Gestational Diabetes Mellitus in Mothers as a Diabetes Predictor in Fathers: A Retrospective Cohort Analysis

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In women, there is a sevenfold risk increase for type 2 diabetes in the years following a pregnancy complicated by gestational diabetes mellitus (GDM) (1,2). We hypothesized that GDM also signals diabetes risk in men. Consistent with this possibility, prior studies demonstrate partners to be concordant for changes in weight (3) and physical activity (4), as well as for diabetes (5). No previous study has assessed a link between GDM in mothers and diabetes incidence in fathers.

This retrospective cohort study combined information from health administrative, birth, and death registry data from the Canadian province of Quebec (universal health insurance). Randomly selected singleton live births (1 April 1990 to 31 December 2007) with two or more diagnostic codes for GDM in mothers (ICD-9 and -10) were matched to births without GDM (year of delivery, mother’s age-group, health region). Incident diabetes in fathers was evaluated from mother’s postdelivery discharge from hospital to the father’s departure from Quebec, death, or end of study period (31 March 2012). Diabetes was defined as 2 or more outpatient diabetes diagnoses or one hospital discharge diabetes diagnosis within a 2-year period. Comorbid condition information was based on data from the 3 years prior to the mother’s postdelivery discharge date (i.e., index date). Procedures were reviewed and approved by the Quebec Access to Information Commission (Commission d’accès à l’information du Québec) and the institutional review board of the McGill University Health Centre.

Most of the 70,890 fathers (50% partners with GDM) were under 40 years of age at baseline (87% vs. 87.8%), lived with their partner (93.1% vs. 91.5%) as suggested by concordant health administration territory, and shared the partner’s ethnocultural background (91.5% vs. 90.9%). More fathers with partners with GDM lived in socioeconomically deprived neighborhoods (43.3% vs. 37.3% from two most deprived quintiles) and were of non-European background (23.3% vs. 18.1%). More partners with GDM had prior pregnancies (50.7% vs. 28.2%).

Figure 1—Kaplan-Meier analysis of diabetes-free survival in fathers.
Over a mean of 13 years (SD 5.3), diabetes incidence was 4.01 per 1,000 person-years (95% CI 3.83, 4.20) in fathers whose partners had GDM and 3.03 per 1,000 person-years (95% CI 2.87, 3.19) in fathers whose partners did not (Fig. 1). This corresponded to 1,838 fathers with partners with GDM compared with 1,397 fathers with partners without GDM (5.2% vs. 3.9%). A Cox regression model demonstrated that diabetes incidence was 33% higher in fathers with partners with GDM (hazard ratio [HR] 1.33; 95% CI 1.24, 1.43). Results were similar when follow-up was truncated when health administrative territories of partners were discordant (HR 1.31; 95% CI 1.18, 1.44). There was some attenuation in adjusted models (HR 1.18; 95% CI 1.09, 1.27; adjusted for age, comorbid conditions, cohabitation, ethnocultural background, deprivation level). We did not have information on adiposity or physical activity levels; concordance for these factors likely underpins the link between GDM and incident diabetes in fathers.

In conclusion, GDM in mothers signals incident diabetes in fathers. This is partly mediated by shared deprivation level and ethnocultural background. GDM may be leveraged as a tool to enhance diabetes detection and prevention in fathers.

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