

## **Fetal exposure to moderate/high caffeine levels linked to excess childhood weight gain**

*Should mums-to-be cut out caffeine altogether, ask the researchers?*

Exposure to moderate to high caffeine levels while in the womb is linked to excess weight gain in early childhood, suggests a large observational study published in the online journal **BMJ Open**.

The findings, which back general advice to limit caffeine intake while pregnant, prompt the researchers to query whether mums-to-be should cut out the world's most widely consumed central nervous system stimulant altogether.

Caffeine passes rapidly through tissues, including the placenta, and takes the body longer to get rid of during pregnancy. It has been linked to a heightened risk of miscarriage and restricted fetal growth.

The researchers wanted to try and find out if caffeine intake during pregnancy might also be associated with excess weight gain in the child's early years.

They therefore drew on just under 51,000 mother and infant pairs, all of whom were part of the Norwegian Mother and Child Cohort Study between 2002 and 2008.

At 22 weeks of pregnancy, the mums-to-be were asked to quantify their food and drink intake from among 255 items, including caffeine, using a specially adapted Food Frequency Questionnaire.

Sources of caffeine included coffee, black tea, caffeinated soft/energy drinks, chocolate, chocolate milk, sandwich spreads; and desserts, cakes, and sweets. Daily intake was grouped into: 0-49 mg (low); 50-199 mg (average); 200-299 mg (high); and 300 + mg (very high).

Their children's weight, height, and body length were subsequently measured at 11 time points: when they were 6 weeks old; at 3, 6, 8, and 12 months; and then at 1.5, 2, 3, 5, 7, and 8 years of age.

Excess weight gain was assessed using World Health Organization criteria, while overweight and obesity were assessed according to International Obesity Task Force criteria. Growth trajectories for weight and length/height were calculated from the age of 1 month to 8 years using a validated approach (Jenss-Bayley growth curve).

Just under half of the mums-to-be (46%) were classified as low caffeine intake; 44 percent as average intake; 7 percent as high; and 3 percent as very high.

The higher the intake, the greater was the likelihood that the mother was older than 30, had had more than one child, consumed more daily calories, and smoked during her pregnancy. And women with a very high caffeine intake during their pregnancy were more likely to be poorly educated, and to have been obese before they got pregnant.

Average, high, and very high caffeine intake during pregnancy were associated with a heightened risk—15, 30, and 66 percent, respectively—of faster excess growth during their child's infancy than low intake, after taking account of potentially influential factors.

And exposure to any caffeine level while in the womb was associated with a heightened risk of overweight at the ages of 3 and 5 years, although this persisted only for those 8 year olds whose mums had had a very high caffeine intake during their pregnancy.

Children exposed to very high levels of caffeine before birth weighed 67-83 g more in infancy (3-12 months); 110-136 g more as toddlers; 213-320 g more as pre-schoolers (3-5 years); and 480 g more at the age of 8 than children who had been exposed to low levels.

This is an observational study, so it can't confirm causality, while questionnaires can only provide a snapshot in time of dietary behaviour.

Nevertheless, the researchers point to the large sample size, the consistency of their findings, and a plausible biological explanation—fetal programming.

“Maternal caffeine intake may modify the overall weight growth trajectory of the child from birth to 8 years,” the write.

“The results add supporting evidence for the current advice to reduce caffeine intake during pregnancy and indicate that complete avoidance might actually be advisable,” they add.