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Gestational Weight Gain Prior to Glucola and Risk of Gestational Diabetes Mellitus

University of Massachusetts UMASS Medical School

UMassMemorial HEALTH CARE

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Background

- GDM complicates 4–7% of US pregnancies
- Latinas are at risk with higher rates of diabetes and obesity in Hispanic population compared to non-Hispanic whites
- Early-to-mid gestational weight gain (GWG) thought associated with increased prevalence of GDM, however 2009 Institute of Medicine (IOM) GWG guidelines concluded insufficient evidence regarding association

Objective

To investigate associations of GWG adherence as per 2009 IOM guidelines prior to 1-hour 50g glucose tolerance test (GTT), or glucola, with GDM diagnoses in Latinas.

Materials and Methods

- Retrospective chart review
- Inclusion Criteria (n=1156):
  - Hispanic women
  - Delivered by UMass Memorial faculty between 4/1/06-3/31/11
  - Received prenatal care at faculty or resident practices
- Abstracted:
  - Pre-pregnancy weight and height
  - Gestational Weight Gain (GWG) & Gestational Age (GA) most proximate to glucola
  - Results 50g Glucola & 100g GTT where appropriate
  - Relevant demographics
- GWG categorized as inadequate, appropriate or excessive according to 2009 IOM Guidelines with adjustment for GA (Table 1), for example at time of glucola at 28 weeks (Figure 1).

Figure 1. Normal weight - 2009 IOM guideline

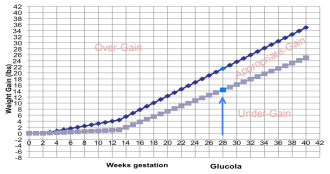


Table 1. 2009 IOM Gestational Weight Gain Recommendations

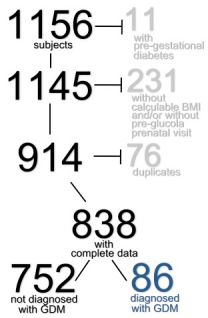
Pre-pregnancy BMI	BMI	Total Weight Gain	Rates of GWG (2nd & 3rd Δ lbs/wk)
Underweight	<18.5	28-40	1 (1-1.3)
Normal Weight	18.5 - 24.9	25-35	1 (0.8 -1)
Overweight	25.0 - 29.9	15-25	0.6 (0.5-0.7)
Obese	≥30.0	11-20	0.5 (0.4-0.6)

Results

- Subjects used in analysis (n=1156, Fig. 2)
- Demographic Characteristics, comparison between included (n=838) and excluded (n=231) subjects (Table 2). BMI (n=838, Fig. 3) and GWG Adherence (n=838, Fig. 4) of included subjects.
  - **Excluded subjects with significantly higher gravidity (p=0.049), and more Spanish-only speakers (p=0.025).**
- 86 of 838 diagnosed with GDM (10.3%, Fig. 5)
- By 2009 IOM guidelines, 13/189 (6.9%), 22/204 (10.8%) and 51/445 (11.5%) with inadequate, appropriate and excessive gain respectively diagnosed with GDM (Fig. 6). OR (95% CI) 1.07 (0.63-1.82) for overgainers and 0.61 (0.30-1.25) for undergainers.
  - **No significant association between pre-glucola GWG & GDM (p=0.211).**
- GWG Adherence of subjects with diagnosed GDM (n=86, Fig. 7).

Study Flow

Figure 2. Study Flow Diagram



Demographics

Figure 3. BMI (n=838)

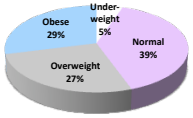


Figure 4: Adherence to IOM Guidelines (n=838)

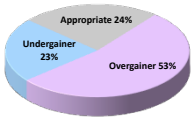


Table 2. Demographic Characteristics, Included (n=838) and Excluded (n=231) Subjects

	Included Mean±SD	Excluded Mean±SD	P-value
Age	25.25±5.91	25.81±6.30	0.211
Gravidity	2.84±1.81	3.10±1.79	**0.049**
	N (%)	N (%)	
Language Preference			**0.025**
English	626 (74.70)	157 (67.97)	
Spanish	203 (24.22)	67 (29.00)	
Other	9 (1.07)	7 (3.03)	
Education Level			**<0.001**
<8th Grade	23 (2.74)	10 (4.33)	
<High school	220 (26.25)	42 (18.18)	
HS grad or GED	256 (30.55)	54 (23.38)	
Post HSS trade or Tech School	12 (1.43)	2 (0.87)	
1-2 yrs College	98 (11.69)	15 (6.49)	
College Grad	25 (2.98)	6 (2.60)	
Grad work/Higher Degree	6 (0.72)	3 (1.30)	
Unknown	198 (23.63)	99 (42.86)	
Family History of Diabetes			**0.004**
No	459 (54.77)	138 (59.74)	
Yes	342 (40.81)	73 (31.60)	
Unknown	37 (4.42)	20 (8.66)	
Prior Pregnancy with Gestational Diabetes			0.392
No	802 (95.70)	218 (94.37)	
Yes	36 (4.30)	13 (5.63)	

Results

Figure 5. Development of GDM in all Subjects (n=838)

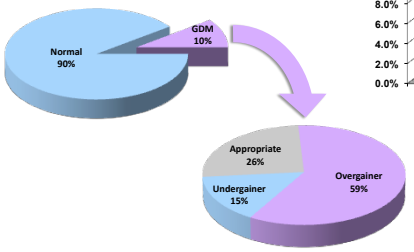


Figure 6. Percent of Undergainers, Appropriate Gainers and Overgainers Developing GDM (n=838)

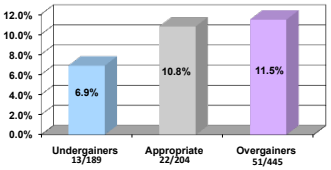


Figure 7. Percentage of GDM Cases within GWG Adherence Categories (n=86)

p=0.211

Conclusions

- Rate of GDM in preliminary cohort of Latina women almost double that of the general population (10.3%)
- Excluded subjects had more unknown demographic data (education level, family history of diabetes).
- More overgainers diagnosed with GDM than under- or appropriate gainers.
  - **Although there is a trend toward increased weight gain associated with increased gestational diabetes risk, this association was not statistically significant.**
- Further evaluation warranted within high-risk subgroups.
- Data to be combined and re-assessed with larger study from UMass Amherst.