The Challenge
Maternal smoking during pregnancy has been linked to an increased risk for obesity in the child. Any connection between maternal smoking and childhood obesity may be confounded, i.e. explained by a third factor which is related to both smoking and obesity. For example, mothers from poorer communities are more likely to smoke and their children are at increased risk for obesity. A second example is that people who smoke are more likely to have a lifestyle which can lead to obesity (diet and activity) and a child’s lifestyle is a reflection of that of their parents.

To prove that maternal smoking actually causes childhood obesity, a study would ideally compare obesity rates between groups where one group of mothers quit smoking before or early in pregnancy and a second group did not quit. This type of study is extremely hard to do due to the challenge in helping pregnant mothers to quit and the need to wait for five years to see if the children become obese or not.

An alternative is to do a sibling comparison study. This type of study asks the question “if a mother starts smoking between pregnancies, is the younger sibling (i.e. the one exposed to products of tobacco smoke) at increased risk for obesity compared to their older sibling (who was not exposed)?

Whilst this type of study does not prove that maternal smoking causes childhood obesity, it does partly get around the problem of confounding, assuming that their deprivation and lifestyle remain constant. This type of study does require a lot of children and is therefore well-suited to analysis of routinely acquired data.

The Research
The Aberdeen Maternity and Neonatal Databank (AMND) holds details of mothers who have delivered their babies at Aberdeen Maternity Hospital since the 1950s. Researchers from the University of Aberdeen linked maternal details, including smoking status, to the Study of Trends in Obesity in children in North East Scotland (STONES). The STONES database holds routinely acquired height and weight data of children as they enter primary school at the age of 5-6 years.

Within the linked AMND-STONES dataset they were able to identify mothers whose smoking status was known and who delivered two children whose body mass index (BMI) was determined in early childhood. Maternal smoking status was by self-report in early pregnancy. Their analysis considered the following factors as possible confounders: deprivation, maternal obesity, maternal weight gain between pregnancies, maternal age and the child’s sex and age.

The Results
Maternal smoking status in successive pregnancies was linked to child BMI at age 5 years in 6,581 mother-child pairs of whom 718 included sibling pairs. Children whose mothers had quit, started smoking or smoked in consecutive pregnancies had higher BMI compared to those not exposed to maternal smoking. Siblings born after onset of maternal smoking had a higher BMI compared to unexposed older siblings. The younger siblings had a higher BMI score compared to older siblings born to mothers who smoked in both pregnancies.

The Impact
This work adds further evidence to the theory that maternal smoking during pregnancy causes childhood obesity. There are many very good reasons for pregnant mothers to be helped to quit smoking, and with this evidence, preventing childhood obesity is an additional reason for encouraging mothers to stop smoking before or during pregnancy.

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