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Fetal tobacco exposure and adult cardiovascular disease risk

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Background: Pre-natal environment and cardiovascular disease risk in adulthood have been studied primarily in relation to markers of growth, such as birth-weight or gestational age. Fewer studies examine pre-natal exposures, such as maternal smoking, in relation to cardiovascular risk, although there is some evidence that the risk of obesity increases with fetal exposure to tobacco. The aim of this study is to establish whether maternal smoking in pregnancy is associated with cardiovascular disease risk in mid-life, and if so, whether the association is mediated by body mass index.

Methods: 8772 cohort members of 1958 British birth cohort participating in biomedical survey at age 44-45 years and with data on maternal smoking in 1958. Maternal smoking was defined as >1 cigarette/day smoked after 4th month of pregnancy. Body mass index (BMI), systolic and diastolic blood pressure, HbA1c, total and high density lipoprotein (HDL) cholesterol, triglycerides and fibrinogen were measured at the biomedical survey.

Results: In sex-adjusted linear regression models, maternal smoking was significantly associated with all cardiovascular risk factors except total and HDL cholesterol, such that those exposed to tobacco in utero had increased systolic and diastolic blood pressure, HbA1c, BMI, triglycerides, and fibrinogen. Associations attenuated only slightly with adjustment for own smoking behaviour, although for fibrinogen the association was no longer significant. Adjustment for concurrent BMI abolished all associations between maternal smoking and cardiovascular risk factors.

Implications: Exposure to tobacco in utero is associated with adiposity in adult life, and thereby, appears to influence several cardiovascular risk factors.