Kids might get ADHD if their mothers have taken a lot of paracetamol

Heavy use of the common pain and fever reliever paracetamol during pregnancy could have an effect on the development of ADHD. Norwegian researchers found genetic changes among the offspring of women who took paracetamol at least 20 days of their pregnancies.

Several population studies have shown a connection between extensive use of paracetamol during pregnancies and an elevated risk of development disturbances in the brain, such as ADHD.

Yet no one had understood how paracetamol can disturb foetal development.

A Norwegian study has discovered a connection between paracetamol and changes in the regulation of genes, known as epigenetic mechanisms.

Ground-breaking

The results show that extensive use of paracetamol during a pregnancy impacts specific genes in the infant which can be turned on or off in the foetal stage. These are genes involved in the development of ADHD.

The Norwegian Institute of Public Health claims in a press release that the finds are ground-breaking.

“The study indicates that the quantities a mother takes of paracetamol can have an impact on children who are predisposed toward developing ADHD,” says Researcher Kristina Gervin the University of Oslo’s School of Pharmacy Oslo to forskning.no.

The researchers did not find the genetic changes in all children who developed ADHD, only in the ones whose mothers had used a lot of paracetamol.

Analysed umbilical cord blood

The researchers used information about the mothers’ usage of medications in a questionnaire from the Norwegian Mother and Child Cohort Study (MoBa) and combined it with ADHD diagnoses from the Norwegian Patient Register.

Then they analysed blood taken from umbilical cords to see if any had the genetic changes that can affect the switching of genes on or off during foetal development.

Found changes linked to ADHD

The medical researchers came across a link between women’s use of paracetamol and genetic changes among children with ADHD. But this link was only seen if the mother had used the painkiller at least 20 days of her pregnancy.
The genes that showed the biggest changes are related to oxidative stress and neurological processes. Earlier studies have shown these genes to be involved in ADHD.

“These are complex relationships, but for instance these are genes connected to the development of neurons in the brain and the transmission of nerve signals,” explains Gervin.

Other causes taken into account

Paracetamol (acetaminophen) is a widely used over-the-counter medication used for reduction of pain and lowering fevers.

"Can you rule out that the differences were caused by the reasons why the mothers took so painkillers so much, for instance some illness?"

“We have tried to adjust for other possible factors among the mothers,” says Gervin.

But the researchers cannot fully rule out that some other factor has been involved.

It could have been some disease the mother had, or alternative genetic or family conditions.

“Such connections are usually very complicated and it is hard to draw absolutely indisputable conclusions regarding causality,” says Gervin.

When during the pregnancy

The researchers lacked information about when during a pregnancy it is especially hazardous to use too much paracetamol.

“This was because the mothers who used paracetamol excessively used it throughout the pregnancy,” says Gervin.

So it is uncertain whether the foetuses were affected early or late in the pregnancies.

Intakes of paracetamol 20 times in the course of 40 weeks mean that the mother took the drug at least once every other week during her pregnancy.

No warning yet

"Should pregnant women stop taking paracetamol?"

“There is nothing indicating that sporadic use of paracetamol is harmful for the foetus and it still the first choice if a painkiller is needed during a pregnancy.”

Alternative pain relievers such as Ibux (ibuprofen) and Naproxen are probably worse for pregnancies.

“It would be jumping the gun to change recommendations regarding what medications can be taken during pregnancies. More studies would be needed to do that,” she says.

Stem cell research

Gervin is now engaged in laboratory studies of stem cells to find out whether paracetamol really does change cells and neurological development.
We know that many medications work via epigenetic mechanisms, for instance some medications for treating cancer.

“But we still know little about undesired epigenetic side-effects from medications,” says Gervin.

This study was carried out through collaboration among the University of Oslo (UiO) Institute of Clinical Medicine, the UiO School of Pharmacy and the Norwegian Institute of Public Health.