

Skin-to-skin 'kangaroo care' found to boost neurodevelopment in preemies

August 7 2024, by Erin Digitale



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Skin-to-skin cuddling with a parent has lasting cognitive benefits for premature babies, according to a new Stanford Medicine study. Premies who received more skin-to-skin contact, also known as

kangaroo care, while hospitalized as newborns were less likely to be developmentally delayed at 1 year of age, the study found.

The research, which was [published](#) online July 11 in *The Journal of Pediatrics*, showed that even small increases in the amount of skin-to-skin time made a measurable difference in the babies' neurologic development during their first year.

"It's interesting and exciting that it doesn't take much to really improve babies' outcomes," said the study's senior author, Katherine Travis, Ph.D., who was an assistant professor at Stanford Medicine when the study was conducted and is now an assistant professor at Weill Cornell Medical School and Burke Neurological Institute.

The study's first author is Molly Lazarus, a clinical research coordinator in pediatrics previously at Stanford Medicine and now at Weill Cornell Medical School.

The intervention is simple: With the baby only in a diaper, a parent holds the baby on their chest, next to their skin. But because hospitalized preemies are small and fragile, and often hooked to lots of tubes and wires, holding the baby can seem complicated. Parents may need help from their baby's medical team to get set up. That work is worth it, the study showed.

"It didn't matter if the baby was from a high- or low-income family; the effects we found were the same. And it didn't matter if the baby was sicker or less sick—both responded to this treatment," Travis said.

Neurological complications are challenging

Over the last 50 years, preemies' survival rates have improved dramatically thanks to better treatments for many of the complications

of prematurity, which is defined as being born at least three weeks early. For instance, neonatologists have developed effective approaches to help preemies breathe, even with immature lungs, while in the neonatal intensive care unit.

But premature birth still leaves babies at risk for long-term neurodevelopmental problems, including developmental delays and learning disabilities. Doctors and families have long hoped for treatments they could use during the newborn period to prevent such challenges.

"Ultimately, we want our patients to be healthy kids who can achieve the same milestones as if they didn't come to the NICU," said study co-author Melissa Scala, MD, clinical professor of pediatrics. Scala is a neonatologist who cares for preemies at Lucile Packard Children's Hospital Stanford.

"Our finding legitimizes skin-to-skin care as a vital intervention in the [neonatal intensive care unit](#) to support our goal of getting that child out of the hospital, able to learn and develop," Scala said.

Skin-to-skin care was first used in low-income countries to boost babies' survival, where it is often used for healthy infants born after full-term pregnancies. In rural or impoverished areas, it is an essential way to keep newborns warm, promote parent-child bonding and facilitate the start of breastfeeding.

It's been slower to catch on in the United States, especially for premature babies, who generally receive high-tech intensive care. But a growing body of research suggests that the practice has benefits for preemies' brains, possibly because it could offer some of the same developmental inputs they would have received if they had not been born early.

More skin-to-skin was better

The research team reviewed medical records for infants who were born very prematurely, meaning at least eight weeks early, and were cared for at Lucile Packard Children's Hospital Stanford between May 1, 2018, and June 15, 2022. Nurses in the hospital's NICU had begun making notes in patients' medical charts about developmental care practices, including the amount of time parents held babies skin-to-skin, shortly before the study began.

The study included 181 preemies who did not have genetic or congenital conditions known to affect neurodevelopment and who had received follow-up evaluations after they left the NICU. All very [premature babies](#) are eligible for care through California's High Risk Infant Follow-Up program until age 3. The program provides developmental testing and connects families to appropriate therapists if their children have developmental delays.

The study used records from follow-up evaluations that the babies received at 6 and 12 months' adjusted age, meaning their ages were corrected to account for how early they were born.

The evaluation included measures of visual-motor problem solving in standard tasks (such as dropping a cube into a cup) and expressive and receptive language skills (such as turning to see where the sound of a bell is coming from).

In addition to accounting for infants' gestational age (how early they were born), the outcomes were adjusted for families' socioeconomic status and for four common complications of prematurity: bronchopulmonary dysplasia, a breathing complication; brain hemorrhage, or bleeding; sepsis, an infection of the bloodstream; and necrotizing enterocolitis, an intestinal condition.

The infants in the study were born, on average, at about 28 weeks' gestation, or about 12 weeks before their due dates. They stayed in the hospital for an average of about two and a half months.

Babies in the study averaged about 17 minutes a day of skin-to-skin care, usually in sessions lasting more than an hour but occurring less than two days per week. Seven percent of families did not do any skin-to-skin care, and 8% did more than 50 minutes per day.

Small increases in the amount of skin-to-skin care were linked to large differences in 12-month neurodevelopmental scores. An average of 20 minutes more per day of skin-to-skin care was associated with a 10-point increase on the scoring scale used for neurodevelopment. Similar to an IQ test, the scale has an average of 100 points; a score of 70 or less suggests significant [developmental delays](#).

The frequency and duration of skin-to-[skin contact](#) predicted 12-month cognitive scores even after controlling for possible confounding factors, including the infant's gestational age and medical complications, and the family's socioeconomic status and frequency with which they visited the NICU.

How does it work?

Although the study was not set up to explore how skin-to-skin care benefits babies' brains, the researchers have some educated guesses.

"We think of the womb as our benchmark for preterm babies. In utero, a fetus is physically contained, listening to the maternal heartbeat, hearing Mom's voice, probably hearing her digest her sandwich," Scala said. "In the NICU, they're not next to anybody, and they hear the fan in the incubator; it's a very different environment. Skin-to-skin care is probably the closest we can get to mimicking the womb."

Parents can also benefit from skin-to-skin care, and this in turn may benefit their newborns, the research team said.

"The environment of the NICU is very stressful for parents and babies, and skin-to-skin care may buffer that," Travis said, noting that it is not unusual for parents with a very tiny, sick baby to develop post-traumatic stress disorder.

In addition, many preemies are not developmentally ready to breastfeed, and skin-to-skin care can provide an alternate way to promote bonding between parents and babies.

The researchers hope their findings will motivate medical teams to help parents provide skin-to-skin care in NICUs across the country and will encourage parents by showing them the long-term benefits of this simple but important technique.

Packard Children's recently expanded its infant developmental care program by hiring neurodevelopmental nurse practitioners, more physical and occupational therapists, a psychologist, and child life and music therapy experts for their NICU and intermediate care nurseries. The expanded team can make customized developmental care plans for high-risk infants.

Scala hopes other hospitals will follow suit.

"I would love for people to see this as part of the medical plan, not just something nice we're doing, but to be really intentional about it," Scala said. "Our findings underscore the value of having parents on the intensive care unit, doing this important part of infant care."

More information: Molly F. Lazarus et al, Inpatient Skin-to-skin Care Predicts 12-Month Neurodevelopmental Outcomes in Very Preterm

Infants, *The Journal of Pediatrics* (2024). DOI: [10.1016/j.jpeds.2024.114190](https://doi.org/10.1016/j.jpeds.2024.114190)

Provided by Stanford University

Citation: Skin-to-skin 'kangaroo care' found to boost neurodevelopment in preemies (2024, August 7) retrieved 7 August 2024 from <https://medicalxpress.com/news/2024-08-skin-kangaroo-boost-neurodevelopment-preemies.html>

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