

Mothers at increased risk for gestational diabetes in Massachusetts



Isabel A. Cáceres, MMath

Division of Research and Epidemiology, Massachusetts Department of Public Health

Objective: Identify women who are at an increased risk for gestational diabetes in Massachusetts

Background

- Gestational diabetes mellitus (GD) is associated with:
 - Immediate pregnancy complications
 - Increased risks for subsequent development of maternal and infant overt diabetes.
- Maternal, infant, and pregnancy characteristics contributing to gestational diabetes mellitus are poorly understood.

Methods

- **Population:**
 - Resident birth certificates of all Massachusetts live births, 2004-2005 (N= 143,537)
- **Exclusions:**
 - Certificates reporting diabetes mellitus
 - Certificates with unknown gestational diabetes
- We analyzed the following characteristics:
 - **Maternal:** age, educational attainment, race, ethnicity, place of birth, cesarean history
 - **Infant:** infant birth weight (BWT), gestational age
 - **Pregnancy:** parity, plurality, labor/delivery complications
- Logistic regression was used to model the probability of developing gestational diabetes. The characteristics mentioned above were grouped and entered as independent variables.
- Adjusted odd ratios (aOR) with 95% confidence intervals (95% CI) were used to identify vulnerable groups that are at increased risk for the development of gestational diabetes.

Limitations

- Gestational diabetes may be under-reported in birth certificates
- Reporting bias may occur for cases presenting symptoms vs. those without symptoms
- The GD rate among multiples is inflated as multiple births are accounted for more than once

Results

- The proportion of mothers developing gestational diabetes among Massachusetts resident women increased by 23%, between 2000 and 2005 (Figure 1).
- In 2004-2005, 3.5% (5,061 of 143,537) of Massachusetts women delivering a live birth developed gestational diabetes.
- The proportion of mothers developing gestational diabetes varies by maternal (Figure 2), infant (Figure 3), and by combined maternal/infant characteristics (Figure 4).
- After controlling for all the other variables, groups of Massachusetts pregnant women with increased odds of gestational diabetes include (Table 1):
 - Age >35 yrs (OR: 4.12, 95%CI:3.69-4.60)
 - Haitian Ethnicity (OR:1.80, 95%CI:1.30-2.74)
 - Multiples (OR:1.36, 95%CI:1.20-1.54)
 - Infant BWT>4,090g (OR:1.46, 95%CI:1.32-1.61)
 - Prior cesarean (OR:1.27, 95%CI:1.17-1.36)

Conclusions

- Massachusetts women increase their risk for gestational diabetes
 - Increased maternal age
 - Lower educational attainment
 - Asian-Indian, Portuguese, and Haitian ethnicity
- Infant birth weight may vary by ethnicity despite gestational diabetes diagnosis.
- Gestational diabetes is associated with
 - Big babies (infant birth weight >4090g or >9 lbs)
 - Multiples
 - Complications at labor and delivery
 - Early delivery
 - Prior cesarean

Public Health Implications

- Programs that assess women at risk for gestational diabetes may need to incorporate maternal age, education, ethnic, and cultural environments in order to reduce disparities.
- Differing infant birth weight may affect appropriate surveillance of infants at future risk for diabetes.

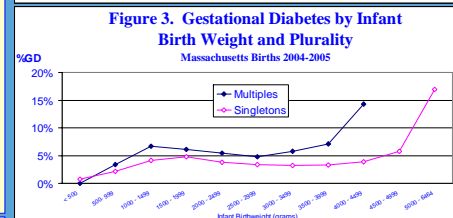
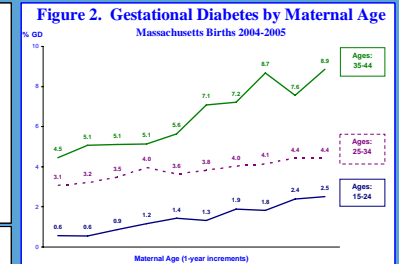
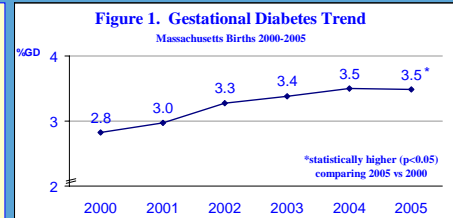
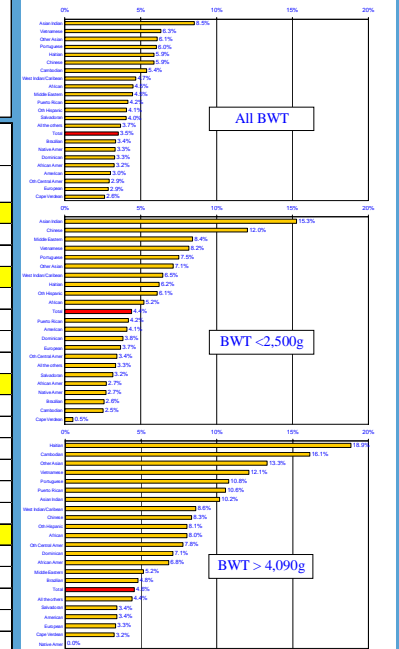


Figure 4. Gestational Diabetes by Maternal Ethnicity and Infant Birth Weight Massachusetts Births 2004-2005

Table 1. Adjusted Odds Ratios (aOR) and 95% Confidence Intervals for GD			
Characteristic	Effect on GD	aOR	95% CI
Maternal Age	35+ vs <25	4.12	3.69, 4.60
	25-34 vs <25	2.72	2.46, 3.01
Maternal Education	Less than high school vs Postgrad	2.10	1.84, 2.41
	High school vs Postgrad	2.14	1.93, 2.37
	Associate vs Postgrad	1.95	1.76, 2.16
	Bachelor vs Postgrad	1.23	1.11, 1.35
Maternal Ethnicity	Asian Indian vs American	2.27	1.43, 3.99
	Portuguese vs American	1.96	1.71, 2.48
	Haitian vs American	1.80	1.30, 2.74
	West Indian/Caribbean vs American	1.47	1.00, 2.36
	Middle Eastern vs American	1.42	1.12, 1.95
	African American vs American	1.38	1.02, 2.08
Infant/Pregnancy Characteristics	Preterm vs Full Term(37-42 wks)	1.59	1.42, 1.78
	Birth Weight (>4090g] vs [2500-4090g]	1.46	1.32, 1.61
	Multiples vs Singletons	1.36	1.20, 1.54
	Any labor/delivery Complication vs None	1.32	1.25, 1.40
	Prior-CS vs No prior-CS	1.27	1.17, 1.36



Acknowledgments: The author thanks Dr. Wanda D. Barfield, MD, MPH, Maternal and Child Health Epidemiology, Division of Reproductive Health, Centers for Disease Control and Prevention, for her assistance with research and helpful comments on this work, and to the Gestational Diabetes Working Group, Bureau of Family and Community Health, Massachusetts Department of Public Health, for their input in the initial development of this work.