Medical Xpress

Cognitive flexibility may predict developmental problems in babies born prematurely

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Understanding preterm development. The fact that preterm birth affects the risk of developmental disorders and diseases suggests the environment plays a significant role in early development. So researchers believe that understanding the development of preterm infants is also important for understanding the interaction between genetics and the environment. Credit: Rohan Mehra – The University of Tokyo

There are a number of risks associated with preterm infants born before 32 weeks. One of these is an increased chance of behavioral and attention problems. Previous studies suggest there might be early indicators of problems that develop in childhood, but results lacked consistency. A new study tests a methodology with improved consistency and explores cognitive and social functions over longer periods of time. Results suggest there are markers that can indicate potential problem areas in the development of preterm infants.

Medical progress has increased the survival rate of very preterm and low-birthweight infants. However, such children can often face behavioral and academic problems, for example attention deficit hyperactivity disorder. So, there is an increasing desire to understand how and why developmental issues occur. Such knowledge could help identify children in need of support and aid practitioners in improving support for affected children.

Project Assistant Professor Yuta Shinya from the University of Tokyo's Graduate School of Education and his team explore this issue. Amongst other things, they are looking for measurable traits in the early stages of an infant's life that strongly correlate with the kinds of issues that can occur later on which might require support. Their most recent study has found evidence of such a behavioral marker.

"We noticed a specific behavior in preterm infants at 12 months old that was not present in standard term infants and that seems to predict certain cognitive and social functions at 18 months," said Shinya. "Essentially, preterm infants performed significantly worse in a standard test to retrieve a hidden toy. The toy was repeatedly moved in plain sight, yet the infants in question would often fail to stop searching in its previous locations. Standard term infants faired far better in this test."

What is novel about the team's methodology is that they used digital eye tracking to identify the infants' visual motor coordination. Previous studies along similar lines had their results confounded by too much human presence which distracted the young participants, so automating some aspects of the test offers more consistent results. The researchers' study was also comparatively longitudinal. They followed up the tests with parental questionnaires designed to gauge the infants' executive function, which consists of cognitive skills to set goals and coordinate thoughts, emotions and actions toward those goals.

"Our data suggests that the earlier tests can predict with some accuracy developmental outcomes later on," said Shinya. "Of course, this was only a small study consisting of 27 preterm and 25 standard term infants in total. But we plan to follow up with a larger sample size over longer time frames. We also aim to explore the neurophysiological mechanism responsible for the cognitive difficulties in preterm infants. These findings will help us identify children who need early support. We hope to make society a better place to raise children, even if they are born prematurely."

More information: Yuta Shinya et al, Cognitive flexibility in 12-month-old preterm and term infants is associated with neurobehavioural development in 18-month-olds, *Scientific Reports* (2022). DOI: 10.1038/s41598-021-04194-8

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