

# Maternal smoking could lead to an increased risk for Tourette syndrome and tic disorders

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A study published in the September 2016 issue of the *Journal of the American Academy of Child and Adolescent Psychiatry (JAACAP)* found an association between maternal smoking during pregnancy and an increased risk for Tourette syndrome and other chronic tic disorders. The link seems especially strong for complex presentations of Tourette syndrome in which two or more psychiatric disorders are present.

Smoking while pregnant has been associated with several behavioral manifestations in children, including neuropsychiatric difficulties such as chronic tic disorders and attention-deficit/hyperactivity disorder (ADHD). However, reasons for this association have not been fully elucidated. For example, mothers who smoke during pregnancy have a higher chance of having a psychiatric disorder, so it may be that the risk for psychiatric disorders is transferred from parent to child by genetic factors or environmental factors that are not directly related to smoking. Maternal smoking is also associated with prematurity and lower birth weight, which may, in turn, be a risk factor for subsequent behavioral problems in the child. Furthermore, parental smoking is associated with lower socioeconomic status and higher rates of alcohol and substance use, and these factors are also linked to behavioral changes in children.

Developing a clear understanding of both the risks for [behavioral problems](#) in children and then the mechanisms by which these risk factors operate is a complex undertaking that benefits from very large epidemiological samples and ongoing, rather than retrospective, data collection. These research methods use more reliable data and are less

prone to bias.

A collaboration between a group of researchers at the Icahn School of Medicine at Mount Sinai, New York, USA, and Aarhus University, Aarhus, Denmark, used longitudinal data collected in the Danish National Birth Cohort and the Danish national health registers to address questions about the relationship between maternal smoking and two related disorders: chronic tic disorders, which include Tourette syndrome, and pediatric obsessive-compulsive disorder (OCD). The team looked at data from 73,073 pregnancies, focusing on maternal smoking (including light versus heavy smoking) and children presenting with chronic tic disorders or pediatric OCD.

Because of the detailed information available from the Danish National Birth Cohort, the team was able to correct for factors associated with maternal smoking, including [maternal age](#), presence of maternal psychiatric disorders, [socioeconomic status](#), consumption of beer, wine, spirits, coffee, and hashish during pregnancy, gestational age and birth weight, and partner smoking. In addition, given the rich psychiatric information in the Danish health registers, the team was able to assess the association between maternal smoking and emergence in the child of either chronic tic disorders or "complex" chronic tic disorders, the latter defined as chronic tic disorders that occur along with other comorbid psychiatric conditions.

The researchers found that maternal smoking is associated with increased risk for chronic tic disorders in the child, after correcting for many other factors. This finding was most evident in the case of heavy [maternal smoking](#) (10 or more cigarettes a day) during pregnancy. In these instances, the researchers observed a 66% increased risk for chronic tic disorders in the child. In addition, the team observed that heavy smoking was associated with a 2- to 3-fold increased risk of chronic tic disorders occurring with other psychiatric diagnoses in the

child ("complex" chronic tic disorders), such as ADHD. The studies in pediatric-onset OCD showed similar trends, but, because not all children had passed through the age of risk for this disorder, there was a smaller number of diagnosed cases, and conclusions from those analyses were less certain.

"Identifying environmental causes for chronic tic disorders and related psychiatric conditions is important because if we know specific risk factors, we can develop more effective strategies for prevention," said Dorothy Grice, MD, professor at the Icahn School of Medicine and senior author on the study.

"The next step is to understand how these environmental factors exert their effects on risk, as this will provide a window into the biological mechanisms that underlie these conditions. As we learn more about the neurobiological pathways that underlie a specific disorder, we will be better positioned to develop more specific and targeted treatments. Our study not only shows an important role for maternal prenatal smoking in risk for both simple and complex chronic tic disorders in children, but it also suggests that smoking may be exerting some of its effects through subtle changes in brain development that might occur as a result of fetal exposure to nicotine."

Further study on how smoking and nicotine exposure alters brain development may offer insight into the brain changes that lead to these outcomes. In the meantime, educational and treatment programs that support mothers to reduce and eliminate smoking during pregnancy will have beneficial effects for both the mother and the child.

**More information:** Heidi A. Browne et al, Prenatal Maternal Smoking and Increased Risk for Tourette Syndrome and Chronic Tic Disorders, *Journal of the American Academy of Child & Adolescent Psychiatry* (2016). [DOI: 10.1016/j.jaac.2016.06.010](https://doi.org/10.1016/j.jaac.2016.06.010)

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