

Diabetes in pregnancy

- long-term implications for the offspring

Tine Dalsgaard Clausen

Department of Obstetrics
The Juliane Marie Centre, Rigshospitalet
Faculty of Health Sciences
University of Copenhagen
Denmark

1.1 Summary in English

The epidemic of obesity and type 2 diabetes has major impact on public health and underlines the urgency for identification of risk groups to target preventive strategies. Studies of developmental origins of health and disease have highlighted the possible role of intrauterine exposure to maternal diabetes in the pathogenesis of overweight, type 2 diabetes and cardiovascular disease. Furthermore diabetes in pregnancy may also affect cognitive function in the offspring.

The overall aim of this PhD thesis was to provide knowledge of the long-term implications for the offspring of exposure to diabetes in utero in a primarily Caucasian population.

The thesis comprises a review and three original papers (I, II and III). In our own studies we evaluated the risk of type 2 diabetes/prediabetes (Paper I), the risk of overweight and the metabolic syndrome (Paper II) as well as the cognitive function (Paper III) in 18-27 year old offspring of women with gestational diabetes mellitus (GDM) or pre-gestational type 1 diabetes. Overall we examined 597 offspring from these two groups and from two un-exposed

control groups. All three papers have focus on potential associations between maternal glucose metabolism during pregnancy and offspring outcome.

We found that offspring of women with GDM had eight-fold higher risk of type 2 diabetes/prediabetes, two-fold higher risk of overweight and five-fold higher risk of the metabolic syndrome than offspring from the background population. Offspring of women with type 1 diabetes during pregnancy had four-fold higher risk of type 2 diabetes/prediabetes and more than doubled risk of overweight and the metabolic syndrome compared with the background population. Furthermore, offspring in these two groups obtained lower scores in cognitive tests and had a three-fold increased risk of cognitive deficits compared to offspring from the background population.

We found several associations between estimates of maternal glucose metabolism during pregnancy and adverse outcome in the offspring. These findings support the hypothesis that a hyperglycaemic intrauterine environment may play a pathogenetic role in type 2 diabetes, overweight and the metabolic syndrome in addition to genetics and other risk factors.

Intrauterine hyperglycaemia may also affect offspring cognitive function, but the impaired cognitive function seemed primarily explained by confounders.

Women with gestational diabetes or type 1 diabetes during pregnancy should be informed about the excess risk of overweight, type 2 diabetes and the metabolic syndrome in their offspring, and preventive strategies towards diabetes and cardiovascular disease are urgently needed in the next generation.

