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Association between maternal hyperglycaemia and childhood obesity in a Scottish population

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Many environmental and biological factors are believed to play a role in the development of childhood obesity. It has been reported that foetal development in a diabetic intrauterine environment results in foetal macrosomia (birth weight >4000 g), as stimulation of insulin secretion can result in hypertrophy of adipose tissue, skeletal and myocardial muscle⁽¹⁾. It may also be positively associated with higher risk of childhood obesity⁽²⁾.

The present study investigates the prevalence of maternal hyperglycaemia during pregnancy and its association with childhood obesity in the fourth year and sixth year of life within a Scottish population using the longitudinal Growing Up in Scotland (GUS) Birth Cohort ($n = 5217$) and Child Cohort ($n = 2859$) surveys. Maternal hyperglycaemia status during pregnancy was determined using variables that collected information on gestational diabetes mellitus (GDM) status and diabetes mellitus (DM) status. Multiple logistic regression models were created to explore associations between infant feeding, maternal GDM status, maternal DM status, birth weight of infant and/or maternal education with childhood obesity.

In the birth cohort, 0.5% ($n = 28/5217$) and 0.6% ($n = 30/5217$) of maternal cases reported having received medical attention for GDM or DM during pregnancy, respectively. In the child cohort, 0.9% ($n = 27/2859$) GDM cases and 0.6% ($n = 16/2859$) DM cases were observed. A significant positive association between maternal GDM and childhood obesity in the fourth year of life after controlling for birth weight, infant feeding and education (AOR 3.5, 95% CI: 1.2, 10.3) was observed in the birth cohort. Similarly in the child cohort, maternal GDM was positively associated with childhood obesity in the sixth year of life (AOR 1.6, 95% CI: 0.4, 6.8). Maternal DM was positively, but not significantly, associated with childhood obesity in children in their fourth year of life (AOR 2.0, 95% CI: 0.4, 9.1) and in children in their sixth year of life (AOR 1.8, 95% CI: 0.2, 15.1). These findings call for concerted efforts by national government and their arms length agencies to raise awareness, campaign and ensure better understanding plus implementation of tailored lifestyle and nutrition management throughout our lifecycle.

1. Lawlor D, Fraser A, Lindsay R, *et al.* (2010) Association of existing diabetes, gestational diabetes and glycosuria in pregnancy with macrosomia and offspring body mass index, waist and fat mass in later childhood: findings from a prospective pregnancy cohort. *Diabetologia* **53**, 89–97.
2. Hillier T, Pedula K, Schmidt M, *et al.* (2007) Childhood obesity and metabolic imprinting: the ongoing effects of maternal hyperglycemia. *Diabetes Care* **30**, 2287–2292.