stable vital signs, effective breathing pattern, presence of bowel sounds, an active sucking reflex”, they begin breastfeeding straight away and have little to no issues with growth and energy (Perry et al., 2018). They are able to gain their 60-80 ml/kg a day without supplementation.

If a full term infant is able to feed properly, as compared to a preterm infant, there are few nutritional concerns to worry about. In the clinical setting, we were able to see findings that support this. One example was a mom who had given birth at 35 weeks. Her baby was struggling to latch on and when the baby did latch on, she would then show signs of respiratory distress. Another baby that was born at 39 weeks had no feeding issues. The 35 week old baby needed to be nutritionally supplemented throughout the shift and was not able to breastfeed until respiratory issues were resolved. This highlights how the a preterm baby’s underdevelopment can lead to nutritional issues later on.

## Conclusion & Implications for Future Research

In conclusion, premature babies generally have more difficulty feeding due to their bodies not being fully developed. Due to the increased difficulty, the babies are more at risk for having malnutrition if supplementation is not provided.

For future research, researchers should specify exactly how preterm the babies being researched are. In our analysis, we looked at preterm babies as a whole. It would be interesting to see the same experiment completed on both late preterm infants and early preterm infants to see which group had the most difficulty feeding and are more at risk for malnutrition. This experiment could be improved by including specific interventions like kangaroo care or meeting with a lactation specialist who has preterm infant experience.

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