

# Childhood psychiatric symptom risk strongly linked to adverse exposures during gestation

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Harmful exposures during pregnancy, including some that occur even before pregnancy is recognized, appear to significantly increase a child's risk for psychiatric or behavioral problems early in life, researchers from

Massachusetts General Hospital report.

In their study of 9,290 children from the ages of 9 to 10 living in 21 communities in the United States, the researchers found that children subjected during [pregnancy](#) to two or more of six adverse exposures were significantly more likely to have clinically significant scores on the Child Behavior Checklist (CBCL), indicating a higher level of problems such as depression, attention difficulties or anxiety.

The adverse prenatal exposures are [unplanned pregnancy](#); maternal use of alcohol, tobacco or marijuana before pregnancy was recognized; complications during pregnancy (such as high blood pressure or gestational diabetes); and complications during labor and delivery. Pre-term birth or Caesarean delivery were not associated with increased risk.

"While individually these factors had previously been associated with similar risks in prior, often smaller studies, this is the first time that we were able to gauge the effect of cumulative exposures, which were fairly dramatic," says lead author Joshua L. Roffman, MD, MMSc, director of the Mass General Early Brain Development Initiative.

For example, while children with none of the exposures during their mother's pregnancy had only a 7% chance of developing clinically significant psychiatric symptoms, this risk increased steeply and in a linear fashion, such that those with four or more of the exposures had a 29% chance of clinically significant symptoms.

As the researchers report in their study, published in the open-access journal *PLOS ONE*, they saw similar patterns across a range of specific symptoms, from mood and anxiety to attention and thought disturbances.

The associations between prenatal exposures and psychiatric symptoms in childhood held up even when the researchers accounted for other factors that might skew the results, such as the mother's socioeconomic status, or exposures after birth that are known to increase a child's risk for [psychiatric disorders](#), such as a traumatic life event.

To validate their findings, Roffman and colleagues also tested them in a separate group of non-twin siblings who differed in their exposures during pregnancy, and here too the data showed that the sibling with the higher number of exposures was at greater risk for more severe symptoms.

A limitation of the results is that they are based on the mother's recall of events during pregnancy, although the frequency of adverse events closely followed national trends. The study did not measure the effects of maternal infections or stress during pregnancy, although each of these has also been associated with increased risk in previous studies.

Given the additive effects of the common exposures they studied, Roffman and colleagues speculate that the "floor" of risk for psychiatric symptoms may have been raised for children born during the COVID-19 pandemic.

"Our findings reinforce the importance of the prenatal environment for brain health and for reducing risk of psychiatric symptoms in childhood. This brings increased urgency to the need to discover, develop and implement early life interventions that mitigate some of these risks," says Roffman, who is also an associate professor of Psychiatry at Harvard Medical School (HMS).

Improving child brain development and psychiatric health is the main goal of the Mass General Early Brain Development Initiative, a multidisciplinary collaboration among staff in the Departments of

Psychiatry, Obstetrics, Pediatrics and Medicine.

**More information:** *PLOS ONE* (2021). [DOI: 10.1371/journal.pone.0250235](https://doi.org/10.1371/journal.pone.0250235)

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