Behavioral and Psychosocial Influences on Weight Control: Application to Pregnancy

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Approximately 65% overweight and obese women exceed current IOM weight gain guidelines (Olson & Strawderman, 2003; Schieve et al., 1998)
Overview

• Effective weight control strategies in non-pregnant populations
  – Randomized controlled trials
  – Observational studies

• Application to preventing excessive gestational weight gain

• Future directions
Promoting weight loss vs. Reducing weight gain

More Similarities than Differences

- Epidemiologic research suggests similar predictors of weight gain vs. weight regain (Klesges et al., 1992; Lissner et al., 1991; Pereira et al., 2005; Lewis et al., 2003)

- Effective weight gain prevention programs target the same variables as effective weight loss programs (Simkin-Silverman et al., 2003)

- Weight modification involves targeting same components of Energy Balance: DIET & EXERCISE
Is Changing Quality of Diet Enough?
Women’s Health Initiative

Howard et al; *JAMA*. 2006;295:39-49.
Low Fat vs. Low Calorie
Female sample

6 Months

Low Fat Diet  Low calorie, low fat diet

weight loss, kg

0 1 2 3 4 5 6 7 8 9

p < .0008

Schlundt et al, IJO, 1992
## Setting Caloric, Dietary, and Weight Loss Goals

<table>
<thead>
<tr>
<th>Weight</th>
<th>Calories</th>
<th>Fat %</th>
<th>Weight loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight &lt; 200 lbs</td>
<td>1000 - 1200</td>
<td>20 - 30%</td>
<td>&gt; 7-10%</td>
</tr>
<tr>
<td>Weight &gt; 200 lbs</td>
<td>1500 - 1800</td>
<td>20 - 30%</td>
<td>&gt; 7-10%</td>
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</table>
Meal Replacements Enhance Initial and Long-term Weight Loss

*1200–1500 kcal/d diet prescription.
CF=conventional foods.
MR-2=replacements for 2 meals, 2 snacks daily.
MR-1=replacements for 1 meal, 1 snack daily.

Physical Activity Usually Does Not Increase Short-Term Diet-Induced Weight Loss

Wadden 1997
Ross 1996
Marks 1995
Ross 1995
Blonk 1994
Sweeney 1993
Bertram 1990

Each study ranged from 4 to 6 months.

*P<0.05 vs diet-only group.
Considerable Physical Activity is Necessary for Weight Loss Maintenance

Physical Activity Strategies

• Physical Activity Recommendation for weight control
  – 60 minutes/day (IOM, 2002)
  – 10,000 steps/day (Tudor-Lock & Bassett, 2004)

• Strategies to promote physical activity
  – Short-Bouts (Jakicic et al., 1995)
  – Home-Based (Jakicic et al., 1999; Leermarkers et al., 1998)
  – Pedometers (Bravata et al., 2007)
Daily Self-Weighing Promotes Weight Control

24 Month Weighing Frequency
Linde, Annals Behav Med, 2005
Randomized Controlled Trials Demonstrating Other Key Strategies

- **Goal-setting** (Cullen et al., 2001)
- **Behavior monitoring** (Boutelle & Kirschenbaum, 1998)
- **Continued contact** (Perri et al., 1993)
What Doesn’t Work?

• **Education alone** (e.g., Cameron et al., 1990)

• **“Non diet” approaches** (e.g., Bacon et al, 2002; Katzer et al., 2008)
  – Body acceptance
  – Eating behavior
  – Activity
  – Nutrition
  – Social support
Evaluation of a “Non Diet” Intervention for Weight Control

p = .0001

Weight in kg

BL 12 weeks 24 weeks 52 weeks

Non-diet

Diet

Bacon et al., IJO; 2002
OBSERVATIONAL STUDY
The National Weight Control Registry

Characteristics (N = 5585)
- 76.8% female, 23.2% male
- 85% college educated; 95.0% Caucasian
- 64.5% married; Age = 46.4 ± 12.4 y

Weight Loss
- 33.2 ±17.7 kg
- Maintained ≥13.6 kg loss for 5.2 y
1. Low calorie-low fat diet (Klem et al, 1998)
2. High level of physical activity (Klem et al, 1998; Phelan et al, 2006)
3. Limit TV viewing (Raynor et al, 2006)
4. Frequent self-weighing (Butryn et al, 2007)
5. Maintain dieting consistency (Gorin et al, 2004)
7. Eat breakfast (Wyatt et al., 2002)
8. Limit fast food (Phelan et al., 2006)
9. Low Dietary Disinhibition (Klem et al., 1998)
10. High Cognitive Restraint (Klem et al., 1998)
Cognitive Restraint

• Conscious control over food intake
  – Consciously holding back at meals
  – Paying attention to weight and diet
  – Conscious effort to control weight

• Related to
  – Greater weight loss (Bjorvell et al., 1986)
  – Less weight Regain (Westerterp-Plantenga et al., 2004)
  – Less weight gain (French et al., 2000)
Variables Associated with Successful Weight Control in Non-Pregnant Populations

<table>
<thead>
<tr>
<th>Effective</th>
<th>Modestly Effective</th>
<th>Not Effective</th>
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<tbody>
<tr>
<td>• Continued Contact</td>
<td>• Low calorie diet goals</td>
<td>• Fat intake or specific foods</td>
</tr>
<tr>
<td>• Meal replacements</td>
<td>• High physical activity + Diet</td>
<td>• Breakfast</td>
</tr>
<tr>
<td>• Daily self-weighing/monitoring</td>
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<td>• TV-viewing</td>
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<tr>
<td>• Dietary restraint</td>
<td></td>
<td>• Physical activity alone</td>
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<td></td>
<td></td>
<td>• <strong>Social support</strong> <em>(Verheijden et al., 2005)</em></td>
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<td></td>
<td></td>
<td>• <strong>Body image, body acceptance</strong></td>
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<td>• <strong>Education alone</strong></td>
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Cognitive Behavioral “Tools” Effective Across Multiple Populations

- Minority & low-income populations (Wing et al., 1996; Yanovski et al., 1994; Kumanyika et al., 1991)

- Binge eaters (Gladis et al., 1998)

- Patients with elevated depressive symptoms (Gladis et al., 1998; Linde et al., 2004)
Application of Cognitive-Behavioral Weight Control Strategies to Pregnancy

- 1 randomized controlled trial
  - Polley et al., 2002

- 4 non-randomized comparisons
  - Kinnunen et al., 2007
  - Olson et al., 2004
  - Gray-Donald et al., 2000
  - Artal et al., 2007
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<th>Components of Pregnancy Weight Gain Interventions</th>
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Results of Pregnancy Intervention Studies

- Polley et al., 2002: Yes in NW; No effect in OW
- Kinnunen et al., 2007: No effect in NW or OW
- Gray-Donald et al., 2000: No effect in NW or OW
- Olson et al., 2004: Effect in low income OW & NW
- Artal et al., 2007: Unclear
Application to Pregnancy: Observational Studies

• Greater calories/food intake related to more excessive gain (Olafsdottir et al., 2006; Lagiou et al, 2004; Olson et al, 2003; Ohlin & Rossner, 1994)

• Continued exercise related to less excessive gain (Sternfeld et al, 1995; Sampselle et al, 1999; Olson et al, 2003)
Application to Pregnancy: Observational Studies

- Restraint declines in OW women during pregnancy (Clark & Ogden, 1999)

- “Weight fluctuation” (as opposed to “restraint”) related to exceeding IOM (Conway et al, 1999; Fairburn et al, 1992)

- Mixed findings in relation to exceeding IOM
  - Social support (Olson et al, 2003; Hickey et al., 1995; Stevens-Simon et al., 1993)
  - Body image (Dipietro et al., 2003; Copper et al; 1995)
Conclusions & Future Directions

• “Diluted” programs have modest to no effects in preventing excessive weight gain in overweight women

• Need to research effects of stronger treatment components
Conclusions & Future Directions

Need to test stronger treatment components

• Diet: Not just fat restriction but calorie goals
  – What should they be?
  – Do meal replacements work?

• Physical activity: High frequency exercise
  – Effects of more frequent, structured exercise
  – Effects of using pedometers, home-based, short-bouts

• Behaviors: Daily monitoring
  – Daily vs. less frequent self-weighing during pregnancy