THE ROLE OF RESPONSIVE PARENTING IN PEDIATRIC OBESITY PREVENTION

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1 of 3 children in the United States are overweight or obese before age 5
1 of every 7 low-income preschool aged children in the US is obese¹

¹Pan, et al., JAMA, 2012; 2012;308:2563-2565
Conceptual framework: Childhood obesity risk factors from conception through age 2 years*

Environment: Maternal tobacco use, medication use
Community: Child care attendance, health care
Parent/Family/Caregiver: Maternal feeding style

Conception/early life: Birth weight, weight gain
Infant Behaviors: Bottle use, sleep, solid food introduction
Later-life: Weight change

Metabolism & Physiology: Gestational age
Epigenetics: DNA methylation
Genetics (Human & Microbiotic): Genotype

The first 1000 days (conception to age 2): target for obesity prevention

- Rapid change in diet, metabolic, and behavioral systems are *opportunities*
- Early onset obesity comorbidities are more serious
- Infants and toddlers don’t tend to “grow out of it”
- Obesity interventions later in life* have limited success
- Dietary patterns are established early in life
- Experimental studies suggest promising strategies for early obesity prevention (T1 and T2)

*Summerbell et al Cochrane review, 2005; Harris et al, 2009; Haynos & O’Donohue, 2012
Responsive parenting

• Defined as a mother’s/caregiver’s prompt, contingent, & appropriate interaction with child

Why target responsive parenting?

- Language development
- Attachment
- Emotional growth
- Social competence
- School readiness
- Weight status
- Self regulation

Responsive Feeding

Parent is:
1. Aware of cues
2. Accurate interpretation
3. Prompt, developmentally appropriate response

Feeding practices can have negative impacts on regulation and impact.

Why are you hiding in the closet?

You said you didn’t want me eating any more of those cookies.
Responsive feeding

• Greater parental awareness of infant hunger and satiety associated with lower neophobia¹
• Pressure and restriction associated with higher neophobia²
• Pressuring associated with decreased satiety responsiveness²
• Responsive feeding may reduce risk of overweight³

¹Cassells et al. 2014 Appetite
²Li et al. 2014 Pediatrics
³DiSantis et al. 2011 Int J Obes
Discordant Feeding Responsiveness $\rightarrow$ Overweight

Self-regulation

Self-regulation refers to the ability to inhibit dominant responses and control one’s behaviors

- Children with lower self-regulatory abilities consume more snack foods (Riggs, et al., 2010)

- Lower self-regulation linked to excessive weight gain during childhood (Francis & Susman, 2009)

(Riggs, et al., Nutr Educ & Behav, 2010; Francis & Susman, JAMA, 2009)
What factors may impact responsive parenting/feeding?
Infant fussing and soothing

- Use of food to soothe associated with greater child weight
- Relationship stronger with high temperamental negativity

Stifter et al. 2011 Appetite
Antecedents and consequences of restriction

Costanzo and Woody's (1985) model of parental control and obesity proneness
Structure-based parenting may influence child eating behavior

Control
Psychological Control:
• Pressure
• Intrusiveness
• Dominance

Structure
Behavioral Control:
• Routines
• Guidance
• Limit setting

Control in Feeding
• Restricts all access
• Hiding foods
• Parent perspective
• Takes food away

Structure in Feeding
• Provides access
• Rules & routines
• Child perspective
• Parent provides, child decides

Overconsumption?
Consumption in moderation?

Poorer self-regulatory abilities
Greater self-regulatory abilities

Grolnick & Pomerantz, Child Devel Pers, 2009; Rollins, Savage, Birch, IJO, 2015
Primary Aim: To test the efficacy of an intervention designed to prevent rapid weight gain in infancy and overweight at 3 y by providing guidance on responsive feeding and healthy dietary choices.

Study protocol: Paul et al. 2014 BMC Pediatrics

Funding: NIDDK R01DK088244
The Intervention Nurses Start Infants Growing on Healthy Trajectories (INSIGHT) RCT

We hypothesize that the use of food to control infant fussing, crying, and wakefulness can lead to overconsumption of calories and weight gain.
Sample Characteristics

• Demographic characteristics assessed at birth

• Singleton, term newborns $\geq 37$ weeks gestation

• Birth weight $\geq 2500$ grams

• Primiparous mothers $\geq 20$ years old

• English speaking

• No major maternal/infant morbidities

• 251 (of 279) mothers completed the 1 year visit (90%)
INSIGHT Design

- Randomized, controlled trial with birth cohort

Birth to 1 year
Main responsive parenting intervention themes:
- Recognition and appropriate response to infant hunger and fullness cues
- Alternatives to feeding in order to soothe infant
- Promoting adequate sleep, self-soothing, “settling”
- Developmentally appropriate introduction of solid foods and portion sizes
## Intervention curriculum*

<table>
<thead>
<tr>
<th>Feed</th>
<th>Fuss</th>
<th>Sleep</th>
<th>Active social play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby belly size</td>
<td>Happiest Baby On the Block DVD</td>
<td>Nap &amp; Bedtime routines</td>
<td>Tummy time</td>
</tr>
<tr>
<td>Bottle/nipple size</td>
<td>Alternatives to using food to soothe</td>
<td>Bedtime between 7 and 8 o’clock</td>
<td>Turn the TV off &amp; play with baby</td>
</tr>
<tr>
<td>Hunger and fullness</td>
<td>Baby temperament</td>
<td>To bed drowsy but awake</td>
<td>Use of restrictive devices</td>
</tr>
<tr>
<td>Feeding solid &amp; beverages</td>
<td></td>
<td>Sleep location</td>
<td>Imitation</td>
</tr>
<tr>
<td>Repeated exposure</td>
<td></td>
<td>Night waking</td>
<td>Age appropriate activities and games</td>
</tr>
</tbody>
</table>

* These are examples of topics and not exhaustive
# Responsive feeding curriculum

<table>
<thead>
<tr>
<th>Theme</th>
<th>3 weeks</th>
<th>16 weeks</th>
<th>28 weeks</th>
<th>40 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What to feed</strong></td>
<td>Do not add cereal to bottle</td>
<td>Beverages to avoid/limit (fruit juice, sugar-sweetened beverages)</td>
<td>Finger foods to avoid (salty snacks, cookies, French fries, etc)</td>
<td>Fruits and vegetables at every meal</td>
</tr>
<tr>
<td><strong>When to feed</strong></td>
<td>Hunger &amp; fullness cues</td>
<td>When to introduce solid foods (4-6 mos)</td>
<td>When to introduce a cup</td>
<td>When to wean from bottle (by 1 year)</td>
</tr>
<tr>
<td><strong>How to feed</strong></td>
<td>Do not pressure to finish bottle</td>
<td>Repeated exposure to encourage acceptance of new foods</td>
<td>Establishing mealtime routines and limit setting</td>
<td>Do not use food as a reward or to control behavior</td>
</tr>
</tbody>
</table>
Main sleep curriculum messages *

1. Consistent bedtime routine
2. Bedtime between 7 and 8 o’clock
3. To bed drowsy but awake
4. Appropriate responses to night wakings
5. Strategies to promote self-soothing during late infancy
6. Developmentally appropriate expectations for sleep
7. Individualized sleep profile

* Based on the IOM Recommendations
INSIGHT: Infants in parenting intervention have less rapid weight gain from birth to 28 weeks*

*CWG Mean = 0;  CWG score >0 = faster weight gain,  CWG score <0 = slower weight gain;

Faster weight gain:
37% parenting
51% safety.

Savage et al. presented at PAS meeting, 2015; In Preparation, 2015
Lower weight-for-length percentile at 1y in parenting intervention group

5.5% in parenting infants

12.7% of control infants were overweight

Overweight = weight/length ≥95th percentile

*Kolmogorov Smirnov Two-Sample Test p<0.01; Savage et al. presented at PAS meeting, 2015; In Preparation, 2015
Total nighttime sleep duration by study group
Parenting infants slept longer at night compared to control babies.
Lessons learned from INSIGHT

• Out of 24 behavioral interventions at 2y or younger, only 4 have had significant effects on weight\(^1\)
  • SLIMTIME\(^2\)
  • Healthy Beginnings\(^3\)
  • Verbestal et al. 2013
  • NOURISH
  • and now INSIGHT

• Commonalities of SLIMTIME, Healthy Beginnings, INSIGHT:
  • Home intervention delivery by nurses targeting first time mothers
  • Multi-component interventions that start early (first weeks of life)
  • **Focus on responsive parenting**

\(^1\)Redsell et al. 2015 Mat Child Nutr; \(^2\)Paul et al. 2011 Obesity; \(^3\)Wen et al. 2012 BMJ
Next step: translation to practice

- What intervention components work in different populations
- Integrating intervention into existing community entities
Good health starts outside the doctor’s office, in places where we live, learn, work, and play.

Cross-sector work engages sectors traditionally responsible for health promotion—such as health care providers and public health agencies—and nontraditional partners—such as city planners, members of the media, and business leaders—to work together to improve health.

IOM’s Roundtable on Obesity Solutions
Center for Childhood Obesity Research

QUESTIONS?