Strategies to Prevent Overfeeding in Infancy: The WIC Baby Behavior Study

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Introduction: WIC

- Despite extensive nutrition education provided to WIC participants, many do not comply with infant feeding guidelines
  - 44% of WIC participants BF exclusively for 1 mo
  - 15% BF exclusively for 4 mo
  - WIC participants are more than 4x more likely than non-participants to start solids before 4 mo
- These behaviors are associated with increased risk for childhood obesity


Research Focus

- What are low-income mothers’ barriers to compliance with infant feeding guidelines?
- What can be done to overcome those barriers and prevent overfeeding of young infants?
Results from UC Davis Studies

- Focus groups (2003-2008)
  - 87 English-speaking, 67 Spanish-speaking low-income mothers
- 4 WIC agencies
  - Community Resource Project WIC Sacramento, Solano County, Yolo County, Butte County
- Sessions recorded and transcribed (supplemented with field notes)
- Transcriptions reviewed and independently coded by 3 researchers
  - Coding differences resolved by consensus


Results – Focus Groups (2003)

“Breast is best.”

- Health messages regarding breastfeeding were loud and clear
  - “Helps them protect against viruses better, breastfeeding. It’s also very important for development of the brain and eyes.”
  - “My mom breastfed my brothers and so that was something I wanted to do with my son because, you know, that special bond, and I feel there’s a bond and it’s healthier.”


Results – Focus Groups (2003)

- Mothers believe babies cry because of hunger (and that formula and cereal prevent hunger)
  - "When I gave formula, the baby no longer cried and slept, and that is when I decided not to give him breast milk.”

Results – Focus Groups (2003)

- They believe babies wake because of hunger
  - “The baby sleeps better with formula.”
  - “From the time she was maybe 3 or 4 months old, I started putting a little cereal in her bottle, and it was like at night. It would help her; she would be full and sleep through the night.”


Results – Focus Groups (2003)

- They think their babies will stay full longer if they are overfed
  - “My baby used to wake up, but now I am giving him formula if he is already full and he no longer wakes up.”


Results – Focus Groups (2003)

- Moms were pressured by others to feed:
  - “His dad went and bought the formula and he still would wake up. Oh my God, I’m not going to get no sleep. His grandma, she went and bought the rice cereal and started mixing it up, and he’d eat it and he’d burp a little and then he started sleeping more and more because he was full. But before that he was not full, he was always hungry and crying. His dad would say, ‘Are you feeding him?’”

Infant Behavior and Feeding Practices: The Connection

- Participants knew what was best but felt compelled by their infants’ behavior to ignore feeding guidelines.
- Infant behavior resulted in “multiple mode feeding”:
  - Supplementation of breastfeeding with formula (or breastfeeding cessation)
  - Increased use of formula (exceeding guidelines)
  - Addition of cereal
  - Addition of other foods and fluids
- Inappropriate feeding and overfeeding became necessary to cope with stress
  - Original goals were reinterpreted.

Intervention Challenges

- Intervention must address unrealistic parental/societal expectations about “normal” infant behavior:
  - Intervention should promote positive interactions between caregivers and infants.
- Intervention must assist overburdened staff to better understand baby behavior and be prepared to answer caregiver questions:
  - Complex messages must be reduced into more accessible “units” that can be delivered quickly.

Infant Behavior Research

- Infant behavior has been explored and documented for more than 30 years:
  - Brazelton, 1973
- Teaching parents about infant behavior is nothing new (Leitch, Nur Res, 1999):
  - Interventions have been shown to improve mother-infant attachment and promote infant development
  - Infant-feeding outcomes have not been investigated.
Fit WIC Baby Behavior Study

Study Design

- Funded by USDA WIC Special Projects Grant (2006-2009)
- 3-year quasi-randomized controlled trial (8 sites)
  - Year 1: Material development, staff training, and baseline data collection
  - Year 2: Intervention period
  - Year 3: Post-intervention data collection, write-up, and dissemination
- Concept: Create a clinic environment supporting positive caregiver-infant interactions

Normal Infant Behavior

- Baby behavior information is another "tool" to help parents with feeding decisions
- Does not replace current breastfeeding or nutrition support
- Our handouts and trainings are simplified versions of infant behavioral theory
  - akin to the "5-a-day" approach to nutrition education
Staff Trainings

- Topics covered in each of 4 intervention trainings
  1. Project background, infant states, cues, sleep cycles, caregiver coping behavior, and data collection
  2. Review, 3-step assessment intervention
  3. Review and practice using participant materials
  4. Class design, implementation, and practice
- Topics covered in control training – data collection and measuring growth in young children

Social Marketing Materials

- Posters, activities, displays used to inform parents that WIC is a place to learn about infant behavior
- No mention of infant feeding in these materials
  - Parents do not perceive they are overfeeding

Handouts
Integration of Messages into Classes
- Prenatal Classes
  - Sleep information
  - Introduction to cues
- Postnatal Classes
  - Details about infant cues
  - Review of infant sleep
  - Breastfeeding support
  - Messages about need for infant activity

All Sites Combined: Food Package Selection (0-6 mo)
- Increase in Excl BF Food Package
  - Intervention = 6.3% (43% higher than baseline level)
  - Control = 2.3% (16.5% higher than baseline level)
- Decreased formula use
  - 3.4% reduction in exclusive formula feeding food package
  - 7% reduction in distribution of cans of formula while caseload increased 3.6%
  - Values in control sites remained flat

Exclusive BF Food Package by Age
Postpartum Participant Survey

**BF with No Formula at 1 mo**

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<th>Language</th>
<th>Intervention</th>
<th>Control</th>
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<tr>
<td>English</td>
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<tr>
<td>Spanish</td>
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*p<0.05* Excluding those with self-reported initial medical or latch problems

Postpartum Participant Survey

**Aota MEC for Adults**

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<th>Year</th>
<th>Intervention</th>
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*p<0.05*

Postpartum Participant Survey

**Likes going to WIC classes**

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*p<0.05*
Infants >95th percentile wt/age

- Attained weight for age > 95th percentile 5-7 mo

According to WHO growth standards *P<.01

N=339  N=411

Secrets of Baby Behavior: Training Example

Infant Sleep Patterns

Your Turn

How many times do parents think that babies wake up…
- At 2 mo? _______
- At 4 mo? _______
- At 6 mo? _______
What Parents Said

- What parents really think about their babies waking at night:
  - At 2 mo: 0-20 times per night
  - At 4 mo: 0-6 times per night
  - At 6 mo: 0-6 times per night

Average Night Waking

- Average waking at night is:
  - 2-3 times by 2 mo
  - 2 times by 4 mo
  - 1 time at 6 mo

- Too much waking is stressful and should be investigated (before infants are switched from breastfeeding to formula)
- Babies may wake too often when sick, uncomfortable, or because of a change in routine
- Limited waking is healthy and important for babies

Infant Sleep States

- Active sleep (REM) is considered to be important for brain development
  - Babies dream and blood flows to the brain bringing nutrients to active brain cells
  - Images stimulate brain function

- Quiet sleep is deep sleep
  - No dreaming
  - Little or no movement
  - Important for the brain to rest

- Infants "cycle" through active sleep, quiet sleep, and waking. Parents can see these sleep states by looking at their babies.
Infant Sleep Cycles

- Infant sleep cycles are 60 minutes long (adult cycles are 90 minutes long)
- Infants sleep 13-14 hours per day from 2-12 months – but not all at once!
  - Initially, newborns may wake with each cycle (every 1-2 hours)

Peirano et al. J Pediatr 2003; 143: 70-9

Newborn Sleep/Wake Cycle

2-Month-Old Infant Sleep/Wake Cycle
**4+ Month-Old Infant Sleep/Wake Cycle**

![Baby sleeping]

- QS: Quiet Sleep
- AS: Active Sleep
- Wake

**Infant Sleep Patterns**

- As infants get older, they can link cycles together:
  - < 2 mo (links 2 cycles: 2 hrs)
  - 3 - 4 mo (links 4 cycles: 4 hrs)
  - ≥ 6 mo (links several cycles: 6-8 hrs)

- So, infants will sleep longer and will not be as easy to wake as they get older


**Healthy Sleep for You and Your Baby**

- **Key Messages**
  - Active versus quiet sleep
  - Why active sleep is good for babies
  - How sleep patterns change
  - Tips for sleepy parents

*Healthy Sleep: For You and Your Baby*

- Waking up with babies can be hard. For me parents, knowing what to expect will help you feel more informed and confident.
Understanding Baby Cues

Key Messages
- “I want to be near you” cues
- “I need a break” cues
- Ideas for caregivers to respond to cues

Playing with Your Baby

Key Messages
- Physical activity is important for babies
- Babies need to develop strength and coordination in large muscles and small muscles
- Safety

Why Do Babies Cry?

Key messages
- Tips about preventing crying as well as dealing with crying babies
- Includes information about excessive crying and soothing techniques but we don’t want to overemphasize soothing
Lessons Learned

- Simple “5-a-day” approach to infant behavior was accepted by staff and participants
- Intervention challenged preexisting beliefs about participants and infant care – time is needed to gain acceptance and comfort with messages
  - Training must be broken down into several short sessions separated by 2-4 weeks

Materials on FitWIC website

- All of the WIC Baby Behavior materials (handouts, posters, etc) will be posted on the Fit WIC website, upon approval by USDA Food and Nutrition Service
- Class outlines and training materials will also be shared, upon approval by USDA FNS

http://www.nal.usda.gov/wicworks/Sharing_Center/statedev_FIT.html
Secrets of Baby Behavior

- Higher reading level, dense text
- More information may be obtained from our website http://lactation.ucdavis.edu
- Read our blog at: www.secretsbabybehavior.com
- We're on Facebook too!

Summary

- Baby Behavior education resulted in increased breastfeeding, increased compliance with infant feeding guidelines, and reduced numbers of infants classified at risk for unhealthy weight at WIC
- Staff and participants were enthusiastic about the information and classes but staff needed time to gain confidence in counseling and teaching messages
- Baby Behavior education may be synergistic with other efforts to reduce health disparities