

Secrets of Baby Behavior: How Babies Communicate and Its Importance on Infant Feeding

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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
 - 5% BF exclusively for 6 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

Jackowitz et al. Pediatrics 2007; 119: 281-289.

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

Heinig et al. J Hum Lact. 2006;22:27-38. Heinig et al. J Hum Lact 2009; 25: 163-172.

Infant Feeding Intentions/Practices

- Majority planned to breastfeed (though most planned to mix feed)
- Many changed plans after the baby was born (gave formula in first mo)
 - Clinical issues were reported but not in great numbers
- Most reported giving solids at 4 mo on pre-session survey, but earlier intro was mentioned frequently
 - Cereal not always considered a solid food
 - Few gave juice or sugary drinks

Heinig et al. J Hum Lact. 2006;22:27-38.

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.”*

Heinig et al. J Hum Lact. 2006;22:27-38.

UCD Focus Groups (2003)

- Some mothers reported latch difficulty, pain, other clinical challenges
- Many mothers reported that their infants were not satisfied when they followed guidelines
 - We asked how could they tell?
 - Many of the mothers told us about their baby's behavior



Heinig et al. J Hum Lact. 2006; 22: 27-38.

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.”



Heinig et al. J Hum Lact. 2006; 22: 27-38.

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.”*



Heinig et al. J Hum Lact. 2006; 22: 27-38.

Results – Focus Groups (2003)

- They think their babies will stay full longer if they are overfed
 - *“He was not full, and I gave him other things. My baby used to wake up, but now I am giving him formula if he is already full and he no longer wakes up.”*



Heinig et al. J Hum Lact. 2006; 22: 27-38.

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?'”*

Heinig et al. J Hum Lact. 2006; 22: 27-38.

Results – Focus Groups (2003)

- Mothers understand what is best, but many believe that their circumstances *force* them to make other choices
 - Full, quiet, sleeping child is norm
- Mothers believe that health care providers/ support staff do not understand what they are experiencing
 - *“They don't see what you're going through. They are not there to see that you can't do it and you keep trying. It's like, 'You try it.'”*

Heinig et al. J Hum Lact. 2006; 22: 27-38.

Coping Skills

- Problem Management
 - Changing the situation
 - Focus if the problem is perceived to be solvable
- Emotional Regulation
 - Changing the feelings about the situation
 - Focus if the problem is perceived not to be solvable

Glanz J Occup Med 1992; 34: 1071-8.

Positive and Negative Coping Skills

- Problem Management
 - Active problem management
 - Planning solutions
 - Implementing solutions
 - Seeking information
- Emotional Regulation
 - Positive regulation
 - Social support
 - Relaxation techniques
 - Acceptance/humor
 - Spiritual evaluation
 - Negative regulation
 - Disengagement / Distraction
 - Denial
 - Emotional disassociation
 - Anger

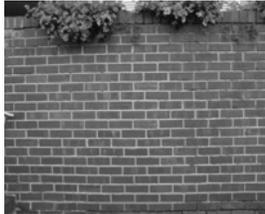
Glanz J Occup Med 1992; 34: 1071-8.

Coping with Stress

- Moms in our studies knew what was best but felt compelled to ignore feeding guidelines
- Infant behavior resulted in "multiple mode feeding"
 - Supplementation of breastfeeding with formula (or stopped breastfeeding)
 - Add more and more formula
 - Add cereal
 - Add other foods
- Inappropriate feeding and overfeeding becomes necessary to cope with stress

WIC Participants: Coping with Stress

- We can't ask participants to run through walls
- We have to provide tools so that what we're asking them to do sounds doable!
- Every "should" must include the "how"



What can we do?

- We can help parents
 - To tell the difference between hunger and other cues
 - To know why babies wake up
 - To gain confidence in their abilities to know what their babies need



Infant Behavior Research

- Infant behavior has been explored and documented for more than 30 years
 - Brazelton, 1973
 - Barnard 1978, 1987, 1993
- 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

Challenges in Developing an Intervention

- Dealing with unrealistic parental/societal expectations about “normal” infant behavior
 - Interventions must address issues that are important to parents (e.g. full=quiet sleeping infants)
- Assisting overburdened WIC staff to better understand baby behavior and be prepared to answer caregiver questions
 - Reducing complex messages into more accessible “units”
 - Ensuring that interventions do not require excessive amounts of time

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
 - Social marketing materials, staff training, handouts, classes, activities, incentives

Site Selection



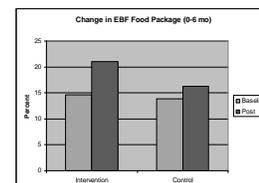
- 15 sites applied – all willing to be randomized
 - Sites with outside funding for BF were ineligible
 - 12 matched on size, geography, infant feeding
 - 8 pairs chosen randomly – first site of each pair was assigned to intervention group
- 4 Northern California sites
 - 2 near Sacramento
 - 2 in Oakland
- 4 Southern California sites
 - 2 in LA/Orange County
 - 2 in San Diego

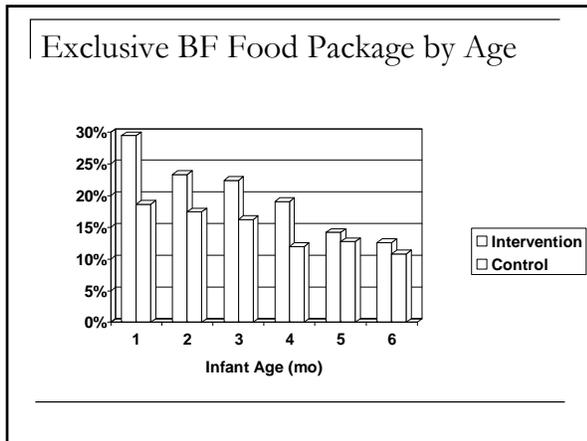
Population Characteristics

- More than 80% of intervention group was Latino vs just over 70% in the control group
 - Significantly more of the respondents in the intervention group completed the survey in Spanish
 - About half of the prenatal and postnatal samples were born outside of the US
- About 1/3 of the respondents:
 - Had completed less than a high school education
 - Were employed outside the home
- Average age of respondents was 27 and half had 2 children in the home

All Sites Combined: Food Package Selection

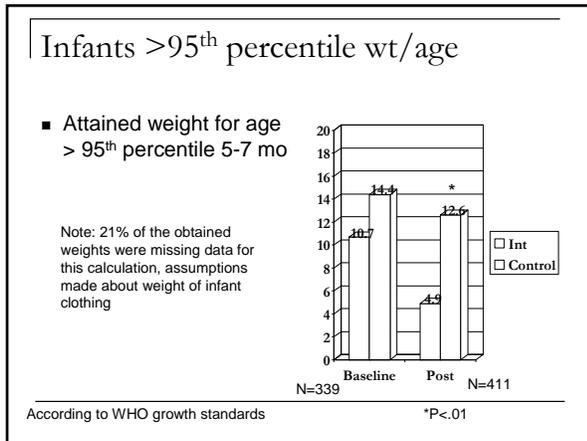
- Increase in Excl BF Food Package
 - Intervention = 6.3% (43% higher than baseline)
 - Control = 2.3% (16.5% higher than baseline)
- Decreased formula use
 - 3.4% reduction in exclusive formula feeding food package
 - 7% reduction in distribution of cans of formula while caseload increased 3.6%





Infant Weights

- Weights of 5-7 month-old infants obtained in clinics using scales provided
 - Challenging to obtain (n=427 at baseline, n=517 at end of study, however missing data made many unusable)
- Used reported birth weights to determine infant gain
- Made assumptions about weight of infant clothing

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



Secrets of Baby Behavior: Training Highlights

Infant States, Cues, Crying, and Sleep Patterns



Crying

- Tears
- Jerking motions
- Color changes
- Tight muscles
- Rapid breathing
- Generally don't respond



Basis: Primary means of expressing any distress

Irritable (Active Alert)

- Lots of body and facial movement
- Irregular breathing
- Eyes open but may not want to interact
- Sometimes fussy
- Sensitive to what's going on inside and around them
- Common before feeding



Basis: Distracted or distressed by bodily functions, mild fatigue, excessive stimulation

Quiet Alert

- Little body movement
- Eyes open and wide
- Steady, regular breathing
- Highly responsive
- Wants to learn and play - interactive
- For young babies, requires active effort to control! Tiring.



Basis: Innate desire to learn, communicate, find comfort

Drowsy

- Variable movement
- Irregular breathing
- Opens and closes eyes
- Eyes glazed
- Takes time to react
- Easily startled



Basis: Fatigue, satiation, overstimulation

Active Sleep

- Moves a little every now and then
- Irregular breathing
- Facial twitches
- Rapid Eye Movements (REM)
- Easy to wake



Basis: Need for neural activity to promote brain growth

Quiet Sleep

- No body movement
- Rhythmic breathing
- Bursts of sucking
- Startles but does not wake
- Does not respond
- Hard to wake



Basis: Need for complete recovery and rest

Infant Communication

- Healthy infants will try to give cues to "tell" others what they need
- By responding to cues, caregivers help infants change states as needed and assist them to improve their ability to provide clear cues
 - Better response = better cues
 - Infants learn to communicate



Adapted from: NCAST Keys to Caregiving

Types of Infant Cues

- Young infants try to tell caregivers when they want to interact (**engagement cues**)
- Young infants try to tell caregivers when they need to “take a break” or do something different (**disengagement cues**)



Kelly et al. Promoting First Relationships, NCAST Pub 2003

Engagement Cues “I want to be near you”



- **Obvious**
 - Looking intently at faces
 - Rooting
 - Feeding sounds
 - Smiling
 - Smooth body movements
- **Subtle**
 - Eyes open
 - Face relaxed
 - Feeding posture
 - Raising head
 - Following voices and faces

Kelly et al. Promoting First Relationships, NCAST Pub 2003

Disengagement Cues “I need something to be different”



- **Obvious**
 - Turns away
 - Pushes, arches away
 - Crying
 - Choking, coughing
 - Extending fingers, stiff hand
 - Falling asleep
- **Subtle**
 - Looks away
 - Faster breathing
 - Yawning
 - Hand to ear
 - Grimace
 - Glazed look

Kelly et al. Promoting First Relationships, NCAST Pub 2003

Clustered Cues: Hunger

- Clenched fingers and fists over chest and tummy
- Flexed arms and legs
- Mouthing
- Rooting
- Fast breathing
- Sucking noises/motions



Kelly et al. Promoting First Relationships, NCAST Pub 2003

Clustered Cues: Full

- Arms and legs extended
- Fingers extended and relaxed
- Pushing away
- Falling asleep
- Slow or decreased sucking
- Back arching



Kelly et al. Promoting First Relationships, NCAST Pub 2003

Helping Parents Respond to Cues

- **Engagement cues**
 - Interact and play with baby
 - Best time to learn, play, feed
 - Keep in mind that engagement is hard work!
- **Disengagement cues**
 - Consider all causes (babies can't be specific)
 - Change the environment (diapers included)
 - Fix the problem, provide comfort
 - Stop interactions (siblings too)
 - Let the baby have a break

Kelly et al. Promoting First Relationships, NCAST Pub 2003

Talking to Parents About Their Babies

- Our approach – honor the baby and honor the relationship
 - “What a wonderful baby!” or “I love your baby’s outfit” or “Look at her..how sweet” etc.
 - “Aren’t babies amazing, they try to tell us what they want with their bodies and their noises....”
 - “Isn’t it amazing how babies tell us what they want? Every baby is different but it looks like your baby wants you to....”

Sleep Patterns in Infancy



Average Night Waking

- Parents tend to report a wide range of night waking
- Average waking at night is:
 - 2-3 times by 2 mo
 - 2 times by 4 mo
 - 1 time at 6 mo
- Babies wake when sick, uncomfortable, or because of a change in routine
- Too much waking is stressful and should be investigated

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

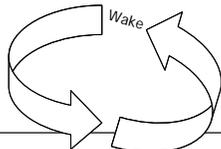
Infant Sleep States

- 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 or movement, important for the brain to rest
- Infants “cycle” through active sleep, quiet sleep, and waking

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

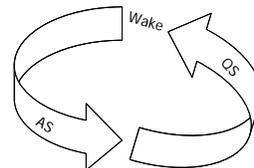
Infant Sleep Cycles

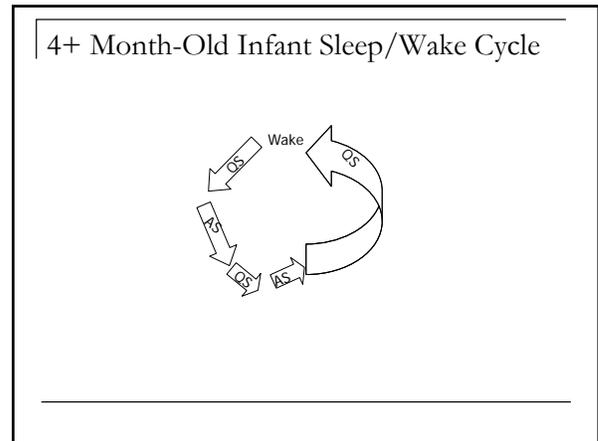
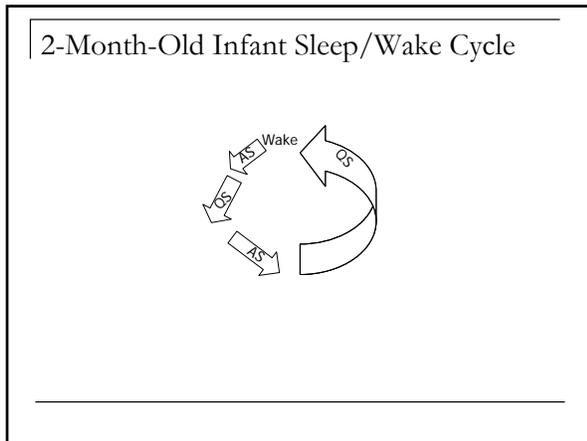
- Infant sleep cycles are 60 minutes long (adult cycles are 90 minutes long)
- Infants sleep 13-14 hours per day from 2-12 months
- Initially, newborns may wake with each cycle (every 1-2 hours)



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

Newborn Sleep/Wake Cycle





Infant Sleep Patterns

- As they mature, infants can link cycles together (won't require caregiver with every cycle)
 - ≤ 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

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

Why Active Sleep and Night Waking are Good

- Waking and active sleep are important for brain development
- Waking may be essential to survival—needs must be met for breathing, feeding, warmth
- Breastfeeding mothers' hormonal cycles are interrupted by night feeds
- Therefore, active sleep and waking at night are beneficial for mother and baby

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

Infant Feeding and Sleep

- Breastfed infants do wake more than formula-fed infants
 - Breastfed infants have more active sleep (more likely to wake up)
 - Babies digest breast milk more quickly than formula – this is best for their development and growth
- Formula-feeding moms can promote active sleep by putting babies “back to sleep” or using pacifiers

Horne et al. Ped Resp Rev 2004; 5: 190-8.

The Bottom Line on Infant Sleep

- Newborns fall asleep dreaming and are easy to wake for about 30 minutes
 - Being easy to wake is important
- As infants get older their sleep patterns change
 - Less time dreaming
 - More time sleeping
- Most will wake at least once through 12 months
- More sleep during the day means more waking at night



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

“Normal” Crying

- Crying makes adults want to help (important for survival)
- ALL infants cry (crying is used to communicate needs)
 - Babies cry more in the first 6 wks than at any other age (up to 2.5 hrs per day)
 - Crying decreases over the next 10 weeks (most babies cry much less by 4 mo of age)



Hiscock H. The Crying Baby. Australian Family Physician 2006; 35: 680-4.

Why Do Babies Cry?

- Discomfort
- Distress
- Hunger
- Fatigue
- Overstimulation
- Frustration
- Pain
- Distracted
- Fear



Is There a “Hungry Cry”?

- Babies cry whenever they are uncomfortable or unhappy
- How can caregivers tell when a crying baby is hungry?
- Hungry babies *might* cry but they will ALSO bring their hands to their face, clench their hands, flex their arms and legs, root, make sucking motions and noises
- All these behaviors together help us know when a baby is hungry

Helping Parents Deal with Crying

- Infant crying is stressful to everyone
- Parents can be taught to watch for cues to minimize crying and to recognize all the reasons why infants cry
- Parents can be taught soothing techniques though soothing should not be overemphasized
 - Soothing techniques should be tools given to parents as part of an overall strategy to promote positive interactions

Materials on FitWIC website



- All of the WIC Baby Behavior materials 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

Questions?

