Press release: European College of Neuropsychopharmacology (ECNP) congress, Copenhagen

Children of anxious mothers twice as likely to have hyperactivity in adolescence

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Type of study: some of the work is peer reviewed/observational study/people

A large study has shown that children of mothers who are anxious during pregnancy and in the first few years of the child's life have twice the risk of having hyperactivity symptoms at age 16. This work is being presented for the first time at the ECNP Congress in Copenhagen.

Scientists know that foetal and early life conditions can have long-term effect on subsequent health. Now a long-term study of more than 3000 children in the Avon Longitudinal Study of Parents and Children (ALSPAC) has shown that maternal anxiety is associated with hyperactivity in their children, although the link with other ADHD symptoms such inattention is more tenuous.

ALSPAC is a long-term project based in Bristol UK, which allows scientists to track how children's health changes over time. The study recorded reported levels of some physical symptoms of anxiety such as sweating, trembling, dizziness, and insomnia in 8727 mothers in the period between early pregnancy and her child reaching 5 years of age.

The researchers were able to classify the mothers' anxiety levels, depending on how often the mothers reported signs of physical anxiety. Very broadly, the women fell into low anxiety, medium anxiety, or high anxiety class.

The researchers then checked how children performed in attention tests (when they reached 8 and a half years of age), and found that there was no difference between children in attention, no matter how anxious the mothers had been. However, testing a larger group of 3199 children at the age of 16 showed that there was a significant difference in hyperactivity symptoms, depending on how anxious the mother had been.

On average a child from a mother who had expressed moderate or high anxiety was around twice as likely to show symptoms of hyperactivity from a mother with low anxiety* Adjusting for social and demographic factors showed a similar correlation**. This means that 11% of the children from 'high anxiety" mothers, and 11% of children from 'moderate anxiety' mothers showed symptoms of hyperactivity. Only 5% of children from 'low anxiety' mothers showed hyperactivity symptoms.

Dr. Blanca Bolea, led the study when she was at the University of Bristol. She is now

Assistant Professor at the University of Toronto in Canada. She said:

"This is the first time that a study has shown that anxiety is linked to a child's hyperactivity in later life but that inattention is not linked. One interpretation is that some symptoms of ADHD are associated with the mother's anxiety, but not all of them. More broadly, it shows that the stresses a mother experiences can show up in her child nearly a generation later; it is worth noting that all the mothers reported an increase in anxiety during pregnancy*. Around 28% of the women we tested showed medium or high anxiety. We controlled for hyperactivity in 3199 children in total, and found that 224 children showed signs of hyperactivity, with the rate of hyperactivity being more than doubled if the mother had suffered from medium or high anxiety".*

This is an association, so we can't 100% say that anxiety symptoms in pregnancy and early life causes later hyperactivity, other genetic, biological or environmental effects may be at play. However, this idea is supported by studies in animals. We're not sure why this might happen. It could be a that the children are responding to perceived anxiety in the mother, or it could be that there is some biological effect which causes this, for example stress hormones in the placenta having an effect on a developing brain. ADHD is a controversial illness, and there doesn't seem to be any single cause, though we know it can be hereditary. This work shows that maternal anxiety is one factor which is linked to ADHD, but we need some more research to confirm this and other causes"

Commenting, Professor Andreas Reif (University Hospital, Frankfurt) said:

"This is a very interesting study, especially given the longitudinal and transgenerational character and its large sample size. As with all studies of this design, one however must be caution not to mix association with causation. As we know that ADHD and anxious traits are correlated on the genetic level (see Demontis and colleagues, 2019), the finding could well be reflective of shared genetic influences. However, it is also important to stress that this study is not on anxiety disorders or ADHD, but rather on traits related to these disorders. For sure these data however further add to emerging picture that ADHD / hyperactivity, anxiety and bipolar disorder (Meier et al., Br J Psychiat 2018) are linked."

This is an independent comment; Professor Reif was not involved in this work

Notes

*(OR=2.27,p<0.001 for the class with moderate anxiety and OR=2.23, p=0.003 for the class with high anxiety).

*** (OR=2.09, p<0.001 for moderate anxiety, and OR=1.90, p=0.023 for high anxiety).

ENDS

Notes for Editors

European College of Neuropsychopharmacology (ECNP)

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: www.ecnp.eu

The 31st annual ECNP Congress takes place from 7th to 10th September in Copenhagen. It is Europe's premier scientific meeting for disease-oriented brain research, annually attracting up to 6,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: https://2019.ecnp.eu/

Conference abstract

Maternal trajectories of anxiety in the perinatal period and hyperactivity and inattention in children (poster 532), B. Bolea-Alamanac1, S. Davies2*1University of Toronto, Department of Psychiatry, Toronto, Canada2university of Toronto, Dept. of Psychiatry, Toronto, Canada*

Background: Maternal mental health influences child development. Maternal depression has been linked to dysfunctional attachment and externalizing and internalizing behaviours in children [1]. This association has been shown to persist to adolescence and mediate other outcomes such as exposure to social violence [2]. Maternal stress during pregnancy, measured by number of negative life events has been associated with hyperactivity and pervasive developmental disorders [3]; though not all studies have found evidence for this association . Less is known, however, about the effect of anxiety symptoms during pregnancy and early years and behavioural outcomes in children. Early exposure to maternal anxiety may predispose children to certain behaviours [4, 5].The aim of this study was to investigate maternal trajectories of somatic anxiety during pregnancy and after delivery and their relationship with hyperactivity and inattention symptoms in the offspring.

Methods: A latent class analysis was performed using data on maternal somatic anxiety obtained from early pregnancy up to the child's fifth birthday (N=8,725). Posterior probabilities for each trajectory were calculated and included in a logistic regression model with child hyperactivity and inattention symptoms measured with the Strengths and Difficulties Questionnaire (SDQ) at 16 years(N=3,417) and results on three subtests of everyday attention in children (TEA-Ch) at age 8.5 years as outcomes (Sky search, Sky search Dual Test and Opposite Worlds).

Results: All women increased anxiety symptoms during pregnancy. The best model produced three distinct classes: "low anxiety", "moderate anxiety" and "high anxiety". The classes with moderate and high maternal anxiety were associated with hyperactivity symptoms in children at age 16, while the class with low maternal anxiety was not associated with hyperactivity (OR=2.27,p<0.001 for the class with moderate anxiety and OR=2.23, p=0.003 for the class with high anxiety). Adjusting for sociodemographic factors attenuated the strength of the association with hyperactivity but still yielded the same results(OR=2.09, p<0.001 and OR=1.90, p=0.023). Maternal anxiety trajectory was not associated with any of the TEA-Ch subscores before or after adjustment (β=-0.03, p=0.680, β-=0.21, p=0.186 for the Sky Search subtest, β=-0.029, p=0.971 and β=0.77,p=0.642 for the Sky Search Dual Test and β=0.46, p=0.220 and β=0.17, p=0.827 for the Opposite Worlds subtest, all results unadjusted).

Conclusions: Maternal somatic anxiety during pregnancy and early childhood contributes to child hyperactivity but not to inattention symptoms. The differential effect may be related to specific pathophysiological mechanisms related to foetal neural programming during pregnancy or may be related to later perinatal modelling effects that affect hyperactivity symptoms specifically. This highlights the importance of specific maternal anxiety symptoms in pregnancy and during the first years of development in the behavioural outcomes of children. Interventions aimed at identifying and supporting women at risk of anxiety may benefit not only the women targeted but also their children.

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