UC SANTA BARBARA

THE Current

May 3, 2024

Sonia Fernandez

Researchers find that a new mother's immune status varies with her feeding strategy

In one of the first studies of its kind, UC Santa Barbara researchers have found that the immune status of postpartum mothers shifts with how she feeds her baby. According to a paper published in the journal Scientific Reports, certain inflammatory proteins — substances that are secreted as part of an immune response — peak at different times of day, correlating with whether the mothers breastfeed, pump or formula-feed their babies.

"It's a great study; there are so many unanswered questions about maternal health in the postpartum period," said Amy Boddy, a human biologist and evolutionary theorist at UCSB's Department of Anthropology, and senior author of the paper. It's a rare deep look at immunity from the postpartum mother's perspective, which she hopes will become a springboard for future research.

Indeed, she said, much of the research on the effects of breastfeeding concentrates on the infant, with many findings that demonstrate benefits of breastfeeding to the baby's immunity and development. In the longer term, mothers who have breastfed also have a lower risk for developing certain cancers and diabetes.

But how about women within the crucial first months to years after childbirth? To investigate, Boddy, lead author and co-principal investigator Carmen Hové and team

followed a population of 96 women in the Seattle area who had given birth within the previous six months and collected their saliva twice over a 24-hour period, once before going to bed, and again in the morning after waking. Because the COVID-19 pandemic had just hit and everyone was on lockdown, the researchers found themselves with an unexpectedly ideal experimental situation, in which the mothers' environments were heavily controlled for infections which could confound the immunity readings.

"It was kind of a perfect natural experiment, because we're looking at immune function and of the reports, no one was sick," Boddy said. The goal? To follow cyclical levels of five types of proteins (labeled CRP, IL-1β. IL-6, IL-8 and TNF-α) that indicate inflammation that is a marker of immune response.

"It's been shown before that breastfeeding has a suite of inflammatory responses to it," Boddy explained. "Inflammation isn't always a bad thing — the breast is remodeling, functioning and doing things in the body." The proteins' diurnal patterns meant that generally speaking, concentrations are typically higher in the mornings and lower in the evenings. What the researchers were interested in was seeing out-of-the-ordinary levels in the normal ebb and flow of these proteins and how they matched up with the new mothers' infant feeding strategies.

For several proteins, there were no measurable deviances in the morning and evening levels no matter whether the mothers pumped or breastfed. However, for the C-reactive protein (CRP) the researchers found that levels peaked in the evenings for women who relied heavily on breastfeeding, reversing the normal diurnal trend.

"We expected that low rates of lactating would be associated with a relatively high morning peak in CRP and vice versa,"Hové said. "What we ended up finding is that among mothers who reported intensive lactation, via either breastfeeding or pumping, CRP was higher at nighttime." More research is needed to determine the precise effects of this unique pattern in breastfeeding or lactating mothers, she added.

"We don't know exactly what's going on here," Boddy said, "maybe not emptying your breast fully, leads to inflammation." Or maybe it's the other direction, and the inflammation is a healing response from pregnancy. Maybe the incomplete emptying is a change of behavior due to stress. Perhaps the stress is the result of interrupted

sleep that comes with round-the-clock breastfeeding schedules. “We don’t have the causal arrow of what’s going on; it’s just an association,” she said. “This study shows that there is a unique immune profile, and we should study this in more detail.”

What this study reveals is the true complexity of postpartum breastfeeding. Breastfeeding is part of an ongoing physiological negotiation between mother and the new baby which favors the infant, Boddy said.

“There’s something in evolutionary biology called maternal-fetal conflict. The idea is, when you've two bodies in one maternal unit, that the baby always wants a little more than the mother has to give,” she explained. This research dives into the gray area of postpartum health from the mother’s perspective, particularly in the realm of breastfeeding and immunity.

Indeed, despite the ideal, long promoted by institutes such as the World Health Organization that “breast is best,” the researchers found that even from their sample of educated, relatively affluent women, there existed a combination of lactation feeding strategies, highlighting challenges of exclusive at-the-nipple feeding.

“There’s been a lot of pushback, mostly from lactating mothers, centered around time constraints. Our society doesn’t make it easy for us to actually breastfeed and have lactational support,” said Boddy, who nursed both her children as infants and found it “challenging to meet breastfeeding goals.” In addition, the guidelines aren’t clear on when breastfeeding should end. When do the physiological and other benefits diminish for the mother in this ongoing negotiation, which could last years? Could this information yield some insight on other trends, such as maternal mortality?

The researchers hope to study the topic more deeply, and on a more individual level, to tease out further patterns in postpartum health and breastfeeding, such as with the various hormones involved in lactation.

“I think this study has opened up more questions than what we’ve answered. What we would like to do is follow some of these same women throughout the course of their postpartum experience,” Boddy said. “It’s always been challenging to find the best way of feeding our babies and breastfeeding is so demanding.”

Media Contact

Sonia Fernandez

Senior Science Writer

(805) 893-4765

sonia.fernandez@ucsb.edu

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.