

## PRESS RELEASE

*Toyama, November 20, 2025*

### **How Maternal Distress Affects Neurological Development in Children: New Study Sheds Light**

*The study finds that maternal psychological distress at 1 year after childbirth affects neurodevelopment in toddlers more strongly than prenatal distress*

**Brain development during the initial years is critical, shaped by both environment and caregiver behaviors. To clarify the causal relationship between maternal psychological distress and neuropsychiatric developmental delays, researchers in Japan analyzed data from over 82,000 mother–child pairs in a large-scale nationwide cohort. They found that distress within 1 year postpartum had stronger effects on the toddler’s neurodevelopment than prenatal distress, emphasizing the importance of continuous maternal mental health support before and after childbirth.**

The first few years of a child’s life are at a stage of great brain plasticity and neurodevelopment, and form the foundation for their future cognitive, social, and emotional skills. This period, extending from fetal stage up to about 2 years of age, is heavily influenced both by the environment and the behavior of the child’s caregiver. In particular, maternal psychological distress—including stress, anxiety, and depression—during both the prenatal and postpartum periods, is a massive risk factor for delay in the child’s developmental process.

Despite the established link between a mother’s mental health and child’s development, researchers have struggled to pinpoint the best time for targeted intervention. Is it more critical to address distress during pregnancy or during the first postpartum year? Answering this question has proved difficult owing to the bidirectional relationship at play: just as a mother’s psychological distress can negatively affect the child’s development, a child’s health issues or developmental delays can similarly increase maternal distress. While previous studies have revealed associations, a causal relationship has not been confirmed so far.

To shed light on this issue, a research team led by Junior Associate Professor Kenta Matsumura from the University of Toyama (now a Professor at the Aomori University of Health and Welfare) in Japan, conducted a rigorous large-scale investigation. As reported in their latest study, published in Volume 8, Issue 10 of the journal [\*JAMA Network Open\*](#) on October 31, 2025, the team used advanced statistical modeling to estimate the independent causal effects of maternal psychological distress at specific time points on neurodevelopmental outcomes in young children. The paper was co-authored by Dr. Tomomi Tanaka, Dr. Akiko Tsuchida, and Dr. Hidekuni Inadera from the University of Toyama.

The researchers gathered data from the Japan Environment and Children’s Study, an ongoing, nationwide birth cohort study. The final analysis included a large dataset of 82,418 mother–

child pairs, ensuring a statistically robust and representative sample of Japanese mothers. The team measured maternal psychological distress at two key time points: during mid- to late pregnancy and 1 year after childbirth. The primary outcome considered was neuropsychiatric developmental delay, assessed every 6 months from 1.5–3 years of age.

Using a marginal structural modeling approach based on causal inference to account for time-varying and bidirectional confounding, the researchers successfully quantified the independent causal effect of distress at each period. A key finding was that maternal psychological distress experienced at 1 year postpartum was more strongly associated with neurodevelopmental delay in toddlers, compared to the distress experienced during mid/late pregnancy. This finding was consistent across all five developmental areas and the effects were found to be additive—experiencing distress at both pregnancy and postpartum, further amplified the risk of delays. *“The results from our study clearly highlight the need to support maternal mental health at all times from pregnancy through 1 year postpartum,”* remarks Dr. Matsumura.

Overall, the study underscores the critical importance of effective screening and intervention for postpartum mental health while still recognizing the necessity of prenatal support. *“In designing public health, maternal and child health, and child-rearing support policies, these insights will be essential to support evidence-based decision-making,”* concludes Dr. Matsumura.

Hopefully, further studies in this area will provide more actionable knowledge, leading to a lower incidence of neurodevelopmental delays and maternal stress alike.

## Image

HPイラスト  
出産前後における母の心理的苦痛と子の精神神経発達遅延リスク



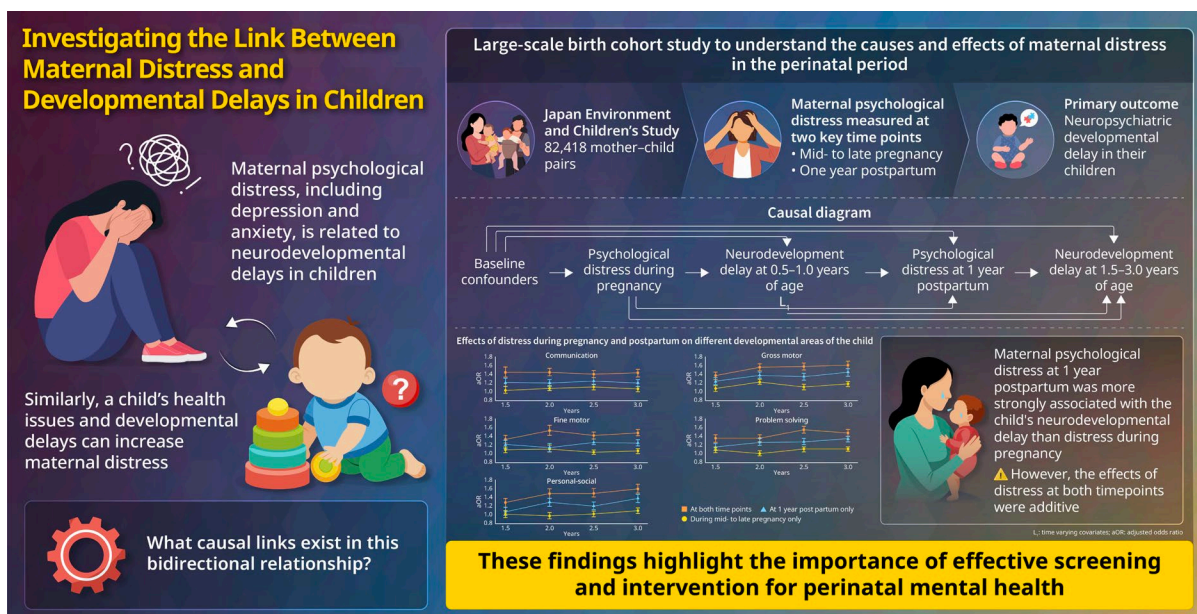
**Title:** Maternal psychological distress around childbirth and the risk of neuropsychiatric developmental delays in children

**Caption:** Both maternal distress during pregnancy and after childbirth increase the risk of neuropsychiatric developmental delays in infants, finds a new study from researchers at the University of Toyama, Japan. The insights gained from this study could aid in designing policies for maternal mental health before and after childbirth.

**Credit:** Dr. Kenta Matsumura from the University of Toyama, Japan

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Maternal Psychological Distress Before and After Childbirth and Neurodevelopmental Delay in Toddlers  
Matsumura et al. (2025) | *JAMA Network Open* | DOI: 10.1001/jamanetworkopen.2025.40907



**Image title:** Investigating the link between maternal distress and developmental delays in children

**Image caption:** Researchers investigate the bidirectional relationship that exists between maternal psychological distress and neurodevelopmental delay in children, emphasizing the importance of perinatal mental health

**Credit:** Dr. Kenta Matsumura from the University of Toyama, Japan

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## Reference

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**About University of Toyama, Japan**

University of Toyama is a leading national university located in Toyama Prefecture, Japan, with campuses in Toyama City and Takaoka City. Formed in 2005 through the integration of three former national institutions, the university brings together a broad spectrum of disciplines across its 9 undergraduate schools, 8 graduate schools, and a range of specialized institutes. With more than 9,000 students, including a growing international cohort, the university is dedicated to high-quality education, cutting-edge research, and meaningful social contribution. Guided by the mission to cultivate individuals with creativity, ethical awareness, and a strong sense of purpose, the University of Toyama fosters learning that integrates the humanities, social sciences, natural sciences, and life sciences. The university emphasizes a global standard of education while remaining deeply engaged with the local community.

Website: <https://www.u-toyama.ac.jp/en/>

#### **About Dr. Kenta Matsumura from the University of Toyama, Japan**

Dr. Kenta Matsumura received his M.A. and Ph.D. degrees in Human Sciences from Hokkaido University in 2004 and 2007, respectively. He joined the University of Toyama in 2018 as an Assistant Professor, where he served as a Junior Associate Professor at the start of this study. He is currently a Professor at Aomori University of Health and Welfare. Dr. Matsumura specializes in epidemiology, public health, mental health, nutritional psychiatry, and biological psychology and has published over 140 papers on these topics.

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