

The effect of maternal obesity and gestational diabetes on pregnancy course and outcome pose a significant public health concern, due to potential long-term influence on the offspring health. As previously reported, maternal obesity and gestational diabetes are associated with increased risk of child early weight gain. In addition, gestational diabetes is associated with abnormal fetal development leading to macrosomia, heart muscle hypertrophy and heart dysfunction. Epidemiological studies suggest that the prenatal environment and abnormal fetal growth could permanently affect fetal heart development with long-term implications for cardiovascular health.

This hypothesis, known as fetal programming, was first introduced by the British epidemiologist David Barker, based on the association between low birth weight and increased risk of coronary heart disease in the adult life. However, it remains an open question, whether maternal obesity and gestational diabetes directly disturb fetal cardiovascular development, increasing the risk of cardiovascular diseases in later life.

Our project aims to assess the transgenerational effect of maternal obesity and gestational diabetes on offspring cardiovascular system and cardiovascular risk profile at six years of age.

In our study, we will assess 201 mother-child pairs, a subgroup of the RADIEL trial (the Finnish Gestational Diabetes Prevention Study). RADIEL is a randomized controlled multi-centre interventional trial conducted among women with increased risk of gestational diabetes. The subgroup assessed in our study was recruited aiming for the balanced occurrence of mothers with and without gestational diabetes.

Our project focus on non-invasive imaging of heart structure and function in the offspring. We will assess heart chamber dimensions, left ventricle mass, and multiple parameters of systolic and diastolic heart function, utilizing conventional and advanced echocardiography (including Tissue Doppler and Strain Imaging). Moreover, in both mothers and child, we will evaluate body size and composition parameters (height, weight, thigh and waist circumferences, lean and fat body mass), blood pressure, blood glucose and lipid indices.

Based on collected data we will evaluate the effect of maternal pre-pregnancy adiposity and gestational diabetes on offspring body size and composition, as well as heart structure and function in early childhood, adding to our current understanding of fetal programming phenomenon. We will also provide an insight into transgenerational transmission of cardiovascular risk factors.