Weight, Pregnancy, and Health Across the Generations

Naomi E. Stotland, MD
Associate Professor
Dept. of Obstetrics, Gynecology, and Reproductive Sciences
University of California, San Francisco
San Francisco General Hospital

Obesity Effects Across Generations

Obesity in pregnancy

Adult obesity

Childhood obesity

Excessive pregnancy weight gain
When to intervene to prevent/address obesity?

- Preconception?
- During Pregnancy, prenatal care?
- Postpartum?
- Early feeding, lactation?
- Childhood?
- Adolescence?
- Adulthood?

We should move our attention to the first ½ of this list.

Preconception Interventions

- Very little known, some research is ongoing
- About half of pregnancies are unintended
- Postpartum is an opportunity, with challenges
- Bariatric surgery literature supports a decrease in obesity-related pregnancy complications
Weight Gain During Pregnancy

Animal Studies

• Dams fed obesogenic diets during pregnancy have fatter offspring with long-term metabolic dysfunction
• Offspring of overfed rat dams have reduced energy expenditure and increased desire for junk food

The IOM Report and Guidelines

IOM Recommendations for Weight Gain in Pregnancy (1990)

<table>
<thead>
<tr>
<th>Pre-pregnancy BMI</th>
<th>IOM Recommended Gestational Weight Gain (lbs/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;19.8 (Low)</td>
<td>28-40 / 12.5-18</td>
</tr>
<tr>
<td>19.8 - 26.0 (Normal)</td>
<td>25-35 / 11.5 - 16</td>
</tr>
<tr>
<td>26.1 - 29.0 (High)</td>
<td>15-25 / 7 – 11.5</td>
</tr>
<tr>
<td>&gt;29.0 (Obese)</td>
<td>At least 15 / At least 6</td>
</tr>
</tbody>
</table>
The NEW IOM Report and Guidelines

IOM Recommendations for Weight Gain in Pregnancy 2009

<table>
<thead>
<tr>
<th>Pre-pregnancy BMI (kg/m²)</th>
<th>IOM Recommended Gestational Weight Gain (kg / lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5 (Underweight)</td>
<td>12.5-18 / 28-40</td>
</tr>
<tr>
<td>18.5 – 24.9 (Normal)</td>
<td>11.5-16 / 25-35</td>
</tr>
<tr>
<td>25.0 - 29.9 (Overweight)</td>
<td>7-11.5 / 15-25</td>
</tr>
<tr>
<td>≥30.0 (Obese)</td>
<td>5-9 / 11-20</td>
</tr>
</tbody>
</table>

What outcomes have been associated with INADEQUATE pregnancy weight gain?

- IUGR/SGA
- Spontaneous preterm birth and PPROM
- Neonatal morbidity (extremely low gain only)
What outcomes have been associated with EXCESSIVE pregnancy weight gain?

ANTEPARTUM OUTCOMES
• Gestational diabetes and impaired glucose tolerance
• Post-dates pregnancy

INTRAPARTUM OUTCOMES
• Prolonged labor (independent of BW)
• Primary cesarean birth (independent of BW)
• VBAC failure
• Hypertensive disorders of pregnancy

Outcomes Associated with Excessive Weight Gain

NEONATAL OUTCOMES
• Preterm birth
• Neonatal morbidity
• Childhood overweight/obesity

POSTPARTUM OUTCOMES
• Failure to initiate and/or sustain breastfeeding
• Postpartum weight retention
How common is excessive pregnancy weight gain?

In a population-based sample in 2004-05,

41.8% of normal-weight women and 64.1% of overweight women gained over the IOM recommendations.

45.9% of obese women gained more than 25 lbs.


Comparison of weight gain by BMI category between PRAMS 2002-2003, and new IOM guidelines
Does Prenatal Advice on Weight Gain Matter?

- Receiving correct advice about weight gain was associated with actual weight gain within guidelines;

- Receiving no advice about weight gain was associated with gain outside guidelines;

- About a third of women report receiving no advice about how much weight to gain.


Qualitative study of prenatal weight gain counseling

- 7 focus groups of prenatal care providers (N=52) in SF Bay Area
- Snowball sampling
- Separate groups of OBs, CNMs, and NPs
- Diversity of practice settings (private, HMO, public)
- Research questions:
  - What barriers exist to weight gain counseling?
  - How do the type of provider and patient characteristics impact weight gain counseling?
Barriers to Weight Gain Counseling among prenatal care providers

- Insufficient training on nutrition
- Concern about the sensitivity of the topic
- Concern about causing negative emotions, stress
- Perception that counseling is ineffective.
- Failure to address weight gain proactively

Stotland et al, JWH 2010

Quotes from providers

“So, I tell them not to worry [about weight gain]. That's my job, and if I feel like there's an issue, I will bring it to their attention.” -- a prenatal nurse practitioner
Quotes from providers

“If I give them numbers [of pounds to gain] and then they exceed those numbers, then they get stressed. It's not something they have that much control over, is what I really believe, so I don't want them to be more anxious.” – an OB/GYN

Quotes from providers

• “She knows how obese she is, and to bring up her weight with her – like I'm sure that’s all she ever hears or thinks and it’s so far gone that I feel like ‘Oh, there’s no point in talking to her about [cutting back on] juice.’ She’s 300 pounds.” – a certified nurse-midwife
How to overcome barriers to prenatal weight gain counseling?

- Educate providers about efficacy of counseling
- Provide tools/counseling aids to use in the clinic or at home (prompt sheets, aps, computerized tools)
- Provide culturally-appropriate messages
- Universalize weight gain counseling
- Group interventions

Interventions to Prevent Excessive Pregnancy Weight Gain

- Used diet and physical activity counseling
  Asbee study –used standard care
- Some benefit among normal-weight women

- Phelan et al – for obese, reduced postpartum weight retention but not gestational weight gain
### RCTs to Reduce Gestational Weight Gain

<table>
<thead>
<tr>
<th>Author</th>
<th>Population</th>
<th>Intervention</th>
<th>GWG/Retained Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artal, 2007</td>
<td>96 obese Missouri women w/GDM</td>
<td>Diet + Exercise</td>
<td>Yes</td>
</tr>
<tr>
<td>Claesson, 2007</td>
<td>348 obese Swedish women</td>
<td>Weekly talks + aerobics</td>
<td>Yes</td>
</tr>
<tr>
<td>Asbee, 2009</td>
<td>100 North Carolina women</td>
<td>Counseling</td>
<td>Yes</td>
</tr>
<tr>
<td>Mottola, 2010</td>
<td>65 Canadian women</td>
<td>Diet + Exercise counseling</td>
<td>Yes</td>
</tr>
<tr>
<td>Phelan, 2011</td>
<td>401 California women</td>
<td>Counseling &amp; mailings</td>
<td>− Wt Retention</td>
</tr>
<tr>
<td>Thornton, 2009</td>
<td>275 NYC women</td>
<td>Counseling w/food records</td>
<td>Yes</td>
</tr>
<tr>
<td>Wolff, 2008</td>
<td>50 Danish women</td>
<td>Ten 1 hr diet consultations</td>
<td>Yes</td>
</tr>
<tr>
<td>Polly, 2002</td>
<td>120 Pennsylvania Women</td>
<td>Counseling</td>
<td>Lean—Yes/OWt--No</td>
</tr>
<tr>
<td>Gray-Donald, 2000</td>
<td>219 Cree Canadian</td>
<td>Diet + Exercise</td>
<td>No</td>
</tr>
<tr>
<td>Guelinckx, 2010</td>
<td>195 Belgium women</td>
<td>Education + Exercise</td>
<td>No</td>
</tr>
<tr>
<td>Olson, 2004</td>
<td>560 rural New York women</td>
<td>Educational mailings</td>
<td>No</td>
</tr>
</tbody>
</table>

Obese women may need *different* interventions.
Stress and “non-homeostatic eating”

Presumed Intervention effects on mediators and outcomes

- Mindfulness—attentional skills for regulating eating and stress
  1. Mindful Eating
     - Awareness of hunger and fullness
     - Enjoyment of food
     - Urge surfing/dealing with cravings
  2. Stress reduction
     - Acceptance/approach based coping
     - Increased affect tolerance
  3. Nutrition and activity
• 168 low- to middle-income pregnant women, 18-45 years old, who are overweight/obese (BMI 25-40) and less than 20 weeks gestation at the start of the classes.
• Women who are 20-28 weeks gestation but otherwise eligible will serve as a comparison group.
• Weekly 2-hour classes for 8 weeks during pregnancy; 4 postpartum classes

Study Outcomes:
• weight gain during pregnancy
• body composition
• measures of stress, mindful eating, and well-being
**Video Doctor**

- Interactive, multi-media counseling tool
- Created by Barbara Gerbert, PhD, at UCSF
- Based on stages of change and motivational interviewing
- Used in provider’s office/clinic prior to visit
- Was found to be acceptable and effective in diverse populations, including low-literacy
- The Video Doctor actress appears on the screen in a series of video clips
- Uses complex branching logic and provides individualized counseling

**Video Doctor – *Keep Fit* Study**

- PI: Barbara Gerbert, PhD
- Collaborators: Naomi Stotland, MD; Rebecca Jackson, MD, and others
- RCT of an interactive, multi-media intervention during pregnancy to improve weight gain, diet, and exercise behaviors
- Intervention was done once mid-pregnancy with one brief booster 6 weeks later
- Predominantly low-income cohort, diverse race/ethnicity
Video Doctor – *Keep Fit*

Results

Compared to usual care group, *Keep Fit* group showed:

- Improved knowledge about nutrition
- Improved diet and exercise behaviors, including increased intake of fruits & vegetables, whole grains, and healthy fats
- Improved rate of clinician-patient discussion
- *These behavioral changes seen after one brief session with Video Doctor*
- No difference in weight gain
- Mean gestational age at enrollment = 19.4 weeks
- Intervention might prevent excessive gain if started earlier in pregnancy & repeated throughout pregnancy


(http://www.sciencedirect.com/science/article/pii/S0738399110003113)

Will aggressive weight control for obese women during pregnancy reduce child obesity?

*Is it safe?*
Ongoing Studies

University of Adelaide, Australia
RCT of 2500 overweight & obese women, limiting gain to 0-5 kg
Collecting data on body composition and cardio-metabolic outcomes on mother & child

Ongoing Studies

Kaiser – Portland, Oregon
RCT of 200 women with BMI 30 or higher
Intensive diet and exercise counseling to keep weight stable during pregnancy
(target = ZERO weight gain)
Will follow maternal and infant outcomes to 1 year postpartum
Link:
xnet.kp.org/newscenter/pressreleases/nat/2009/102109healthymoms.html
Exercise and Weight Gain in Pregnancy

Epidemiologic studies are conflicting as to the association between exercise and weight gain during pregnancy.

In 2 studies among obese women moderate aerobic exercise reduced weight gain compared to non-exercising controls.

Many ongoing studies of exercise in pregnancy.

ACOG Committee Opinion

“The Centers for Disease Control and Prevention and American College of Sports Medicine recommendation for exercise…suggests that an accumulation of 30 minutes or more of moderate exercise a day should occur on most, if not all, days of the week. In the absence of either medical or obstetric complications, pregnant women also can adopt this recommendation.”
Behaviors associated with successful weight maintenance

• Self-monitoring of weight - home scale
• Self-monitoring of exercise - pedometer
• Regular exercise
• Consuming foods with low energy-density before rest of meal (soup or salad)

Dietary factors associated with excessive pregnancy weight gain

- Consumption of sweets
- Higher calorie intake
- Consumption of energy-dense foods (calories per gram)
- Lower intake of water and vegetables
Postpartum?

- Women feel abandoned after delivery
- Ongoing research using online, social-media and telephone-based interventions
- Women too busy to come in for care
- Contraception/pregnancy spacing
- Must view postpartum period as *pre-conception*

Breastfeeding and Obesity

- Epidemiologic and cohort studies show *inconsistent* relationship between BF and reduced obesity risk in children
- Methodologic limitations of studies
- Inconsistent relationship between maternal weight and breastfeeding, but *metabolic and other health benefits are clear* (e.g. reduces visceral fat, diabetes risk)
- Breastfeeding is not a magic bullet for obesity prevention
Summary of Recommendations

- Preconception measures
- PRENATAL COUNSELING
- Eliminate unjustified bed-rest
- Support for postpartum health
- Encourage self-monitoring of weight
- Use of technology
- Encourage breastfeeding

Links

- UCSF MAMAs study: mamasstudy.com/index.html
- UCSF Center for Obesity Assessment, Study, & Treatment (COAST): chc.ucsf.edu/coast/
- UCSF Video Doctor: chips.ucsf.edu/%28new%29research-prenatal-fit.htm